Joe Heffron | Curriculum Vitae

219.464.6811 • joseph.heffron@valpo.edu

- Field of Specialization: Environmental engineering
- Research Interests: Viruses and waterborne pathogens; environmental electrochemistry; distributed water treatment and reclamation.

Education

Academic Qualifications

- **Marquette University** — **Milwaukee, WI**
  PhD, Civil Engineering — *2015 – 2019*
  Dissertation: Iron-enhanced mitigation of viruses in drinking water
- **Marquette University** — **Milwaukee, WI**
  MS, Civil Engineering — *2014 – 2015*
  Thesis: Removal of trace heavy metals from drinking water by electrocoagulation
- **University of Wisconsin - Milwaukee** — **Milwaukee, WI**
  Civil Engineering (Prerequisites for MS, 28 cr.) — *2013*
- **Drake University** — **Des Moines, IA**
  BA, Environmental Science and Policy — *1998 - 2002*

Honors

- 2022-2023 Donald V. Fites Fellow, Valparaiso University
- 2018-2019 Arthur J. Schmitt Leadership Fellowship, Marquette University
- 2017-2018 Richard W. Jobling Distinguished Research Assistantship, Marquette University
- 2014 Alan Haase Memorial Scholarship, Federation of Environmental Technologists

Teaching Experience

Instructor of Record

- **Civil & Environmental Engineering** — **Valparaiso University**
  Assistant Professor — *2021 - Present*
- **CEEN 4535/5535 Environmental Microbiology** — **Marquette University**
  Adjunct Professor — *Spring 2019*
- **English as a Foreign Language** — **English Learning Center, Peace Corps**
  Volunteer instructor — *2006 - 2008, 2008 - 2010*

Guest Lecturer

- **Drinking water microbiology (Environmental Microbiology)** — **Marquette University**
  Four-lecture module — *Spring 2018*
- **Equilibrium modeling with MINEQL+ (Environmental Chemistry)** — **Marquette University**
  Lecture — *Fall 2015, 2017 - 2019*
- **Viruses in the environment (Environmental Microbiology)** — **Marquette University**
  Lecture — *Spring 2017*
- **Challenges in international aid (International Nursing)** — **Carroll University**
  Lecture — *Fall 2010*

Publications

Peer-reviewed

1. **Heffron, J**, Bork, M, Mayer, BK, and Skwor, T. (2021) A comparison of porphyrin photosensitizers in photodynamic inactivation of RNA and DNA bacteriophages. *Viruses*, 13(3): 530.
2. **Heffron, J**, and Mayer, BK (2021) Spotlight: Theories and methods of virus isoelectric point estimation (Minireview). *Applied and Environmental Microbiology* 87(3), e02319-20.
3. Ryan, DR, Maher, EK, **Heffron, J**, Mayer, BK, and McNamara, PJ (2021) Electrocoagulation-Electrooxidation for Mitigating Trace Organic Compounds in Model Drinking Water Sources. *Chemosphere*, 273, 129377.
4. **Heffron, J**, and Mayer, BK (2020) Spotlight: Improved virus isoelectric point estimation by exclusion of known and predicted genome-binding regions. *Applied and Environmental Microbiology* 86(23), e01674-20.
5. Lynn, W, **Heffron, J**, and Mayer, BK (2019) Electrocoagulation as a pretreatment for electroxidation of *E. coli*. *Water* 11, 2509.
6. **Heffron, J.**, McDermid, B., Maher, E., McNamara, P.J. and Mayer, B.K. (2019) Mechanisms of virus mitigation and suitability of bacteriophages as surrogates in drinking water treatment by iron electrocoagulation. *Water Research* 163, 114877.
7. **Heffron, J**, McDermid, B, and Mayer, B.K. (2019) Bacteriophage inactivation as a function of ferrous iron oxidation. *Env. Sci.: Water Research Technol.* 5, 1309-1317.
8. **Heffron, J**, Ryan, DR, and Mayer, BK (2019) Sequential electrocoagulation-electrooxidation for virus mitigation in drinking water. *Water Research* 160, 435-444.
9. Maher, E.K., O'Malley, K.N., **Heffron, J.**, Huo, J., Wang, Y., Mayer, B.K. and McNamara, P.J. (2019) Removal of estrogenic compounds via iron electrocoagulation: impact of water quality and assessment of removal mechanisms. *Env. Sci.: Water Research Technol.* 5, 956-966.
10. Maher, E.K., O'Malley, K.N., **Heffron, J.**, Huo, J., Wang, Y., Mayer, B.K. and McNamara, P.J. (2019) Analysis of operational parameters, reactor kinetics, and floc characterization for the removal of estrogens via electrocoagulation. *Chemosphere* 220, 1141-1149.

11. **Heffron, J.**, Marhefke, M., and Mayer, B.K. (2016). Removal of trace metal contaminants from potable water by electrocoagulation. *Scientific Reports* 6, 28478.
12. **Heffron, J.** and Mayer, B.K. (2016). Emerging Investigator Series: Virus mitigation by coagulation: recent discoveries and future directions. *Env. Sci.: Water Research Technol.* 2(3), 443-459.

Presentations

Oral Presentations

1. **Heffron, J.** (2019) *Waterborne pathogens: modern surveillance of ancient enemies* Marquette University Emerging Contaminants Short Course, Milwaukee, WI.
2. **Heffron, J.** (2018) *Removal of viruses in drinking water* Marquette University Emerging Contaminants Short Course, Milwaukee, WI.
3. **Heffron, J.** and Mayer, B.K. (2018) *Suitability of bacteriophages as surrogates for virus mitigation by electrocoagulation* Int. Soc. for Food and Environmental Virology Conference, Tempe, AZ.
4. **Heffron, J.** and Mayer, B.K. (2018) *Virus inactivation during iron electrocoagulation* University of North Carolina Water Microbiology Conference, Chapel Hill, NC.
5. **Heffron, J.** and Mayer, B.K. (2016) *Factors influencing virus removal by electrocoagulation* International Water Association 2016 Particle Separation Conference, Oslo, Norway.
6. **Heffron, J.** and Mayer, B.K. (2015) *Molecular and cultural methods of quantifying virus removal by electrocoagulation* Marquette University 2015 Forward Thinking Colloquy, Milwaukee, WI.
7. **Heffron, J.** (2015) *Removal of trace heavy metals from drinking water by electrocoagulation* Marquette University Water Quality Center Seminar Series, Milwaukee, WI.
8. **Heffron, J.** and Mayer, B.K. (2014) *Mechanisms of virus removal by electrocoagulation* Marquette University 2014 Forward Thinking Colloquy, Milwaukee, WI.
9. **Heffron, J.** (2014) *Electrocoagulation* Presentation for the American Society of Civil Engineers, Marquette University student chapter, Milwaukee, WI.
10. **Heffron, J.**, and Mayer, B.K. (2014) *Evaluation of electrocoagulation-microfiltration for removal of trace heavy metals, hardness, and viruses* Project update for the Water Equipment and Policy Research Center, Milwaukee, WI.

Poster Presentations

1. Maher, E., **Heffron, J.**, O'Malley, K., Mayer, B.K., McNamara, P. (2019) *Estrogenic Compound Removal Using Electrocoagulation: A Parametric and Kinetic Study*. American Water Works Association Annual Conference and Exposition (ACE), Denver, CO.
2. **Heffron, J.**, Mayer, B.K., and McNamara, P.J. (2019) *Critical thinking strategies in an upper-level environmental engineering microbiology course*. Association of Environmental Engineers and Science Professors (AEESP) 2019 Research and Education Conference, Tempe, AZ.
3. **Heffron, J.** and Mayer, B.K. (2017) *Effect of water quality on virus mitigation by electrocoagulation* University of Michigan Borchardt Conference, Ann Arbor, MI.

4. **Heffron, J.** and Mayer, B.K. (2016) *Modeling virus sorption from structural features* Marquette University 2016 Emerging Contaminants Short Course, Milwaukee, WI.
5. **Heffron, J.** and Mayer, B.K. (2015) *Removal of trace heavy metals from drinking water by electrocoagulation* AEESP 2015 Research and Education Conference, New Haven, CT.
6. **Heffron, J.** and Mayer, B.K. (2014) *Removal of heavy metals, hardness and viruses from drinking water by electrocoagulation* American Chemical Society Research and Education Conference, San Francisco, CA.

Funded Proposals

Official Authorship Role

1. Babayan, L., Heffron, J. (2010) *Hands-On Science Education Manuals.* U.S. Embassy – Yerevan Democracy Commission Grant. Award: $6,881
2. Margaryan, G., Heffron, J. (2010) *"By Children for Children" Puppet Theater.* U.S. Embassy – Yerevan Democracy Commission Grant. Award: $14,975
3. Babayan, L., Heffron, J. (2010) *Syuniq Province Science Fair.* U.S. Embassy – Yerevan Democracy Commission Grant. Award: $1,565
4. Heffron, J. (2010) *Syuniq Province Hands-On Science Day.* Friends of Armenia Small Project Grant. Award: $650
5. Margaryan, G., Heffron, J. (2009) *Kapan Children's Puppet Theater.* World Vision grant. Award: In-kind audio-visual equipment and materials

Support Role

1. Mayer, B.K., McNamara, P., Young, K. (2017) *Electrocoagulation and electrooxidation to treat microbial and chemical contaminants in small drinking water systems* Environmental Protection Agency's (EPA's) Water Innovation Network for Sustainable Small Systems (WINSSS) Emerging Technologies Program. Award: $50,000
   Heffron role: Proposal development, project advisement
2. Mayer, B.K., McNamara, P. (2016) *Novel Electro-Treatment for the Mitigation of Endocrine-Disrupting Compounds and Viruses in Drinking Water* Lafferty Foundation Grant. Award: $50,000
   Heffron role: Proposal writing, conducting research, project advisement

Work Experience

- **USDA - Agricultural Research Service** — **Marshfield,WI**
  ORISE Post-doctoral fellow — *July 2020 – July 2021*

  Develop a hierarchical dose-response model for *Cryptosporidium* based on outbreak and experimental data; use applied Quantitative Microbial Risk Assessment for case studies.

- **Marquette University** — **Milwaukee,WI**
  Post-doctoral fellow — *August 2019 – June 2020*

Model virus structure and interactions in the environment; research electrochemical and photodynamic drinking water treatment.

- **Marquette University** **Milwaukee,WI**
  Adjunct Professor *Spring 2019*

  Independently prepare lesson materials and teach combined undergraduate/graduate course in environmental microbiology as the instructor of record; prepare and grade all assessment materials, including homework, lab reports and exams.

- **Marquette University** **Milwaukee,WI**
  Graduate Research Assistant *January 2014 – May 2019*

  Research electrochemical water treatment for the mitigation of viruses and heavy metals; contribute to research grant applications; oversee and mentor graduate and undergraduate researchers in Biosafety Level 2 laboratory.

- **City of Sioux Falls** **Sioux Falls, SD**
  Sustainability Technician *January 2011 – June 2012*

  Manage waste industry recycling reporting; develop regional recycling and diversion rate methodology; develop and implement media and public outreach programs; collaborate on ordinance revisions.

- **U.S. Peace Corps** **Kapan, Armenia**
  Environmental Education Volunteer *May 2008 – July 2010*

  Give seminars for science teachers; teach science and English language to children and adult learners; organize regional student competitions and events; write and manage grants.

- **Eltron Research** **Boulder, CO**
  Laboratory Technician *September 2003 – July 2005*

  Synthesize and evaluate novel organic compounds for removing arsenic and nitrates from wastewater.

Service

Department

- **Water Quality Center, Marquette University** **Milwaukee, WI**
  Lab tours and meet-and-greets for donors and prospective students *2014 – 2019*

University

- **Schmitt Fellows Alumni Network Outreach** **Milwaukee, WI**
  Arthur J. Schmitt Leadership Project *2018 – 2019*

Professional

- **Various academic journals**
  Peer reviewer *2020 – present*

  - Water Research
  - Environmental Science: Water Research & Technology
  - Colloids & Surfaces B: Biointerfaces
  - Water

- **Clean Water Science Network** — **Mexico, Peru (virtual)**
  Mentor for undergraduate engineering students — *2020 – present*
- **Intel International Science and Engineering Fair** — **Milwaukee, WI**
  Mentor for state finalist high school team — *2016*

Community

- **WI Department of Natural Resources** — **Milwaukee, WI**
  Wisconsin Master Naturalist, Water Action Volunteer — *2017-2019*
- **Urban Ecology Center** — **Milwaukee, WI**
  Volunteer — *2012*
- **U.S. Peace Corps** — **Kapan, Armenia**
  Environmental Education Volunteer — *2008 – 2010*
- **English Learning Center** — **Minneapolis, MN**
  EFL Instructor — *2006 – 2008*
- **Mississippi National River and Recreation Area** — **Minneapolis, MN**
  Restoration Work Crew Leader — *2007*
- **Neal Smith National Wildlife Refuge** — **Prairie City, IA**
  Restoration Volunteer — *2000 – 2002*