

TIEZHENG TONG

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ACADEMIC APPOINTMENT

Associate Professor (with tenure), Colorado State University, Fort Collins, Colorado (2023/07 – present), Department of Civil and Environmental Engineering

Assistant Professor, Colorado State University, Fort Collins, Colorado (2017/08 – 2023/06)
Department of Civil and Environmental Engineering

EDUCATION AND TRAINING

Postdoctoral Research Associate, Yale University, New Haven, Connecticut (2017)

Advisor: Prof. Menachem Elimelech

Ph.D., Environmental Engineering, Northwestern University, Evanston, Illinois (2015)

Advisors: Prof. Kimberly A. Gray and Prof. Jean-François Gaillard

M.S., Environmental Engineering, Northwestern University, Evanston, Illinois (2011)

M.S., Environmental Engineering, Tsinghua University, Beijing, China (2010)

B.S., Environmental Engineering, Beijing Normal University, Beijing, China, with honor (2008)

SELECTED AWARDS & HONORS

- 2024 James J. Morgan Early Career Award (honorable mention), American Chemical Society
- 2023 George T. Abell Outstanding Early-Career Faculty Award, College of Engineering, Colorado State University
- 2023 Faculty Award for Excellence in Research, Department of Civil and Environmental Engineering, Colorado State University
- 2023 CAPEES/UCEEF Early Career Award, Chinese-American Professors in Environmental Engineering and Science (CAPEES)
- 2022 Faculty Early Career Development (CAREER) Award, National Science Foundation
- 2022 40 under 40 Award, American Academy of Environmental Engineers and Scientists
- 2022 *ACS ES&T Engineering Best Paper Award*, American Chemical Society
- 2020 Young Membrane Scientist Award, North American Membrane Society
- 2016 Excellence in Reviewing Award, *Water, Air & Soil Pollution*, Springer
- 2014 Royal E. Cabell Terminal Year Fellowship, Northwestern University, Evanston, IL
- 2013 Student Award, Sustainable Nanotechnology Organization
- 2013 Environmental & Water Resources Institute (EWRI) Student Scholarship Award, Illinois Section of American Society of Civil Engineers, Chicago, IL (graduate-student level)
- 2013 Certificate of Merit Award for presentation at the American Chemical Society National Meeting, American Chemical Society
- 2012 Environmental Chemistry Graduate Student Award, American Chemical Society
- 2012 Goldschmidt Travel Grant
- 2011 Student Research Award, Institute for Sustainability and Energy at Northwestern
- 2010 Walter P. Murphy Fellowship, Northwestern University
- 2009 Mei-shang International Scholarship (top 5%), Tsinghua University
- 2008 Outstanding Senior Undergraduate Award of Beijing City (top 5%)

2008 Undergraduate Thesis with Honor, Beijing Normal University
2008 Outstanding Senior Award of Beijing Normal University

PUBLICATIONS (Citation: >5,300; H-index: 36; [Google Scholar](#))

† Contributed equally, * Corresponding author, § Graduate/undergraduate student mentee

Referred Journal Publications

1. Liu, C., Gao, R., Zhang, X., **Tong, T.**, Sun, Z., He, Q., and Ma, J. (2024) Controlled architecture of multi-defense anti-fouling forward osmosis membrane for efficient shale gas wastewater treatment. *Journal of Membrane Science*, under review.
2. Zhao, S.*, Zhao, Z., Zhang, X., Zha, Z., **Tong, T.***, Wang, R.*, and Wang, Z.* (2024) Polyamide membranes with surface charge reversal induced by dipole-dipole interaction for selective ion separation. *Environmental Science & Technology*, under revision.
3. Park, S. §, Saavedra, M. §, Liu, X., Li, T., Anger, B., and **Tong, T.*** (2024) A comprehensive study on combined organic fouling and gypsum scaling in reverse osmosis: Decoupling surface and bulk phenomena. *Journal of Membrane Science*, 694, 122399.
4. Kalam, S., Dutta, A., Du, X. §, Li, X., **Tong, T.**, and Lee, J. (2024) A non-substrate-specific technique of antifouling and antiwetting Janus membrane fabrication for membrane distillation. *Desalination*, 573, 117195.
5. Yao, Y. §, Ge, X. §, Yin, Y. §, Minjarez, R. §, and **Tong, T.*** (2023) Antiscalants for mitigating silica scaling in membrane desalination: Effects of molecular structure and membrane process. *Water Research*, 246, 120701.
6. Jeong, N. § †, Wiltse, M.E. †, Boyd, A., Blewett, T., Park, S. §, Broeckling C., Borch, T.*, and **Tong, T.*** (2023) Efficacy of nanofiltration and reverse osmosis for the treatment of oil-field produced water intended for beneficial reuse. *ACS ES&T Engineering*, 3, 10, 1568-1581.
Selected as [ACS Editor's choice](#).
7. Jeong, N. §, Epsztein, R., Wang, R., Park, S. §, Lin, S., and **Tong, T.*** (2023) Exploring the knowledge attained by machine learning on ion transport across polyamide membranes using explainable artificial intelligence. *Environmental Science & Technology*, 57, 46, 17851-17862.
8. Zhang, X. †, Yao, Y. † §, Horseman, T. †, Wang, R., Yin, Y. §, Zhang, S., **Tong, T.***, and Lin, S.* (2023) Electrodialytic crystallization to enable zero liquid discharge. *Nature Water*, 1, 547-554.
Featured as [cover article](#).
9. **Tong, T.***, Liu, X.*, Li, T.*, Park, S. §, and Anger, B. (2023) A tale of two foulants: The coupling of organic fouling and mineral scaling in membrane desalination. *Environmental Science & Technology*, 57, 18, 7129-7149.
10. Grauberger, B.M. §, Cole, G.M., Robbins, C.A. §, Quinn, J.C., **Tong, T.***, and Bandhauer, T.M.* (2023) Viability of waste heat capture, storage, and transportation for decentralized flowback and produced water treatment. *Applied Energy*, 330, 120342.
11. Yin, Y. §, Li, T., Zuo, K., Liu, X., Lin, S., Yao, Y. §, and **Tong, T.*** (2022) Which surface is more scaling resistant? A closer look at nucleation theories for heterogeneous gypsum nucleation in aqueous solutions. *Environmental Science & Technology*, 56, 22, 16315-16324.
12. Du, X. §, Carlson, K.H., **Tong, T.*** (2022) The water footprint of hydraulic fracturing under different hydroclimate conditions in the Central and Western United States. *Science of The Total Environment*, 840, 156651.
Cited by [The New York Times](#).
13. Du, X. §, Alipanahrostami, M., Wang, W.*, **Tong, T.*** (2022) Long-chain PFASs-free omniphobic membranes for sustained membrane distillation. *ACS Applied Materials & Interfaces*, 14, 20, 23808-23816.
14. Sun, C., Lyu, Q., Si, Y., **Tong, T.**, Lin, L., Yang, F., Tang, C.Y., Dong, Y. (2022)

Superhydrophobic carbon nanotube network membranes for membrane distillation: High-throughput performance and transport mechanism. *Environmental Science & Technology*, 56, 9, 5775-5785.

15. Zhao, Y., Tong, X., Kim, J., **Tong, T.**, Huang, C.-H., Chen, Y. (2022) Capillary-assisted fabrication of thin-film nanocomposite membranes for improved solute–solute separation. *Environmental Science & Technology*, 56, 9, 5849-5859.
16. Cole, G.M., Robbins, C.A. §, Graubeger, B.M. §, Garland, S., **Tong, T.**, Bandhauer, T.M., Quinn, J.C. (2022) Optimization of mobile oil and gas produced water treatment unit deployment logistics to achieve economic feasibility. *Resources, Conservation & Recycling*, 181, 106249.
17. Christie, K.S.S., Horseman, T., Wang, R., Su, C., **Tong, T.**, and Lin, S. (2022) Gypsum scaling in membrane distillation: Impacts of temperature and vapor flux. *Desalination*, 525, 115499.
18. Robbins, R.A. §, Yin, Y. §, Hanson, A.J., Blotevogel, J., Borch, T., and **Tong, T.*** (2022) Mitigating membrane wetting in the treatment of unconventional oil and gas wastewater by membrane distillation: A comparison of pretreatment with omniphobic membrane. *Journal of Membrane Science*, 645, 120198
19. Wang, X., Lyu, Q., **Tong, T.**, Sun, K., Lin, L., Tang, C., Yang, F., Guiver, M., Quan, X., Dong, Y. (2022) Robust ultrathin nanoporous MOF membrane with intra-crystalline defects for fast Water transport. *Nature Communications*, 13, 266.
20. Yin, Y. §, Kalam, S., Livingston, J.L., Minjarez, R. §, Lee, J., Lin, S., and **Tong, T.*** (2022) The use of anti-scalants in gypsum scaling mitigation: Comparison with membrane surface modification and efficiency in combined reverse osmosis and membrane distillation. *Journal of Membrane Science*, 643, 120077.
21. Robbins, R.A. §, Du, X. §, Bradley, T.H., Quinn, J.C., Bandhauer, T.M., Conrad, S.A., Carlson, K.H., **Tong, T.*** (2022). Beyond treatment technology: Understanding motivations and barriers for wastewater treatment and reuse in unconventional energy production. *Resources, Conservation and Recycling*, 177, 106011.
22. Hejase, C., Weitzel, K., Stokes, S., Graubeger, B.M., Young, R., Arias-Paic, M., Kong, M., Chae, S., Bandhauer, T., **Tong, T.**, Herber, D., Stout, S., Miara, A., Huang, Z., Evans, A., Kurup, P., Talmadge, M., Kandt, A., Stokes-Draut, J., Macknick, J., Borch, T., Dionysiou, D. (2022) Opportunities for Treatment and Reuse of Agricultural Drainage in the U.S. *ACS ES&T Engineering*, 2, 3, 292-305.
23. Jeong, N. §, Chung, T. §, and **Tong, T.*** (2021) Predicting micropollutant removal by reverse osmosis and nanofiltration membranes: Is machine learning viable? *Environmental Science & Technology*, 55, 16, 11348-11359.
24. Qi, Y., **Tong, T.**, and Liu, X. (2021) Mechanisms of silica scale formation on organic macromolecule-coated surfaces. *ACS ES&T Engineering*, 1, 8, 1826-1836.
25. Sun, Y., Wu, M., **Tong, T.**, Liu, P., Tang, P., Gan, Z., Yang, P., He, Q., and Liu, B. (2021) Organic compounds in Weiyuan shale gas produced water: Identification, detection and rejection by ultrafiltration–reverse osmosis processes. *Chemical Engineering Journal*, 412, 128699.
26. Liu, L., He, H., Wang, Y., **Tong, T.**, Li, X., Zhang, Y., and He, T. (2021) Mitigation of gypsum and silica scaling in membrane distillation by pulse flow operation. *Journal of Membrane Science*, 624, 119107.
27. Yin, Y. §, Jeong, N. §, Minjarez, R. §, Robbins, C.A. §, Carlson, K.H., and **Tong, T.*** (2021). Contrasting behaviors between gypsum and silica scaling in the presence of anti-scalants during membrane distillation. *Environmental Science & Technology*, 55, 8, 5335-5346.
28. Zhao, Y., **Tong, T.**, Wang, X., Lin, S., Reid, E., and Chen, Y. (2021) Differentiating solutes with precise nanofiltration for next generation environmental separations: A review. *Environmental Science & Technology*, 55, 3, 1359-1376.
29. Horseman, T., Yin, Y. §, Christie, K.S.S., Wang, Z., **Tong, T.***, Lin, S.* (2021) Wetting, scaling, and fouling in membrane distillation: State-of-the-art insights on fundamental mechanisms and

mitigation strategies. *ACS ES&T Engineering*, 1, 1, 117-140.

Featured as [cover article](#) of the inaugural issue of *ACS ES&T Engineering*; selected to receive *ACS ES&T Engineering Best Paper Award*

30. Robbins, C.A.[§], Carlson, K.H., Garland S., Bandhauer, T., Grauberger, B.M.[§], **Tong, T.*** (2021) Spatial analysis of membrane distillation powered by waste heat from natural gas compressor stations for unconventional oil and gas wastewater treatment in Weld County, Colorado. *ACS ES&T Engineering*, 1, 2, 192-203.
31. Du, X.[§], Li, H., Robbins, C.A.[§], Carlson, K.H., **Tong, T.*** (2021) Activity and water footprint of unconventional energy production under hydroclimate variation in Colorado. *ACS ES&T Water*, 1, 2, 281-290.
32. Robbins, C.A.^{§†}, Grauberger, B.M.^{§†}, Garland S.[†], Carlson, K.H., Lin, S., Bandhauer, T.*, and **Tong, T.*** (2020) On-site treatment capacity of membrane distillation powered by waste heat or natural gas for unconventional oil and gas production in the Denver-Julesburg Basin. *Environment International*, 145, 106142.
33. Chang, H., Liu, S., **Tong, T.**, He, Q., Crittenden, J.C., Vidic, R.D., Liu, B. (2020) On-site treatment of shale gas flowback and produced water in Sichuan Basin by fertilizer drawn forward osmosis for irrigation. *Environmental Science & Technology*, 54, 17, 10926–10935.
34. Li, C., Li, X., Du, X.[§], Zhang, Y., Wang, W., **Tong, T.**, Kota, A.K., Lee, J. (2020) Elucidating the trade-off between membrane wetting resistance and water vapor flux in membrane distillation. *Environmental Science & Technology*, 54, 16, 10333–10341.
35. Yin, Y.[§], Jeong, N.[§], **Tong, T.*** (2020) The effects of membrane surface wettability on pore wetting and scaling reversibility associated with mineral scaling in membrane distillation. *Journal of Membrane Science*, 614, 118503.
36. Qi, Y., **Tong, T.**, Zhao, S., Zhang W., Wang, Z., and Wang, J. (2020) Reverse osmosis membrane with simultaneous fouling- and scaling-resistance based on multilayered metal-phytic acid assembly. *Journal of Membrane Science*, 601, 117888.
37. Christie, K.S.S.[†], Yin, Y.^{†§}, Lin, S.*, and **Tong, T.*** (2020) Distinct behaviors between gypsum and silica scaling in membrane distillation. *Environmental Science & Technology*, 54, 1, 568-576.
38. Yin, Y.[§], Wang, W., Kota, A.K., Zhao, S., and **Tong, T.*** (2019) Elucidating mechanisms of silica scaling in membrane distillation: Effects of membrane surface wettability. *Environmental Science: Water Research & Technology*, 5, 2004-2014.
39. Pica, N.E., Funkhouser, J., Yin, Y.[§], Zhang, Z.[§], Ceres, D., **Tong, T.**, and Blotevogel, J. (2019): Electrochemical oxidation of hexafluoropropylene oxide dimer acid (GenX): Mechanistic insights and efficient treatment train with nanofiltration. *Environmental Science & Technology*, 53, 12602-12609.
40. Wang, W.[†], Du, X.^{†§}, Vahabi, H., Zhao, S., Yin, Y.[§], Kota, A.K.*, and **Tong, T.*** (2019) Trade-off in membrane distillation with monolithic omniphobic membranes. *Nature Communications*, 10, 3220.

Featured in [College of Engineering at CSU](#) and [ScienceDaily](#).

41. **Tong, T.***, Carlson, K.H., Robbins, C.A.[§], Zhang, Z.[§], and Du, X.[§] (2019) Membrane-based treatment of shale oil and gas wastewater: The current state of knowledge. *Frontiers of Environmental Science & Engineering*, 13, 63. (Featured as the cover article)
42. Li, C., Li, X., Du, X.[§], **Tong, T.**, Cath, T.Y., and Lee, J. (2019) Antiwetting and antifouling Janus membrane for desalination of saline oily wastewater by membrane distillation. *ACS Applied Materials & Interfaces*, 11, 18456-18465.
43. **Tong, T.***, Wallace, A.F.*, Zhao, S*, and Wang, Z.* (2019) Mineral scaling in membrane desalination: Mechanisms, mitigation strategies, and feasibility of scaling-resistant membranes. *Journal of Membrane Science*, 579, 52-69.
44. Zhang, Z.[§], Du, X.[§], Carlson, K.H., Robbins, C.A.[§], and **Tong, T.*** (2019) Effective treatment of

shale oil and gas produced water by membrane distillation coupled with precipitative softening and walnut shell filtration. *Desalination*, 454, 82-90.

45. Du, X. ^{†§}, Zhang, Z. ^{†§}, Carlson, K.H., Lee, J., and **Tong, T.*** (2018) Membrane fouling and reusability in membrane distillation of shale oil and gas produced water: Effects of membrane surface wettability. *Journal of Membrane Science*, 567, 199-208.
46. Quay, A.N. [†], **Tong, T.** ^{†*}, Hashmi, S., Zhou, Y., Zhao, S., and Elimelech, M.* (2018) Combined organic fouling and inorganic scaling in reverse osmosis: Role of protein-silica interactions. *Environmental Science & Technology*, 52, 16, 9145-9153.
47. Cheng, W., Liu, C., **Tong, T.**, Epsztein, R., Sun, M., Ma, J., and Elimelech, M. (2018) Selective removal of divalent cations by multilayer polyelectrolyte nanofiltration membrane: Role of ion size, polyelectrolyte charge, and ionic strength. *Journal of Membrane Science*, 559, 98-106.
48. Deshmukh, A., Boo, C., Karanikola, V., Lin, S., Straub, A.P., **Tong, T.**, Warsinger, D.M., and Elimelech, M. (2018) Membrane distillation at the water-energy nexus: Limits, opportunities, and challenges. *Energy & Environmental Science*, 11, 1177-1196.
49. Guo, N., Wang, Y., **Tong, T.**, and Wang, S. (2018) The fate of antibiotic resistance genes and their potential hosts during bio-electrochemical treatment of high-salinity pharmaceutical wastewater. *Water Research*, 133, 78-86.
50. **Tong, T.*** (2018) Environmental nanotoxicology: Where are we now? *Journal of Industrial and Environmental Chemistry*, 2(1), 11-13 (Invited editorial contribution).
51. Sun, J., Hu, C., **Tong, T.**, Zhao, K., Qu, J., and Elimelech, M. (2017) Performance and mechanisms of ultrafiltration membrane fouling mitigation by coupling coagulation and applied electric field in a novel electrocoagulation membrane reactor. *Environmental Science & Technology*, 51, 15, 8544-8551.
52. Zhao, S., Huang, L., **Tong, T.**, Zhang, W., Wang, Z., Wang, J., and Wang, S. (2017) Antifouling and antibacterial behavior of polyethersulfone membrane incorporating polyaniline@silver nanocomposites. *Environmental Science: Water Research & Technology*, 3, 710-719.
53. **Tong, T.** [†], Zhao, S. [†], Boo, C., Hashmi, S., and Elimelech, M. (2017) Relating silica scaling in reverse osmosis to membrane surface properties. *Environmental Science & Technology*, 51, 8, 4396-4406.
54. Wilke, C.M., **Tong, T.**, Gaillard, J.-F., and Gray, K.A. (2016) Attenuation of microbial stress due to nano-Ag and nano-TiO₂ interactions under dark conditions. *Environmental Science & Technology*, 50, 20, 11302-11310.
55. **Tong, T.** and Elimelech, M. (2016) The global rise of zero liquid discharge for wastewater management: Drivers, technologies, and future directions. *Environmental Science & Technology*, 50, 13, 6846-6855.
56. Wang, N., **Tong, T.**, Xie, M., and Gaillard, J.-F. (2016) Lifetime and dissolution kinetics of zinc oxide nanoparticles in aqueous media. *Nanotechnology*, 27(32), 324001.
57. Binh, C.T.T., Adams, E., Vigen, E., **Tong, T.**, Gaillard, J.-F., Gray, K.A., Peterson, C., and Kelly, J.J. (2016) Chronic addition of a common engineered nanomaterial alters biomass, activity and composition of stream biofilm communities. *Environmental Science: Nano*, 3, 619-630.
58. Ozaki, A., Adams, E., Binh, C.T.T., **Tong, T.**, Peterson, C., Gaillard, J.-F., Gray, K.A., and Kelly, J.J. (2016) One-time addition of nano-TiO₂ triggers short-term responses in benthic bacterial communities in artificial streams. *Microbial Ecology*, 71, 266-275.
59. **Tong, T.**, Wilke, C.M., Wu, J., Binh, C.T.T., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. (2015) Combined toxicity of nano-ZnO and nano-TiO₂: From single- to multinanomaterial systems. *Environmental Science & Technology*, 49, 13, 8113-8123.
60. Binh, C.T.T., Peterson, C., **Tong, T.**, Gaillard, J.-F., Gray, K.A., and Kelly, J.J. (2015) Comparing acute effects of nano-TiO₂ on cosmopolitan freshwater phototrophic microbes using high-throughput screening. *PLoS One*, 10(4), e0125613.

61. **Tong, T.**, Hill, A., Alsina, M., Wu, J., Shang, K., Kelly, J.J., Gray, K.A., and Gaillard, J.-F. (2015) Spectroscopic characterization of TiO₂ polymorphs in wastewater treatment and sediment samples. *Environmental Science & Technology Letters*, 2, 1, 12-18.
62. Binh, C.T.T., **Tong, T.**, Gaillard, J.-F., Gray, K.A., and Kelly, J.J. (2014) Acute effects of TiO₂ nanomaterials on the viability and taxonomic composition of aquatic bacterial communities assessed via high-throughput screening and next generation sequencing. *PLoS One*, 9(8), e106280.
63. **Tong, T.**, Fang, K., Thomas, S.A., Kelly, J.J., Gray, K.A., and Gaillard, J.-F. (2014) Chemical interactions between nano-ZnO and nano-TiO₂ in a natural aqueous medium. *Environmental Science & Technology*, 48, 14, 7924-7932.
64. Thomas, S.A., **Tong, T.**, and Gaillard, J.-F. (2014) Hg(II) bacterial biouptake: The role of anthropogenic and biogenic ligands present in solution and spectroscopic evidence of ligand exchange reactions at the cell surface. *Metallomics*, 6(12), 2213-2222.
65. Binh, C.T.T., **Tong, T.**, Gaillard, J.-F., Gray, K.A., and Kelly, J.J. (2014) Common freshwater bacteria vary in their responses to short-term exposure to nano-TiO₂. *Environmental Toxicology and Chemistry*, 33, 317-327.
66. Li, D., **Tong, T.**, Zeng, S., Lin, Y., Wu, S., and He, M. (2014) Quantification of viable bacteria in wastewater treatment plants by using propidium monoazide combined with quantitative PCR (PMA-qPCR). *Journal of Environmental Sciences*, 26(2), 299-306.
67. **Tong, T.**, Shereef, A., Wu, J., Binh, C.T.T., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. (2013) Effects of material morphology on the phototoxicity of nano-TiO₂ to bacteria. *Environmental Science & Technology*, 47, 21, 12486-12495.
68. **Tong, T.**, Binh, C.T.T., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. (2013) Cytotoxicity of commercial nano-TiO₂ to *Escherichia coli* assessed by high-throughput screening: Effects of environmental factors. *Water Research*, 47(7), 2352-2362.
69. Long, F., Wu, S., He, M., **Tong, T.**, and Shi, H. (2011) Ultrasensitive quantum dots-based DNA detection and hybridization kinetics analysis with evanescent wave biosensing platform. *Biosensors & Bioelectronics*, 26, 2390-2395.
70. **Tong, T.**, Wu, S., Li, D., He, M., Yang, T., and Shi, H. (2011) Evaluation of pathogen disinfection efficacy by chlorine and monochloramine disinfection based on quantitative PCR combined with propidium monoazide (PMA-qPCR). *Environmental Science*, 32(4), 1120-1126.
71. Zheng, S., Zhang, Y., **Tong, T.**, Cui, C., and Sun, J. (2010) Dominance of yeast in activated sludge under acidic pH and high organic loading. *Biochemical Engineering Journal*, 52, 282-288.
72. Wu, S., Shi, H., **Tong, T.**, He, M., Zhu, A., Long, F., and Han, S. (2010) Development and performance study of novel DNA optic fiber biosensor. *Chinese Journal of Analytical Chemistry*, 38(10), 1528-1532.
73. **Tong, T.**, Zhang, Y., Zheng, S., and Yang, J. (2008) Control of microbial communities achieved by pH adjustment and its influences on batch treatment of antibiotic wastewater. *Environmental Science*, 29(2), 338-343.

Reports & Book Chapters

1. **Tong, T.** (2023) The Roles of Nanostructures in Mitigating Pore Wetting and Mineral Scaling in Membrane Distillation. In *Nanotechnology for Water Treatment and Water Interfaces*, J. Chen & M. Tirrell (Eds.), pp. 323–340. Vol. 2 of *The World Scientific Reference of Water Science*. Singapore: World Scientific
2. Borch, T., Dionysiou, D.D., Katz, L., Xu, P., Bandhauer, T., Breckenridge, R., Chae, S., Ellison, K., Fox, J., Grauberger, B., Hejase, C.A., Herber, D., Kong, M., Macknick, J., Sedlak, D., Stokes, S., Stokes-Draut, J., **Tong, T.**, Weitzel, K.A., and Young, R.B. (2021) National Alliance Water Innovation Agriculture Sector Technology Roadmap. DOE/GO-102021-5564.

Conferences & Workshops

1. **Tong, T.** Tale of two scales: Elucidating the contrast behaviors and mitigation strategies of gypsum and silica scaling in membrane desalination. The ACS 2024 Spring National Meeting, March 17-21, 2024, New Orleans, LA (oral presentation, invited for the Session of Outstanding Achievements Award and James J. Morgan Early Career Award in Environmental Science and Technology).
2. Yao, Y.[§], Yin, Y.[§], and **Tong, T.** The design of anti-scalants for gypsum and silica scaling in membrane desalination: A systematic study. The 10th International Water Association Membrane Technology Conference & Exhibition for Water and Wastewater Treatment and Reuse, July 23-26, 2023, St. Louis, MO (invited, oral presentation, won **Best Oral Presentation Award**).
3. Yao, Y.[§], Ge, X.[§], and **Tong, T.** Anti-scalants for mitigating silica scaling in membrane desalination: Effects of molecular structure and membrane process. The 2023 Association of Environmental Engineering and Science Professors (AEESP) Research & Education Conference, June 20-23, 2023, Boston, MA (oral presentation).
4. Park, S.[§], Saavedra, M.[§], and **Tong, T.** A tale of two foulants: Combined organic fouling and mineral scaling during reverse osmosis desalination. The 2023 Association of Environmental Engineering and Science Professors (AEESP) Research & Education Conference, June 20-23, 2023, Boston, MA (poster).
5. **Tong, T.** and Jeong N.[§] Exploring the knowledge attained by machine learning on organics and ion transport across polyamide membranes using explainable artificial intelligence. The 2nd Greater Bay Area Symposium on Separation and Purification Technology, May 19-23, 2023, online (invited, oral presentation).
6. Yao, Y.[§] and **Tong, T.** Antiscalants for mitigating silica scaling in membrane desalination: Effects of molecular structure and membrane process. North American Membrane Society 32nd Annual Meeting, May 13-17, 2023, Tuscaloosa, AL (oral presentation).
7. Yao, Y.[§], Zhang, X., Horseman, T., Wang, R., Yin, Y.[§], Zhang, S., Lin, S., and **Tong, T.** Electro-dialytic crystallization for energy-efficient brine management. 2023 WateReuse Colorado Conference, May 2, 2023, Boulder, CO (poster)
8. **Tong, T.** and Yin, Y.[§] A tale of two scales: The contrast behaviors and mitigation strategies of gypsum and silica scaling in membrane distillation. The ACS 2022 Fall National Meeting, August 21-25, 2022, Chicago, IL (oral presentation).
9. **Tong, T.** and Yin, Y.[§] A tale of two scales: The contrast behaviors and mitigation strategies of gypsum and silica scaling in membrane distillation. Association of Environmental Engineering & Science Professors (AEESP) Research and Education Conference, June 28-30, 2022, St. Louis, MO (oral presentation).
10. Jeong, N.[§] and **Tong, T.** Predicting efficiency and elucidating mechanisms for organic and inorganic compound removal by reverse osmosis and nanofiltration membranes using machine learning. Association of Environmental Engineering & Science Professors (AEESP) Research and Education Conference, June 28-30, 2022, St. Louis, MO (oral presentation).
11. Weitzel, K., Hejase, C., Stokes, S., Grauberger, B.[§], Young, R., Arias-Paic, M., Kong, M., Chae, S., Bandhauer, T., **Tong, T.**, Herber, D., Stout, S., Miara, A., Huang, Z., Evans, A., Kurup, P., Talmadge, M., Kandt, A., Stokes-Draut, J., Macknick, J., Borch, T., Dionysiou, D. Treatment and reuse of agricultural drainage water: opportunities and challenges. Association of Environmental Engineering & Science Professors (AEESP) Research and Education Conference, June 28-30, 2022, St. Louis, MO (poster, won **Best Poster Award**).
12. Grauberger, B.M.[§], Cole, G.M., Robbins, C.A.[§], Quinn, J.C., **Tong, T.**, and Bandhauer, T.M. Feasibility of waste heat capture, storage, and transportation for utilization in decentralized produced water treatment. 7th Thermal and Fluids Engineering Conference (TFEC), May 15-18, 2022, Las Vegas, NV (oral).

13. Jeong, N.[§] and **Tong, T.** Predicting efficiency and elucidating mechanisms for organic and inorganic compound removal by reverse osmosis and nanofiltration membranes using machine learning. North American Membrane Society 2022 Annual Meeting, May 14-18, 2022, Tempe, AZ (oral presentation).
14. **Tong, T.**, Bandhauer, T., Robbins, C. [§], Grauberger, B.[§] Understanding the feasibility of membrane distillation powered by waste heat for the treatment of unconventional oil and gas wastewater. The ACS 2021 Fall National Meeting, August 22-26, 2021, Atlanta, GA (oral presentation).
15. Yin, Y. [§] and **Tong, T.** Contrast behaviors and mitigation strategies of gypsum and silica scaling in membrane distillation. North American Membrane Society 30th Annual Meeting, August 28-September 2, 2021, Estes Park, CO (poster).
16. Yin, Y. [§], Jeong, N. [§], **Tong, T.** NSF-E05-The effects of membrane surface wettability on pore wetting and scaling reversibility associated with mineral scaling in membrane distillation. The 9th Sustainable Nanotechnology Organization Conference, November 12-13, 2020, virtual (poster, invited).
17. **Tong, T.** More than wetting resistance: How does membrane surface wettability regulate water vapor permeability in membrane distillation? North American Membrane Society 29th Annual Meeting, May 18-21, 2020, online (invited, oral presentation)
18. **Tong, T.**, Kota, A.K., Wang, W., Du, X. [§], and Vahabi, H. Beyond wetting resistance: How membrane wettability regulates water vapor permeability in membrane distillation. Association of Environmental Engineering & Science Professors (AEESP) Research and Education Conference, May 14-16, 2019, Phoenix, AZ (poster).
19. **Tong, T.**, Zhao, S., Quay, A., Qi, Y. Unravel the Gordian Knot of membrane desalination: Understanding and mitigating silica scaling in reverse osmosis. The 28th North America Membrane Society (NAMS) Annual Meeting, May 11-15, 2019, Pittsburgh, PA (oral presentation).
20. **Tong, T.**, Robbins, C.A. [§], Carlson, K.H., Du, X. [§], and Zhang, Z.[§] Wastewater treatment and reuse in shale oil and gas industry: Challenges, technologies, and opportunities. BP Remediation Engineering & Technology Summit, November 13-15, 2018, Denver, CO (poster).
21. **Tong, T.**, Zhang, Z. [§], Du, X. [§], Carlson, K.H., and Robbins, C.A. Effective treatment of shale oil and gas produced water by membrane distillation coupled with precipitative softening and walnut shell filtration. 25th Annual International Petroleum Engineering Conference, October 30-November 1, 2018, Denver, CO (oral presentation).
22. **Tong, T.**, Zhao, S., Boo, C., Hashmi, S., Elimelech, M. Understanding the barrier for high recovery desalination: Relating silica scaling in reverse osmosis to membrane surface properties. Association of Environmental Engineering & Science Professors (AEESP) 2017 Research and Education Conference, June 20-22, 2017, Ann Arbor, MI (oral presentation).
23. **Tong, T.**, Zhao, S., Elimelech, M. Influence of membrane surface chemistry on silica scaling in reverse osmosis. 2016 Gordon Research Conference/Seminar on Membranes: Materials & Processes, July 30- August 5, 2016, New London, NH (poster, won **3rd poster place at Gordon Research Seminar**).
24. **Tong, T.**, Binh, C.T.T., Fang, K., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. Ecological consequences of nano-TiO₂ in aquatic environments: From a single-ENM system to multi-ENMs systems. The Third Sustainable Nanotechnology Organization Conference, November 2-4, 2014, Boston, MA (poster).
25. **Tong, T.**, Hill, A., Shang, K., Kelly, J.J., Gaillard, J.-F. and Gray, K.A. Environmental fate of engineered nanomaterials determined by X-ray absorption spectroscopy. Synchrotron Environmental Science VI Conference, September 11-12, 2014, Argonne National Laboratory, IL (poster).
26. **Tong, T.**, Binh, C.T.T., Fang, K., Thomas, S.A., Wilke, C.M., Kelly, J.J., Gaillard, J.-F., and

- Gray, K.A. Ecological consequences of nano-TiO₂ released into aquatic systems: From a single-ENM system to multi-ENM systems. The 248th ACS National Meeting, August 10-14, 2014, San Francisco, CA (oral presentation).
27. **Tong, T.**, Binh, C.T.T., Fang, K., Thomas, S.A., Kelly, J.J., Gaillard, J.-F., and Gray, K.A.. Ecological consequences of nano-TiO₂ released into aquatic systems: interactions of nano-TiO₂ with bacteria and nano-ZnO. Annual Meeting of the Midwest Chapter of Society of Environmental Toxicology and Chemistry, March 24-25, 2014, Chicago, IL (oral presentation, won **runner-up of best student platform**).
 28. **Tong, T.**, Fang, K., Thomas, S.A., Binh, C.T.T., Kelly, J.J., Gray, K.A., and Gaillard, J.-F. When “nano” meets “nano”: Effects of nano-TiO₂/nano-ZnO interactions on nano-ZnO dissolution and photoactivity. The Second Sustainable Nanotechnology Organization Conference, November 3-5, 2013, Santa Barbara, CA (poster).
 29. **Tong, T.**, Binh, C.T.T., Shereef, A., Wu, J., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. Ecotoxicological effects of nanostructured titania to bacteria: Mechanistic insights of regulating factors. The 246th ACS National Meeting, September 8-12, 2013, Indianapolis, IN. (oral presentation, Certificate of Merit Award)
 30. **Tong, T.**, Binh, C.T.T., Shereef, A., Wu, J., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. Potential toxicological effects of nanostructured titania on bacteria: Probing toxicity mechanism using high-throughput screening. 2013 Gordon Research Conference on Environmental Nanotechnology, June 2-7, 2013, Stowe, VT (poster).
 31. **Tong, T.**, Binh, C.T.T., Shereef, A., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. Potential toxicological effects of nanostructured titania on bacteria: Predicting ecotoxicity using high-throughput screening. The First Sustainable Nanotechnology Organization Conference, November 3-6, 2012, Arlington, VA (poster).
 32. **Tong, T.**, Binh, C.T.T., Kelly, J.J., Gaillard, J.-F., and Gray, K.A. High-throughput analysis of eco-toxicity of nano-TiO₂ to model bacteria under simulated environmental conditions. The 22nd V.M. Goldschmidt Conference, June 24-29, 2012, Montréal, Canada (poster).
 33. **Tong, T.**, Thomas, S.A., Gaillard, J.-F., and Gray, K.A. Effects of nano-TiO₂ on the bioavailability of mercury in aquatic environment. International Materials Institute for Solar Energy and Environment Workshop, September 12-16, 2011, Chengdu, China (oral presentation).
 34. **Tong, T.**, Wu, S., He, M., Shi, H. Selective Detection of viable pathogens in wastewater treatment plant by quantitative PCR combined with propidium monoazide. International Conference on Environment Simulation and Pollution Control, November 13-14, 2009, Beijing, China (oral, as presenter, won **Best Student Presentation Award**).
 35. Gray, K.A., **Tong, T.**, Binh, C.T.T., Kelly, J.J., Gaillard, J.-F. Interactions of nanotitania at bacterial surfaces under environmental conditions. The 88th ACS 2014 Colloid and Surface Science Symposium, June 22-25, 2014, Philadelphia, PA (oral presentation).
 36. Binh, C.T.T., **Tong, T.**, Gaillard, J.-F., Gray, K.A., Kelly, J.J. Use of high-throughput screening to measure short-term cytotoxicity of nano-titanium dioxide to common stream bacteria and bacterial communities in natural surface waters. The 113th General Meeting of American Society for Microbiology, May 18-21, 2013, Denver, CO (poster).
 37. Binh, C.T.T., **Tong, T.**, Gray, K.A., Gaillard, J.-F., and Kelly, J.J. Short-term effects of a widely used nanomaterial, nano-titanium dioxide, on *Escherichia coli* in natural surface water. The 112th General Meeting of American Society for Microbiology, June 16-19, 2012, San Francisco, CA (poster).

INVITED SEMINARS/LECTURES

1. Texas A&M University Kingsville, Department of Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Connecting Fundamental Science with*

Engineering Applications to Improve System Resilience. (2023/03)

2. Pacific Northwest National Laboratory. *Unraveling the Gordian Knot of Membrane Desalination: Understanding and Mitigating Mineral Scaling in Membrane Desalination. (2023/03)*
3. Arizona State University, School of Sustainable Engineering and the Built Environment. *Addressing the Gordian Knot of Membrane Desalination: Connecting Fundamental Science with Engineering Applications for Efficient and Resilient Treatment of Hypersaline Brines. (2023/02)*
4. University of Colorado, Boulder, Department of Civil, Environmental, and Architectural Engineering. *Membrane Distillation for Hypersaline Brine Management: Connecting Fundamental Science with Engineering Applications for Improving System Resilience. (2022/11)*
5. University of California, Berkeley, Department of Civil and Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Connecting Fundamental Science with Engineering Applications for Improving System Resilience. (2021/10)*
6. Georgia Institute of Technology, School of Civil and Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Connecting Fundamental Science with Engineering Applications for Improving System Resilience. (2021/09)*
7. Cornell University, Department of Civil and Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Connecting Fundamental Science with Engineering Applications for Improving System Resilience. (2021/09)*
8. Florida A&M University-Florida State University, College of Engineering, Department of Civil and Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Material Innovation for Resilience Systems. (2021/02).*
9. Northwestern University, Department of Civil and Environmental Engineering. *Membrane Distillation for Hypersaline Brine Management: Material Innovation, Resilience, and Energy Consumption. (2021/01)*
10. NL Chemical Technology Inc. *Effective Treatment of Shale Oil and Gas Produced Water by Membrane Distillation: Process Design and Membrane Materials. (2018/11)*

RESEARCH PROJECTS

External funding (\$4.6M in total)

United States – Israel Binational Science Foundation, “Elucidating the role of ion dehydration in regulating transport and selectivity of monovalent ions in polyamide nanofiltration membranes”, (10/2024-09/2028), **PI**, \$236,000 (granted, postponed by one year for applying the NSF-BSF grant, collaborative project with Technion–Israel Institute of Technology and University of Wisconsin-Madison).

U.S. Department of Energy, via National Alliance for Water Innovation, “Controlling the effects of antiscalants on the nucleation of highly soluble salts in reverse osmosis concentrate” (12/2023-11/2025), **CSU PI**, \$1.35M (CSU portion: \$295,000 including \$220,000 federal funding, collaborative project with Washington University in St. Louis, Clarkson University, Argonne National Laboratory, and OLI Systems, Inc).

National Science Foundation, “Collaborative Research: A Bioinspired Approach towards Sustainable Membranes for Resilient Brine Treatment” (10/2022-09/2025), **PI**, \$250,000 (collaborative project with University of Tennessee, Knoxville).

National Science Foundation, “CAREER: Harnessing Mineralogy and Polymer Science to Elucidate Mechanisms and Mitigation Strategies for Mineral Scaling in Membrane Desalination” (07/2022-06/2027), **PI**, \$519,160

National Science Foundation, “Collaborative Research: Elucidating the Coupling of Inorganic
Tiezheng, TONG

Scaling and Organic Fouling in Reverse Osmosis Desalination: An Integrated Experimental and Computational Approach” (07/2022-06/2025), **PI**, \$258,052 (collaborative project with George Washington University).

U.S. Department of Energy, via National Alliance Water for Innovation, “A novel electro-dialytic crystallizer (EDC) for energy efficient zero-liquid discharge” (10/2021-09/2024), **CSU PI**, \$1.31M (CSU portion: \$542,601 including \$406,902 federal funding, collaborative project with Vanderbilt University).

U.S. Department of Agriculture (NIFA-AFRI), “Oilfield-produced water as alternative source for agricultural irrigation: Impact on soil and crop health” (01/2021-12/2023), **Co-PI** (PI: Thomas Borch), \$499,989 (\$158,149 to Tong lab).

U.S. Department of the Interior, Bureau of Reclamation, “Developing relationships between mineral scaling and membrane surface chemistry to improve water recovery of inland brackish water desalination” (07/2019-06/2021), **PI**, \$133,633.

Colorado Office of Economic Development and International Trade, Advanced Industries (AI) Accelerator Grant Programs. “On-site and cost-effective wastewater treatment package for shale oil and gas production” (01/2019-12/2020), **PI**, \$78,000.

Internal funding (\$100,000 in total)

Office of the Vice President of Research, Colorado State University, Quarterly OVPR Investment Funding. “Supporting summer undergraduate research at the water-energy nexus” (05/2019-06/2020), **PI**, \$10,000.

Agricultural Experiment Station, Colorado State University, “Assessing the Feasibility of Membrane-based Treatment of Oil and Gas Produced Water for Agricultural Irrigation” (07/2020-06/2023), **PI**, \$90,000

TEACHING

CIVE 530: Environmental Engineering at the Water-Energy-Health Nexus, graduate/senior level, instructor, CSU, 2018, 2019, 2020, 2021, 2022.

CIVE 541: Physical Chemical Water Treatment Processes, graduate/senior level, instructor, CSU, 2018, 2019, 2021, 2022, 2023.

CIVE 538, Aqueous Chemistry, graduate/senior level, instructor, CSU, 2021, 2023

CIVE 438, Fundamentals of Environmental Engineering, undergraduate level, instructor, CSU, 2022, 2023

STUDENT ADVISEMENT

Current students:

Yiqun Yao (2021/08 – present), Ph.D. student, CSU

Shinyun Park (2021/08 – present), Ph.D. student, CSU

Brandi Grauberger (2021/01 – present), Ph.D. student, CSU (co-advised with Todd Bandhauer)

Connor Coolidge (2022/08 – present), M.S. student, CSU

Xijia Ge (2023/08 – present), M.S. student, CSU

Abby Rafert (2024/01– present), undergraduate research assistant, CSU

Group alumni

I have graduated four Ph.D. students and three M.S. students as their main advisor.

Nohyeong Jeong, Ph.D. (2019/08 – 2023/05), currently postdoc researcher at Georgia Tech

Yiming Yin, Ph.D. (2018/08–2022/05), currently postdoc researcher at Pacific Northwest National Laboratory

Xuewei Du, M.S/Ph.D. (2018/01–2022/05), currently postdoc researcher at New Mexico State University

Cristian A. Robbins, Ph.D. (2018/08–2021/05, co-advised with Kenneth H. Carlson), currently Assistant Professor at United States Military Academy

Tai-heng Chuang. M.S. (2020/09–2021/05)

Zuoyou Zhang, M.S. (2017/10–2019/05)

Xijia Ge, undergraduate research assistant (2022/01 – 2023/05)

Mayca Saavedra, undergraduate research assistant (2022/10 – 2023/05)

Francisco Hernadez, undergraduate research assistant (2023/01– 2023/05)

Ronny Minjarez, undergraduate research assistant (2021/01–2021/12)

THESIS COMMITTEE

Shuangshuang Huang, Department of Civil and Environmental Engineering, CSU (M.S.)

Nara Shin, Department of Environmental and Radiological Health Sciences, CSU (M.S.)

Luke Giugliano, Department of Mechanical Engineering, CSU (M.S.)

Kofi Christie, Department of Civil and Environmental Engineering, Vanderbilt University (Ph.D.)

Garrett Cole, Mechanical Engineering, CSU (M.S.)

PROFESSIONAL SERVICE

Peer-reviewed journals (>30 journals)

ACS Applied & Materials Interfaces, ACS Nano, ACS ES&T Engineering, ACS ES&T Water, Desalination, Engineering, Environmental International, Environmental Pollution, Environmental Science: Nano, Environmental Science: Water Science & Technology, Environmental Science & Technology, Environmental Science & Technology Letters, Enzyme and Microbial Technology, Frontiers of Environmental Science and Engineering, Journal of Hazardous Materials, Nano Letters, Nature Communications, Nature Sustainability, Nature Water, npj Clean Water, Journal of Material Cycles and Waste Management, Journal of Membrane Science, Journal of Membrane Science Letter, Journal of Nanoparticle Research, Journal of Water Process Engineering, Langmuir, PLoS One, Separation & Purification Reviews, Separation & Purification Technology, Science of the Total Environment, Science Advances, The ISME Journal, Water, Air, & Soil Pollution, Water Research, Water Research X

Grant review

National Science Foundation: Environmental Engineering Program (panel four times), Nanoscale Interactions Program (panel one time), and Environmental Chemical Science Program

The U.S. – Egypt S&T Joint Fund, managed by the U.S. National Academies of Sciences, Engineering, and Medicine (panel one time)

The USDA Agriculture and Food Research Initiative (AFRI) Exploratory Research program

Natural Sciences and Engineering Research Council of Canada (NSERC), Civil, Industrial and Systems Engineering

American Chemical Society - ACS Petroleum Research Fund

The German-Israeli Water Technology Cooperation Program, Israeli Ministry of Innovation, Science and Technology

BARD - The US-Israel Agricultural Research & Development Fund

Conference/workshop organizer

Session chair, Membrane Distillation and Pervaporation Session, the North American Membrane Society 2023 Annual Meeting, Tuscaloosa, AL

Editorial activity

Guest Editor, *Desalination* (2023 – present)

Editorial Board, *Journal of Membrane Science* (2023 – present)

Associate Editor, *Frontiers in Membrane Science and Technology* (2022 – present)

Early Career Editorial Board, *Journal of Membrane Science* (2021 – 2023)

Topic Editor, *Membranes* (2020 – present)

PROFESSIONAL AFFILIATIONS

American Chemistry Society (ACS)

Association of Environmental Engineering and Science Professors (AEESP)

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

North American Membrane Society (NAMS)