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EDUCATION AND TRAINING

Postdoctoral Research Associate, Yale University, New Haven, CT (2015 – present)
Department of Chemical and Environmental Engineering
Advisor: Prof. Menachem Elimelech

Ph.D. in Environmental Engineering, Northwestern University, Evanston, IL (2015)
Department of Civil and Environmental Engineering
Advisors: Prof. Kimberly A. Gray and Prof. Jean-François Gaillard

M.Sc. in Environmental Engineering, Northwestern University, Evanston, IL (2011)
Department of Civil and Environmental Engineering
Advisors: Prof. Kimberly A. Gray and Prof. Jean-François Gaillard

M.Sc. in Environmental Engineering, Tsinghua University, Beijing, China (2010)
School of Environment,
Advisor: Prof. Miao He

B.Sc. in Environmental Engineering, Beijing Normal University, Beijing, China (2008)
School of Environment, with highest honor

RESEARCH EXPERIENCE

Scaling-resistant Thin-film Composite Reverse Osmosis (RO) Membranes

Yale University, Advisor: Prof. Menachem Elimelech

- Surface modification of thin-film composite polyamide RO membranes with various polymer coatings
- Elucidating the relationship between silica scaling and membrane surface chemistry
- Mechanistic understanding of silica scaling in RO process

Application of Membrane-based Technologies in Zero Liquid Discharge

Yale University, Advisor: Prof. Menachem Elimelech

- Analysis of the global drivers and benefits of zero liquid discharge as an important wastewater treatment strategy
- Evaluation of the advantages and limitations of membrane-based technologies in achieving zero liquid discharge

Environmental Impacts of Nanomaterials in Aquatic Environments

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

- Probing the toxicological effects of nano-TiO₂ on both bacteria monocultures and microbial communities in natural aqueous media

- Investigation of chemical interactions and co-toxicity of nano-TiO₂, nano-ZnO, and nano-Ag
- Analysis of the fate and accumulation of TiO₂ nanoparticles in wastewater treatment plants and natural sediments
- Nanomaterial characterization by synchrotron-based X-ray absorption spectroscopy

Metal Speciation and Bioavailability in Aqueous Media

Northwestern University, Advisor: Prof. Jean-François Gaillard

- Measurement of mercury bioavailability to bacteria using a luminescence whole-cell biosensor
- Investigation of the effects of organic ligands on mercury speciation and bioavailability

Pathogen Detection in Water and Wastewater Treatment Processes

Tsinghua University, Advisor: Prof. Miao He

- Selective detection of viable bacteria using quantitative PCR with propidium monoazide pretreatment (PMA-qPCR)
- Application of PMA-qPCR in evaluating disinfection and wastewater treatment efficiencies
- Development of an optic fiber biosensor for detection of bacterial DNA

Microbial Community Analysis in Industrial Wastewater Treatment Systems

Beijing Normal University, Advisor: Prof. Shaokui Zheng

- Comparison of yeast- and bacteria-dominant activated sludge systems for the treatment of antibiotic-containing wastewater from a pharmaceutical factory
- Analysis of microbial community in activated sludge by molecular methods

SELECTED AWARDS & HONORS

National, Regional or Professional

- Excellence in Reviewing Award, *Water, Air & Soil Pollution*, Springer, 2016
- 3rd place poster prize at the Gordon Research Seminar on Membranes Materials & Processes, 2016
- Chinese Government Award for Outstanding Self-financed Student Abroad, 2015
- Best Student Platform (runner-up) presented at the Annual Meeting of the Midwest Chapter of Society of Environmental Toxicology and Chemistry, 2014
- Student Award, Sustainable Nanotechnology Organization, 2013
- Certificate of Merit Award for presentation at the American Chemistry Society National Meeting, Division of Environmental Chemistry of the American Chemical Society, 2013
- Illinois Section of the ASCE Environmental & Water Resources Institute (EWRI) Student Scholarship Award (graduate-student level), 2013 (**one awardee per year within the Chicago area**)
- Environmental Chemistry Graduate Student Award, American Chemistry Society, 2012 (**25 awardees per year in the US**)
- Goldschmidt Travel Grant, 2012
- Best Student Presentation Award at the 2009 International Conference on Environment Simulation and Pollution Control, 2009

- Outstanding Senior Student Award of Beijing City, 2008 (awarded to only **top 5%** senior student in Beijing)

University Awarded

- Postdoctoral Scholars Travel Fund Award, Yale University, 2016
- Royal E. Cabell Terminal Year Fellowship, Northwestern University, 2014/2015
- Conference Travel Grant, Northwestern University, 2011, 2012
- Student Research Award, Institute for Sustainability and Energy at Northwestern, 2011
- Walter P. Murphy Fellowship, Northwestern University, 2010
- Mei-shang International Scholarship, Tsinghua University, 2009 (awarded to only **top 5%** students)
- Undergraduate Research Award, Beijing Normal University, 2008
- Outstanding Senior Award of Beijing Normal University, 2008
- First Class Professional Scholarship of Beijing Normal University, 2005, 2006, 2007 (awarded to only **top 5%** students)

PUBLICATIONS (H-index: 10)

Referred Journal Publications

† Contributed equally

1. Zhao, S., Huang, L., **Tong, T.**, Zhang, W., Wang, Z., Wang, J., and Wang, S. (2017) Antifouling and antibacterial properties of polyethersulfone membrane incorporating polyaniline@silver nanocomposites. *Environmental Science: Water Research & Technology*, accepted.
2. **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.
3. Wilke, C.M., **Tong, T.**, Gaillard, J.-F., and Gray, K.A. (2016) Attenuation of microbial stress due to n-Ag and n-TiO₂ interactions under dark conditions. *Environmental Science & Technology*, 50 (20), 11302–11310.
4. **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.
5. 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.
6. 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.
7. 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.
8. **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 multi-ENMs systems. *Environmental Science & Technology*, 49(13), 8113-8123.
9. 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.
 10. **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.
 11. 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.
 12. **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.
 13. 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.
 14. 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.
 15. 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.
 16. **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.
 17. **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.
 18. 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.
 19. **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. (In Chinese)
 20. 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.

21. 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. (In Chinese)
22. **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. (In Chinese)

Manuscripts Under Review

23. Sun, J., Hu, C., **Tong, T.**, Zhao, K., Qu, J., 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*, under review.

Conferences & Workshops

1. **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, as presenter).
2. **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**).
3. **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).
4. **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).
5. **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, as presenter).
6. **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, as presenter, won **runner-up of best student platform**).
7. **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).

8. **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, as presenter)
9. **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).
10. **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).
11. **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).
12. **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, as presenter).
13. **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**).
14. 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 presented by Gray, K. A.).
15. Kelly, J. J., Binh, C. T., **Tong, T.**, Gaillard, J.-F., Gray, K.A. High-throughput screening and next generation sequencing can be used to assess the acute effect of engineered nanomaterials on aquatic bacterial communities. Joint Aquatic Sciences Meeting, May 18-23, 2014, Portland, OR (Oral presented by Kelly, J. J.).
16. 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).
17. 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).

TEACHING EXPERIENCE

- CIV_ENV 365: Environmental Laboratory, graduate level, teaching assistant, Northwestern University, 2012, 2013, 2014, 2015, Winter, Instructor: Prof. Jean-François Gaillard
- CIV_ENV 306: Uncertainty Analysis in Civil Engineering, undergraduate level, grader, Northwestern University, 2012, 2013, Fall, Instructor: Prof. Mark Clark

PROPOSAL WRITING PARTICIPATION

- Development of High Performance Nanofiltration Membranes for Effective Removal of PFOA and PFOS from Groundwater, 2017, \$200 K, pending
PI: Prof. Menachem Elimelech
Sponsor: Strategic Environmental Research and Development Program
- Development of Magnetic Hybrid Nanomaterials for Effective Silica Removal in Inland Brackish Water Desalination, 2017, \$150 K, pending
PI: Prof. Menachem Elimelech
Sponsor: US Department of the Interior, Bureau of Reclamation
- Towards Safer Drinking Water Supply: A Chemical-Free, Compact Process for Sustainable Water Treatment, 2016, \$500 K, pending
PI: Prof. Menachem Elimelech
Sponsor: National Science Foundation, under NSF/NSFC Joint Research on Environmental Sustainability Challenges
- When “Nano” Meets “Nano”: the Co-toxicity of Nano-ZnO and Nano-Ag with Nano-TiO₂, 2013, \$3.6 K, funded
PIs: Prof. Jean-François Gaillard and Kaiqi Fang (Student PI)
Sponsor: Institute for Sustainability and Energy at Northwestern
- Bioavailability of Hg in Aquatic Systems Using a Whole-Cell Bacterial Biosensor, 2011, \$4.7 K, funded
PIs: Prof. Jean-François Gaillard and Tiezheng Tong (Student PI)
Sponsor: Institute for Sustainability and Energy at Northwestern

STUDENTS MENTORED

- Amanda Quay (1st-year PhD student at Yale University)
- Andrea Hill* (1st-year JD-PhD student at Northwestern University)
- Anna Leenay (Undergrad at Northwestern University)
- Carolyn Wilke* (1st-year PhD student at Northwestern University)
- Julianne Wagoner (Undergrad at Northwestern University, worked at ExxonMobil after graduation)
- Kaiqi Fang* (MS student at Northwestern University, enrolled as a PhD student at Carnegie Mellon University after graduation)
- Karis Shang* (Undergrad at Northwestern University)
- Matthew Jones (Undergrad at Northwestern University)
- Matthew Skwarczek (Undergrad at Northwestern University, enrolled as a master student at Northwestern University after graduation)
- Ning Wang* (Exchange PhD student at Northwestern University, from Southwest Jiaotong University)

- Tian Yang* (Undergrad at Tsinghua University, enrolled as a master student at Stanford University after graduation)
- Yufei Zhou (MS student at Northwestern University, worked at Natural Resource Technology, Inc. after graduation)

The asterisk indicates students who have publications with me.

INDEPENDENT REVIEW PARTICIPATION

- **Peer-reviewed journals**

The ISME Journal, PLoS One, Desalination, RSC Advances, Water, Air, & Soil Pollution, Journal of Material Cycles and Waste Management, Enzyme and Microbial Technology

- **Grant review panel**

Yale Institute for Biospheric Studies (YIBS) Small Grant Program

PROFESSIONAL AFFILIATIONS

- Association of Environmental Engineering and Science Professors (AEESP)
- American Chemistry Society (ACS)
- American Society of Civil Engineers (ASCE)
- Geochemical Society
- Illinois Water Environment Association (IWEA)
- NSF Nanosystems Engineering Research Center for Nanotechnology-Enabled Water Treatment (NEWT)
- Midwest Chapter, Society of Environmental Toxicology and Chemistry (SETAC)
- Sustainable Nanotechnology Organization (SNO)