

Kai Yang

University of Wisconsin–Madison | Department of Civil and Environmental Engineering

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Education

University of Wisconsin–Madison, Department of Civil & Environmental Engineering

Madison, WI

· Ph.D. in Environmental Engineering

2020-present

· Research Area: Resource Recovery, Wastewater Treatment, Membrane Distillation, Electrochemical System, Simulation

Columbia University, The Fu Foundation School of Engineering and Applied Science

New York, NY

· Master of Science in Chemical Engineering

2019

Tsinghua University, Department of Chemical Engineering

Beijing, CN

· Bachelor of Engineering in Polymer Materials and Engineering

2016

Research & Teaching

Graduate Research Assistant, University of Wisconsin–Madison

Madison, WI

Mohan Qin Research Group, | Department of Civil and Environmental Engineering

2020-present

Ammonia Recovery from Animal Manure Wastewater in Membrane Electrochemical System

- Collected and characterized manure wastewaters from farms and dairy research centers.
- Developed a mathematical model to simulate the reactions and ion transport in the electrochemical process.

Mechanism Investigation of Ammonia Transport in Membrane Distillation Process

- Incorporated photothermal effects to localize heat the membrane surface and enhance the ammonia transport.
- Proposed and validated an estimation of ammonia mass transfer coefficients.

Lab Instructor, University of Wisconsin–Madison

Madison, WI

CEE 325-301 & 302 Environmental Engineering Materials

Spring 2024

- Led the weekly 4-hour lab sessions independently, hosted lab office hours, graded the exams

Graduate Research Assistant, Columbia University

New York, NY

V. Faye McNeill Research Group, | Department of Chemical Engineering

2017-2019

Formation of Aerosol Light-absorbing Organics

- Synthesized brown carbon from salt aqueous and syringol to the mimic tropospheric aerosol reaction

Journal Publications

6. **Yang, K.**, and Qin, M.* (2024). Enhancing selective ammonium transport in membrane electrochemical systems. *Water Research*, 121668.

5. **Yang, K.**, and Qin, M.* (2024). Understanding ammonia and water transport in direct contact membrane distillation towards selective ammonia recovery. *ACS ES&T Engineering*.

4. Wang, R., **Yang, K.**, Wong, C., Aguirre-Villegas, H., Larson, R., Brushett, F., Qin, M.,* and Jin, S.* (2024). Electrochemical ammonia recovery and co-production of chemicals from manure wastewater. *Nature Sustainability*, 7(2), 179-190.
3. **Yang, K.**, Du, H., and Qin, M.* (2023). Solar enhanced membrane distillation for ammonia recovery. *Journal of Membrane Science Letters*, 3(1), 100043.
2. **Yang, K.**, and Qin, M.* (2021). The application of cation exchange membranes in electrochemical systems for ammonia recovery from wastewater. *Membranes*, 11(7), 494. Invited, featured as highly cited articles-2021.
1. Xu, J., Cui, T., Fowler, B., Fankhauser, A., **Yang, K.**, Surratt, J. D., McNeill, V. F.* (2018). Aerosol brown carbon from dark reactions of syringol in aqueous aerosol mimics. *ACS Earth and Space Chemistry*, 2(6), 608-617.

Conference Talks (* presenter)

15. **Yang, K.**, Burns, M., and Qin, M.* | Ammonia recovery from manure wastewater using membrane electrochemical systems. | Electrochemical Society 245th Meeting | San Francisco, CA | May 26, 2024. (Oral)
14. Kim, B.*, **Yang, K.**, and Qin, M. | Hydrolysis of urine as a pretreatment of resource recovery from manure. | UW–Madison Undergraduate Research Scholar 26th Symposium | Madison, WI | April 25, 2024. (Oral)
13. Karamushko, M.*, **Yang, K.**, and Qin, M. | Recycling clean water and ammonia via membrane distillation. | UW–Madison Undergraduate Research Scholar 26th Symposium | Madison, WI | April 25, 2024. (Oral)
12. Cartier, B.*, **Yang, K.**, and Qin, M. | Resource recovery from wastewater using electro driven processes. | UW–Madison Undergraduate Research Scholar 26th Symposium | Madison, WI | April 25, 2024. (Oral)
11. **Yang, K.*** and Qin, M. | Nutrient recovery: Extracting ammonia from livestock wastewater by membrane distillation. | Central States Water Environment Association 29th Annual Education Seminar | Madison, WI | April 9, 2024. (Poster)
10. **Yang, K.*** and Qin, M. | Recovering ammonia from wastewater by sustainable energy and membrane distillation. | Water @UW-Madison 2023 Fall Art & Science Meeting | Madison, WI | November 7, 2023. (Poster)
9. Wang, R., **Yang, K.**, Qin, M., and Jin, S.* | Ammonia recovery from manure wastewater and simultaneous electrosynthesis using ammonium-ion selective redox material. | American Chemistry Society Fall Meeting | San Francisco, CA | August 17, 2023. (Oral)
8. **Yang, K.**, Burns, M., and Qin, M.* (Invited talk) | Ammonia recovery from livestock manure using membrane electrochemical systems. | American Chemistry Society Fall Meeting | San Francisco, CA | August 17, 2023. (Oral)
7. **Yang, K.***, Du, H., and Qin, M. | Enhanced ammonia recovery from wastewater by photothermal-incorporated membrane distillation. | American Chemistry Society Fall Meeting | San Francisco, CA | August 13, 2023. (Oral)
6. **Yang, K.** and Qin, M.* (Invited talk) | Enhanced ammonia recovery from wastewater using solar photothermal membrane distillation. | 10th International Water Association Membrane Technology Conference | St. Louis, MO | July 23, 2023 (Oral)
5. **Yang, K.***, Du, H., and Qin, M. | Photothermal membrane distillation for enhanced ammonia recovery from wastewater. | Association of Environmental Engineering and Science Professors Research and Education Conference | Boston, MA | June 22, 2023. (Poster)
4. Wang, R.*, **Yang, K.**, Qin, M., and Jin, S. | Ammonium recovery from manure wastewater and simultaneous electrosynthesis using ammonium-ion selective redox material. | Electrochemical Society 243rd Meeting | Boston, MA | May 29, 2023. (Oral)
3. **Yang, K.*** and Qin, M. | The selectivity of ammonium ions across cation exchange membrane in membrane electrochemical systems | Association of Environmental Engineering and Science Professors Research and Education Conference | St. Louis, MO | June 29, 2022. (Poster)
2. **Yang, K.*** and Qin, M. | Simulation of selective nitrogen recovery in membrane electrochemical systems | Computing in Engineering Forum 2021 | Madison, WI | September 21, 2021. (Poster)
1. **Yang, K.*** and Qin, M. | Mechanisms of selective nitrogen recovery from wastewater in membrane electrochemical system | American Chemistry Society Fall Meeting | Virtual | August 17, 2020. (Oral)

Memberships in Professional Organizations

American Chemistry Society (ACS)

Association of Environmental Engineering and Science Professors (AEESP)

Chinese-American Professors in Environmental Engineering and Science (CAPEES)

Mentoring

Graduate Researchers

<i>Name</i>	<i>Date</i>	<i>Current Position</i>
Hanyu Tang	2023-present	Ph.D. Student at UW–Madison
Samarpan Deb Majumder	2022-2023	Ph.D. Student at George Washington University
Hongang Du	2022	Ph.D. Student at Johns Hopkins University

Undergraduate Researchers (*URS: Undergraduate Research Scholar*)

<i>Name</i>	<i>Date</i>	<i>Major</i>
Bodey Cartier (<i>URS</i>)	2023-2024	Biomedical Engineering
Blessing Kim (<i>URS</i>)	2023-2024	Neuroscience
Benjamin Michael Simplot	2023-2024	Environmental Engineering
Matthew Alex Karamushko (<i>URS</i>)	2023-2024	Engineering Mechanics
Annie Thevara	2023	Chemical Engineering
Gibeom Park	2022	Environmental Engineering, Visiting Student from Chungnam National University
Elizabeth Gardner	2020-2021	Environmental Engineering

Honors and Awards

Student Research Grant Competition, UW–Madison	2023
Becker Travel Awards, UW–Madison	2022
Honorable Mentions in Computing in Engineering Forum, Grainger Institute for Engineering	2021
Second Prize in Top Open Project (top 5%), Tsinghua University	2015
Excellent Student Leaders, Tsinghua University	2015