Riley Vickers, PhD

rileyvic@umich.edu rileyvickers.com

Education

2017 – 2023	PhD Environmental Sciences and Engineering, The University of North Carolina at Chapel Hill. Dissertation: Molecular-Scale Analysis of the Morphology, Topology, and Performance of Crosslinked Aromatic Polyamide Used in Reverse Osmosis Membranes. Advisors: Dr. Orlando Coronell and Dr. Cass T. Miller.
2012 – 2016	BS Civil Engineering, The University of Texas at Austin. Thesis: Electrophoretic Mobility of Silica Nanoparticles in Produced Water. Advisor: Dr. Desmond Lawler.

Professional Experience

08/2023 – Present	Postdoctoral Research Fellow, The University of Michigan, Department of Chemical Engineering. Advisors: Dr. Bryan R. Goldsmith and Dr. Jovan Kamcev
08/2017 – 07/2023	Graduate Research Fellow, The University of North Carolina at Chapel Hill, Environmental Sciences and Engineering

Honors and Awards

2019	National Science Foundation Graduate Research Fellowship
2017	Caroline H. and Thomas S. Royster Doctoral Fellowship
2017	Environmental Sciences and Engineering Departmental Fellowship
2016	Equal Opportunity in Engineering Summer Research Fellowship

Research Funding

Total:	25 million Core-Hours of High Performance Computing Resources, $366,840.
2023 – Present	National Science Foundation ACCESS High Performance Computing, 10 million Core-Hours, Value: $83,532.
2020-2023	National Science Foundation XSEDE High Performance Computing, 15 million Core-Hours, Value: $115,008.
2017-2023	Caroline H. and Thomas S. Royster Doctoral Fellowship, Value: $66,300.
2019-2022	National Science Foundation Graduate Research Fellowship, Value: $102,000

Professional Service and Outreach Activities

2018-2020	Coronell Laboratory Manager
2018-2020	Clean Water Science Network Mentor
2018-2020	The University of North Carolina at Chapel Hill Graduate and Professional Student Federation Senator

Professional Service and Outreach Activities Continued

2018-2019	Environmental Sciences and Engineering Department Social Chair
2017-2019	Carolina Covenant Scholar Mentor

Teaching

Invited Lectures

Fall 2021	ENVR 403 Environmental Chemistry, Categories of Chemical Reactions in Water.
Spring 2021	ENVR 419 Chemical Equilibrium of Natural Waters, Water Pollutants and Drinking Water Purification.
	ENVR 756 Physical/Chemical Processes for Water Treatment, Coagulation and Flocculation.
Spring 2020	ENVR 890 Science and Technology of Membranes for Water Purification, Microscale Morphological Characterization of Reverse Osmosis Membranes.
	ENVR 419 Chemical Equilibrium of Natural Waters, Water Pollutants and Drinking Water Purification.

Publications

4. Armstrong, M.; **Vickers, R.**; and Coronell, O. Trends and Errors in Reverse Osmosis Membrane Performance Calculations Stemming from Test Pressure and Simplifying Assumptions about Concentration Polarization and Solute Rejection. *Journal of Membrane Science 660. DOI: 10.1016/j.memsci.2022.120856.*

3. Armstrong, M.; **Vickers, R.**; and Coronell, O. Dataset of Reverse Osmosis Membrane Transport Properties Calculated with and without Assumptions about Concentration Polarization and Solute Rejection and the Errors Associated with Each Assumption. *Data in Brief 44. DOI: 10.1016/j.dib.2022.108538.*

2. **Vickers, R.;** Weigand, T.M.; Miller, C.T.; Coronell, O. Molecular Methods for Assessing the Morphology, Topology, and Performance of Polyamide Membranes. *Journal of Membrane Science 644. DOI: 10.1016/j.memsci.2021.120110.*

1. Wang, J.; Armstrong, M.; Grzebyk, K.; **Vickers, R.**; Coronell, O. Effect of Feed Water pH on the Partitioning of Alkali Metal Salts from Aqueous Phase into the Polyamide Active Layers of Reverse Osmosis Membranes. *Environmental Science & Technology 55. DOI: 10.1021/acs.est.0c06140.*

Invited Presentations

4. The University of Michigan, Department of Chemical Engineering, Goldsmith and Kamcev Group Meeting, April 5, 2023. *Molecular Scale Simulations of Polymeric Membrane Materials.*

3. The University of North Carolina at Chapel Hill, University Research Week: Access to Clean Water, November 11, 2021. *From the Bottom Up: Atomic-scale Simulations of Desalination Membranes.*

Invited Presentations Continued

2. The University of North Carolina at Chapel Hill, Phil C. Singer Symposium, November 5, 2021. *Molecular Simulations of Desalination Membranes.*

1. The University of North Carolina at Chapel Hill, ENVR 400 Research Seminar, September 15, 2021. *A Hundred Thousand Atoms Walk into 1 Bar at 300 K: Molecular Dynamics Simulations of Desalination Membranes.*

Conference Abstracts

Oral Presentations

5. Weigand, T.M.; **Vickers, R.;** Coronell, O.; Miller, C.T. PMMoTo: A parallel toolkit for analyzing molecular-scale membrane morphology and topology. *Presented at the International Congress on Membranes and Membrane Processes*, Chiba, Japan, July 9-14, 2023.

4. **Vickers, R.;** Weigand, T. M.; Miller, C. T.; Coronell, O. Insights on molecule transport through polyamide films from molecular dynamics simulations. *Presented at the 2022 Physics of Membrane Processes Meeting,* Wageningen, NL, October 12-14, 2022.

3. Armstrong, M.D.; **Vickers, R.;** Coronell, O. Quantifying uncertainties in water-solute selectivity of reverse osmosis membranes caused by not accounting for concentration polarization. *Presented at the 2021 North American Membrane Society (NAMS) Annual Meeting*, Estes Park, CO, August 28-September 2, 2021.

2. **Vickers, R.;** Weigand, T.M.; Miller, C.T.; Coronell, O. Molecular Dynamics Simulation Methods for Assessing Hydration and Performance of Polyamide Active Layers. *Presented at the 2021 North American Membrane Society (NAMS) Annual Meeting*, Estes Park, CO, August 28-September 2, 2021.

1. **Vickers, R.;** Weigand, T. M.; Miller, C. T.; Coronell, O. Estimating Fluid Pressure Gradients within Crosslinked Aromatic Polyamide Using Molecular Dynamics. *Presented at the 2020 North American Membrane Society (NAMS) Annual Meeting*, Online, May 18-21, 2020.

Poster Presentations

3. **Vickers, R.;** Weigand, T. M.; Miller, C. T.; Coronell, O. Molecular Dynamics Simulations of Water Transport through Crosslinked Aromatic Polyamide Reverse Osmosis Membranes. *Presented at the National Institute of Environmental Health Sciences Superfund Research Program Annual Meeting*, Online, December 14-15, 2020.

2. **Vickers, R.;** Weigand, T. M.; Miller, C. T.; Coronell, O. Estimating Pressure Gradients within Crosslinked Aromatic Polyamide during Water and Solute Transport Using Molecular Dynamics. *Presented at the International Congress on Membranes and Membrane Processes*, Online, December 7-11, 2020.

1. **Vickers, R.**; Wang, J.; Weigand, T.; Miller, CT.; Coronell, O. 'Estimating salt diffusion coefficients in polyamide active layers of reverse osmosis membranes using microscale continuum modeling' *Presented at the 2019 North American Membrane Society (NAMS) Annual Meeting*, Pittsburgh, PA, May 11-15, 2019.