

Shihong Lin Ph.D.

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ACADEMIC APPOINTMENT

Assistant Professor, Vanderbilt University, Nashville, TN, Jan 2015—Present

Department of Civil and Environmental Engineering (Primary Appointment)

Department of Chemical and Biomolecular Engineering (Secondary Appointment)

EDUCATION AND TRAINING

Post-doctoral Research Associate, Yale University, New Haven, CT

Department of Chemical and Environmental Engineering (2013-2014)

Ph.D. in Environmental Engineering, Duke University, Durham, NC (2012)

M.Sc. in Environmental Engineering, Duke University, Durham, NC (2011)

B.Sc. in Environmental Engineering, Harbin Institute of Technology, Harbin, China (2006)

PROFESSIONAL AFFILIATIONS AND SERVICES

Member of the Following Organizations

- American Chemical Society (ACS)
- Association of Environmental Engineering and Science Professors (AEESP)
- American Water Works Association (AWWA)
- International Water Association (IWA)
- Association of Chinese American Professors in Environmental Engineering and Science

Reviewer for Academic Journals:

Environmental Science & Technology, Water Research, ACS Nano, Langmuir, Journal of Membrane Science, Journal of Colloid and Interface Science, ACS Sustainable Chemistry & Engineering, Carbon, Bioresource and Technology, Journal of Contaminant Hydrology, Environmental Science: Nano, RSC Advance, Frontier of Environmental Science and Engineering, Membranes, Reviews in Chemical Engineering, Separation and Purification Technology, ACS Applied Materials and Interfaces, Scientific Report

Conference Session Chair

- Membranes: Water Treatment, 2015 AEESP Research and Education Conference, Yale, New Haven, June 12-16, 2015
- Membranes: Processes, 2015 AEESP Research and Education Conference, Yale, New Haven, June 12-16, 2015

Proposal Review Panel

- National Science Foundation

Other Services

- Reviewer, Navigating the Job Search Workshop, 2015 AEESP Research and Education Conference, Yale, New Haven, June 12-16, 2015

AWARDS

- ACS Environmental Chemistry Graduate Student Award (2013)
- ORAU Ralph E. Powe Junior Faculty Awards (2015)

PEER REVIEWED PUBLICATIONS

1. **Lin, S.***, "Mass Transfer in Forward Osmosis with Hollow Fiber Membranes", *Journal of Membrane Science*, in press
2. Zhang, W., Elimelech, M., and **Lin, S.***, "Composite Membrane with Underwater-Oleophobic Surface for Anti-Oil-Fouling Membrane Distillation", *Environmental Science & Technology*, 50, 2016, pp 3866-3874
3. Zhang, W., Elimelech, M., and **Lin, S.***, "Environmental Applications of Interfacial Materials with Special Wettability", *Environmental Science & Technology*, 50, 2016, pp 2132-2150
4. Zhang, W., Hou, D., and **Lin, S.***, "Gross vs. Net Energy: Towards a Rational Framework for Assessing the Practical Viability of Pressure Retarded Osmosis", *Journal of Membrane Science*, 503, 2016, pp 132-147
5. **Lin, S.** and Elimelech, M., "Staged Reverse Osmosis Operation: Configuration, Energy Efficiency, and Application Potential", *Desalination*, 366, 2015, pp 9-14.
6. Deshmukh, A., Yip, N.Y., **Lin, S.**, and Elimelech, M. "Desalination by forward osmosis: identifying performance limiting parameters through module-scale modeling", *Journal of Membrane Science*, 491, 2015, Pp 159-167
7. Shaulsky, E., Boo, C., **Lin, S.**, and Elimelech, M., "Membrane-Based Osmotic Heat Engine with Organic Solvent for Enhanced Power Generation from Low-Grade Heat", *Environmental Science & Technology*, 49, 2015, pp 5820-5827
8. Shaffer, D., Jaramillo, H., Werber, J.R., **Lin, S.**, and Elimelech, M., "Forward Osmosis: Where Are We Now?" *Desalination*, 356, 2015, pp 271-285
9. **Lin, S.**, Nejati, S., Boo, C., Hu, Y., Chinedum, O., and Elimelech, M., "Omniphobic Membrane for Robust Membrane Distillation", *Environmental Science & Technology-Letters*, 1(11), 2014, pp 443-447
10. A.P. Straub, **Lin, S.**, and Elimelech, M., "Pressure Retarded Osmosis: Practical Performance and Module Scale Operational Factors", *Environmental Science & Technology*, 48(20), 2014, Pp 12435-12444
11. **Lin, S.**, A.P. Straub, and Elimelech, M., "Thermodynamic Limits of Extractable Energy by Pressure Retarded Osmosis", *Energy and Environmental Science*, 7, 2014, pp 2706-2715.
12. **Lin, S.**, Yip, N.Y., Cath, T.Y., Osuji, C.O., and Elimelech, M., "Hybrid Pressure Retarded Osmosis—Membrane Distillation System for Power Generation from Low-

- grade Heat: Thermodynamic Analysis and Energy Efficiency”, *Environmental Science & Technology*, 48(9), 2014, pp 5306-5317
13. Hotze, E.M., Louie, S.M., **Lin, S.**, Wiesner, M.R., Lowry, G.V. “Nanoparticle Core Properties Affect Attachment of Macromolecule-coated Nanoparticles to Silica Surfaces”, *Environmental Chemistry*, 13(3), 2014, pp 257-267
 14. **Lin, S.**, Yip, N.Y., and Elimelech, M., “Direct Contact Membrane Distillation with Heat Recovery: Thermodynamic Insights from Module Scale Modeling”, *Journal of Membrane Science*, 453, 2014, pp 498-515
 15. Yang, X., **Lin, S.**, Wiesner, M.R., “Influence of Natural Organic Matter on Transport and Retention of Polymer Coated Silver Nanoparticles in Porous Media”, *Journal of Hazardous Materials*, 264, 2014, pp 161-168
 16. **Lin, S.***, Huang, R.*, Cheng, Y., Liu, J., Lau, B., and Wiesner, M.R., “Silver Nanoparticle-Alginate Composite Beads for Point-of-Use Drinking Water Disinfection”, *Water Research*, 47(21), 2013, Pp 3959-3965 (*Equal Contribution)
 17. Ferris, R., **Lin, S.**, Therezien, M., Yellen, B.B., and Zauscher, S., “Electrical Double Layer Formed by Polarized Ferroelectric Thin Films”, *ACS Applied Materials and Interfaces*, 5(7), 2013, pp 2610-2617
 18. Chae, S.R., Hotze, E.M., Badireddy, A.R., Lin, S., Kim, J.O., Wiesner, M.R., “Environmental implications and applications of carbon nanomaterials in water treatment”, *Water Science & Technology*, 67 (11), 2013, pp 2582-2586
 19. **Lin, S.** and Wiesner, M.R., “Deposition of Aggregated Nanoparticles— A Theoretical and Experimental Study on the Effect of Aggregation State on the Affinity between Nanoparticles and a Collector Surface”, *Environmental Science & Technology*, 46(24), 2012, pp 13270-13277
 20. **Lin, S.** and Wiesner, M.R., “Theoretical Investigation of Steric Interaction in Colloidal Deposition”, *Langmuir*, 28(43), 2012, pp 15233-15245
 21. **Lin, S.** and Wiesner, M.R., “Paradox of Stability of Nanoparticles at Very Low Ionic Strength”, *Langmuir*, 28(30), 2012, pp 11032-11041
 22. **Lin, S.** and Wiesner, M.R., “Theoretical Investigation on the Interaction between a Soft Particle and a Rigid Flat Surface”, *Chemical Engineering Journal*, 191, 2012, pp 297-305
 23. **Lin, S.**, Cheng, Y., Liu, J., and Wiesner, M.R., “Polymeric Coatings on Silver Nanoparticles Hinder Auto-aggregation but Enhance Attachment to Uncoated Surfaces”, *Langmuir*, 26(22), 2012, Pp 4178-4186
 24. Zhang, L., Chae, S-R., **Lin, S.**, and Wiesner, M.R., “Proton-conducting Composite Membranes Derived from Ferroxane-Polyvinyl Alcohol Complex”, *Journal of Environmental Engineering Science*, 29(2), 2012, Pp 124-132
 25. Chae, S., Xiao, Y., **Lin, S.**, Noeiaghahi, T., Kim, J., and Wiesner, M.R., Effects of humic acid and electrolytes on photocatalytic reactivity and transport of carbon nanoparticle aggregates in water, *Water Research*, 46(13), 2012, Pp 4053-4062
 26. **Lin, S.**, Cheng, Y., Bobcombe, Y., Jones, K.L., Liu, J., and Wiesner, M.R. “Deposition of Silver Nanoparticles in Geochemically Heterogeneous Porous Media: Predicting Affinity from Surface Composition Analysis”, *Environmental Science & Technology*, 45(12), 2011, Pp 5209-5215

27. Chae, S-R., Therezien, M., Farnar Budarz, J., Wessel, L., **Lin, S.**, Xiao, Y., and Wiesner, M.R., "Comparison of the Photosensitivity and Bacterial Toxicity of Spherical and Tubular Fullerenes of Variable Aggregate Size", *Journal of Nanoparticle Research*, 13(10), 2011, Pp 5121-5127
28. Shawky, H.A., Chae, S-R., **Lin, S.**, and Wiesner, M.R., "Synthesis and Characterization of a Carbon Nanotube/Polymer Nanocomposite membrane for Water Treatment" *Desalination*, 272, 2011, pp 46-50
29. **Lin, S.**, and Wiesner, M.R. "Exact Analytical Expressions for the Potential of Electrical Double Layer Interactions for a Sphere-Plate System", *Langmuir*, 26(22), 2010, Pp 16638-16641
30. Cheng, Y., Yin, L., **Lin, S.**, Wiesner, M.R., Bernhardt, E., and Liu, L. "Toxicity Reduction of Polymer-Stabilized Silver Nanoparticles by Sunlight", *Journal of Physical Chemistry C*, 115(11), 2010, Pp 4425-4432
31. Chae, S-R., Badireddy, A.R., Farnar Budarz, J., **Lin, S.**, Xiao, Y., Therezien, M., and Wiesner, M.R., "Heterogeneities in Fullerene Nanoparticle Aggregates Affecting Reactivity, Bioactivity, and Transport", *ACS Nano*, 4(9), 2010, pp 5011-5018

CONFERENCE PROCEEDINGS

1. Wang, Z., and **Lin, S.** "Gross vs. Net Energy Output: A Rational Framework for Assessing the Viability of Pressure Retarded Osmosis", *AFS Fall Conference*, Franklin, TN, 2015 (Poster)
2. **Lin, S.** "Simplified Thermodynamic Analysis on Direct Membrane Distillation", *DesalTech*, San Diego, CA, 2015 (Oral)
3. **Lin, S.** "Omniphobic Membrane for Antiwetting Membrane Distillation", *DesalTech*, San Diego, CA, 2015 (Poster)
4. Wang, Z., and **Lin, S.** "Gross vs. Net Energy Output: A Rational Framework for Assessing the Viability of Pressure Retarded Osmosis", *DesalTech*, San Diego, CA, 2015 (Oral by Wang, Z.)
5. **Lin, S.**, Nejati, S., Boo, C., Hu, Y., Chinedum, O., and Elimelech, M., "Omniphobic Membrane for Robust Membrane Distillation", *AEESP*, New Haven, CT, 2015 (Poster)
6. **Lin, S.**, Nejati, S., Boo, C., Hu, Y., Chinedum, O., and Elimelech, M., "Omniphobic Membrane for Robust Membrane Distillation", *ACS National Conference*, San Francisco, CA, 2014 (Oral)
7. **Lin, S.**, A.P. Straub, and Elimelech, M., "Thermodynamic Limits of Extractable Energy by Pressure Retarded Osmosis", *Gordon Research Conference: Membrane*, New London, NH, 2011 (Poster)
8. **Lin, S.**, Yip, N.Y., and Elimelech, M., "Direct Contact Membrane Distillation with Heat Recovery: Thermodynamic Insights from Module Scale Modeling", *AEESP 50th Anniversary Conference*, Golden, CO. 2013 (Poster)
9. **Lin, S.**, and Wiesner, M.R., "Deposition of Aggregated Nanoparticles— A Theoretical and Experimental Study on the Effect of Aggregation State on the Affinity between Nanoparticles and a Collector Surface", *Particle Separation Conference*, Berlin, Germany 2012 (Oral by Wiesner, M.R.)

10. **Lin, S.**, and Wiesner, M.R., "", *ACS Colloid Symposium*, Baltimore, MD, 2012 (Oral, as presenter)
11. **Lin, S.**, and Wiesner, M.R., "Relative Insignificance of Aggregation State on the Affinity between Nanoparticles and Surfaces", *ACS Colloid Symposium*, Baltimore, MD, 2012 (Oral, as presenter)
12. Chae, S-R., Jassby, D., Xiao, Y., **Lin, S.**, Park, P-K., Kim, J-O., and Wiesner, M.R., "Membrane Separation of Fullerene Nanomaterials from Water", *11th World Filtration Congress*, Graz, Austria, 2012 (Oral by Chae, S-R.)
13. **Lin, S.**, and Wiesner, M.R., "Deposition of Nanoparticles: Effect of Size, Surface Modification and Aggregation State", *CEINT Conference*, Durham, NC, 2012 (Poster)
14. **Lin, S.**, Cheng, Y., Liu, J., and Wiesner, M.R., "Polymeric coatings on nanoparticles prevent auto-aggregation but enhance attachment to uncoated surfaces", *ACS Conference*, Denver, CO, 2011 (Oral, as presenter)
15. **Lin, S.**, and Wiesner, M.R., "Exact Analytical Expressions for the Potential of Electrical Double Layer Interactions for a Sphere-Plate System", *ACS Conference*, Denver, CO, 2011 (Poster)
16. **Lin, S.**, and Wiesner, M.R., "Reduced Stability of Nanosized Particles at Very Low Ionic Strength", *ACS Conference*, Denver, CO, 2011 (Poster)
17. **Lin, S.**, Cheng, Y., Liu, J., and Wiesner, M.R., "Polymeric coatings on nanoparticles prevent auto-aggregation but enhance attachment to uncoated surfaces", *Gordon Research Conference*, Waterville, NH, 2011 (Poster)
18. **Lin, S.**, and Wiesner, M.R., "Exact Analytical Expressions for the Potential of Electrical Double Layer Interactions for a Sphere-Plate System", *ICEIN Conference*, Durham, NC, 2011 (Oral, as presenter)
19. Hotze, E.M., **Lin, S.**, Chae, S-R., Wiesner, M.R., and Lowry, G.V., "Coated Nanoparticle Transport: Does the Underlying Particle Play a Role?" *ACS Conference*, Boston, MA, 2011 (Poster)
20. **Lin, S.**, Cheng, Y., Bobcombe, Y., Jones, K.L., Liu, J., and Wiesner, M.R., "Deposition of Silver Nanoparticles in Geochemically Heterogeneous Porous Media", *CEINT Conference*, Durham, NC, 2010 (Poster)

Invited Talks

1. "Membrane Distillation for Improving Sustainability at Water-Energy-Environment Nexus", Vanderbilt University, Nashville, TN, January, 2014
2. "Membrane Distillation for Improving Sustainability at Water-Energy-Environment Nexus", University of Michigan, Ann Arbor, MI, February, 2014
3. "Membrane Distillation: Thermodynamic Analysis and Novel Membrane Development", University of Massachusetts, Amherst, MA, September, 2014
4. "Membrane Distillation: Thermodynamic Analysis and Novel Membrane Development" Sichuan Agricultural University, Chengdu, Sichuan, China, Nov, 2015
5. "Expanding the Versatility of Membrane Distillation via Materials Innovation", Clemson University, Clemson, SC, March, 2016