

MENG WANG, PhD, PE

Assistant Professor in Environmental Systems Engineering
John and Willie Leone Family Department of Energy and Mineral Engineering
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EDUCATION

University of Massachusetts Amherst, USA	PhD in Civil Engineering	2013
Xi'an Jiaotong University, Xi'an, China	MS in Environmental Engineering	2008
Zhengzhou University, Zhengzhou, China	BS in Environmental Engineering	2005

RESEARCH INTERESTS AND EXPERTISE

- Biological wastewater treatment and water reuse
- Resource recovery
- Municipal solid waste management
- Sustainable Food-Energy-Water Nexus
- Bioremediation
- Environmental sustainability

PROFESSIONAL EXPERIENCE

Assistant Professor in Environmental Systems Engineering Sep. 2018- present
John and Willie Leone Family Department of Energy and Mineral Engineering, Penn State University
Postdoctoral Research Associate and Instructor 2013 - 2018
Department of Civil and Environmental Engineering, University of South Florida
Research Assistant 2008-2013
Department of Civil and Environmental Engineering, University of Massachusetts Amherst
Engineer Intern 2010
Frevar KF Municipal Enterprise and Aquateam, Norway
Research Assistant 2005-2008
School of Energy and Power Engineering, Xi'an Jiaotong University, China

RESEARCH GRANTS

- “IGE: Stakeholder-Driven Sustainable Development Experiences for Enhancing STEM Graduate Education”. **PI:** Rachel Brennan, **Co-PI:** Meng Wang. **Sponsor:** NSF, **Total Funding:** \$458, 240; June 2021-May 2024.
- “Consortium to Assess Northern Appalachia Resource Yield (CANARY)” **Role:** Faculty member (PI: Sarma Pisupati). **Sponsor:** DOE. **Total Amount of Funding:** \$ 1.2 million; 2021-2023
- “Mainstream deammonification by ion exchange and bioregeneration via partial nitrification/anammox” **PI:** Meng Wang. **Co-PIs:** Zuleima Karpyn at PSU, Sarina Ergas and John Kuhn at USF, and Michal Green and Tarre Sheldon at Technion-Israel Institute of Technology. **Sponsor:** National Science Foundation and US-Israel Binational Science Foundation. **Total Amount of Funding:** \$660, 000; Amount to PSU: \$230,557; July 2020 – June 2023.
- “Re-engineering anaerobic treatment processes for novel functionalities” **PIs:** Meng Wang (PSU) and Shan Yi (University of Auckland). **Co-PIs:** John M. Regan (PSU), Filicia Wicaksana and Wei-Qin Zhuang at the University of Auckland. **Sponsor:** Penn State and University of Auckland Collaboration Seed Fund. **Total Amount of Funding:** 20,000 NZD; June 2020- Dec. 2021.
- “Granulation of Algal-Bacterial Consortia for enhanced CO₂ capture and Resource Recovery”. **PI:** Meng Wang. **Co-PIs:** Julie Cosmidis, Mary Ann Bruns and Xinwei Niu. **Sponsor:** PSU IEE. **Total Amount of Funding:** \$30, 000 and one semester of tuition for a graduate student; July 2020-June 2022.
- “Towards Energy Neutral Wastewater Treatment Plant by Enhanced Organic Carbon Capture and Mainstream Deammonification” **Sponsor:** PSU OPP; July 2019-present.

- “Dynamics of Reactive Nitrogen Released into Environment in Biological Nutrient Removal Processes”. **PI:** Meng Wang. **Sponsor:** EMS E. Willard & Ruby S. Miller Faculty Fellowship. **Total Amount of Funding:** \$50,000; July 2019-June 2024.
- “Valorization of Waste Streams by Bioelectrochemical Processes”. **PI:** Meng Wang. **Sponsor:** EMS Sustainability Fund. **Amount of Funding:** \$9,000. April 2022.

PEER-REVIEWED JOURNAL PUBLICATIONS

- [20] Shayan, S. I., Zalivina, N., **Wang, M.**, Ergas, S. J., & Zhang, Q. (2022). Dynamic model of algal-bacterial shortcut nitrogen removal in photo-sequencing batch reactors. *Algal Research*, 64, 102688.
- [19] Wang, J., Liang, J., Ning, D., Zhang, T., & **Wang, M.** (2022). A review of biomass immobilization in anammox and partial nitrification/anammox systems: Advances, issues, and future perspectives. *Science of The Total Environment*, 152792.
- [18] Wang, J., Liang, J., Sun, L., Shen, J., & **Wang, M.** (2021). Achieving reliable partial nitrification and anammox process using polyvinyl alcohol gel beads to treat low-strength ammonia wastewater. *Bioresource Technology*, 324, 124669.
- [17] Lee, E., Oliveira, D. S. B. L., Oliveira, L. S. B. L., Jimenez, E., Kim, Y., **Wang, M.**, Ergas, S. and Zhang, Q. (2020). Comparative environmental and economic life cycle assessment of high solids anaerobic co-digestion for biosolids and organic waste management. *Water Research*, 171, 115443.
- [16] Adhikari, U., Chabrelie, A., Weir, M., Boehnke, K., McKenzie, E., Ikner, L., **Wang, M.**, Wang, Q., Young, K., Haas, C.N., & Rose, J. (2019). A Case Study Evaluating the Risk of Infection from Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV) in a Hospital Setting Through Bioaerosols. *Risk Analysis*, 39(12), 2608-2624.
- [15] Lee, E., Bittencourt, P., Casimir, L., Jimenez, E., **Wang, M.**, Zhang, Q., & Ergas, S. J. (2019). Biogas production from high solids anaerobic co-digestion of food waste, yard waste and waste activated sludge. *Waste Management*, 95, 432-439.
- [14] **Wang, M.**, Payne, K., Tong, S. and Ergas, S (2018). Hybrid algal photosynthesis and ion exchange (HAPIX) process for high ammonium strength wastewater treatment. *Water Research*. 142: 65-74.
- [13] **Wang, M.**, Keeley, R., Zalivina, N*, Halfhide, T., Scott, S., Zhang, Q., van der Steen, P., Ergas, S. (2018). Advances in algal-prokaryotic wastewater treatment: a review of nitrogen transformations, reactor configurations, and molecular tools. *Journal of Environmental Management*. 217: 845-857.
- [12] **Wang, M.**, Lee, E., Dilbeck, M*, Liebelt, M.*, Zhang, Q. and Ergas, S. (2017). Thermal pretreatment of microalgae for biomethane production: experimental studies, kinetics, and energy analysis. *Journal of Chemical Technology and Biotechnology*.92:399-407.
- [11] Lee, E., Cumberbatch, J., **Wang, M.**, and Zhang Q. (2017). Kinetic parameter estimation model for anaerobic co-digestion with waste activated sludge and microalgae. *Bioresource Technology*. 228: 9-17.
- [10] Amini, A., Aponte-Morales, V., **Wang, M.**, Dillbeck, M.*, Manser, N., Zhang, Q., Cunningham, J., Lahav, O., Ergas, S. (2017). Cost-effective treatment of swine wastes through the recovery of energy and nutrients. *Waste Management*. 69:508-517.
- [9] **Wang, M.**, Lee, E., Zhang, Q, and Ergas, S (2016). Anaerobic co-digestion of swine manure and microalgae *Chlorella* sp.: experimental studies and energy analysis. *BioEnergy Research*.9: 1-12.
- [8] Manser, N., **Wang, M.**, Ergas, S., Mihelcic, J., Mulder, A., van de Vossenber, J, van Lier J., and van der Steen, P. (2016) Biological nitrogen removal in a photo-sequencing batch reactor with an algal-nitrifying bacterial consortium and anammox granules. *Environmental Science & Technology Letters*. 3: 175-179.
- [7] Arashiro, L. *, Rada-Ariza, A., **Wang, M.**, van der Steen P., and Ergas, S. (2016). Modeling shortcut nitrogen removal from wastewater using an algal-bacterial consortium. *Water Science and Technology*. 75: wst2016561.
- [6] **Wang, M.**, Yang, H. *, van der Steen, P. and Ergas, S. (2015). A novel shortcut nitrogen removal process using an algal-bacterial consortium in a photo-sequencing batch reactor (PSBR). *Water Research*. 87: 38-48.
- [5] **Wang, M.** and Park, C. (2015). Investigation of anaerobic digestion of *Chlorella* sp. and *Micractinium* sp. grown in high-nitrogen wastewater and their co-digestion with waste activated sludge. *Biomass and Bioenergy*, 80: 30-37.

[4] **Wang, M.**, Kuo-Dahab, C., Dolan, S. and Park, C. (2014). Kinetics of nutrient removal and expression of extracellular polymeric substance by microalgae *Chlorella* sp. and *Micractinium* sp. in wastewater treatment. *Bioresource Technology*.154: 131-137.

[3] **Wang, M.**, Sahu, A., Rusten, B. and Park, C. (2013). Anaerobic co-digestion of microalgae *Chlorella* sp. and waste activated sludge. *Bioresource Technology*.142: 585-590.

[2] Baek, K., **Wang, M.**, McKeever, R., Rieber, K., Park, C., and Nüsslein, K. (2013). Biodegradation of low concentrations of 1,2-dibromoethane in groundwater is enhanced by phenol. *Applied Microbiology and Biotechnology*. 98: 1329-1338.

[1] Yuan, X., **Wang, M.**, Park, C., Kumar, A, Sahu, A., Ergas, S. (2012). Microalgae growth using high-strength wastewater followed by anaerobic co-digestion. *Water Environment Research*. 84: 396-404.

PATENT

- Systems and processes for wastewater treatment (Patent # 10961142). Sarina Ergas and Meng Wang

BOOK CHAPTER

[1] Wang M., Chapter III.3 "Environmental applications of microalgae: CO₂ capture and nutrient recycling" in Book "Microalgae as a Source of Bioenergy: Products, Processes and Economics" (2017). Bentham Science Publishers.

CONFERENCE PRESENTATIONS

[21] Zhang, T., Payne, K., & Wang, M.. "Hybrid ion exchange and biological processes for ammonia removal: experimental and modeling studies," Water and Environment Student Talks, University of British Columbia, Virtual Conference, June 9, 2021.

[20] Zalivina, N., Recinos-Arenas, C., van der Steen, P., van de Vossenberg, J., Wang, M., & Ergas, S.. "High ammonia strength wastewater treatment using algae, bacteria and ion exchange," IWA Conference on Algal Technologies and Stabilisation Ponds for Wastewater Treatment and Resource Recovery, June 30, 2019 - July 2, 2019. Valladolid, Spain.

[19] Wang, M., DeBellis, J., Zalivina, N., Weissbrodt, D., Guest, J., & Ergas, S.. "Impact of Solids Residence Time on the Microbial Community of Photo-sequencing Batch Reactors (PSBR) for shortcut N removal," IWA Conference on Algal Technologies and Stabilisation Ponds for Wastewater Treatment and Resource Recovery, June 30, 2019 - July 2, 2019. Valladolid, Spain.

[18] Lee, E., Bittencourt, P., Jimenez, E., Oliveira, D., Oliveira, L., Hinds, G., Wang, M., Zhang, Q., & Ergas, S.. (). "Sustainable Bioenergy Production by High Solids Anaerobic Co-digestion of Food Waste, Yard Waste and Biosolids," WEF/IWA Residuals and Biosolids Conference, May 8, 2019 - May 10, 2019, Ft. Lauderdale, FL.

[17] Wang, M., Payne, K., Tong, S., Ergas S. (2017). A hybrid algal photosynthesis and ion-exchange (HAPIX) process for side stream wastewater treatment: experimental and modeling studies. Oral presentation and conference proceeding. Water Environment Federation 90th Annual Technical Exhibition and Conference (WEFTEC 2017), Chicago, IL.

[16] Wang, M., Payne, K., Tong, S., Ergas S. (2017). Hybrid Ion Exchange and Algae for High Strength Side Stream Wastewater Treatment. Oral presentation and conference proceeding. WEF Nutrient Symposium, June 12-14, Ft. Lauderdale, FL.

[15] Zalivina, N.*, Keeley, R., Wang, M., Arashiro, L.T., Scott, K., Ergas, S.J., van der Steen, P. (2017). Effect of Solids Retention Time on Nitrogen Removal and Microbial Consortium in a Novel Algal-Bacterial Shortcut Nitrogen Removal System, WEF Nutrient Symposium, June 12-14, Ft. Lauderdale, FL.

[14] Arashiro, L.*, Rada-Ariza, A., Wang, M., van der Steen P., and Ergas, S. (2016). Modeling shortcut nitrogen removal from wastewater using an algal-bacterial consortium. Oral presentation and conference proceeding. 13th Leading Edge Conference on Water and Wastewater Technologies, Jun. 13-16, 2016, Spain.

[13] Wang, M., Liebelt, M.*, Dilbeck, M.*, and Ergas, S. (2015). Thermal pretreatment of microalgae for biogas production. WEF/IWA Residuals and Biosolids Conference, Washington D.C.

[12] Wang, M., Yang, H.*, and Ergas, S., Van der Steen, P. (2015). A novel shortcut nutrient removal process by an algal-bacterial consortium in a sequencing batch photobioreactor (SBPB). Oral presentation, 249th ACS National Meeting & Exposition, Denver, CO.

- [11] Wang, M., Lee, E., Zhang, Q and Ergas, S. (2014) Energy production from anaerobic co-digestion of swine manure and microalgae *Chlorella* sp. Oral presentation and conference proceeding, Water Environment Federation 87th Annual Technical Exhibition and Conference (WEFTEC 2014), New Orleans, LA.
- [10] Amini, A. Veronica Aponte-Morales, V., Wang, M., et al. (2014). A proposed treatment train for sustainable energy and nutrient recovery from swine waste. Poster presentation and conference proceeding, Water Environment Federation 87th Annual Technical Exhibition and Conference (WEFTEC 2014), New Orleans, LA.
- [9] Wang, M., Kuo-Dahab, C. and Park C. (2013) Investigation of characteristics of microalgae grown in different wastewater and their enhancing anaerobic digestibility of waste activated sludge. Oral presentation and conference proceeding, Water Environment Federation 86th Annual Technical Exhibition and Conference (WEFTEC 2013), Chicago, IL.
- [8] Wang, M., Zhu, Z., Dolan, S. and Park, C. (2012) Cultivation and anaerobic co-digestion of microalgae for wastewater treatment systems. Oral presentation and conference proceeding, International Water Association (IWA) Water Congress, Busan, Korea.
- [7] Wang, M. and Park, C. (2012) Improving the digestibility of micro green algae by anaerobic co-digestion with waste activated sludge. Oral presentation and proceeding, Water Environment Federation 26th Annual Residuals and Biosolids Management Conference, Raleigh, NC.
- [6] Wang, M., Zhu, Z., Dolan, S., and Park, C. (2012) Investigation of algal cultivation and anaerobic co-digestion of sewage sludge and algae at wastewater treatment plant (WWTP). Conference proceeding, Water Environment Federation 85th Annual Technical Exhibition and Conference (WEFTEC 2012), New Orleans, LA.
- [5] Teague, P., Wang, M. and Park, C. (2011) Predicting the digestibility of sludge using EPS analysis, Conference proceeding, Water Environment Federation 84th Annual Technical Exhibition and Conference (WEFTEC 2011), Los Angeles, CA.
- [4] Wang, M., Teague, P., and Park, C. (2010) Effects of feeding patterns on extracellular polymer substances (EPS) and digestibility of activated sludge. Poster and conference proceeding, Water Environment Federation 83th Annual Technical Exhibition and Conference (WEFTEC 2010), New Orleans, LA.
- [3] Yuan, X., Wang, M., Park, C., Sahu, A.K., and Ergas, S.J. (2010) Microalgae growth using high strength wastewater followed by anaerobic co-digestion. Oral presentation and proceeding, Water Environment Federation 83th Annual Technical Exhibition and Conference (WEFTEC 2010), New Orleans, LA.
- [2] Wang, M., Teague, P., and Park, C. (2010) Effects of activated sludge reactor and EPS on anaerobic digestion and sludge pretreatment. Oral presentation and conference proceeding, Water Environment Federation 24th Annual Residuals and Biosolids Management Conference, Savannah, GA.
- [1] Park, C., Nüsslein, K., Teague, P, and Wang, M. (2009) Effects of feeding patterns on activated sludge characteristics and its digestibility in anaerobic digestion. Oral presentation and conference proceeding, Water Environment Federation 82th Annual Technical Exhibition and Conference (WEFTEC 2009), Orlando, FL.

Posters

- [1] Wang, M., Payne, K., Tong, S., Ergas, S.J. (2018). Resource Recovery From Anaerobic Digestion Effluent By A Hybrid Algal Photosynthesis And Ion-exchange Process. IWA Leading Edge Conference on Water and Wastewater Technologies (IWA-LET), Nanjing, China, May 27-May 31, 2018.
- [2] Zalivina, N., Sanford, S., Sokefun, T., Wang, M., Ergas, S.J. (2018). Application of an Anammox-enhanced Zeolite System for Nitrogen Removal from Anaerobic Digestion Sidestreams. Florida Water Resources Conference (FWRC), Daytona Beach, FL, April, 2018. (First place for the poster competition).
- [3] Dixon, P., Waris, A., Lacroff, P., Lee, E., Wang, M., Zhang, Q., Mihelcic, J., and Ergas, S. (2018) Energy From Biosolids and Municipal Solid Waste: Effect of Organic Loading Rate on Methane Yield, Florida Water Resource Conference (FWRC), Daytona Beach, FL, April, 2018.
- [4] Wang, M., Payne, K., Tong, S., Ergas S. (2017). Hybrid ion-exchange (IX) and algae for high strength side stream wastewater treatment, 1st IWA Conference on Algal Technologies for Wastewater Treatment and Resource Recovery, March 16-17, Delft, The Netherlands.
- [5] Kim, Y., Wang, M., Ergas S., Zhang, Q. (2016). A sustainable energy supply system in aquaculture. Poster presented at the World Aquaculture Society Conference, Feb. 22-26, Nevada, LV.
- [6] Wang, M., and Ergas, S.J. (2014). Anaerobic co-digestion of swine manure and microalgae for biogas production, Poster presentation, 2014 International Biomass Conference & Expo, Orlando, FL, March 24-26.

- [7] Wang, M., Lee, E., Zhang, Q. and Ergas, S.J. (2014). Anaerobic co-digestion of algae and swine manure. Poster presentation, Florida Energy Systems Consortium Workshop, Gainesville, FL, May 12-13.
- [8] Wang, M. and Park, C. (2011) Anaerobic co-digestion of microalgae and activated sludge from wastewater treatment systems. Oral presentation, Annual Northeast Residuals & Biosolids Conference, Seekonk, MA.
- [9] Teague, P., Wang, M., and Park, C. (2010). The effect of iron concentration and aeration basin configuration on susceptibility to sonication pretreatment and subsequent anaerobic digestion. Poster presentation, Water Environment Federation 83th Annual Technical Exhibition and Conference (WEFTEC 2010), New Orleans, LA.
- [10] Wang, M., and Park, C. Investigating the nitrogen removal by microalgae in N-rich wastewater and anaerobic digestion of their biomass as biomethane feedstock. Oral presentation, The 6th International conferences on "Challenges in Environmental Science and Engineering" (CESE 2013), Daegu, Korea.

INVITED PRESENTATIONS AND SEMINARS

- Wang, M. (April 2, 2021). "Intensification of Algae-Based Wastewater Treatment for Nutrient Removal and Resource Recovery," University of Buffalo, Invited. Universities.
- Wang, M. (March 26, 2021). "Sustainable Management of Water and Nutrient at Penn State," USF Seminar, University of South Florida, Invited.
- Wang, M. (October 23, 2019). "Intensification of Algae-Based Wastewater Treatment for Nutrient Removal and Resource Recovery," CEE Seminar, Civil and Environmental Engineering, PSU, Invited. Local.
- Wang, M. (June 2019). "Intensification of Algae-Based Wastewater Treatment for Nutrient Removal and Resource Recovery," Wageningen University Environmental Technology Group, Wageningen, the Netherlands.
- Wang, M. (June 20, 2019). "Intensification of Algae-Based Wastewater Treatment for Nutrient Removal and Resource Recovery," Seminar, University of Antwerp, Antwerp, Belgium.
- Wang, M. (April 6, 2019). "Intensification of Wastewater Treatment for Nutrient Removal and Resource Recovery," Water Insight Seminar, Environmental and Natural Resources Institute, College of Agricultural Sciences, PSU State College, PA, Invited. Local.
- Wang, M. (September 2018). "Sustainable Environmental Systems for Waste Management and Resource Recovery," The John and Willie Leone Family Department of Energy and Mineral Engineering 2018 Research Showcase, PSU EME, State College, PA
- Wang, M. (2017). Nutrient and energy recovery from different waste streams. Case Western Reserve University, Cleveland, OH.
- Wang, M. (2016). Nutrient management and bioenergy production from anaerobic digestion. New Mexico State University, Las Cruces, NM.
- Wang, M. Microalgae grown in different wastewaters and their anaerobic co-digestion with waste activated sludge (2014). Civil and Environmental Engineering Seminar, University of South Florida.
- Wang, M. Application of microalgae for nutrient removal and anaerobic digestion at wastewater treatment plants. Civil and Environmental Engineering Seminar, University of Massachusetts Amherst. Jan. 2013

GRADUATE STUDENTS MENTORED

- Tengge Zhang, PhD (2019-present), Committee Chair
- Leiyu He, PhD (2019-present), Committee Chair
- Oluwayomi Awe, PhD (2021-present) Committee Chair

TEACHING EXPERIENCE

Courses Taught at Penn State University

- ENVSE 427: Pollution Control in Process Industries
- ENVSE 412: Environmental Systems Engineering Laboratory
- ENVSE 480: Environmental Systems Engineering Process Design

Course Taught at the University of South Florida 2015-2017

- Taught graduate level course EES6107 "Biological Principles of Environmental Engineering" (12 students).

- Taught undergraduate level course ENV4004L “Environmental Engineering Lab,” and integrated research projects into the undergraduate curriculum (27 students).
- Assisted in teaching CWR4812 “Capstone Water Resources/Environmental Design” (5 projects and 21 students).

SERVICE

- Chair for Scholarship Committee, Water Works Operators’ Association of Pennsylvania, Chairperson. (August 2021 - Present).
- Committee, PA Water and Environmental Association, Committee Member. (March 2021 - Present).
- Co-chair, Resource Recovery Session of the 9th International Conference on Water Resources and Environment Research (ICWRER 2022). April 25-27, 2022, Orlando, FL USA.
- Co-Organizer of Wastewater Reuse Conference: 50+ Years of Research, Management, and Lessons Learned. Chair of the Wastewater Management Session. April 5-7, 2022, Hybrid Mode.
- Penn State Wastewater Management Committee (2018-present)
- NSF review panelist: CAREER and SBIR
- Reviewer for Global Water Pathogens Project (GWPP): <http://www.waterpathogens.org/>.
- Faculty Advisor for the Society of Environmental System Engineers/Student Chapter of AWWA at Penn State University.

AWARDS AND HONORS

- E. Willard and Ruby S. Miller Faculty Fellowship, 2019
- First Place of 2016/2017 EESF/AEESP Student Video Competition (Postdoctoral Advisor)
- Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute Travel Award, 2015
- Elsevier Tropical Connections Fellowship, 2015
- Graduate Student Travel Grant, 2012, University of Massachusetts Amherst

PROFESSIONAL AFFILIATIONS AND CERTIFICATION

- Registered PE in the state of Florida
- Water Environment Federation (WEF)
- International Water Association (IWA)
- Association of Environmental Engineering and Science Professors (AEESP)
- Certification in Quantitative Microbial Risk Assessment (QMRA), Michigan State University