Wei Wang

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230 Kelly Hall, 325 Stanger Street, Blacksburg, VA, 24061

Education

Virginia Tech ***Aug. 2019 – Dec. 2023(Expected)***
PhD program in Civil Engineering | Department of Civil and Environmental Engineering Blacksburg, US
Supervisor: Dr. Peter J. Vikesland

Nanjing University ***Sep. 2014 – Jun. 2017***
Master of Engineering in Environmental Engineering | School of the Environment Nanjing, China
Supervisors: Dr. Qing Zhou and Dr. Aimin Li

Nanjing University ***Sep. 2010 – Jun. 2014***
Bachelor of Engineering in Environmental Engineering | School of the Environment Nanjing, China

Professional/Research Experience

Graduate Research Assistant | Virginia Tech ***Aug. 2019 – Current***
Develop surface-enhanced Raman spectroscopy (SERS)-based sensors for pathogen detection. Blacksburg, US

- Develop bacterial nanocellulose-based SERS platforms for bacteria detection and integrate them with machine learning for bacterial discrimination.
- Evaluate bacterial stress responses (i.e., temperature change, antibiotic treatment, bacteriophage infection) using SERS-based assays and multivariate analysis.
- Develop 3D printable SERS-based hydrogel for 3D cell culture and 3D cell imaging.
- Develop SERS-based lateral flow test kit for SARS-CoV-2 detection in the environment.

Research Assistant | Jiangsu Provincial Academy of Environmental Science ***Jul. 2017 – Jul. 2019***
Investigation of Phosphorus, nitrogen, and organics in Lake Tai-a drinking water resource in China Nanjing, China

- Assists establish administrative regulations (i.e., water quality standards).
- Analysis of organic pollutants in various water matrix.

Graduate Research Assistant | Nanjing University ***Sep. 2014 – Jun. 2017***
Development of polymer-based adsorbents for organic micropollutant removal Nanjing, China

- Synthesis of magnetic resins with high surface area and ion exchange capacity for organic pollutants removal.
- Evaluate the environmental conditions (i.e., pH, salts, humic acids) on the adsorption performance.

Funding Proposals

1. Dr. Abel Wolman Fellowship, Funded by American Water Works Association (AWWA). **2023-2024**
   Monitoring the extracellular antibiotic resistance genes released from water disinfection using a plasmonic nanosensor. **$30,000**
2. Graduate student Mini-Grant, Funded by Center for Emerging, Zoonotic, and Arthropod-borne Pathogens (CeZAP), Virginia Tech. **2022-2023**
   Development of sensitive and rapid SERS-based lateral flow test for SARS-CoV-2 in the environment. **$4,780**

Publications

Paper in review

1. **W Wang**, PJ Vikesland. SERS-active printable hydrogel for 3D cell culture and imaging. Submitted to *Analytical Chemistry* (In Revision).

Paper in preparation

1. **W Wang**, S. Srivastava, A. Grag, S. Hawks, J. Pan, N. Duggal, W. Zhou, LC Marr, PJ Vikesland. SERS-based lateral flow dipstick for rapid and sensitive SARS-CoV-2 detection in the environment.

Peer reviewed papers (†co-first authors)

1. **W Wang**, PJ Vikesland, **2023**. Metabolite-mediated bacterial antibiotic resistance revealed by surface-enhanced Raman spectroscopy. *Environmental Science & Technology* (ASAP). https://doi.org/10.1021/acs.est.3c04001.
2. A Garg, W Nam, **W Wang**, PJ Vikesland, W Zhou, **2023**. In Situ Spatiotemporal SERS Measurements and Multivariate Analysis of Virally Infected Bacterial Biofilms Using Nanolaminated Plasmonic Crystals. *ACS Sensors* 8 (3) 1132–1142. https://doi.org/10.1021/acssensors.2c02412.
3. **W Wang**, A Rahman, S Kang, PJ Vikesland. **2023**. Investigation of the influence of stress on label-free bacterial

surface-enhanced Raman spectra. *Analytical Chemistry* 95 (7), 3675-3683. https://doi.org/10.1021/acs.analchem.2c04636.

4. **W Wang**,† S Kang,† W Zhou, PJ Vikesland, **2023**. Environmental routes of virus transmission and the application of nanomaterial-based sensors for virus detection. *Environmental Science: Nano* 10, 393-423. https://doi.org/10.1039/D2EN00600F.
5. S Kang, **W Wang**, A Rahman, W Nam, W Zhou, PJ Vikesland, **2022**. Highly porous gold supraparticles as surface enhanced Raman spectroscopy (SERS) substrates for sensitive detection of environmental contaminants. *RSC Advances* 12, 32803. https://doi.org/10.1039/d2ra06248h.
6. **W Wang**, A Rahman, Q Huang, PJ Vikesland, **2022**. Surface enhanced Raman spectroscopy enabled evaluation of bacterial inactivation. *Water Research* 220, 118688. (Received ACS C. Ellen Gonter paper award) https://doi.org/10.1016/j.watres.2022.118668.
7. A Rahman, **W Wang**, D Govindaraj, S Kang, PJ Vikesland, **2022**. Recent advances in environmental science and engineering applications of cellulose nanocomposites. *Critical Reviews in Environmental Science and Technology* 53(5), 650-675. https://doi.org/10.1080/10643389.2022.2082204.
8. G Divyapriya, A Rahman, W Leng, **W Wang**, P Vikesland, **2022**. One-step Biosynthesis of Bilayered Graphene Oxide Embedded Bacterial Nanocellulose Hydrogel for Versatile Photothermal Membrane Applications. *Environmental Science: Nano* 9 (5), 1639-1650. https://doi.org/10.1039/D1EN00754H.
9. A Garg, E Mejia, W Nam, M Nie, **W Wang**, P Vikesland, W Zhou, **2022**. Microporous Multiresonant Plasmonic Meshes by Hierarchical Micro–Nanoimprinting for Bio-Interfaced SERS Imaging and Nonlinear Nano-Optics. *Small* 2106887. https://doi.org/10.1002/smll.202106887.
10. A Rahman, S Kang, **W Wang**, Q Huang, I Kim, PJ Vikesland, **2022**. Lectin-Modified Bacterial Cellulose Nanocrystals Decorated with Au Nanoparticles for Selective Detection of Bacteria Using Surface-Enhanced Raman Scattering Coupled with Machine Learning. *ACS Applied Nano Materials* 5, 1, 259–268. https://doi.org/10.1021/acsanm.1c02760.
11. **W Wang**, S Kang, PJ Vikesland, **2021**. Surface-Enhanced Raman Spectroscopy of Bacterial Metabolites for Bacterial Growth Monitoring and Diagnosis of Viral Infection. *Environmental Science & Technology* 55 (13), 9119-9128. https://doi.org/10.1021/acs.est.1c02552.
12. Q Huang, **W Wang**, PJ Vikesland, **2021**. Implications of the Coffee-Ring Effect on Virus Infectivity. *Langmuir* 37 (38), 11260-11268. https://doi.org/10.1021/acs.langmuir.1c01610.
13. A Rahman, S Kang, **W Wang**, A Garg, A Maile-Moskowitz, PJ Vikesland, **2021**. Nanobiotechnology enabled approaches for wastewater-based epidemiology. *TrAC Trends in Analytical Chemistry* 143, 116400. https://doi.org/10.1016/j.trac.2021.116400
14. **W Wang,** M Qi, X Jia, J Jin, Q Zhou, M Zhang, W Zhou, A Li, **2020**. Differential adsorption of zwitterionic PPCPs by multifunctional resins: The influence of the hydrophobicity and electrostatic potential of PPCPs. *Chemosphere* 241, 125023. https://doi.org/10.1016/j.chemosphere.2019.125023.
15. **W Wang,** Z Zhu, M Zhang, S Wang, C Qu, **2020**. Synthesis of a novel magnetic multi-amine decorated resin for the adsorption of tetracycline and copper. *Journal of the Taiwan Institute of Chemical Engineers*. 106, 130-137. https://doi.org/10.1016/j.jtice.2019.10.017
16. **W Wang,** J Cheng, J Jin, Q Zhou, Y Ma, Q Zhao, A Li, **2016**. Effect of humic acid on ciprofloxacin removal by magnetic multifunctional resins. *Scientific Reports*, 6, 30331. https://doi.org/10.1038/srep30331.
17. **W Wang**, Y Ma, A Li, Q Zhou, W Zhou, J Jin, **2015**. Two novel multifunctional magnetic adsorbents for effective removal of hydrophilic and hydrophobic nitroaromatic compounds. *Journal of Hazardous Materials*, 294, 158-167. https://doi.org/10.1016/j.jhazmat.2015.04.005.
18. **W Wang**, Y Ma, Q Zhou, C Shuang, M Zhang, A Li, **2015**. Preparation of a permanent magnetic hypercrosslinked resin and assessment of its ability to remove organic micropollutants from drinking water. *Frontiers of Environmental Science & Engineering*, 9, 96-104. https://doi.org/10.1007/s11783-014-0724-3.

Patents

1. Q Zhou, **W Wang**, et al. Portable efficient magnetic solid phase extraction device and extraction method thereof; Pub No. US20170276576A1. (US patent)
2. **W Wang**, Q Zhou, et al. A magnetic chelating resin and the manufacturing method thereof; Pub No. CN 108047361A. (CN patent, in Chinese)

Presentations

Talks

2023 Association of Environmental Engineering and Science Professors (AEESP) Conference. ***Jun. 2023***
Development of lateral flow-based nano Raman sensor for SARS-CoV-2 detection in the environment. Boston, US
SciX Conference of the Federation of Analytical Chemistry and Spectroscopy Societies ***Oct. 2022***

SERS of bacterial metabolites to unveil bacterial tolerance to antibiotics. Northern Kentucky, US
American Chemical Society (ACS) conference Fall 2022 (invited for Gonter Award) ***Aug. 2022***
Surface enhanced Raman spectroscopy enabled evaluation of bacterial inactivation. Chicago, US
American Chemical Society (ACS) conference Spring 2022 ***Mar. 2022***
Surface enhanced Raman spectroscopy enabled evaluation of bacterial inactivation. San Diego, US
SciX Conference of the Federation of Analytical Chemistry and Spectroscopy Societies ***Nov. 2021***
SERS of bacterial metabolites for bacterial growth monitoring and diagnosis of viral infection. Virtual

Posters

2022 Association of Environmental Engineering and Science Professors (AEESP) Conference. ***Jun. 2022***
SERS of bacterial metabolites to unveil bacterial tolerance to antibiotics. St. Louis, US
The 6th IWA – ASPIR Conference & Exhibition. ***Oct. 2015***
The removal of hydrophilic and hydrophobic nitroaromatic compounds by magnetic resins. Beijing, China

Awards/Honor

- American Water Works Association (AWWA) Abel Wolman Fellowship **2023**
- C. Ellen Gonter Award (ACS Division of Environmental Chemistry) **2022**
- National Scholarship of China **2017**
- Master's thesis award of Jiangsu Province **2017**
- Master's thesis award of Nanjing University **2017**
- Scholarship of Nanjing University **2016**

Teaching/Mentoring

- Mentor, Nicole Odibo and Rishab Desai, Virginia Tech Undergraduate Research Program **Summer 2023**
- Mentor, Maryam Al Jawad, Virginia Tech-KAUST Undergraduate Research Program **Summer 2022**
- Teaching assistant, CEE 4114, Virginia Tech, Fundamentals of Public Health Engineering **Spring 2022**
- Teaching assistant, CEE 3104, Virginia Tech, Introduction to Environmental Engineering **Fall 2021**
- Mentor, Qingqing Zhao, Undergraduate thesis, Nanjing University **Spring 2017**

Contact information for Reference Letters

1. Dr. Peter J. Vikesland, Nick Prillaman Professor, Department of Civil and Environmental Engineering, Virginia Tech, Email: pvikes@vt.edu.

2. Dr. Linsey C. Marr, Charles P. Lunsford Professor and University Distinguished Professor, Department of Civil and Environmental Engineering, Virginia Tech, Email: lmarr@vt.edu.

3. Dr. Wei Zhou, Associate Professor, Department of Electrical and Computer Engineering, Virginia Tech, Email: wzh@vt.edu.