

YUEXIAO SHEN

111A Maddox Engineering Research Center
Department of Civil, Environmental and Construction Engineering
Texas Tech University, Lubbock, TX 79409
Phone: (806)834-7320; Email: yuexiao.shen@ttu.edu
Website: <https://shenlabttu.com/>

PROFESSIONAL APPOINTMENTS

Texas Tech University, Civil, Environmental and Construction Engineering

Assistant Professor

Sept. 2019-present

EDUCATION AND RESEARCH EXPERIENCE

University of California, Berkeley, Chemistry, Postdoc.

2017-2019

Optimization of artificial photosynthesis using light harvesting semiconductor materials and bacteria ([CUBES](#))

Symbiotic coculturing system performing both carbon and nitrogen fixations

Research supervisor: Dr. Peidong Yang

The Pennsylvania State University, Chemical Engineering, Postdoc.

2016-2017

Characterization of polymeric membrane materials using electron tomography

Research supervisor: Dr. Enrique Gomez and Dr. Manish Kumar

The Pennsylvania State University, Chemical Engineering, Ph.D.

2011-2016

Development of artificial water channel based-membranes for desalination and other environmental applications.

Aquaporin-based supported biomimetic desalination membranes

Research supervisor: Dr. Manish Kumar

Tsinghua University, Environmental Engineering, Master of Science

2009-2011

Physiochemical and biological properties of mixed liquor in full-scale membrane bioreactors

Research supervisor: Dr. Xia Huang

Tsinghua University, Water Supply and Sewer System Engineering, Bachelor of Science

2005- 2009

Fouling in a membrane bioreactor coupled with anaerobic-anoxic-oxic process for coke wastewater treatment.

Research supervisor: Dr. Xia Huang

FUNDED, CURRENT, & PENDING SUPPORT

- Enhancing bioremediation of groundwater co-contaminated by chlorinated volatile organic compounds and 1,4-dioxane using novel macrocyclic materials, PI, NIH, R01 ES032692-01, 01/01/2021-12/31/2025, \$1,351,855
- Develop Synergetic Novel Macrocyclic-based Sorbents with Thermal Destruction for Enhanced Per- and Polyfluoroalkyl Substances (PFAS) Removal in Groundwater and Drinking Water Treatment, PI, DoD SERDP, ER21-C1-1256, 08/19/2022-08/18/2025, \$1,150,758
- Strategic Management and Resource Recovery Transformation (SMAR2T): Recovery of Water and Elements of Interest from Produced Water Using Intensified Membrane Distillation and Metal Extraction, Co-PI, DoE, 01/01/2025-12/31/2027, \$1,499,993
- Developing a Regional Evaluation and Assessment of critical Minerals – Gulf Coast and Permian Basin (DREAM-GCPB), DoE, Co-PI, \$3,300,000
- Bio-Inspired and Biocatalytic Degradation of “Forever Chemicals”, investigator, \$393,638, subcontracted from Geosyntec Consultants leading NSF Convergence Accelerator’s 2025 Cohort Phase 2 Award \$4,981,076

- Developing fixed-bed column models for novel adsorbents to predict the removal of emerging micropollutants, EPA, PI, intend to award, \$1,538,969
- CAREER: Understanding Transport Mechanisms and Long-Term Performance of Nanofiltration Membranes for Lithium Extraction from Brine, NSF CAREER, pending, \$553,891
- Diversity Supplement (PA-21-071) of R01 ES032692-01, PI, NIH, 01/11/2022-10/31/2023, \$39,261
- Intensified Membrane Distillation Crystallization-Nanofiltration (iMDC-NF) for Direct Lithium Extraction by DOE, Geothermal Lithium Extraction Prize first phase winner. Co-PI, 12/01/2021-04/07/2022

AWARDS & HONORS

- One of the recipients of the 2025 40 Under 40 Recognition Program by the American Academy of Environmental Engineers and Scientists (AAEES). [\[link\]](#)
- Whitacre Engineering Research Award. Texas Tech, 2024
- One of the best reviewers of Frontiers of Environmental Science & Engineering in 2022
- Proposal assistance program, Texas Tech, 2022 Spring
- Geothermal Lithium Extraction Prize first phase winner, 2021
- Proposal assistance program, Texas Tech, 2020 Fall
- Faculty Travel Grants, Texas Tech, 2020.
- One of the 8 student and postdoc delegates selected nationwide for 7th Distinguished Young Scholars Seminar (DYSS) at the University of Washington, Seattle, 2017 [\[link\]](#)
- Chair of Gordon Research Seminar (GRS), Membranes: Materials & Processes, 2016-2018 [\[link\]](#)
- Poster Competition North American Membrane Society (NAMS), 2nd Prize, 2016
- Chinese Government Scholarship for Outstanding Self-financed Students Abroad, 2016 [\[link\]](#)
- Harold K. Schilling Dean's Graduate Scholarship, Penn State, 2016
- Best Paper Award, Department of Chemical Engineering, Penn State, 2015 [\[link\]](#)
- Poster Competition North American Membrane Society (NAMS), 1st Prize, 2015
- North American Membrane Society (NAMS) Student Fellowship Award, 2015
- AIChE Separations Division Graduate Student Research Award, 2014 [\[link\]](#)
- One of the 8 student delegates selected nationwide for the Council for Chemical Research Conference, 2014
- Teaching Fellow, Department of Chemical Engineering, Unit operations class, Penn State, 2014
- Leighton Reiss Graduate Fellowship, Penn State, 2013
- **Shen, Y.**, Saboe, P., Ferlez, B., Erbakan, M. & Escotet, M. Solar energy based biomimetic water desalination and purification. 28th Annual Graduate Exhibition at Penn State. 2nd Prize, 2013
- **Shen, Y.**, Saboe, P., Ferlez, B., Erbakan, M. & Escotet, M. Solar energy based biomimetic water desalination and purification. Dow Sustainability Innovation Challenge. 2nd Prize at Penn State, 2012 [\[link\]](#)
- Larson Aquatic Research Support Doctoral Scholarship, American Water Works Association, 2012
- The First-Class Scholarship of Tsinghua-Meishang International Scholarship, 2010
- Excellent undergraduate student, Tsinghua University, 2009
- Excellent undergraduate thesis, Tsinghua University, 2009
- Member of youngsters' scientific and technological innovation plan in Tsinghua University, 2008-2009
- National Scholarship, China, 2007 and 2008
- Gold Medal of Practical Investigation Contest in Tsinghua University with the project "Survey on the energy efficiency of buildings in Beijing", 2007
- The First-Class Scholarship of Tsinghua-POSCO Scholarship, 2006

PUBLICATIONS (After joining Texas Tech, **corresponding author***)

57. Li, D., Wang, K., Liu, W., Wang, X., Li, Y., Fei, W., Li, Z., **Shen, Y.***, & Huang, X. 3-Dimensional nanoscale structure of polyamide nanofiltration membranes revealed by electron tomography. *J. Membr. Sci.* **735**, 124531, (2025). [\(link\)](#)
56. Li, D., Liu, W., Wang, X., Lin, W., Zhai, J., Fan, H., Xiao, K., Wang, K., Li, Y., Jin, Y., Fang, J., **Shen, Y.***, Elimelech, M. & Huang, X. Nodular networks in hydrated polyamide desalination membranes enhance water transport. *Science Advances*. **11**, eadt3324 (2025). [\(link\)](#)

55. Li, D., Zhai, J., Wang, K., **Shen, Y.*** & Huang, X. 3-Dimensional Reconstruction-Characterizations of Polymeric Membranes: A Review. *Environ. Sci. Technol.* **59**, 2891–2916, (2025). ([link](#))
54. Zhai, J., Balogun, A., Bhattacharjee, S., Vogler, R. J., Khare, R., Malmali, M., Deonarine, A. & **Shen, Y.*** Nanofiltration as pretreatment for lithium recovery from salt lake brine. *Journal of Membrane Science* **710**, 123150, (2024). ([link](#))
53. Tesfamariam, E. G., Ssekimpi, D., Hoque, S. S., Chen, H., Howe, J. D., Zhou, C., **Shen, Y.** & Tang, Y. Isolation and characterization of pure cultures for metabolizing 1,4-dioxane in oligotrophic environments. *Water Science and Technology* **89**, 2440-2456, (2024). ([link](#))
52. Abaie, E., Kumar, M., Kumar, N., Sun, Y., Guelfo, J., **Shen, Y.*** & Reible, D. Application of β -Cyclodextrin Adsorbents in the Removal of Mixed Per- and Polyfluoroalkyl Substances. *Toxics* **12**, 264, (2024). ([link](#))
51. Abaie, E., Kumar, M., Garza-Rubalcava, U., Rao, B., Sun, Y., **Shen, Y.*** & Reible, D. Chlorinated volatile organic compounds (CVOCs) and 1,4-dioxane kinetics and equilibrium adsorption studies on selective macrocyclic adsorbents. *Environmental Advances* **16**, 100520, (2024). ([link](#))
50. Li, D., Lu, R., Wang, K., Li, Y., Lin, W., Wang, X.-m., **Shen, Y.*** & Huang, X. Neural Network-Assisted Data Processing Improved Tomography Characterizations of Reverse Osmosis Polyamide Layers. *ACS ES&T Engineering*, **4**, 128–138 (2024). ([link](#))
49. **Shen, Y.*** Beating natural proteins at filtering water. *Science* **376**, 698-699, (2022). ([link](#))
48. Kim, J., Cestellos-Blanco, S., **Shen, Y.**, Cai, R. & Yang, P. Enhancing Biohybrid CO₂ to Multicarbon Reduction via Adapted Whole-Cell Catalysts. *Nano Letters* **22**, 5503-5509, (2022). ([link](#))
47. Cestellos-Blanco, S., Chan, R. R., **Shen, Y.**, Kim, J. M., Tacken, T. A., Ledbetter, R., Yu, S., Seefeldt, L. C. & Yang, P. Photosynthetic biohybrid coculture for tandem and tunable CO₂ and N₂ fixation. *PNAS* **119**, e2122364119, (2022). ([link](#))
46. Li, D., Lin, W., Shao, R., **Shen, Y.**, Zhu, X. & Huang, X. Interaction between humic acid and silica in reverse osmosis membrane fouling process: A spectroscopic and molecular dynamics insight. *Water Research* **206**, 117773, (2021). ([link](#))
45. Abaie, E., Xu, L. & **Shen, Y.*** Bioinspired and biomimetic membranes for water purification and chemical separation: A review. *Frontiers of Environmental Science & Engineering* **15**, 124, (2021). ([link](#))
44. Su, Y., Cestellos-Blanco, S., Kim, J. M., **Shen, Y.**, *et al.* Close-packed nanowire-bacteria hybrids for efficient solar-driven CO₂ fixation. *Joule* **4**, 800-811, (2020). ([link](#))
43. Yu, J., Xiao, K., Xue W., **Shen, Y.**, *et al.* Excitation-emission matrix (EEM) fluorescence spectroscopy for characterization of organic matter in membrane bioreactors: Principles, methods and applications. *Front. Environ. Sci. Eng.* **14**, 31, (2020). ([link](#))
42. Cestellos-Blanco, S., Zhang, H., Kim, J. M., **Shen, Y.** & Yang, P. Photosynthetic semiconductor biohybrids for solar-driven biocatalysis. *Nat. Catal.* **3**, 245-255, (2020). ([link](#))
41. Tu, Y.-M., Song, W., Ren, T., **Shen, Y.**, *et al.* Rapid Fabrication of Precise, High-Throughput Filters from Membrane Protein Nanosheets. *Nat. Mater.* **19**, 347–354, (2020) ([link](#))
40. Song, W., Joshi, H., Chowdhury, R., Najem, J., **Shen, Y.**, *et al.* Artificial Water Channels Enable Fast and Selective Water Permeation Through Water-Wire Networks. *Nat. Nanotechnol.* **15**, 73-79, (2020). ([link](#))
39. Xiao, K., Han, B., Sun, J., Tan, J., Yu, J. Liang, S., **Shen, Y.*** & Huang, X. Stokes Shift and Specific Fluorescence as Potential Indicators of Organic Matter Hydrophobicity and Molecular Weight in Membrane Bioreactors. *Environ. Sci. Technol.* **53**, 8985-8993, (2019). ([link](#))
38. Shen, L., Jin, Zi., Xu, W., Jiang, X., **Shen, Y.**, Wang, Y. & Lu, Y. Enhanced Treatment of Anionic and Cationic Dyes in Wastewater through Live Bacteria Encapsulation Using Graphene Hydrogel. *Ind. Eng. Chem. Res.* **58**, 7817-7824, (2019). ([link](#))

PUBLICATIONS (Before joining Texas Tech)

37. Xiao, K. **Shen, Y.**, *et al.* Correlating fluorescence spectral properties with DOM molecular weight and size

- distribution in wastewater treatment systems. *Environmental Science: Water Research & Technology* **4**, 1933-1943, (2018). ([link](#))
36. Xiao, K., **Shen, Y.**, *et al.* Characteristic Regions of Fluorescence Excitation-Emission Matrix (EEM) to Identify Hydrophobic/Hydrophilic Contents of Organic Matter in Membrane Bioreactors. *Environ. Sci. Technol.* **52**, 11251-11258, (2018) ([link](#), **corresponding author**).
 35. Song, W., **Shen, Y.**, *et al.* Unique selectivity trends of highly permeable PAP[5] water channel membranes. *Faraday Discussions* **209**, 193-204, (2018). ([link](#))
 34. Song, W., Lang, C. **Shen, Y.** & Kumar, M. Design Considerations for Artificial Water Channel-Based Membranes. *Annu. Rev. Mater. Res.* **48**, 57-82, (2018). ([link](#))
 33. Schantz, A., Ren, T., Pachalla, A., **Shen, Y.**, *et al.* Porous Vesicles with Extrusion-Tunable Permeability and Pore Size from Mixed Solutions of PEO-PPO-PEO Triblock Copolymers. *Macromolecular Chemistry and Physics* **219**, 1700620, (2018). ([link](#))
 32. Lang, C., **Shen, Y.**, *et al.* Creating cross-linked lamellar block copolymer supporting layers for biomimetic membranes. *Faraday Discussions* **209**, 179-191, (2018). ([link](#))
 31. Culp, T., **Shen, Y.**, *et al.* Electron tomography reveals details of the internal microstructure of desalination membranes. *PNAS.* **115**, 8694-8699, (2018). ([link](#), **co-first author**)
 30. **Shen, Y.**, *et al.* Achieving high permeability and enhanced selectivity for Angstrom-scale separations using artificial water channel membranes. *Nat. Commun.* **9**, 2294, (2018). ([link](#))
 29. Ren, T. Erbakan, M., **Shen, Y.**, *et al.* Membrane Protein Insertion into and Compatibility with Biomimetic Membranes. *Advanced Biosystems* **1**, 1700053, (2017). ([link](#))
 28. Kumar, M., Culp, T. & **Shen, Y.** Water Desalination: History, Advances, and Challenges. *Frontiers of Engineering: Reports on Leading-Edge Engineering from the 2016 Symposium*, (2017). ([link](#))
 27. Kowalik, M., Schantz, A. Naqi, A., **Shen, Y.**, *et al.* Chemically specific coarse-grained models to investigate the structure of biomimetic membranes. *RSC Adv.* **7**, 54756-54771, (2017). ([link](#))
 26. Xiao, K., Sun, J., **Shen, Y.**, *et al.* Fluorescence properties of dissolved organic matter as a function of hydrophobicity and molecular weight: case studies from two membrane bioreactors and an oxidation ditch. *RSC Adv.* **6**, 24050-24059, (2016). ([link](#))
 25. Sun, Y., **Shen, Y.** *et al.* Multiple antibiotic resistance genes distribution in ten large-scale membrane bioreactors for municipal wastewater treatment. *Bioresour. Technol.* **222**, 100-106, (2016). ([link](#), **co-first author**)
 24. Mo, Y., Zhao, X. & **Shen, Y.** Cation-dependent structural instability of graphene oxide membranes and its effect on membrane separation performance. *Desalination* **399**, 40-46, (2016). ([link](#))
 23. Licsandru, E., Kocsis, I., **Shen, Y.**, *et al.* Salt excluding artificial water channels reveal enhanced dipolar water and proton translocation. *J. Am. Chem. Soc.* **138**, 5403-5409, (2016). ([link](#), **co-first author**)
 22. **Shen, Y.**, *et al.* Highly permeable artificial water channels that can self-assemble into two-dimensional arrays. *PNAS.* **112**, 9810-9815, (2015). ([link](#), [Penn State news](#) and other science websites)
 21. Sun, J. Xiao, K., Yan, X., Liang, P., Shen, Y., *et al.* Membrane bioreactor vs. oxidation ditch: full-scale long-term performance related with mixed liquor seasonal characteristics. *Process Biochemistry* **50**, 2224-2233, (2015). ([link](#))
 20. Grzelakowski, M., Cherenet, M. F., **Shen, Y.** & Kumar, M. A framework for accurate evaluation of the promise of aquaporin based biomimetic membranes. *J. Membr. Sci.* **479**, 223-231, (2015). ([link](#))
 19. Sun, Y., **Shen, Y.**, *et al.* Linkages between microbial functional potential and wastewater constituents in large-scale membrane bioreactors for municipal wastewater treatment. *Water Res.* **56**, 162-171 (2014). ([link](#), **co-first author**)
 18. Erbakan, M., **Shen, Y.**, *et al.* Molecular Cloning, Overexpression and Characterization of a Novel Water Channel Protein from *Rhodobacter sphaeroides*, *Plos One.* **9**, e86830 (2014). ([link](#))
 17. Xiao, K., **Shen, Y.**, *et al.* A systematic analysis of fouling evolution and irreversibility behaviors of MBR supernatant hydrophilic/hydrophobic fractions during microfiltration. *J. Membr. Sci.* **467**, 206-216 (2014). ([link](#))

16. Kaufman, Y., Grinberg, S., Linder, C., Heldman, E., Gilron, J., **Shen, Y.**, *et al.* Towards supported bolaamphiphile membranes for water filtration: Roles of lipid and substrate. *J. Membr. Sci.* **457**, 50-61, (2014). ([link](#))
15. **Shen, Y.**, *et al.* Biomimetic membranes: A review. *J. Membr. Sci.* **454**, 359-381 (2014). ([link](#), one of the most downloaded *J. Membr. Sci.* articles)
14. Sun, J., Xiao, K., Mo, Y., Liang, P., Shen, Y., *et al.* Seasonal characteristics of supernatant organics and its effect on membrane fouling in a full-scale membrane bioreactor. *J. Membr. Sci.* **453**, 168-174, (2014). ([link](#))
13. Xiao, K., **Shen, Y.** & Huang, X. An analytical model for membrane fouling evolution associated with gel layer growth during constant pressure stirred dead-end filtration. *J. Membr. Sci.* **427**, 139-149 (2013). ([link](#))
12. **Shen, Y.**, *et al.* Improvement on Modified Lowry Method against Interference by divalent cations for soluble protein measurement in wastewater systems. *Appl. Microbiol. Biotechnol.* **97**, 4167-4178 (2013). ([link](#))
11. Kumar, M., **Shen, Y.** & Saboe, P. Biological and biomimetic membranes. *Encyclopedia of Membrane Science and Technology*, 1-38, (2013). ([link](#))
10. **Shen, Y.**, Xiao, K., Liang, P., Sun, J., Sai, S. & Huang, X. Characterization of soluble microbial products in 10 large-scale membrane bioreactors for municipal wastewater treatment in China. *J. Membr. Sci.* **415–416**, 336-345 (2012). ([link](#))
9. Kumar, M., Habel, J., **Shen, Y.**, *et al.* High-Density Reconstitution of Functional Water Channels into Vesicular and Planar Block Copolymer Membranes. *J. Am. Chem. Soc.* **134**, 18631-18637, (2012) ([link](#))
8. Mo, Y., Xiao, K., **Shen, Y.** & Huang, X. A new perspective on the effect of complexation between calcium and alginate on fouling during nanofiltration. *Sep. Purif. Tech.* **82**, 121-127, (2011). ([link](#))
7. Zhao, W., **Shen, Y.**, *et al.* Fouling characteristics in a membrane bioreactor coupled with anaerobic–anoxic–oxic process for coke wastewater treatment. *Bioresour. Technol.* **101**, 3876-3883 (2010). ([link](#))
6. **Shen, Y.**, *et al.* A systematic insight into fouling propensity of soluble microbial products in membrane bioreactors based on hydrophobic interaction and size exclusion. *J. Membr. Sci.* **346**, 187-193 (2010). ([link](#))
5. **Shen, Y.**, *et al.* State of the Art of Membrane Bioreactors. *China Water & Wastewater* **26**, 22-27, (2010).
4. **Shen, Y.**, *et al.* State-of-the-Art of Membrane Fouling and Membrane Materials. *China Water & Wastewater* **26**, 16-22, (2010).
3. **Shen, Y.**, *et al.* State-of-Art of Microfiltration, Ultrafiltration, Nanofiltration and Reverse Osmosis Technologies. *China Water & Wastewater* **26**, 1-5, (2010).
2. Huang, X., Xiao, K. & **Shen, Y.** Recent advances in membrane bioreactor technology for wastewater treatment in China. *Front. Environ. Sci. Eng.* **4**, 245-271, (2010). ([link](#))
1. Zhao, W., Huang, X., Lee, D., Wang, X. & **Shen, Y.** Use of submerged anaerobic–anoxic–oxic membrane bioreactor to treat highly toxic coke wastewater with complete sludge retention. *J. Membr. Sci.* **330**, 57-64, (2009). ([link](#))

INVITED PRESENTATIONS

1. **Shen, Y.** Artificial water channels: Past, Current, and Future, Center for Enhanced Nanofluidic Transport, MIT, July 2023.
2. **Shen, Y.** Recent progress on using electron tomography to characterize the polyamide layers of reverse osmosis membranes, 3M company, March 2023.
3. **Shen, Y.** Energy efficient water purification – from biological channels to bioinspired artificial channels, 7th Distinguished Young Scholars Seminar (DYSS), the University of Washington, Seattle, August 2017 ([link](#))
4. **Shen, Y.** & Kumar, M. Artificial Water Channels—Bioinspired and Energy-Efficient Filtration Materials, MRS Spring Meeting, Phoenix, April 2017
5. **Shen, Y.** Artificial Water Channels—Bioinspired and Energy-Efficient Filtration Materials, Seminar at the Department of Civil, Environmental, and Construction Engineering, The Texas Tech University, March 2017
6. **Shen, Y.** Artificial Water Channels—Bioinspired and Energy-Efficient Filtration Materials, Seminar at the Department of Chemical, Biological and Materials Engineering, University of Oklahoma, February 2017

7. **Shen, Y.** & Kumar, M. Highly permeable artificial water channels in block copolymer membranes. Membranes: Materials & Processes, Gordon Research Conference, New London, August 2016 (One of the 11 student or postdoc delegates selected nationwide)
8. **Shen, Y.**, Licsandru, E., Barboiu, M. & Kumar, M. Functional reconstitution and characterization of artificial proton channels. 25th Annual North American Membrane Society Meeting, Boston, June 2015. (Awards session)
9. **Shen, Y.**, Erbakan, M., Decker, K., Aksimentiev, A., Hou, J. & Kumar, M. Artificial Water Channels—Can they reach the performance of biological channels? Membranes: Materials & Processes, Gordon Research Seminar, New London, July 2014.
10. **Shen, Y.**, Erbakan, M., Hou, J. & Kumar, M. Single Molecule Transport Characterization of a High Permeable Artificial Water Channel. Council for Chemical Research Annual Meeting, Alexandria, May 2014. (One of the 8 student delegates selected nationwide)

CONFERENCE PRESENTATIONS AND POSTERS

1. **Shen, Y.***, Li, D., Elimelech, M. & Huang, X. Nodular networks in hydrated polyamide desalination membranes enhance water transport. Annual North American Membrane Society Meeting, Nashville, May 2025. (talk and poster)
2. Patyal, A., Hana, G., Sun, Y., Zhou C., Guelfo J., Howe, J., Khatib, S., & **Shen, Y.*** Develop Synergetic Novel Macrocyclic-based Sorbents with Thermal Destruction for Enhanced PFAS Removal in Groundwater and Drinking Water Treatment, SERDP PFAS meeting, Long Beach, August 2024. (poster)
3. Zhai, J., Balogun, A., Bhattacharjee, S., Vogler, R. J., Khare, R., Malmali, M., Deonarine, A. & **Shen, Y.*** Nanofiltration as pretreatment for lithium recovery from salt lake brine., Annual North American Membrane Society Meeting, Fanta Fe, May 2024. (talk and poster)
4. Patyal, A., Hana, G., Sun, Y., Zhou C., Guelfo J., Howe, J., Khatib, S., & **Shen, Y.*** Develop Synergetic Novel Macrocyclic-based Sorbents with Thermal Destruction for Enhanced PFAS Removal in Groundwater and Drinking Water Treatment, SERDP PFAS meeting, Portland, August 2023. (poster)
5. Zhai, J., Bhattacharjee, S., Malmali, M., Deonarine, A., & **Shen, Y.*** Assessing the suitability of nanofiltration for pretreatment of lithium-enriched brines, Annual North American Membrane Society Meeting, Tuscaloosa, May 2023. (talk and poster)
6. Patyal, A., Hana, G., Sun, Y., Zhou C., Guelfo J., Howe, J., Khatib, S., & **Shen, Y.*** Develop Synergetic Novel Macrocyclic-based Sorbents with Thermal Destruction for Enhanced PFAS Removal in Groundwater and Drinking Water Treatment, SERDP/ESTCP and OE-I Symposium, Arlington, Dec. 2022. (poster)
7. Zhai, J., Bhattacharjee, S., Malmali, M., Deonarine, A., & **Shen, Y.*** Evaluating of polyamide nanofiltration membrane for lithium enrichment from salt lake brine, Annual North American Membrane Society Meeting, Tempe, May 2022. (talk and poster)
8. **Shen, Y.**, Ren, T. & Kumar, M. Highly permeable artificial water channels in block copolymer membranes. 2016 Annual AIChE conference, San Francisco, November 2016. (talk)
9. **Shen, Y.**, Ren, T. & Kumar, M. Highly permeable artificial water channels in block copolymer membranes. 26th Annual North American Membrane Society Meeting, Bellevue, May 2016. (talk and poster)
10. **Shen, Y.**, et al. Artificial Channels—Can they reach the performance of biological channels? 51st AEESP Anniversary Conference, New Haven, June 2015. (poster)
11. **Shen, Y.**, et al. Artificial Channels—Can they reach the performance of biological channels? 25th Annual North American Membrane Society Meeting, Boston, June 2015. (talk and poster)
12. **Shen, Y.**, Erbakan, M., Decker, K., Aksimentiev, A., Hou, J. & Kumar, M. Artificial Water Channels—Can they reach the performance of biological channels? 2014 Annual AIChE conference, Atlanta, November 2014. (talk)
13. **Shen, Y.**, Erbakan, M., Decker, K., Aksimentiev, A., Hou, J. & Kumar, M. Artificial Water Channels—Can they reach the performance of biological channels? Membranes: Materials & Processes, Gordon Research Conference and Seminar, New London, July 2014. (talk and poster)
14. **Shen, Y.**, Erbakan, M., Decker, K., Aksimentiev, A., Hou, J. & Kumar, M. Artificial Water Channels—Can they reach the performance of biological channels? 24th Annual North American Membrane Society Meeting, Houston,

July 2014. (talk and poster)

15. **Shen, Y.**, Sines, I., Licsandru, E., Barboiu, M. & Kumar, M. Functional reconstitution and characterization of artificial water channels for desalination. 246th ACS National Meeting & Exposition, Indianapolis, September 2013. (talk)
16. **Shen, Y.**, Licsandru, E., Barboiu, M. & Kumar, M. Functional reconstitution and characterization of artificial water channels for desalination. 50th AEESP Anniversary Conference, Golden, July 2013. (poster)
17. **Shen, Y.**, Licsandru, E., Barboiu, M. & Kumar, M. Functional reconstitution and characterization of artificial water channels for desalination. 23rd Annual North American Membrane Society Meeting, Boise, July 2013. (poster)
18. **Shen, Y.**, Edwards, A., Saboe, P., Erbakan, M. & Kumar, M. Supported lipid-aquaporin-crystal based biomimetic membranes for desalination. Membranes: Materials & Processes, Gordon Research Conference and Seminar, New London, August 2012. (poster)
19. **Shen, Y.**, Xiao, K., Liang, P., Sun, J., Sai, S. & Huang, X. Soluble microbial products in 10 large-scale membrane bioreactors for municipal wastewater treatment in China: Physiochemical properties and fouling propensity. 6th IWA Conference on Membranes for Water and Wastewater Treatment, Aachen, Germany, September 2011. (talk)
20. **Shen, Y.**, Ma, Y., Liang, P. & Huang, X. Improvement on Modified Lowry Methods against interference by divalent cations for soluble protein quantitation in wastewater systems. 3rd IWA Asia Pacific Young Water Professionals Conference, Singapore, November 2010. (talk)
21. **Shen, Y.**, Zhao, W. & Huang, X. Fouling characteristics in a membrane bioreactor coupled with anaerobic-anoxic process for coke wastewater treatment. 2nd Forum of Membrane Technology for University Graduates Jing-Jin-Tang District. Beijing, China, October 2009. (talk)
22. **Shen, Y.**, Zhao, W., Xiao, K. & Huang, X. A new insight into fouling propensity of soluble microbial products in membrane bioreactors based on hydrophobic interaction and size exclusion. 5th IWA Conference on Membranes for Water and Wastewater Treatment. Beijing, China, September 2009. (talk)

PATENTS

- Thin-film composite membrane and methods of making and using the same, U.S. Serial No. 62/739,912
- Method for biological or biomimetic channel-based membrane fabrications using layer-by-layer structure, U.S. Serial No. 16/414,330

TEACHING AND MENTORSHIP ACTIVITIES

1. Instructor of CE 3303, Fluid Mechanics, Spring and Fall, 2023,
2. Instructor of CE 3171, Environmental Engineering Lab, Fall 2022, Fall 2024, Spring 2025
3. Instructor of CE 5331, Advanced Work in Specific Fields: Advanced Membrane Separation Lab Course, Fall 2021
4. Instructor of ENVE 4107/5107, Advanced Physical and Chemical Wastewater Treatment Lab, Fall 2020
5. Instructor of ENVE 5303, Design of Air Pollution Control Systems, Spring 2020, 2021, 2022, 2024, 2025
6. Instructor of CE 3309, Introduction to Environmental Engineering, Fall 2019
7. Co-instructor of ChE 210 class, Introduction to Material Balances, Fall 2016
8. Graduate Online Teaching Certificate, Penn State, 2015
9. Volunteered to teach several chemical engineering courses during my graduate program. In the ChE 480 class, I was the co-lecturer and selected as the Teaching Fellow of the department. I was responsible for preparing course materials, project design, giving lectures and report grading.
 - ChE 449, Bioseparations, Spring 2013
 - ChE 480, Unit Operation of Chemical Engineering, Spring 2014
 - ChE 330, Fluid Mechanics, Fall 2015
10. Teaching assistant for two chemical engineering courses. I was responsible for onsite experiments demonstration, office hours and exam grading.
 - ChE 480, Unit Operation of Chemical Engineering, Fall 2013
 - ChE 330, Fluid Mechanics, Fall 2015
11. Mentor and Volunteer, Science U H2uOH! Water Camp at Penn State (2013 to present). At this camp, I was responsible for organizing the trip to wastewater treatment plant, demonstrating wastewater treatment experiments and helping middle school students to design hands-on experiments.

NON-FUNDED PROPOSALS

- Evaluation of nanofiltration as pretreatment of lithium extraction from brine, NSF CAREER, PI, 2024 declined
- REU site: Grand challenges in the southwest U.S.: water, sustainability, climate, Co-PI, NSF, 2024, declined
- Separation of metallic particulates from fluoropolymers using electrolysis and ionic liquid, DoD SERDP, PI, 2024, declined
- Plasmin-urease-functionalized magnetic Janus particles as thrombolysis microrobots, Co-PI, NSF, 2024, declined
- Integrating Cost-Effective and Energy-Efficient PFAS Capture and Thermal Destruction by 3D Printed Mesoporous Carbon Joule Heaters, Co-PI, DoD SERDP, 2024, declined
- Evaluate activated carbon and covalent organic framework-based novel sorbents for capture of off-gas byproducts during per- and polyfluoroalkyl substances thermal decomposition, PI, DoD SERDP, ER24-C3-4119, 2023, declined
- REU site: Grand challenges in the southwest U.S.: water, sustainability, climate, Co-PI, NSF, 2023, declined
- Understanding the catalytic selectivity and activity of unspecific peroxygenases through collaboration between simulation and experiment, Co-PI, NSF, 2023, declined
- Enhance in-situ destruction chemical oxidation of 1,4-dioxane and other emerging contaminants using advanced oxidation process and macrocyclic sorbents, Faculty Research & Support Funding for Diversity, TTU, 2022, declined
- Intensified Membrane Distillation Crystallization-Nanofiltration (iMDC-NF) for Direct Lithium Extraction by DOE, Geothermal Lithium Extraction Prize. Second phase. Co-PI, 2022, declined
- Extraction of Carbon Dioxide and Oxygen from Gaseous Mixtures at Low Temperatures and Low Pressures, Co-PI, NASA, 2022 declined
- Bioinspired protein-based materials to recycle rare earth elements from end-of-life technology and waste, PI, DOE Early Career, DE-FOA-0002421, 2021, declined
- Bioinspired materials to recycle rare earth elements from end-of-life technology and waste, Co-PI, pending, SERDP, WPSEED-22-S1, 2021, declined
- Planning Grant: Engineering Research Center for Resource Extraction & Water from Alternative, Recycled & Disposal Sources (REWARDS), Senior Personal, NSF 21-529, 2021, declined
- Carbon, rare earth and critical mineral assessment in lignite-based coal mines and related resources from Gulf Coast Basin, Texas, PI, DOE, DE-FOA-0002364, 2021, declined
- Bioinspired molecular engineering designed materials to separate rare earth and platinum group elements, PI, DOE, DE-FOA-0002483, 2021, declined
- Bioinspired protein-based materials to recycle rare earth elements from end-of-life technology and waste, Powe Junior Faculty Enhancement Awards, 2021, declined
- Turning waste into a resource: Recovery of water, minerals, and precious metals from produced water using hybrid membrane distillation-crystallization and extraction (MDC-E), Co-PI, pending, DOE DE-FOA-0002336, 2020, declined
- Bio-Electro-Chemical Approaches for Depolymerization and Upcycling of Plastics (BECADUP), Co-PI, pending, NSF EFRI E3P, 2020, declined
- Engineered Tobacco mosaic virus (TMV) protein-based membranes for molecular separations, PI, pending, the Welch foundation, 2020, declined
- Bioinspired cotton-based protein materials to recycle rare earth elements in end-of-life technology, The Langer Prize, 2020, declined
- Engineered Tobacco mosaic virus (TMV) protein-based membranes for molecular separations, Ralph E. Powe Junior Faculty Enhancement Awards, 2020, declined

PROPOSAL WRITING EXPERIENCE

1. Kumar, M. (PI). "Army ERDC: Channel based membranes for energy efficient desalination and water reuse." Total requested: \$300,000.00. (submitted: Feb 20, 2016, funded). Wrote the first few drafts and made all the figures. Was highly appreciated by reviewers for visual content.
2. Kumar, M. (PI), "CAREER: Bioinspired Artificial Channel Water Treatment Membranes," National Science Foundation. Total requested: \$500,000.00. (submitted: July 22, 2015, funded).
3. Kumar, M. (PI), "GOALI Collaborative Research: Nanoporous block copolymer films as support for two-dimensional crystal based biomimetic membranes," National Science Foundation. Total awarded: \$194,000.00. (submitted: 2014, funded: August 1, 2015 - July 31, 2018).
4. Kumar, M. (PI), Grant, "Collaborative development of membrane protein based water treatment membranes using PDMS-PMOXA block copolymer vesicles and crystals," Applied Biomimetic (previously AquaZ A/S), Cincinnati Ohio. Total awarded: \$150,727.00. (submitted: 2013, funded: December 1, 2013 - May 31, 2014).
5. Kumar, M. (PI), Contract, "Testing of new generation of RO pretreatment membranes," PPG Industries. Total requested: \$46,314.00. Total awarded: \$46,314.00. (submitted: April 22, 2012, funded: June 1, 2012 - October 31, 2012).

PROFESSIONAL MEMBERSHIPS, SERVICE AND ACTIVITIES

1. Communication Committee in Department of Civil, Environmental and Construction Engineering, Texas Tech
2. Faculty search committee of assistant professor of bio-based products manufacturing in Department of Plant and Soil Science, 2025
3. Co-chair of North American Membrane Society Annual Conference Poster session, 2019-2024
4. Co-chair of North American Membrane Society Annual Conference Bioinspired and Biomimetic Membranes, 2020-2023
5. Youth Editorial Board, Frontiers of Environmental Science & Engineering, 2021-present
6. Reviewer of DOE BES and SBIR
7. Visiting scholar at Department of Chemistry, Fudan University, March to April, 2015
8. AIChE member, 2013-present
9. North American Membrane Society member, 2013-present

JOURNAL REVIEW

- *AIChE Journal*
- *Appl. Microbiol. Biotechnol.*
- *Chem*
- *Chem. Commun.*
- *Chemical Engineering Journal*
- *Environ. Sci. Technol.*
- *Environ. Sci. Technol. Engineering*
- *Front. Environ. Sci. Eng.*
- *J. Am. Chem. Soc.*
- *J. Hazard. Mater.*
- *J. Membr. Sci.*
- *Membranes*
- *Nature Communications*
- *npj Clean Water*
- *PNAS*
- *Science*
- *Sci. Adv.*

- *Sci. Total Environ.*
- *Sep. Purif. Technol.*
- *Water Environ. Res.*
- *Water Res.*