

Education

2015 - 2018. PhD Environmental Engineering, University of Colorado Boulder (CU) Civil, Environmental, and Architectural Engineering (CEAE)
2011 - 2013. MS Civil Engineering with Environmental Specialization, CU CEAE
2006 - 2010. BS Civil Engineering, University of Kentucky (UK) Department of Civil Engineering

Experience

2018 - Present. Assistant Professor, The Ohio State University (OSU), Civil, Environmental, and Geodetic Engineering, Columbus, OH, USA. Core Faculty Member: Sustainability Institute. Faculty Member: Environmental Sciences Graduate Program, Center of Microbiome Science, Infectious Diseases Institute, and STEAM Factory. Courses taught: Fundamentals of Environmental Engineering, Bioremediation of Groundwater and Soil, Environmental Engineering Bioprocesses. Guest lecturer: Sustainable Infrastructure for Developing Rural Communities (OSU), Drinking Water Treatment (CU), Small Community Water/Wastewater Systems (CU).
2016 - 2017. Teaching Assistant and Co-Instructor (Environmental Microbiology), CU CEAE.
2015 - 2018. PhD Graduate Research Assistant (Dr. Karl Linden), CU CEAE.
2014 - 2015. Professional Research Assistant (Dr. Karl Linden), CU CEAE.
2013 - 2014. Professional Research Assistant (Dr. Norman Pace), CU Molecular, Cellular, and Developmental Biology (MCDB).
2012 - 2013. Grader (Fundamentals of Environmental Engineering), CU CEAE.
2011 - 2012. MS Graduate Research Assistant (Dr. Lupita Montoya and Dr. Corrella Detweiler), CU CEAE and MCDB.
2010 - 2011. Teaching Assistant (Civil Engineering Materials) (Introduction to Civil Engineering) (Microbial Aspects of Environmental Engineering), UK.
2010 - 2010. Undergraduate Researcher (Dr. Gail Brion), UK.
2009 - 2011. Summer Senior Engineering Aide, Lexington Fayette Urban County Government, KY, USA.
2007 - 2008. Summer Engineering Intern, Summit Engineering, Inc., Lexington, KY, USA.

Peer Reviewed Publications

1. Ma, D.T.; Weir, M.H.; and Hull, N.M. (2022, under review) Photorepair fluence based QMRA model for decentralized UV disinfection of drinking water. Under review at *Water Research*.
2. Bohrerova, Z.; Brinkman, N.E.; Chakravarti, R.; Chattopadhyay S.; Faith, S.A.; Garland, J.; Herrin, J.; Hull, N.; Jahne, M.; Kang, D.; Keely, S.P.; Lee, J.; Lemeshow, S.; Lenhart, J.; Lytmer, E.; Malgave, D.; Miao, L.; Minard-Smith, A.; Mou, X.; Nagarkar, M.; Quintero, A.; Savona, F.D.R.; Senko, J.; Slonczewski, J.L.; Spurbeck, R.R.; Sovic, M.G.; Taylor, R.T.; Weavers, L.K.; Weir, M. (2022, under review). Ohio Coronavirus Wastewater Monitoring Network: implementation of statewide monitoring for protecting public health. Under review at *Environmental Health Perspectives*.
3. Robinson, R.T.; Mahfooz, N.; Rosas-Mejia, O.; Liu, Y.*; Hull N.M. (2022). UV₂₂₂ disinfection of SARS-CoV-2 in solution. *Scientific Reports* doi: 10.1038/s41598-022-18385-4.
4. Lu, E.; Ai, Y.; Davis, A.; Straathof, J.; Halloran, K.; Hull, N. M.; Winston, R.; Weir, M.; Soller, J.; Bohrerova, Z.; Oglesbee, M.; Lee, J. (2022). Wastewater surveillance of SARS-CoV-2 in dormitories as a part of comprehensive university campus COVID-19 monitoring. *Environmental Research* doi: 10.1016/j.envres.2022.113580.
5. Ma, D.T.; Straathof, J.A.; Liu, Y.; Hull, N.M. (2022). Monitoring SARS-CoV-2 RNA in wastewater with RT-qPCR and chip-based RT-dPCR: sewershed-level trends and relationships to COVID-19. *Environmental Science and Technology Water* doi: 10.1021/acsestwater.2c00055.

6. Nastasi, N.; Renninger, N.; Bope, A.; Cochran, S. J.; Greaves, J.; Haines, S. R.; Balasubrahmaniam, N.; Stuart, K.; Panescu, J.; Bibby, K.; Hull, N. M.; Dannemiller, K. C. (2022). Persistence of viable MS2 and Phi6 bacteriophages on carpet and dust. *Indoor Air* doi: 10.1111/ina.12969.
7. Beck, S. E.; Suwan, P.; Rathnayeke, T.; Nguyen, T. M. H.; Huanambal-Sovero, V. A.; Boonyapalanant, B.; Hull, N. M.; Koottatep, T. (2021). Woven-Fiber Microfiltration (WFMF) and Ultraviolet Light Emitting Diodes (UV LEDs) for Treating Wastewater and Septic Tank Effluent. *MDPI Water* doi: 10.3390/w13111564.
8. Hull, N.M.; Linden, K. (2021). On applicability of a cell proliferation assay to examine DNA concentration of UV- and chlorine-treated organisms - a rebuttal of Molina et al. (2019). *Management of Biological Invasions* doi: 10.3391/mbi.2021.12.2.02.
9. Renninger, N.; Nastasi, N.; Bope, A.; Cochran, S.; Haines, S.; Balasubrahmaniam, N.; Stuart, K.; Bivins, A.; Bibby, K.; Hull, N. M.; Dannemiller K. C. (2021). Indoor dust as a matrix for surveillance of COVID-19. *mSystems* doi: 10.1128/mSystems.01350-20.
10. Vinge, S.; Rosenblum, J.; Linden, Y.; Saenz, A.; Hull, N.M.; Linden, K. (2021). Assessment of UV Disinfection and Advanced Oxidation Processes for Treatment and Reuse of Hydraulic Fracturing Produced Water. *ACS ES&T Engineering* doi: 10.1021/acsestengg.0c00170.
11. Claeys, T.A.; Rosas Mejia, O.; Marshall, S.; Jarzembowski, J.A.; Hayes, D.; Hull, N.M. Liyanage, N.; Chun, R.; Sulman, C.; Huppler, A; Robinson, R. (2019). Attenuation of Helper T Cell Capacity for TH1 and TH17 Differentiation in Children with Nontuberculous Mycobacterial Infection. *Journal of Infectious Diseases* doi: 10.0.4.69/infdis/jiz371.
12. Hull, N.M.; Herold, W.H.; Linden, K.G. (2019). UV LED Water Disinfection: Validation and Small System Demonstration Study. *American Water Works Association Water Science* doi: 10.1002/aws2.1148.
13. Linden, K.G.; Hull, N.M.; Speight, V. (2019). Thinking Outside the Treatment Plant: UV for Water Distribution System Disinfection. *Accounts of Chemical Research* doi: 10.1021/acs.accounts.9b00060.
14. Hull, N.M.; Ling, F.; Pinto, A.J.; Albertsen, M.; Jang, H.G.; Hong, P.Y.; Konstantinidis, K.T.; LeChevallier, M.; Colwell, R.; Liu, W-T. (2019). Drinking Water Microbiome Project: Is it Time? *Trends in Microbiology* doi: 10.1016/j.tim.2019.03.011.
15. Hull, N.M.; Rosenblum, J.S.; Robertson, C.E.; Harris, J.K.; Linden, K.G. (2018). Succession of Toxicity and Microbiota in Hydraulic Fracturing Flowback and Produced Water in the Denver–Julesburg Basin. *Science of the Total Environment* doi: 10.1016/j.scitotenv.2018.06.067.
16. Hull, N.M.; Linden, K.G. (2018). Synergy of MS2 Disinfection by Sequential Exposure to Tailored UV Wavelengths. *Water Research* doi: 10.1016/j.watres.2018.06.017.
17. Beck, S.E.; Hull, N.M.; Poepping, C.; Linden, K.G. (2018). Wavelength-Dependent Damage to Adenoviral Proteins Across the Germicidal UV Spectrum. *Environmental Science and Technology* doi: 10.1021/acs.est.7b04602.
18. Hull, N.M.; Holinger, E.P.; Ross, K.A.; Robertson, C.E.; Harris, J.K.; Stevens, M.J.; Pace, N.R. (2017). Longitudinal and Source-to-Tap New Orleans, LA, U.S.A. Drinking Water Microbiology. *Environmental Science and Technology* doi: 10.1021/acs.est.6b06064.
19. Hull, N.M.; Isola, M.R.; Petri, B.; Chan, P.S.; Linden, K.G. (2017). Algal DNA Repair Kinetics Support Culture-based Enumeration for Validation of Ultraviolet Disinfection Ballast Water Treatment Systems. *Environmental Science and Technology Letters* doi: 10.1021/acs.estlett.7b00076.
20. Stanish, L.F.; Hull, N.M.; Robertson, C.E.; Harris, J.K.; Stevens, M.J.; Spear, J.R.; Pace, N.R. (2016). Factors Influencing Bacterial Diversity and Community Composition in Municipal Drinking Waters in the Ohio River Basin, USA. *PLoS One* doi: 10.1371/journal.pone.0157966.
21. Handorean, A.; Robertson, C.E.; Harris, J.K.; Frank, D.; Hull, N.; Kotter, C; Stevens, M.J.; Baumgardner, D.; Pace, N.R.; Hernandez, M. (2015). Microbial Aerosol Liberation from Soiled

Textiles Isolated During Routine Residuals Handling in a Modern Health Care Setting. *Microbiome*
doi: 10.1186/s40168-015-0132-3.

22. Linden, K.G.; Hull, N.M.; Rodriguez, R.A. (2015). Comment on "UV Disinfection Induces a VBNC State in *Escherichia Coli* and *Pseudomonas Aeruginosa*". *Environmental Science and Technology* doi: 10.1021/acs.est.5b02534.
23. Hull, N.M.; Reens, A.L.; Robertson, C.E.; Stanish, L.F.; Harris, J.K.; Stevens, M.J.; Frank, D.; Kotter, C.; Pace, N.R. (2015). Molecular Analysis of Single Room Humidifier Bacteriology. *Water Research* doi: 10.1016/j.watres.2014.11.024.

Invited Presentations (plus > 90 non-invited presentations at conferences and other venues)

1. Hull, N. M. (2022, upcoming). *Overcoming challenges of implementing UV technologies in small, rural water systems*. International Ultraviolet Association Sustainable Development Goal Task Force webinar. Virtual lecture to be conducted from Columbus, OH, USA.
2. Hull, N. M. (2022). *Impacts of UV wavelengths during water treatment on microbes and their molecules*. ACS Fall 2022 Sustainability in a Changing World: Advances Made by Early to Mid-Career Researchers in Environmental Science & Engineering Session, Lecture conducted from Chicago, IL, USA.
3. Hull, N. M. (2022). *Novel technologies for disinfection of NTM laden water*. Many Hosts of Mycobacteria 9 Conference, Lecture conducted from Columbus, OH, USA.
4. Hull, N. M. (2022). *Controlling water microbiomes in space with specific UV wavelengths*. Center of Microbiome Science and Infectious Diseases Institute Space Microbial Communities Research Workshop 2 Breakout room 1: Microbiology of the Built Environment, Virtual lecture conducted from Columbus, OH, USA.
5. Hull, N. M. (2022). *Microbe management by specific UV wavelengths: from molecule to microbiome*. IUVA Research Innovation Symposium, Session 5: New UV Sources: Far UVC, UV LEDs, and Plasma UV, Lecture conducted from Boulder, CO, USA.
6. Hull, N.M. (2022). *Precision disinfection of water from molecule to microbiome by multi-wavelength UV light*. University of Massachusetts Amherst Environmental and Water Resources Engineering group seminar series. Virtual lecture conducted from Columbus, OH, USA.
7. Hull N.M. (2021). *Precision Water Treatment Using Multi-Wavelength UV: From Molecule to Microbiome*. University of Cincinnati graduate seminar series, Department of Chemical and Environmental Engineering, Virtual lecture conducted from Columbus, OH, USA.
8. Robinson, R.; Mahfooz, N.; Rosas-Mejia, O.; Liu, Y.; Hull, N.M. (2021). *Disinfection of SARS-CoV-2 by UV light: mechanisms, kinetics, and public health implications*. Infectious Diseases Institute (IDI) Seminar Series: Monitoring & Disinfecting SARS-CoV-2 in the Environment. Virtual lecture conducted from Columbus, OH, USA.
9. Dannemiller, K.; Hull, N.M.; Renninger, N.; Nastasi, N.; Bibby, K. (2021). *Novel Indoor Monitoring Techniques for SARS-CoV-2*. Infectious Diseases Institute (IDI) Seminar Series: Monitoring & Disinfecting SARS-CoV-2 in the Environment. Virtual lecture conducted from Columbus, OH, USA.
10. Dannemiller, K.; Hull, N.M.; Renninger, N.; Nastasi, N.; Bibby, K. (2021). *Novel Indoor Monitoring Techniques for SARS-CoV-2*. COVID-19 Inventor Showcase: Novel Indoor Monitoring Techniques for SARS-CoV-2. Virtual lecture conducted from Columbus, OH, USA.
11. Liu, Y.; Killian, A.; Linden, K.; Hull, N.M. (2021). *Impacts of UV-C LED disinfection on drinking water microbiomes*. Pacificchem, Symposium #145 (UV Photochemistry for Water: Implications for Safe Water Disinfection and Oxidation Treatment Applications). Virtual lecture conducted from Columbus, OH, USA.

12. Straathof, J.; Bohrerova, Z.; Hull, N.M. (2020). *Impact of Filter Upset During Conventional Surface Water Treatment on UV Disinfection Efficacy*. Across the Pond Water Talks hosted by Imperial College of London. Virtual lecture conducted from Columbus, OH, USA.
13. Ma, D.; Weir, M.; Hull, N.M. (2020). *Development of quantitative microbial risk assessment model for UV disinfection and photoreactivation in bottled drinking water*. Across the Pond Water Talks hosted by Imperial College of London. Virtual lecture conducted from Columbus, OH, USA.
14. Hull, N.M. (2020). *Novel Tools for On-site, Real-time Monitoring of UV Disinfection System Performance*. AWWA 2020 Annual Conference and Exposition. *Note: This conference and thus presentation were cancelled due to COVID-19.
15. Hull, N.M. (2019). *Water Microbes: Comprehension and Control*. The Ohio State University, Environmental Sciences Graduate Program Seminar. Lecture conducted from Columbus, OH, USA.
16. Straathof, J.; Bohrerova, Z.; Hull, N.M. (2019). *Impact of Filter Upset During Conventional Surface Water Treatment on UV Disinfection Efficacy*. Ohio section American Water Works Association Technical Committee meeting. Lecture conducted from Columbus, OH, USA.
17. Hull N.M. (2018). *Water Microbes: Comprehension and Control*. The Ohio State University, Department of Civil, Environmental, and Geodetic Engineering Seminar, Columbus, OH, USA.
18. Hull N.M. (2018). *Water Microbes: Comprehension and Control*. University of Vermont, Department of Civil and Environmental Engineering Seminar, Lecture conducted from Burlington, VT, USA.
19. Hull N.M. (2018). *Water Microbes: Comprehension and Control*. University of Illinois at Urbana-Champaign, Department of Civil and Environmental Engineering Seminar, Lecture conducted from Urbana-Champaign, IL, USA.
20. Hull N.M. (2018). *Bacterial Dynamics in Conventional Treatment: From the Mississippi River to New Orleans Taps*. NSF/WRF Workshop on Advancing Understanding of Microbiomes in Water Distribution Systems and Premise Plumbing Using Meta-omics Techniques, Lecture conducted from Denver, CO, USA.
21. Hull N.M., and Sholtes K.A. (Feb 2017). *UVC LEDs and Disinfection*. UVC LED Review Workshop for IUVA Americas, Lecture conducted from Austin, TX, USA.
22. Hull N.M. (2017). *Water Microbes: Comprehension and Control*. MIT Rising Stars Workshop, Lecture conducted from Cambridge, MA, USA.
23. Hull N.M. and Linden K.G. (Oct 2017). *Mechanisms and Sustainability of Wavelength-Tailored Ultraviolet Drinking Water Disinfection for Small Systems*. CU Boulder Environmental Engineering Seminar Series, Lecture conducted from Boulder, CO, USA.

Funding

1. PI: Impacts of specific UV wavelengths on antibiotic resistant bacteria and their genes during wastewater treatment (*not confirmed, invited for panel presentation*). Ohio Water Development Authority. \$143,608 of \$143,608 including \$71,817 cost share. 1/2023 - 12/2023.
2. PI: Impacts of low UV wavelengths on cyanobacteria and cyanotoxins in drinking and natural water treatment (*notified; paperwork in progress*). Ohio Department of Higher Education Harmful Algal Bloom Research Initiative. \$151,300 of \$151,300 with no cost share. 8/2022 - 12/2024.
3. Co-I: COVID-19 surveillance in public buildings using vacuumed dust. National Institutes of Health. ~\$3,000 of \$319,332 with no cost share. 2/2022 - 1/2024.
4. Co-PI: Analysis of mitigating concrete cracks with bacteria. Ohio Department of Transportation. ~\$70,000 of \$221,292 with no cost share. 8/2020 - 10/2022.
5. PI: Cyanotoxin biodegradation: An in-plant solution to microcystins in water treatment residuals. Ohio Water Development Authority. \$21,160 of \$21,160 including \$10,580 cost share. 3/2021 - 9/2022.

6. PI: Systemic interactions between individuals and drinking water quality in Appalachia. Ohio State Sustainability Institute. \$50,000 of \$50,000 including \$25,000 cost share. 9/2020 - 8/2022.
7. Co-PI: Coordination and management of statewide and campus SARS-CoV-2 wastewater monitoring. Ohio Department of Health. \$111,328 of \$7,219,172 with no cost share. 7/2021 - 6/2022.
8. Co-I: Surveillance of COVID-19 at the building scale: Pilot measurements of SARS-CoV-2 in building dust on Ohio State University's Columbus Campus. Ohio State Applied Microbiology Services Lab. \$0 of \$25,000 with no cost share. 5/2021 - 12/2021.
9. Co-I: Distributed UV LEDs for Combined Control of Fouling of Drip Emitters and Disinfection during Irrigation with Reclaimed Wastewater Effluent. U.S.-Israel Binational Agricultural Research and Development Fund. \$0 of ~\$300,000 with no cost share. 8/2019 - 7/2021.
10. Co-PI: Coronavirus Relief Fund: State of Ohio wastewater SARS-CoV-2 surveillance. Ohio Environmental Protection Agency. \$183,678 of \$1,963,823 with no cost share. 7/2020 - 6/2021.
11. Co-PI: OSU campus wastewater surveillance as a tool for rapid detection of community level of COVID-19 infection. Ohio State University. ~\$17,000 of \$81,294 with no cost share. 8/2020 - 12/2020.
12. PI: Impact of Filter Upset During Conventional Surface Water Treatment on UV Disinfection Efficacy. Ohio Water Resources Center. \$15,384 of \$15,384 including \$7,692 cost share. 1/2019 - 2/2020.

Professional Membership and Service

2020 - Present. Journal Associate Editor, *American Water Works Association Water Science*.

2021 - Present. Elected Board of Directors Member, International Ultraviolet Association (IUVA).

2020 - Present. Elected Chair. UVC LED Disinfection Performance Task Force, IUVA.

2018 - 2021. Co-Founder and Co-Chair, Young Professionals Committee, IUVA.

Professional Memberships: IUVA. AEESP (Association for Environmental Engineering and Science Professors). IWA (International Water Association). AWWA (American Water Works Association). ASM (American Society for Microbiology). ACS (American Chemical Society).

Conference Involvement: Planning committee: 2022 Purdue microbiome symposium, 2022 IUVA Research Innovation Symposium, 2021 Infectious Diseases Institute Annual meeting. Session Chair/Moderator: 2021 IUVA World Congress, 2018 IUVA Americas. Volunteer: 2018 AWWA One Water Conference.

Proposal Reviewer: National Science Foundation Panel Reviewer (x2), United States Geological Survey panel reviewer, Natural Sciences and Engineering Research Council of Canada proposal, Sustainability Institute student research grants panel reviewer, Ohio Water Resources Center proposal.

Journal Reviewer: *Environmental Science & Technology*, *Environmental Science: Water Research & Technology*, *Environmental Research*, *Water Research*, *Chemosphere*, *BMC Microbiology*, *Journal of Environmental Sciences*, *Scientific Reports*.

Invited Panelist: 2022 OSU STEM Scholars Faculty Panel. 2021 Young Professionals Fall Student Career Panel for OAWWA. 2019 and 2020 Career Pathways for OSU Society of Environmental Engineering.

Committee Service: Department: Graduate Studies (member 1 year), Undergraduate Research (member 2 years then chair 1 year to present). University: Graduate Faculty Representative (2019, 2022)

Entrepreneurial Activity

2018 - 2022. Paid consulting (Hull Consulting, LLC) for UV water treatment systems (disinfection validation expert witness for 2 product lines for Aquisense Technologies, and design consultation for 1 product line for CardioQuip).

2021 - 2022. OSU REACH for Commercialization program participant.

2021. Provisional Patent T2021-093. COVID-19 and virus monitoring in dust.

2019 - 2020. Material Transfer Agreements A2019-1185 and A2020-2654. KrCl excimer lamps from USHIO for BSL-2 and BSL-3 lab research, respectively.
2019. Invention disclosure T2019-222. Hydropowered UV LEDs for water disinfection.
2007. Entrepreneurial Engineering Summer Study Abroad for UK students in Karlsruhe, Germany.
2005. Entrepreneurial Engineering Summer Program for Underrepresented High School Students at UK.

Certifications

2022. OSU College of Engineering Level 1 Inclusive Excellence
2022. OSU Inclusive Teaching
2022. OSU Better Research through Better Mentoring
2019. OSU New Faculty Foundation, Impact, and Transformation
2019. OSU Teaching Support Program Levels 1-3
2018. CU College Teaching graduate certificate
2018. CU Engineering Mentoring graduate certificate
2018. CU Water Engineering and Management graduate certificate

Honors

2022. Nominated attendee to National Academy of Engineering US Frontiers of Engineering Symposium.
2022. W Prize, Technology Breakthrough Category – Honorable Mention (\$200), Confluence Tech Showcase, Confluence Water Technology Innovation Cluster Ohio Valley Region.
2021. Excellence in Undergraduate Research Mentoring Award, OSU Undergraduate Research and Creative Inquiry.
2020. W.D. Sheets Award mentoring excellence award, Ohio Water Environment Association Southeast Section.
2020. Publication Award - Runner Up, American Water Works Association, Small Systems Division.
2020. Best Paper Award - Winner, *American Water Works Association Water Science* journal, Small Systems Division.
2018. QMRA Interdisciplinary Instructional Institute (full funding \$625)
2018. CU Boulder Dissertation Completion Fellowship (full summer funding)
2018. NSF/WRF Water Microbiome and Meta-omics Workshop (full funding ~\$500)
2018. IUVA Americas Best Student Presentation Award, 1st place (\$200)
2017. IUVA World Congress Best Student Presentation Award, 2nd place (\$200)
2017. MIT CEE Rising Stars Workshop for top early career women in academia (full funding ~\$1000)
2016 - 2017. NWRI fellowship (\$5000/yr)
2016. Sloan Foundation STAMPS bioinformatics workshop (full funding ~\$1500)
2016. Sloan Foundation MoBEDAC bioinformatics workshop (full finding ~\$1500)
2016. IUVA World Congress Best Student Presentation Award, 2nd place (\$200)
2012. Beverly Sears Graduate Student Grant (\$1000)
2011. UK Outstanding Graduate Student in Civil Engineering award
2010. Raymond Fellowship (\$1000/yr)
2009 - 2010. Don E. Hancher / C. Michael Garver scholarship (\$1000/yr)
2009 - 2010. Tau Beta Pi Engineering Honor Society member
2006 - 2010. Provost scholarship (\$1000/yr)
2006. Downey scholarship (\$1000)
2006. Bill and Sandy Ramsey scholarship (\$1000)