

# Yuanzhe Liang

yuanzhe.liang@oregonstate.edu

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Professor Yuanzhe Liang is the principal investigator of the *innovation* in Membrane Technology for Circular Economy (*i-MemTec*) Lab at Oregon State University. The *i-MemTec* lab aims to pioneer advanced membrane technology for a circular economy of nutrients, energy, and water (“NEW”) resources. Ongoing research efforts include (1) engineering functional membrane materials and unraveling transport mechanisms, (2) developing separation processes for water purification, emerging contamination treatment, and resource recovery, (3) fostering circularity in membrane materials.

## EDUCATION

**Vanderbilt University**, Nashville, TN, United States

Ph.D. Interdisciplinary Materials Science and Environmental Engineering, 2020

**Case Western Reserve University**, Cleveland, OH, United States

M.S. Macromolecular Science and Engineering, 2016

**Beijing University of Chemical Technology**, Beijing, China

B.S. Polymer Science and Engineering, 2015

## ACADEMIC APPOINTMENTS

**2023.12-present** Assistant Professor, School of Chemical, Biological, and Environmental Engineering, Oregon State University, Corvallis, OR, United States

**2022-2023** Postdoctoral Scholar, Renewable Resources and Enabling Sciences Center, National Renewable Energy Laboratory, Golden, CO, United States

**2021-2022** Postdoctoral Scholar, Department of Civil and Environmental Engineering, Leland Stanford Junior University, Stanford, CA, United States

**2019 summer** Visiting Scholar, Suzhou Institute of Nano-Tech and Nano-Bionics, Suzhou, Jiangsu, China

**2017-2020** Research Assistant, Department of Civil and Environmental Engineering, Vanderbilt University, Nashville, TN, United States

## PUBLICATIONS IN BOOKS AND ARCHIVAL JOURNALS

(\* denotes the corresponding author)

- J17 DesVeaux J., Uekert T., Curley J., Choi H., **Liang Y.**, Singh A., Mante O., Beckham G., Jacobsen A., Knauer K. Economic and environmental impacts of strategies to chemically recycle mixed polyester waste. *Under Review*, **2024**.
- J16 Lee M., **Liang Y.**, Cuthbertson A., Mohamed S., Puente-Urbina A., Michener W., Miscall J., Lincoln C., Lahive C., Fastow E., Winey K., Choi H., Knott B., Banakis N., Allen R., Beckham G., Knauer K. Extraction, purification, and reuse of dyes from mixed polyester textile waste. *In preparation*, **2024**.
- J15 Curley J., **Liang Y.**, DesVeaux J., Uekert T., Choi H., Clarke R., Michener W., Maurya A., Stanley L., Wu Y., Baer A., Tassone C., Jacobsen A., Mante O., Beckham G., Knauer K. Closed-loop recycling of mixed polyesters via catalytic methanolysis and monomer reclamation. *In preparation*, **2024**.

### *Published*

- J14 Knauer K., Higginson C., **Liang Y.**, Lee M. Circular plastics technologies: depolymerization of polymers into parent monomers. *Physical Sciences Reviews*. **2023** Aug 24(0).
- J13 **Liang Y.**, Dudchenko A., Mauter M. A data-driven design protocol for high-precision determination of transport properties of reverse osmosis membranes. *Journal of Membrane Science*. **2023** Aug 5;679:121686.
- J12 **Liang Y.\***, Knauer K. Trends and future outlooks in circularity of desalination membrane materials. *Frontiers in Membrane Science and Technology*. **2023** Apr 6;2:1169158.
- J11 Qin J., Ziemann E., Bar-Zeev B., Bone S., **Liang Y.**, Mauter M., Herzberg M., Bernstein R. Zwitterionic polymer brush pore-filling microfiltration membrane for high virus removal. *ACS Applied Materials & Interfaces*. **2023** Apr 3;15(14):18343-53.

- J10 **Liang Y.**, Dudchenko A., Mauter M. Inadequacy of current approaches for characterizing membrane transport properties at high salinities. *Journal of Membrane Science*. **2022** Dec 2:121246
- J9 **Liang Y.**, Teng X., Zhu Y., Jin J., Lin S. Hydrophilic/lipophilic nonionic surfactant-mediated formation of polyamide nanofiltration membrane via interfacial polymerization. *Environmental Science & Technology Engineering*. **2021** Jan 8;1(3):533-42.
- J8 **Liang Y.**, Lin S. Tailoring active layer structure of Layer-by-Layer polyelectrolyte multilayer with surfactant assemblies for fabricating high-performance nanofiltration membranes. *Environmental Science & Technology*. **2020** Dec 8.
- J7 **Liang Y.**, Gao F., Wang L., Lin S. In-situ monitoring of polyelectrolytes adsorption kinetics by electrochemical impedance spectroscopy: application in fabricating nanofiltration membranes via layer-by-layer deposition. *Journal of Membrane Science*. **2020** Oct 2:118747
- J6 Teng, X., Fang, W., **Liang, Y.** Lin S., Lin H., Liu S., Kong J., Wang Z., Yuan S., Zhu Y., Jin J. High-performance polyamide nanofiltration membrane with arch-bridge structure on a highly hydrated cellulose nanofiber support. *Sci. China Mater.* 63, 2570–2581 (**2020**)
- J5 **Liang Y.**, Zhu Y., Liu C., Lee KR., Hung WS., Wang Z., Li Y., Elimelech M., Jin J., Lin S. Polyamide nanofiltration membrane with highly uniform sub-nanometre pores for sub-1 Å precision separation. *Nature Communications*. **2020** Apr 24;11(1):1-9.
- J4 **Liang Y.**, Lin S. Intercalation of zwitterionic surfactants dramatically enhances the performance of low-pressure nanofiltration membrane. *Journal of Membrane Science*. **2020** Feb 15;596:117726.
- J3 Wang L., **Liang Y.**, Zhang L. Enhancing performance of capacitive deionization with polyelectrolyte-infiltrated electrodes: theory and experimental validation. *Environmental Science & Technology*. **2020** Mar 27.
- J2 Shan L., **Liang Y.**, Prozorovska L., Jennings GK., Ji S., Lin S. Multifold enhancement of loose nanofiltration membrane performance by intercalation of surfactant assemblies. *Environmental Science & Technology Letters*. **2018** Sep 28;5(11):668-74.
- J1 Xue J., He M., **Liang Y.**, Crawford A., Coates P., Chen D., Shi R., Zhang L. Fabrication and evaluation of electrospun PCL–gelatin micro-/nanofiber membranes for anti-infective GTR implants. *Journal of Materials Chemistry B*. **2014**;2(39):6867-77

## OTHER WRITING

### Book Chapters

- B1 Knauer K., Higginson C., Lee M., **Liang Y.** Depolymerization and Unzipping of Polymers into Parent Monomers. *Circular Plastics Technologies: Chemical Recycling*. In preparation.

## INTELLECTUAL PROPERTY AND PATENTS

- P5 **Liang, Y.** and Knauer K., Inventors. Alliance for Sustainable Energy, LLC, c/o National Renewable Energy Laboratory, assignee. Downstream separation of mixed dicarboxylic acids from oxidation of hdpe via liquid-liquid extraction. USA patent application USPTO No. 63/685,126. 2024 August.
- P4 DesVeaux J., **Liang Y.**, Choi H., Mante O., Beckham G., Jacobsen A., Knauer K. Alliance for Sustainable Energy, LLC, c/o National Renewable Energy Laboratory, assignee. Downstream process for separating a mixture of depolymerized polyester products produced from methanolysis. USA patent application PCT/US24/37401. 2024 July.
- P3 Lee M., **Liang Y.**, Cuthbertson A., Mohamed S., Puente-Urbina A., Michener W., Miscall J., Lincoln C., Lahive C., Fastow E., Winey K., Choi H., Knott B., Banakis N., Allen R., Beckham G., Knauer K., inventors. Alliance for Sustainable Energy, LLC, c/o National Renewable Energy Laboratory, assignee. Solvolysis and oxidation of mixed plastic streams. USA patent application USPTO No. 63/642,959. 2023 July.
- P2 Knauer KM, Allen RD, Lee M, Beckham GT, Lahive CW, Cuthbertson AA, Choi H, **Liang Y**, Banakis NA, Sullivan KP, inventors. Alliance for Sustainable Energy, LLC, c/o National Renewable Energy Laboratory, assignee. Methods and systems for dye removal from polymer textiles. USA WO 2024/108081 A1. 2023 November.
- P1 Lahive C., Lee M., Cuthbertson A, Choi H., **Liang Y.**, Beckham G., Knauer K., inventors. Alliance for Sustainable Energy, LLC, c/o National Renewable Energy Laboratory, assignee. Process for sequential acetolysis-autoxidation of plastic streams. USA patent application USPTO No: 63/383,293. 2023.

## SELECTED HONORS AND AWARDS

Graduate Student Best Publication Award, Vanderbilt University	2021
Best Poster Award, NanoDay, Vanderbilt University	2020
PPG Scholarship, Beijing University of Chemical Technology	2015

## STUDENT ADVISING

### *Ph.D. Dissertation Chairs (Primary Advisees)*

- 2 Maoshui Zhuo, Environmental Engineering, Oregon State University, 2024.04 – Present
- 1 Yuxing Cui, Environmental Engineering, Oregon State University, 2024.01 – Present

### *Rotational Doctoral and Master Students (Primary Advisees)*

- 2 Vy Ngoc Nhat Pham, Ph.D. Student, Environmental Engineering, Oregon State University
  - Duration: 2024.09 – 2024.12
- 1 Diego Felipe García Corredor, Master Student, Environmental Engineering, Oregon State University
  - Duration: 2024.09 – 2024.11

### *Other Doctoral Students (with whom I serve as an Advisory Committee member)*

- 3 Sohail Farooq, Environmental Engineering, Oregon State University
  - Primary Advisor: Xue Jin
- 2 Amanda Eness, Environmental Engineering, Oregon State University
  - Primary Advisor: Tala Navab-Daneshmand
- 1 Sohail Farooq, Environmental Engineering, Oregon State University
  - Primary Advisor: Xue Jin

### *Undergraduate Advisee (Primary Advisees)*

- 6 Grace Okoye, Honors College student. Industrial Engineering, Oregon State University
  - Duration: 2024.08 – Present
- 5 Brendan Shroyer, Mechanical Engineering, Oregon State University
  - Duration: 2024.04 – Present
- 4 Natasha Fink, Chemical Engineering, Oregon State University
  - Duration: 2024.04 – 2024.06
- 3 Varun Ramachandran, Chemical Engineering, Oregon State University
  - Duration: 2024.04 – Present
- 2 Jacob Lester, Chemical Engineering, Oregon State University
  - Duration: 2024.01 – Present
  - Clean Water Initiatives Summer Internship
- 1 Sydnee Byres, Chemical Engineering, Oregon State University
  - Duration: 2024.02 – Present
  - Johnson Summer Internship

## INVITED SEMINAR, LECTURE, AND WORKSHOP PRESENTATIONS

- I10 *CAPEES Career Planning and Development Sharing Session. Invited panelist at CAPEES Student Chapter Workshop*, Online Event, 2024
- 19 *Engineering next-generation membrane materials towards a circular economy of “NEW” resources. Invited seminar at Oregon State University*, OR, 2023
- 18 *Engineering next-generation membrane materials towards a circular economy of “NEW” resources. Invited seminar at University of California Merced*, CA, 2023
- 17 *How can surfactant enhance the performance of nanofiltration membrane? Invited seminar at University of Akron*, OH, 2023
- 16 *Polyamide nanofiltration membranes from emulsion-mediated interfacial polymerization. Invited seminar at 13th World Filtration Congress*, CA, 2022
- 15 *How can surfactant enhance the performance of nanofiltration membrane? Invited seminar at Lawrence Berkeley National Laboratory*, CA, 2022
- 14 *How can surfactant enhance the performance of nanofiltration membrane? Invited seminar at National Renewable Energy Laboratory*, CO, 2022

- I3 *How can surfactant enhance the performance of nanofiltration membrane?* **Invited seminar at Argonne National Laboratory, IL, 2022**
- I2 *Polyamide nanofiltration membrane with highly uniform sub-nanometre pores for sub-1 Å precision separation.* **Invited seminar at 2020 NanoDay, Vanderbilt University, 2020**
- I1 *How can surfactant enhance the performance of nanofiltration membrane?* **Invited seminar at Stanford University, CA, 2020**

## GENERAL CONFERENCE PRESENTATIONS

### Oral Presentation

- O4 **Yuanzhe Liang**, Meagan Mauter. Inadequacy of current approaches for characterizing membrane transport properties at high salinities. North American Membrane Society annual conference, Tempe, AZ, 2022
- O3 **Yuanzhe Liang**, Shihong Lin. Mechanism of perm-selectivity enhancement in polyelectrolyte multilayer nanofiltration membranes via surfactant-assembly intercalation. American Chemical Society Meeting, online, 2021
- O2 **Yuanzhe Liang**, Shihong Lin. Polyamide nanofiltration membrane with highly uniform sub-nanometre pores for sub-1 Å precision separation. **Keynote presentation**, 12th International Congress on Membranes & Membrane Processes, U.K., 2020
- O1 **Yuanzhe Liang**, Shihong Lin. Polyamide nanofiltration membrane with highly uniform sub-nanometre pores for sub-1 Å precision separation. North American Membrane Society annual conference, Online, 2020

## PROFESSIONAL LEADERSHIP AND SERVICE

### Review Activity

Regularly peer review for *Nature Nanotechnology*, *Nature Communications*, *Environmental Science & Technology*, *Science of the Total Environment*, *Journal of Membrane Science*, *Desalination*, *ACS Macro Letters*, *Journal of Water Process Engineering*, *Frontiers in Membrane Science and Technology*, *Chemical Engineering Journal Advances*, *Chemistry Select*.

### Conference Organizing and Services

Conference Committee, 13th World Filtration Congress, San Diego, CA 2022

### Professional Societies

Association of Environmental Engineering & Science Professors (AEESP)  
 North American Membrane Society (NAMS)  
 American Filtration and Separations Society (AFS)  
 American Chemical Society (ACS)  
 Chinese-American Professors in Environmental Engineering and Science (CAPEES)

### University Service

Faculty Advisor, Black and Orange Day, Oregon State University 2024

## TEACHING

### Courses Taught at Oregon State University:

#### ENGR213 Strength of Materials

- Spring 2024
- Spring 2025

#### CBEE212 Energy Balance

- Winter 2024
- Winter 2025