

Shiqiang Zou, Ph.D.

Postdoctoral Scholar

Department of Civil and Environmental Engineering, Stanford University

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Education

- 2015-2019** **Virginia Polytechnic Institute and State University, United States (Ph.D., Civil Engineering)**
- GPA: 4.0/4.0. The Raymond and Madelyn Curry Fellowship receiver (1/10).
 - Advisor: Prof. Zhen He, Professor, Director of Environmental Biotechnology & Bioenergy Lab
- 2013-2014** **National University of Singapore, Singapore (M.Sc., Chemistry)**
- GPA: 4.0/4.0. Singapore-Peking-Oxford Research Enterprise (SPORE) Scholarship recipient.
 - Advisor: Prof. Loh Kian Ping, Provost's Chair Professor
- 2011-2014** **Peking University, China (M.Sc., Environmental Engineering)**
- Ranking: 1/34. GPA: 4.0/4.0. The highest departmental scholarship recipient.
 - Advisor: Prof. Jinren Ni, Professor, Academician of Chinese Academy of Sciences
- 2007-2011** **Beijing Institute of Technology, China (B. Eng., Environmental Engineering)**
- Ranking: 3/29. GPA: 3.7/4.0. The Outstanding Undergraduates of Beijing.
 - The National Scholarship receiver (1/135). The "Xu Teli" Scholarship receiver (1/400).

Professional Positions

- 2019.09-Current** **Postdoctoral Scholar (Stanford University, Stanford, CA)**
- Advisor: Prof. Meagan Mauter, Associate Professor, Research Director for DOE NAWI hub
 - Project 1: Electrochemical selenium removal/recovery from flue-gas desulfurization wastewater
 - Project 2: Speciation and thermodynamic modeling of components in industrial wastewater
- 2019.01-2019.05** **Instructor (Virginia Tech, Blacksburg, VA)**
- Course advisor: Prof. Zhen He and Prof. William Knocke
 - Evaluation score: 5.60 / 6.00 (0.75 higher than COE, 0.5 higher than CEE department)
 - Independent instructor for "CEE 3104 Introduction to Environmental Engineering".
- 2018.07-2018.08** **Instructor (Virginia Tech and Virginia Department of Environmental Quality, VA)**
- Instructor for Water/Wastewater Treatment Plant Operators Short School
 - Taught water level-2 class "Chemistry Concepts and Applications" for 20 water plant operators.
 - Taught wastewater level-4 class "Advanced Membrane Treatment" for 35 wastewater operators.
- 2016.01-2016.05** **Teaching Assistant (Virginia Tech, Blacksburg, VA)**
- CEE 4174 Solid & Hazardous Waste Management
 - Advised undergraduates for course-related questions. Provided feedback to the instructor.

Competition & Awards

1. **Outstanding Doctoral Student Awards** (Department of Civil and Environmental Engineering, Virginia Tech, 2019)
2. **ACS Graduate Student Award in Environmental Chemistry** (American Chemical Society, 2019)
3. **Virginia AWWA Graduate Student Scholarship Recipient** (Virginia AWWA, 2018)
4. **WaterJAM 2018 Young Professional "Fresh Ideas" Poster Contest** (*First Prize*, VA AWWA/VWEA 2018)
5. **WaterJAM 2017 Young Professional "Fresh Ideas" Poster Contest** (*First Prize*, VA AWWA/VWEA 2017)

6. **Environmental Competition international (ECi)** (*Second Prize*, Air & Waste Management Association 2017)
7. **WaterJAM 2016 Young Professional “Fresh Ideas” Poster Contest** (*First Prize*, VA AWWA/VWEA 2016)
8. **Environmental Competition international (ECi)** (*Second Prize*, Air & Waste Management Association 2016)

First-author Journal Publication (* stands for co-first author)

Google Citation: 439 H-index: 13 Peer-reviewed Papers: 22 Researchgate Score: 26.75

1. **Zou, S.**, Dudchenko, A., & Mauter, M. (2020) Direct electrochemical selenium reduction and removal in environmental samples using the gold electrode. *In Preparation*.
2. **Zou, S.**,* Smith, E.,* Martin, S., & He, Z. (2019) Mitigation of Bidirectional Solute Flux in Forward Osmosis via Membrane Surface Coating of Zwitterion Functionalized Carbon Nanotubes. *Environmental International*, 131, 104970.
3. **Zou, S.**, Qin, M., & He, Z. (2019) Tackle reverse solute flux in forward osmosis towards sustainable water recovery: reduction and perspectives. *Water Research*, 49, 362-374.
4. **Zou, S.**,* Guan, L.,* Taylor, D.P., Kuhn, D., & He, Z. (2018) Nitrogen removal from water of a recirculating aquaculture system by a bioelectrochemical system. *Aquaculture* 497, 74-81.
5. **Zou, S.** & He, Z. (2018) Efficiently “pumping out” value-added resources from wastewater by bioelectrochemical systems: a review from energy perspectives. *Water Research* 131, 62-73.
6. Zhang, B.,* **Zou, S.**,* Cai, R., Li, M., & He, Z. (2018) High-efficient photocatalytic disinfection of *Escherichia coli* under visible light using carbon supported Vanadium Tetrasulfide nanocomposites. *Applied Catalysis B: Environmental* 224, 383-393.
7. **Zou, S.**,* Kanimba, E.,* Diller, T.E., Tian, Z., & He, Z. (2018) Modelling assisted evaluation of direct electricity generation from waste heat of wastewater via a thermoelectric generator. *Science of the Total Environment* 635, 1215-1224.
8. **Zou, S.** & He, Z. (2017) Electrodialysis recovery of reverse-fluxed fertilizer draw solute during forward osmosis water treatment. *Chemical Engineering Journal* 330, 550-558.
9. **Zou, S.**, Qin, M., Moreau, Y., & He, Z. (2017) Nutrient-energy-water recovery from synthetic sidestream centrate using a microbial electrolysis cell - forward osmosis hybrid system. *Journal of Cleaner Production* 154, 16-25.
10. **Zou, S.** & He, Z. (2017) Electrolysis-assisted mitigation of reverse solute flux in a three-chamber forward osmosis system. *Water Research* 115, 111-119.
11. **Zou, S.**, Yuan, H., Childress, A., & He, Z. (2016) Energy consumption by recirculation: a missing parameter when evaluating forward osmosis. *Environmental Science & Technology* 50, 6827-6829.
12. **Zou, S.** & He, Z. (2016) Enhancing wastewater reuse by forward osmosis with self-diluted commercial fertilizers as draw solutes. *Water Research* 99 (1), 235-243.
13. **Zou, S.**, Yao, S., Ni, J. (2014) High-efficient nitrogen removal by coupling enriched autotrophic-nitrification and aerobic-denitrification consortiums at cold temperature. *Bioresour Technol* 161, 288-296.

Coauthored Journal Publication

1. Ferby, M., **Zou, S.**, & He, Z., Reduction of reverse solute flux induced salinity buildup in the feed solution of forward osmosis. *Environmental Science: Water Research & Technology*, In Press.
2. Li, M., Zhang, B., **Zou, S.**, Liu, Q., Yang, M. (2020) Highly selective adsorption of vanadium by nano-hydrous zirconium oxide-modified anion exchange resin. *Journal of Hazardous Materials*, 384, 121386.
3. Wu, S., **Zou, S.**, Yang, Y., Qian, G., & He, Z. (2018) Enhancing the performance of an osmotic microbial fuel cell through self-buffering with reverse-fluxed sodium bicarbonate. *Chemical Engineering Journal* 349, 241-248.
4. Ceconet, D., **Zou, S.**, Capodaglio, A.G., & He, Z. (2018) Evaluation of energy consumption of treating nitrate-

- contaminated groundwater by bioelectrochemical systems. *Science of the Total Environment* 636, 881-890.
5. Wu, Z., **Zou, S.**, Zhang, B., Wang, L., & He, Z. (2018) Forward osmosis promoted in-situ formation of struvite with simultaneous water recovery from digested swine wastewater. *Chemical Engineering Journal* 342, 274-280.
 6. Qin, M., White, C., **Zou, S.**, & He, Z. (2018) Passive separation of recovered ammonia from catholyte for reduced energy consumption in microbial electrolysis cell. *Chemical Engineering Journal* 334, 2303-2307.
 7. Wu, S., **Zou, S.**, Liang, G., Qian, G., & He, Z. (2018) Enhancing recovery of magnesium as struvite from landfill leachate by treatment of calcium with simultaneous reduction of liquid volume via forward osmosis. *Science of the Total Environment* 610-611, 137-146.
 8. Yang, Y., Chen, M., **Zou, S.**, Long, T., Yang, X., & He, Z. (2017) Efficient recovery of polyelectrolyte draw solutes in forward osmosis towards sustainable water treatment. *Desalination* 422, 134-141.
 9. Iskander, S., **Zou, S.**, Brazil, B., Novak, J., & He, Z. (2017) Energy consumption by forward osmosis treatment of landfill leachate for water recovery. *Waste Management* 63, 284-291.
 10. Xiang, X., **Zou, S.**, & He, Z. (2017) Energy consumption of water recovery from wastewater in a submerged forward osmosis system with commercial liquid fertilizers as draw solutes. *Separation and Purification Technology* 174, 432-438.

Patents

1. Ni, J.R., **Zou, S.**, & Yao, S. Application of psychrotolerant heterotrophic consortium capable of anoxic nitrogen removal in water treatment. Grant Number: CN 103342417 B, *Peking University*, China.
2. Ni, J.R., Yao, S., & **Zou, S.** Application of psychrotolerant autotrophic nitrifying consortium in wastewater treatment. Grant Number: CN 103319000 B, *Peking University*, China.
3. Ni, J.R., Chen, Q., Fu, D., & **Zou, S.** Application of *Comamonas testosteroni* with denitrification and dephosphorization function. Grant Number: CN 102531202 B, *Peking University*, China.
4. Chen, Q., Ni, J.R., & **Zou, S.** Application of *Achromobacter xylosoxidans* with denitrification and dephosphorization function. Grant Number: CN 102533623 B, *Peking University*, China.

Invited Talk

1. Advancing forward osmosis for non-potable water reuse: opportunities, challenges, and perspectives. Invited by Prof. Meagan Mauter, **Carnegie Mellon University**, 06/2019, USA.
2. Energy analysis of bioelectrochemical systems. Invited by Prof. Marika Kokko, **University of Tampere**, 11/2018, Finland.
3. Advancing forward osmosis for energy-efficient wastewater treatment towards enhanced water reuse. Invited by Prof. Marika Kokko, **University of Tampere**, 11/2018, Finland.
4. Optimizing forward osmosis process for enhanced water reuse. Invited by **Nanjing Agricultural University**, 05/2018, China.

Conference (* stands for the presenter)

1. Zou, S.,* Smith, E., Martin, S., & He, Z. (Poster Presentation). Mitigation of bidirectional solute flux in forward osmosis via surface coating of zwitterion functionalized CNTs. **AEESP Research and Education Conference 2019**, Arizona State University, AZ.
2. Zou, S., Smith, E.,* Martin, S., & He, Z. (Poster Presentation). Towards sustainable desalination: mitigation of bidirectional solute flux in forward osmosis process. **AIChE Annual Meeting**, 10/29/2018, Pittsburgh, PA
3. Zou, S.* & He, Z. (Oral Presentation). Efficiently "Pumping Out" Value-added Resources from Wastewater by

Bioelectrochemical Systems: A Review from Energy Perspective. **AWWA & VWEA WaterJAM**, 09/13/2018, Virginia Beach.

4. Zou, S.,* Qin, M., & He, Z. (*Oral Presentation*). Advancing Forward Osmosis for Energy-Efficient Wastewater Treatment towards Enhanced Water Reuse. **AWWA Annual Conference & Exposition**, 06/14/2018, Las Vegas, NV.
5. Zou, S.,* Qin, M., & He, Z. (*Oral Presentation*). Nutrient-energy-water recovery from sidestream centrate via microbial electrolysis cell - forward osmosis hybrid system. **AWWA Annual Conference & Exposition**, 06/13/2018, Las Vegas, NV.
6. Zou, S.,* Kanimba, E., Diller, T.E., Tian, Z., & He, Z. (*Poster Presentation*). Direct Electricity Generation from Waste Heat in Water via Thermoelectric Generator. **AWWA & VWEA WaterJAM**, 09/13/2017, Hampton, VA
7. Zou, S. & He, Z.* (*Oral Presentation*). NEW recovery from sidestream centrate via a microbial electrolysis cell - forward osmosis hybrid system. **2nd International Resource Recovery Conference**, 08/09/2017, New York, NY.
8. Zou, S.* & He, Z. (*Poster Presentation*). Electrolysis-Assisted Mitigation of Reverse Solute Flux in a Three-Chamber Forward Osmosis System. **AEEESP Research and Education Conference**, 06/21/2017, Ann Arbor, MI.

Independent Graduate Research Proposal

1. **Shiqiang Zou** (2018). Developing next-generation membrane electrodes to sustainably tackle nutrient-energy-water nexus. Submitted to Presidential Research Fellow Program at Princeton University.
2. **Shiqiang Zou** (2017). Advancing electrolysis-assisted forward osmosis to achieve in-situ mitigation of reverse solute flux towards energy-efficient water recovery and reuse. Submitted to American Membrane Technology Association.
3. **Shiqiang Zou** (2016). Energy-Efficient Wastewater Treatment and Water Recovery by Using Osmotic Membrane Photobioreactor towards Direct Fertigation. Submitted to American Membrane Technology Association.
4. **Shiqiang Zou** (2016). Nutrient-Energy-Water Recovery from Sidestream Centrate Using a Microbial Electrolysis Cell – Forward Osmosis Hybrid System. Submitted to Virginia Tech Graduate Research and Development Program.

Ad hoc Journal Review (>40 reviews)

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| Water Research | Science of the Total Environment | ACS Sustainable Chemistry & Engineering |
| Journal of Membrane Science | International Journal of Hydrogen Energy | Water Science & Technology |
| RSC Advances | Water Environment Research (2017 Top Reviewer) | |
| Electrochimica Acta | Environmental Engineering Science | Separation and Purification Technology |
| Advanced Powder Technology | Desalination and Water Treatment | Trends in Food Science & Technology |

Professional and Honor Societies

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| Tau Beta Pi Engineering Honor Society | Phi Kappa Phi Honor Society |
| American Water Works Association | Virginia Water Environment Association |
| Water Environment Federation | International Water Association |
| Air & Waste Management Association | American Membrane Technology Association |
| Association of Environ. Engineering & Science Professors | |
| American Academy of Environ. Engineers & Scientists | |

Service and Outreach

1. **Graduate Mentor**, Research Experience for Teachers (**RET**), National Science Foundation & VT (2017 & 2018)
 - Designed a one-to-one research experience for Christiansburg and Salem High School teachers regarding

- forward osmosis experiments, which can be easily translate into high school science, math, and AP chemistry courses.
2. **Graduate Mentor**, Research Experience for Undergraduates (**REU**), National Science Foundation & VT (2018)
 - Designed a one-to-one research experience for University of Florida undergraduate student regarding resource recovery via 3-D printed bioelectrochemical systems.
 3. **Graduate Mentor**, Water INTERface at Virginia Tech & Roanoke Elementary School (2018)
 - Assisted a research team composed of kids between 4th and 7th grades of Roanoke Elementary School.
 - Offered constructive suggestions to help kids built an engineering system to recovery water in space.
 4. **Graduate Ambassador**, Center for Enhancement of Engineering Diversity, Virginia Tech (2016, 2017, & 2018)
 - Guided a full-day tour for C-Tech² Summer Camp for Middle School Women (~50 girl students per year)..
 5. **Beijing 2008 Olympic Volunteer**, Spectator Services, Baseball Stadium, Beijing, China (2008)

Suggested References

1. **Zhen (Jason) He**
Professor, Department of Energy, Environmental and Chemical Engineering, Washington University in St. Louis
Professor, Department of Civil and Environmental Engineering, Virginia Tech (Before January 2020)
Relationship: Ph.D. Advisor
Phone: (314) 935-7124
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2. **Meagan Mauter**
Associate Professor, Department of Civil and Environmental Engineering, Stanford University
Research Director, National Alliance for Water Innovation (DOE Energy-Water Desalination Hub)
Relationship: Postdoc Advisor
Phone: (650) 725-4911
Email: mauter@stanford.edu
3. **Zhiting Tian**
Assistant Professor, Sibley School of Mechanical and Aerospace Engineering, Cornell University
Relationship: Interdisciplinary Research Collaborator on thermal energy recovery
Phone: (607) 255-0733
Email: zhiting@cornell.edu
4. **Andrea Dietrich**
Professor, Department of Civil and Environmental Engineering, Virginia Tech
Relationship: Ph.D. Committee Members
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