Shiqiang Zou, Ph.D.

Assistant Professor
Department of Civil and Environmental Engineering, Auburn University
Office: (334) 844-6393 **E-mail**: shiqiang@auburn.edu **Website:** http://shiqiangzou.com

Professional Positions

2020.01-Present **Assistant Professor (Auburn University, Auburn, AL)**
- Affiliation: Department of Civil and Environmental Engineering
- Office Address: 205 W. Magnolia Ave, 204 Harbert Center, Auburn
- Lab Address: 311 W. Magnolia Ave, 206 Gavin Engineering Research Laboratory, Auburn

2019.09-2020.12 **Postdoctoral Scholar (Stanford University, Stanford, CA)**
- Advisor: Prof. Meagan Mauter, Associate Professor, Research Director for DOE NAWI hub
- Project: Direct electrochemical selenium removal from flue-gas desulfurization wastewater generated in coal-fired power plants

2019.07-2019.08 **Part-time Research Assistant (Virginia Tech, Blacksburg, VA)**
- Advisor: Prof. Zhen He, Professor
- Responsibilities: Mentoring junior Ph.D. students, revising manuscripts, preparing the proposal, and helping with Virginia Water/Wastewater Summer Short School.

Education

2015-2019 **Virginia Polytechnic Institute and State University, United States (Ph.D., Civil Engineering)**
- The Raymond and Madelyn Curry Fellowship recipient.
- Advisor: Prof. Zhen He, Professor, Director of Environmental Biotechnology & Bioenergy Lab

2013-2014 **National University of Singapore, Singapore (M.Sc., Chemistry)**
- 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)**
- 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)**
- The Outstanding Undergraduates of Beijing.
- The National Scholarship recipient. The "Xu Teli" Scholarship recipient.

Academic Experience

2019.01-2019.05 **Graduate Instructor of the Record (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 **Graduate 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 Graduate 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: 674 h-index: 15 Peer-reviewed Papers: 22 Researchgate Score: 26.79

1. **Zou, S.** & Mauter, M. (2021) Direct electrochemical pathways for selenium reduction in aqueous solutions. ***ACS Sustainable Chemistry & Engineering***, Accepted.
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. ***Bioresource Technology*** 161, 288-296.

Coauthored Journal Publication

1. Ferby, M., **Zou, S.**, & He, Z., Forward osmosis concentration of wastewater can benefit subsequent microbial fuel cell treatment. ***In Preparation.***
2. 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***, 6(3), 423-425.
3. 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.
4. 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.
5. Cecconet, 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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. Patent Number: CN 103342417 B, ***Peking University***, China.
2. Ni, J.R., Yao, S., & **Zou, S**. Application of psychrotolerant autotrophic nitrifying consortium in wastewater treatment. Patent 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. Patent Number: CN 102531202 B, ***Peking University***, China.
4. Chen, Q., Ni, J.R., & **Zou, S**. Application of Achromobacter xylosoxidans with denitrification and dephosphorization function. Patent Number: CN 102533623 B, ***Peking University***, China.

Invited Talk

1. Harnessing electric driving forces for energy-efficient NEW resource recovery from wastewater. **University of Toronto**, Canada, 04/2020. (Delivered virtually due to COVID-19)
2. Osmotic, electric, and biologic driving forces to recover NEW resource from wastewater. **Auburn University**, USA, 04/2020. (Delivered virtually due to COVID-19)

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

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. **AlChE 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. **AEESP Research and Education Conference**, 06/21/2017, Ann Arbor, MI.

Pre-proposals and Concept Papers

1. Electrochemical system to remove nitrate and selenium from power plant wastewater. Water Management R&D/Water FWP, NETL & DOE (EY 2021). PIs: Zineb Belarbi, Nicholas Siefert. University Collaborators: Meagan Mauter, Shiqiang Zou. ***Submitted***.
2. Direct electrochemical reduction to selectively remove selenium and other metals from landfill leachate. Environmental Research & Education Foundation. PIs: Shiqiang Zou, Mohan Qin. ***Submitted***.

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 Photobioreac-tor 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 (>50 reviews)

Water Research	Science of the Total Environment	ACS Sustainable Chemistry & Engineering
Journal of Membrane Science	Journal of Cleaner Production	Water Science & Technology
Chemosphere	Journal of Hazardous Materials	International Journal of Hydrogen Energy
RSC Advances	Water Environment Research (**2017 Top Reviewer**)	Desalination
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

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
American Society of Civil Engineers	American Chemical Society

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-Tech^2 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

Email: zhenhe@wustl.edu

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 Member
   Phone: (540) 231-5773
   Email: andread@vt.edu

5. **Zhiwu (Drew) Wang**
   Assistant Professor, Department of Civil and Environmental Engineering, Virginia Tech
   Relationship: Ph.D. Committee Member
   Phone: (703) 361-5606 ext. 119
   Email: wzw@vt.edu