

Yuanzhe Liang

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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. Downstream separation of mixed dicarboxylic acids from oxidation of hdpe via liquid-liquid extraction. USPTO No. 63/685,126.
- P4 DesVeaux J., **Liang Y.**, Curley J., Choi H., Mante O., Beckham G., Jacobsen A., Knauer K. Downstream process for separating a mixture of depolymerized polyester products produced from methanolysis. No. PCT/US24/37401.
- 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. Solvolysis and oxidation of mixed plastic streams. USPTO No. 63/642,959.
- P2 Lee M., Lahive C., Cuthbertson A., Choi H., **Liang Y.**, Beckham G., Knauer K. Methods and systems for dye removal from polymer textiles. USPTO No: 63/384,137.
- P1 Lahive C., Lee M., Cuthbertson A., Choi H., **Liang Y.**, Beckham G., Knauer K. Process for sequential acetolysis-oxidation of plastic streams. USPTO No: 63/383,293.

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

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

- 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)

- 5 Brendan Shroyer, Mechanical Engineering, Oregon State University
 - Duration: 2024.04 – 2024.06
- 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
- I9 **Engineering next-generation membrane materials towards a circular economy of “NEW” resources. Invited seminar at Oregon State University**, OR, 2023
- I8 **Engineering next-generation membrane materials towards a circular economy of “NEW” resources. Invited seminar at University of California Merced**, CA, 2023
- I7 **How can surfactant enhance the performance of nanofiltration membrane? Invited seminar at University of Akron**, OH, 2023
- I6 **Polyamide nanofiltration membranes from emulsion-mediated interfacial polymerization. Invited seminar at 13th World Filtration Congress**, CA, 2022
- I5 **How can surfactant enhance the performance of nanofiltration membrane? Invited seminar at Lawrence Berkeley National Laboratory**, CA, 2022
- I4 **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

CBEE212 Energy Balance

- Winter 2024