

Allyson L. McGaughey

Assistant Professor

Gerald May Department of Civil, Construction, and Environmental Engineering
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Education

Ph.D., Environmental Engineering

University of Southern California

Advisor: Professor Amy E. Childress

Dissertation: *The Roles of Surface and Pore Properties in Wetting Resistance for Membrane Distillation Membranes*

January 2021
Los Angeles, CA, USA

M.S., Environmental Engineering

University of Southern California

May 2017
Los Angeles, CA, USA

B.S., Chemical Engineering with Minor in Music

University of Washington

August 2014
Seattle, WA, USA

Appointments

University of New Mexico

Assistant Professor

Gerald May Department of Civil, Construction, and Environmental Engineering

Albuquerque, NM, USA
January 2024 – present

Princeton University

Distinguished Postdoctoral Fellow

Andlinger Center for Energy and the Environment

Princeton, NJ, USA
June 2021 – November 2023

University of Southern California

Postdoctoral Scholar

Astani Department of Civil and Environmental Engineering

Los Angeles, CA, USA
February 2021 – May 2021

Graduate Research Assistant

Astani Department of Civil and Environmental Engineering

August 2015 – February 2021

Teaching Assistant

August 2015 – December 2020

Astani Department of Civil and Environmental Engineering

Courses: Energy and the Environment (ENE 505), Aquatic Chemistry (ENE 562), Climate Change and Atmospheric Aerosols (ENE 527), Civil & Environmental Engineering Research Colloquium (CE 599), Water Supply and Sewerage Design (CE 465), Water Quality Control (CE 453), Fundamentals of Environmental Engineering (ENE 200)

Publications

1. S. Srinivasan, **A.L. McGaughey**, Z.J. Ren, B. Zuo, R.D. Priestley. "Physical Aging of Poly(methyl methacrylate) Brushes and Spin-Coated Films." *The Journal of Physical Chemistry B*. (2024).
2. S. Lu, **A.L. McGaughey**, S. Im, Y. Liu, X. Wang, A. Leininger, D. Jassby, E.M.V. Hoek, Z.J. Ren. "Membrane electrolysis distillation for volatile fatty acids extraction from pH-neutral fermented wastewater." *Water Research* 265, 122306 (2024).
3. S.G. Joshi, **A.L. McGaughey**, A.E. Childress. "Onset, Rate, and Depth of Wetting Front Progression in Membrane Distillation." *Journal of Membrane Science* 718, 123253 (2024).
4. M. Yang, J.J. Zhu, **A.L. McGaughey**, R.D. Priestley, E.M.V. Hoek, D. Jassby, Z.J. Ren. "Machine Learning for Polymer Design to Enhance Pervaporation-Based Organic Recovery." *Environmental Science & Technology* 58 (23), 10128-10139 (2024).
5. K.S.S. Christie, **A.L. McGaughey**, S. McBride, X. Xu, R.D. Priestley, Z.J. Ren. "Membrane Distillation Crystallization for Sustainable Carbon Utilization and Storage." *Environmental Science & Technology* 57 (43), 16628-16640 (2023).
6. X. Xu, Y.L. Eatmon, K.S.S. Christie, **A.L. McGaughey**, N. Guillomaitre, S.S. Datta, Z.J. Ren, C.B. Arnold, R.D. Priestley. "Tough and recyclable phase-separated supramolecular gels via a dehydration-hydration cycle." *JACS Au* 3 (10), 2772-2779 (2023).
7. **A.L. McGaughey**, S. Srinivasan, T. Zhao, K.S.S. Christie, Z.J. Ren, R.D. Priestley. "Scalable zwitterionic polymer brushes for antifouling membranes via Cu⁰-mediated atom transfer radical polymerization." *ACS Applied Polymer Materials* 5 (7), 4921-4932 (2023).
8. M. Yang, J.J. Zhu, **A.L. McGaughey**, S. Zheng, R.D. Priestley, Z.J. Ren. "Predicting Extraction Selectivity of Acetic Acid in Pervaporation by Machine Learning Models with Data Leakage Management." *Environmental Science & Technology* 57 (14), 5934-5946 (2023).
9. **A.L. McGaughey**, A.E. Childress. "Wetting indicators, modes, and trade-offs in membrane distillation." *Journal of Membrane Science* 642, 119947 (2022).
10. A. Xin, K. Yu, R. Zhang, B. Ruan, **A.L. McGaughey**, Z. Feng, K.H. Lee, Kyung Y. Chen, A. Childress, Q. Wang, "Bone-Inspired Healing of 3D-Printed Ceramics." *Materials Horizons* 7 (8), 2130-2140. (2020).

11. **A.L. McGaughey**, P. Karandikar, M. Gupta, A.E. Childress. "Hydrophobicity versus Pore Size: Polymer Coatings to Improve Membrane Wetting Resistance for Membrane Distillation." *ACS Applied Polymer Materials* 2 (3), 1256-1267 (2020).
12. R.D. Gustafson, **A.L. McGaughey**, W. Ding, S.C. McVety, A.E. Childress. "Morphological Changes and Creep Recovery Behavior of Expanded Polytetrafluoroethylene (ePTFE) Membranes used for Membrane Distillation." *Journal of Membrane Science* 584, 236-245 (2019).
13. C.P. Morrow, **A.L. McGaughey**, S.R. Hiibel, A.E. Childress. "Submerged or Sidestream? The Influence of Module Configuration on Fouling and Salinity in Osmotic Membrane Bioreactors." *Journal of Membrane Science* 548, 583-592 (2018).
14. **A.L. McGaughey**, R.D. Gustafson, A.E. Childress. "Effect of long-term operation on membrane surface characteristics and performance in membrane distillation." *Journal of Membrane Science* 543, 143-150 (2017).

Conference Presentations and Papers

* indicates presenting author

1. **A.L. McGaughey***, S.G. Joshi, A.E. Childress, "Wetting States and Resistance Metrics for Membrane Distillation," *Gordon Research Conference – Membranes: Materials and Processes*. July 31-Aug 1, 2024. New London, New Hampshire, USA. (poster presentation)
2. **A.L. McGaughey***, S. Srinivasan, K.S.S. Christie, Z.J. Ren, R.D. Priestley, "Zwitterionic polymer brush membranes at ambient conditions: examining the roles of brush thickness and density," *10th International Water Association Membrane Technology Conference*. July 23, 2023. St. Louis, Missouri, USA. (oral presentation)
3. **A.L. McGaughey***, S. Srinivasan, Z.J. Ren, R.D. Priestley, "Scaling up polymer brush membranes: relating brush properties to performance," *AEESP Research and Education Conference*. June 21, 2023. Boston, Massachusetts, USA. (oral presentation)
4. S.G. Joshi*, **A.L. McGaughey**, A.E. Childress, "Characterizing liquid intrusion during membrane distillation: impacts of membrane properties, salinity, pressure, and fouling," *NAMS 2023 Annual meeting*. May 15, 2023. Tuscaloosa, Alabama, USA. (poster presentation; 2nd Place Student Poster Award)
5. S.G. Joshi*, **A.L. McGaughey**, A.E. Childress, "Wetting resistance to enhance competitiveness of membrane distillation," *3rd International Workshop on Membrane Distillation and Innovating Membrane Operations in Desalination and Water Reuse*. April 25, 2023. Sorrento, Italy. (oral presentation)
6. **A.L. McGaughey***, S. Srinivasan, K.S.S. Christie, Z.J. Ren, R.D. Priestley, "Scaling up polymer brush membranes for water and resource recovery," *Andlinger Center 2022 Annual Meeting*. October 14 2022. Princeton, New Jersey, USA. (poster presentation)
7. **A.L. McGaughey***, S. Srinivasan, K.S.S. Christie, Z.J. Ren, R.D. Priestley, "Scalable zwitterionic polymer brushes for broad fouling resistance," *AEESP Research and Education Conference*. June 29 2022. St. Louis, Missouri, USA. (oral presentation)

8. **A.L. McGaughey***, S. Srinivasan, K.S.S. Christie, Z.J. Ren, R.D. Priestley, “Scalable polymer brushes for antifouling membranes,” *NAMS 31st Annual Meeting*. May 18 2022. Tempe, Arizona, USA. (oral presentation)
9. **A.L. McGaughey***, S.G. Joshi, A.E. Childress. “Modes and metrics of wetting in membrane distillation.” *5th International Conference on Desalination using Membrane Technology*. November 15 2021. Online: live and on-demand. (keynote presentation)
10. **A.L. McGaughey***, S.G. Joshi, A.E. Childress. “Wetting in membrane distillation: modes, mechanisms, and metrics.” *NAMS 30th Annual Meeting*. August 30 2021. Estes Park, Colorado, USA. (oral presentation)
11. **A.L. McGaughey***, P. Karandikar, M. Gupta, A.E. Childress. “High-salinity membrane distillation: Impact of material properties on membrane performance.” *ACS Spring 2020 National Meeting & Expo*. April 30 2020. Philadelphia, Pennsylvania, USA. (slides published; oral presentation cancelled due to COVID19)
12. A.E. Childress*, **A.L. McGaughey**, R.D. Gustafson. “Wetting in membrane distillation: The roles of surface and internal hydrophobicity.” *4th International Conference on Desalination Using Membrane Technology*. December 3 2019. Perth, Australia. (oral presentation)
13. **A.L. McGaughey***, P. Karandikar, M. Gupta, A.E. Childress. “Understanding wetting of hydrophobic materials for membrane distillation applications.” *AEESP Research and Education Conference*. May 15 2019. Tempe, Arizona, USA. (poster presentation)
14. **A.L. McGaughey***, P. Karandikar, M. Gupta, A.E. Childress. “Impact of membrane properties on wetting in membrane distillation.” *NAMS 28th Annual Meeting*. May 13 2019. Pittsburgh, Pennsylvania, USA. (oral presentation)
15. **A.L. McGaughey***, P. Karandikar, R.D. Gustafson, M. Gupta, A.E. Childress. “Understanding Wetting and Rejection in Membrane Distillation: Towards Long-Term, High Recovery Treatment of High-Salinity Streams.” *2019 Membrane Technology Conference and Exposition*. February 27 2019. New Orleans, Louisiana, USA. (oral presentation and conference paper)
16. **A.L. McGaughey***, R.D. Gustafson, A.E. Childress. “Examining the role of internal and distillate-side membrane hydrophobicity on wetting and rejection in membrane distillation.” *NAMS 27th Annual Meeting*. June 11 2018. Lexington, Kentucky, USA. (poster presentation)

Invited Presentations

1. **A.L. McGaughey**. “Separation processes and advanced materials for sustainable water and resource recovery.” UNM Civil, Construction, and Environmental Engineering Graduate Seminar, University of New Mexico. April 11, 2024.
2. **A.L. McGaughey**. “Advanced separation processes and materials: towards sustainable water recovery from challenging streams.” UNM Chemical and Biological Engineering Departmental Seminar, University of New Mexico. April 10, 2024.

3. **A.L. McGaughey**. “Advanced membrane processes and materials for water recovery from challenging streams.” UA Chemical and Environmental Engineering Departmental Seminar, University of Arizona. March 25, 2024.
4. **A.L. McGaughey**. “Membrane separations for challenging feed streams.” New Mexico Water Committee Technical Noon Webinar, American Water Works Association Rocky Mountain Section. March 20, 2024.
5. **A.L. McGaughey**. “Water and processes: my path (so far) through academia.” USC Women in Science and Engineering Alumni Seminar Series, University of Southern California. February 21, 2024.
6. **A.L. McGaughey**, S. Srinivasan, K.S.S. Christie, Z.J. Ren, R.D. Priestley. “Scalable polymer brushes: new materials for water and resource recovery.” New Light: Rising Stars in Energy and the Environment, Andlinger Center 2022 Summer Seminar Series, Princeton University. July 20 2022.
7. **A.L. McGaughey**, “Membrane Distillation for Challenging Wastewaters: Understanding Wetting Resistance.” USC Women in Science and Engineering STEM Bytes Seminar, USC. October 6 2020.
8. **A.L. McGaughey**, P. Karandikar, R.D. Gustafson, M. Gupta, A.E. Childress. “Membrane Processes for Wastewater Reuse and Desalination.” Civil & Environmental Engineering Colloquium, USC. March 26 2020.
9. **A.L. McGaughey**, A.E. Childress. “Water Sustainability in Coastal Regions: Integrated Systems of Wastewater Reuse and Desalination.” Crespi Carmelite High School STEMinar. Los Angeles, California, USA. May 11 2017.
10. **A.L. McGaughey**, R.D. Gustafson, A.E. Childress. “Impact of Long-Term Operation on Membrane Hydrophobicity and Surface Morphology in Membrane Distillation.” Civil & Environmental Engineering Departmental Seminar, USC. April 7 2017.

Research Support

University of New Mexico Advance Women in STEM Award, 08/12/2024 – 12/15/2025, \$15,000, “Pre- and Post-treatment Processes for Atmospheric Water Harvesting: What Works?”, PI: McGaughey, co-PI: Anjali Mulchandani

New Mexico Water Resources Research Institute, 09/01/2024 – 08/31/2025, \$40,000, “Produced Water Desalination by Membrane Distillation: What Properties Matter?”, PI: McGaughey

University of New Mexico Research Allocations Committee, 04/11/2024 – 10/15/2025, \$4,944, “Membrane Design to Advance Produced Water Reuse”, PI: McGaughey

Awards and Recognition

University of New Mexico Women in STEM Award

2024

Outstanding Peer Reviewer for <i>Environmental Science: Water Research and Technology</i>	2023
Andlinger Center Distinguished Postdoctoral Fellowship	2021-2023
USC Viterbi School of Engineering Jenny Wang Excellence in Teaching Award	2021
USC CEE Best Dissertation Award	2021
USC CEE Outstanding Teaching Assistant Award	2020
USC Women in Science and Engineering (WiSE) Merit Award	2019
American Membrane Technology Association/Affordable Desalination Coalition Fellowship	2019
USC CEE Outstanding Research Assistant Award	2018
USC Viterbi School of Engineering Ph.D. Merit Fellowship	2015-2018
USC Dean's 4.0 List	2017
University of Washington Dean's List	2011-2014

Teaching

University of New Mexico

Sustainable Engineering (CE 438/538) Fall 2024
 Enrollment: 38
 Evaluations: *In progress*

Physical-Chemical Water and Wastewater Treatment (CE 431/531) Spring 2024
 Enrollment: 11
 Evaluations: CE 431 – *Instructor 4.4/5, Course 4.4/5*; CE 531 – *Instructor 4.75/5, Course 4.75/5*

Mentorship

Current Graduate Students

Abdul Qadir Ropari October 2024-present
 M.S., Biomedical Engineering, University of New Mexico

Sagun Parajuli August 2024-present
 M.S., Civil Engineering, University of New Mexico

Current Undergraduate Students

Stephen Emeanuwa (B.S./M.S. Chemical Engineering, University of New Mexico) June 2024-present

Rebecca Nez (B.S., Chemical Engineering, University of New Mexico) April 2024-present

Kenya Hernandez (B.S., Chemical Engineering, University of New Mexico) February 2024-present

Academic Service

University of New Mexico

Ph.D. Qualifying Exam Committees

Carl Abadam (Advisor: Mulchandani) 2024

M.S. Thesis Defense Committees

A.J. Barney (Advisor: Mulchandani) 2024

Maycee Hurd (Advisor: Cerrato) 2024

Mentor, Grand Challenges Water Science Communication Fellowship January-April 2024

Service and Leadership

Journal Reviewer

January 2017-present

Energy and Environmental Science; Environmental Science & Technology Letters; ACS ES&T Engineering; ACS Applied Polymer Materials; Journal of Membrane Science; Journal of Membrane Science Letters; Desalination; Resources, Conservation & Recycling; and Environmental Science: Water Research & Technology

Princeton Keller Center Program in Institutional and Historical Racism

June-May 2022

NextGen Site Representative, National Alliance for Water Innovation (NAWI)

2018-2020

Graduate Student and Postdoctoral Mentor

June 2017-August 2022

National Science Foundation Research Experience for Undergraduates Program (NSF REU); University of Southern California Young Researchers Program (USC YRP); University of Southern California Summer High School Intensive in Next-Generation Engineering (USC SHINE); University of Southern California Women in Science and Engineering (USC WiSE); Cientifico Latino GSMI program

Certifications

US NCEES Engineer-in-Training (EIT)

July 2014

PADI Divemaster and Rescue Diver

June 2012-July 2015