

Mark H. Weir EIT Ph.D.

Associate Professor - With Tenure

Division of Environmental Health Sciences, College of Public Health

Core Faculty Member - Sustainability Institute

Sustainability Institute Faculty Lead for Climate and Health

The Ohio State University, 1841 Neil Ave, Cunz Hall - 426, Columbus, OH, 43210

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EDUCATION

Environmental Engineering, PhD. Drexel University, 2009

Concentrations: Environmental and engineered systems modeling, Quantitative Microbial Risk Assessment (QMRA)

Dissertation: Development of Physiologically Based Pathogen Transport and Kinetics Model for Inhalation of *Bacillus anthracis* Spores

Environmental Engineering, B.S. Wilkes University, 2004

Concentrations: Novel water treatment, water distribution modeling, design

Published Senior Project: Modeling Leakage Reduction Through Pressure Control

PROFESSIONAL LICENSE

Engineer in Training, Pennsylvania. Issued on 12 April 2003, License Number ET004493

PROFESSIONAL POSITIONS

Associate Professor

Jan 2023 - Current

Division of Environmental Health Sciences, College of Public Health
The Ohio State University

Environmental Health Officer - Current Rank: LT (O3)

Dec 2022 - Current

United States Navy Reserve Medical Service Corps

Assistant Professor

Aug 2016 - April 2022

Division of Environmental Health Sciences, College of Public Health
The Ohio State University

Senior Lecturer

Nov 2016 - Current

College of Medicine
Griffith University

Adjunct Assistant Professor

Feb 2017 - Current

Mel and Enid Zuckerman College of Public Health
University of Arizona

CTO & Senior Research Engineer

Oct 2012 - Current

CAMRA Consultants LLC.

Acting Director of Environmental Health Division

Dec 2013 - July 2016

Division of Environmental Health Department of Epidemiology and Biostatistics
Temple University

<u>Assistant Professor</u>	<i>Oct 2012 - July 2016</i>
Division of Environmental Health Department of Epidemiology and Biostatistics Department of Civil and Environmental Engineering Temple University	
<u>Environmental Engineer</u>	<i>Sept 2011 - Sept 2012</i>
Office of Water, United States Environmental Protection Agency	
<u>Associate Director & Visiting Research Associate</u>	<i>Sept 2009 - Sept 2011</i>
Center for Advancing Microbial Risk Assessment (CAMRA), Department of Fisheries and Wildlife Michigan State University	
<u>Graduate Assistant</u>	<i>Sept 2004 - Sept 2009</i>
Department of Civil Architectural and Environmental Engineering, Drexel University	
<u>Co-Instructor</u>	<i>Sept 2005 - May 2009</i>
Department of Civil Architectural and Environmental Engineering, Drexel University	
<u>Teaching Assistant</u>	<i>Sept 2005 - May 2009</i>
Department of Civil Architectural and Environmental Engineering, Drexel University	
<u>Laboratory Assistant</u>	<i>Sept 2000 - Dec 2003</i>
Department of Environmental Engineering and Earth Sciences, Wilkes University	

RESEARCH

Brief Research Statement

I am an Environmental Engineer who focuses on the development of both computational methods and models for mechanistic risk analysis within environmental systems. I am PI of the Engineering Better Decisions (EBD) Laboratory at the Ohio State University, and we focus on the quantitative methods needed to use data better, model systems better, and use those methods and models to inform better decision making. As a core faculty member of the Sustainability Institute at OSU, I focus EBD's research on convergent science and topics addressing future challenges in environmental engineering and health. To briefly generalize, we are working with colleagues on computational methods using frequentist and Bayesian (including hierarchical approaches) to research the following grand challenges: a.) understand how multiple exposures interact in human organ systems, b.) quantify how ambient and human gut microbiomes influence a hazard's health effect, and c.) how engineering and clinical decisions influence exposures and the probability of a health effect.

My research has been continually funded since and including graduate school and has continued to be supported from a diverse portfolio of funders and supporters. Because there are extension components to my research outputs, I can diversify contractual and traditional grant mechanisms for funding, and have recently closed my private businesses to enhance this ability to operate funded contracts through OSU. I am most interested in expanding and refining computational methodologies for mechanistic risk modeling within systems of systems which my funding and publication record demonstrates. Consequently, I am seeking a position focused primarily on research to advance my scientific goals and impact.

Publications

Peer-Reviewed Journal Articles

Published or Accepted

56. Xu, J., Li, X., Xi, C., **Weir, M.H.** (2024) Development of a machine learning model to support low cost real-time Legionella monitoring in premise plumbing systems. *267*:122510
<https://doi.org/10.1016/j.watres.2024.122510>
55. Mitchell, J., Li, H., **Weir, M.H.**, Libarkin, J., Pasek, E. (2024) Development and evaluation of an intensive short course: the Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute (QMRA III). *25*:2 <https://doi.org/10.1128/jmbe.00216-23>
54. Verhougstraete, M., Cooksey E., Walker, J-P., Wilson, A.M., Lewis, M.S., Yoder, A., Elizondo-Craig, G., Almoslem, M., Forsyiaak, E., **Weir, M.H.** (2024) Impact of Terminal Cleaning in Rooms Previously Occupied by Patients with Healthcare-Associated Infections. *Plos One* **19**: 7
53. Seong, D., **Weir, M. H.**, Hoque, S. (2024) Determination of the Trend and Spatial Distribution of Microbial Levels Based on Space and Occupant Characteristics. *Journal of Building Engineering*. **89**, 109240.
<https://doi.org/10.1016/j.jobee.2024.109240>.
52. Hamilton, K.A., Harrison, C., Mitchell, J. **Weir, M.H.**, et al Rose, J.B. (2024) Research gaps and priorities for quantitative microbial risk assessment (QMRA). *Risk Analysis* **44**:11.
<https://doi.org/10.1111/risa.14318>
51. Borhreova, Z., Brinkman, N.E. et al. **Weir, M.H.** (2023) Ohio Coronavirus Wastewater Monitoring Network: Implementation of Statewide Monitoring for Protecting Public Health. *Journal of Public Health Management and Practice*. **29**(6): 845-853. <https://pubs.acs.org/doi/10.1021/envhealth.3c00058>
50. Li, X., Xu, J., Wu, J., **Weir, M.H.**, Xi, C. (2023) Prevalence of Legionella in a Public Building Water Plumbing System During COVID-19 Lockdown. *Environmental & Health*. **1**(5): 352-359.
49. KhudaBukhsh, W.R., Bastian, C.D., Wascher, M., Klaus, C., Sahai, S.Y., **Weir, M.H.**, Kenah, E., Root, E., Tien, J.H., Rempala, G.A., (2023). Projecting COVID-19 cases and hospital burden in Ohio. *Journal of Theoretical Biology*. **561**: 111404. <https://doi.org/10.1016/j.jtbi.2022.111404>
48. Ma, D., **Weir, M.H.**, Hull, N.M., 2023. Fluence-based QMRA model for bacterial photorepair and regrowth in drinking water after decentralized UV disinfection. *Water Research* **231**: 119612.
<https://doi.org/10.1016/j.watres.2023.119612>
47. Mraz, A. L., **Weir, M. H.** (2022) Knowledge to Predict Pathogens: Legionella Pneumophila Lifecycle Systematic Review Part II Growth within and Egress from a Host Cell. *Microorganisms* **10**(1): 141.
<https://doi.org/10.3390/microorganisms10010141>
46. Rodriguez-Alvarez, M. S., Gutiérrez-López, A.; Iribarnegaray, M. A., **Weir, M. H.**, Seghezze, L. (2022) Long-Term Assessment of a Water Safety Plan (WSP) in Salta, Argentina. *Water*. **14**(19): 2948.
<https://doi.org/10.3390/w14192948>.
45. King, M.-F., Wilson, A. M., **Weir, M. H.**, López-García, M., Proctor, J., Hiwar, W., Khan, A., Fletcher, L. A., Sleigh, P. A., Clifton, I., Dancer, S. J., Wilcox, M., Reynolds, K. A., Noakes, C. J. Modeling Fomite-Mediated SARS-CoV-2 Exposure through Personal Protective Equipment Doffing in a Hospital Environment. *Indoor Air*. **32**(1): e12938. <https://doi.org/10.1111/ina.12938>

44. Lu, E., Ai, Y., Davis, A., Straathof, J., Halloran, K., Hull, N., Winston, R., **Weir, M. H.**, 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*. **212**: 113580. <https://doi.org/10.1016/j.envres.2022.113580>
43. Heida, A., Mraz, A., Hamilton, M.T., **Weir, M.H.**, Hamilton, K.A. (2022) Computational framework for evaluating risk trade-offs in costs associated with legionnaires' disease risk, energy, and scalding risk for hospital hot water systems. *Environmental Science: Water Research & Technology*. **8**:1. 76-97
42. Mraz, A.L., **Weir, M.H.** (2022) Knowledge to Predict Pathogens: Legionella pneumophila Lifecycle Systematic Review Part II Growth within and Egress from a Host Cell. *Microorganisms*. **10**:1. 141
41. King, M.F., Wilson, A.M., **Weir, M.H.**, Lopez-Garcia, M., Proctor, J., Hiwar, W., Khan, A., Fletcher, L.A., Sleigh, P.A., Clifton, I., Dancer, S.J., Wilcox, M., Reynolds, K.A., Noakes, C.J. (2021) Modelling the risk of SARS-CoV-2 infection through PPE doffing in a hospital environment. *Indoor Air* **32**:1
40. Wilson, A.M., **Weir, M.H.**, King, M.F., Jones, R.M. (2021) Comparing approaches for modelling indirect contact transmission of infectious diseases. *Journal of the Royal Society Interface*. **18**:182. 20210281
39. Wilson, A.M., **Weir, M.H.**, Bloomfield, S.F., Scott, E.A., Reynolds, K.A. (2021) Modeling COVID-19 infection risks for a single hand-to-fomite scenario and potential risk reductions offered by surface disinfection. *American Journal of Infection Control*. **49**(6): 846-848
38. Wilson, A.M., Jones, R.M., Lerma, V.L., Abney, S.E., King, M-F., **Weir, M.H.**, Sexton, J.D., Noakes, C.J., Reynolds, K.A. (2021) Respirators, face masks, and their risk reductions via multiple transmission routes for first responders within an ambulance. *Journal of Occupational and Environmental Hygiene*. In Press
37. **Weir, M.H.**, Wood, T.A., and Faust, A-Z. (2021) Development of Methods to Estimate Microcystins Removal and Water Treatment Resiliency Using Mechanistic Risk Modelling. *Water Research*. **190** doi.org/10.1016/j.watres.2020.116763
36. Wilson, A.M., **Weir, M.H.**, Bloomfield, S.F., Scott, E.A., Reynolds, K.A. (2020) Modeling COVID-19 Infection Risks for a Single Hand-to-Fomite Scenario and Potential Risk Reductions Offered by Surface Disinfection. *American Journal of Infection Control*. doi.org/10.1016/j.ajic.2020.11.013
35. Gonzalez, R., Curtis, K., Bivins, A., K. Bibby, **Weir, M.H.**, Yetka, K.H., Thompson, H., Keeling, D., Mitchell, J., Gonzalez, D. (2020) COVID-19 Surveillance in Southeastern Virginia Using Wastewater-Based Epidemiology. *Water Research*. **186** doi.org/10.1016/j.watres.2020.116296
34. Wilson, A.M., King, M-F., Lopez-Garcia, **Weir, M.H.**, Sexton, J.D., Canales, R., Mandarano.A., Kostov, G.E., Julian, T.R., Noakes, C.J., Reynolds, K.A. (2020) Evaluating a transfer gradient assumption in a fomite-mediated microbial transmission model using an experimental and Bayesian approach. *Journal of the Royal Society Interface*. **17**:167 doi.org/10.1098/rsif.2020.0121
33. Wilson, A.M., Abney, S.E., King, M-F., **Weir, M.H.**, Lopez-Garcia, M., Sexton, J.D., Dancer, S.J., Proctor, J., Noakes, C.J., Reynolds, K.A. (2020) COVID-19 and Non-Traditional Mask Use: How do Various Materials Compare in Reducing the Infection Risk for Mask Wearers? *Journal of Hospital Infection*. **105**: 4. 640-642 doi.org/10.1016/j.jhin.2020.05.036
32. **Weir, M.H.**, Mraz, A.L., Mitchell, J. (2020) An Advanced Risk Modeling Method to Estimate Legionellosis Risks Within a Diverse Population. *Water*. **12** 1: 43. doi.org/10.3390/w12010043

31. **Weir, M.H.** (2020) Data Simulation Method to Optimize a Mechanistic Dose-Response Model for Viral Loads of Hepatitis-A. *Microbial Risk Analysis*. In Press. doi.org/10.1016/j.mran.2019.100102
30. Mraz, A.L., Nappier, S., Haas, C.N., **Weir, M.H.** (2020) Dose Response Models for Eastern, Western and Venezuelan Encephalitis Viruses in Mice - Part I: Baseline Dose Response and Inference of Effects of Host Age. *Microbial Risk Assessment*. **14**: 38-54. doi.org/10.1016/j.mran.2019.100087
29. Adhikari, U.; Chabreliie, A.; **Weir, M.H.**; Boehnke, K.; McKenzie, E.; Ikner, L.; Wang, M.; Wang, Q.; Young, K.; Haas, C. N.; (2019) A Case Study Evaluating the Risk of Infection from Middle Eastern Respiratory Syndrome Coronavirus (MERS-CoV) in a Hospital Setting Through Bioaerosols. *Risk Analysis*. **39** 12: 2608-2624. doi.org/10.1111/risa.13389
28. Madera-García, V.; Mraz, A. L.; López-Gálvez, N.; **Weir, M.H.**; Werner, J.; Beamer, P. I.; Verhougstraete, M. P. (2019) *Legionella pneumophila* as a Health Hazard to Miners: A Pilot Study of Water Quality and QMRA. *Water*. **11** 8: 1528
27. Dean, K. **Weir, M.H.**, Mitchell, J. (2019) Development of a Dose-Response Model for *Naegleria fowleri*. *Journal of Water and Health*. **17** 1: 63-71
26. Canales, R.A. Reynolds, K.A., Wilson, A.M., Fankem, S.L.M., **Weir, M.H.**, Rose, J.B., Abd-Elmaksound S., Gerba, C.P. (2019) Modeling the Role of Fomites in a Norovirus Outbreak. *Journal of Occupational and Environmental Hygiene*. **16** 1: 16-26
25. Bope, A. **Weir, M.H.**, Pruden, A., Morowitz, M., Mitchell, J., Dannemiller, K.C (2018) Translating Research to Policy at the NCSE 2017 Symposium “Microbiology of the Built Environment: Implications for Health and Design”. *Microbiome*. **6** 1: 160
24. Mraz, A.L., **Weir, M.H.**, McLaughlin, P (2018) Efficacy of anuran trapping and monitoring techniques in the tropical forests of Bioko Island, Equatorial Guinea. *Amphibia-Reptilia*. **39** 4: 435-444
23. Mraz, A.L. **Weir, M.H.** (2018) Knowledge to Predict Pathogens: *Legionella pneumophila* Lifecycle Critical Review Part I Uptake into Host Cells. *Water*. **10**:132
22. Hamilton, K.A., Chen, A., Johnson, E.dG., Gitter, A., Kozak, A., Niquice, C., Zimmer-Faust, A.G., **Weir, M.H.**, Mitchell, J., Gurian, P. (2018) Salmonella risks due to consumption of aquaculture-produced shrimp. *Microbial Risk Analysis*. **9**:22-32
21. **Weir, M.H.**, Mraz, A.L., Nappier, S., Haas, C.N. (2018) Dose Response Models for Eastern, Western and Venezuelan Encephalitis Viruses in Mice - Part II: Quantification of the Effects of Host Age on the Dose Response. *Microbial Risk Assessment*. **9**:38-54
20. Brouwer, A., **Weir, M.H.**, Eisenberg, M., Eisenberg, J. (2017) Dose-Response Relationships for Environmentally Mediated Infectious Disease Transmission Models. *PLOS Computational Biology*. **13**(4): e1005481
19. Rosen, M.B., Pokhrel, L.R. and **Weir, M.H.** (2017) A Discussion About Public Health, Lead and *Legionella pneumophila* in Drinking Water Supplies in the United States. *Science of the Total Environment*. **590-591**: 843-852
18. **Weir, M.H.**, Mitchell, J., Flynn, W.K., Pope, J.M. (2017) Development of a Microbial Dose Response Visualization and Modeling Application for QMRA Modelers and Educators. *Environmental Modeling and Software*. **88**: 74-83

17. Pokhrel, L.R., Ettore, N., Jacobs, Z.L., Zarr, A., **Weir, M.H.**, Scheuerman, P.R., Kanel, S.R., Dubey, B. (2017). Novel carbon nanotube (CNT)-based ultrasensitive sensors for trace mercury(II) detection in water: A review. *Science of the Total Environment*. **574**: 1379-1388
16. Hamilton, K.A., **Weir, M.H.**, and Haas, C.N. (2017) "Dose response models and a quantitative microbial risk assessment framework for the *Mycobacterium avium* complex that account for recent developments in molecular biology, taxonomy, and epidemiology. *Water Research*. **109**: 310-326
15. **Weir, M.H.**, Shibata, T., Masago, Y., Cologgi, D., Rose, J.B. (2016) Effect of Surface Sampling and Recovery of Viruses and Non-Spore-Forming Bacteria on a Quantitative Microbial Risk Assessment Model for Fomites *Environmental Science and Technology*. **50**(11): 5945-5952
14. Alvarez, S.R., **Weir, M.H.**, Pope, J.M. Seghezzi, L., Rajal, V.B., Salusso, M., Moraña, L. (2015) Development of a Relative Risk Model for Drinking Water Regulation and Design Recommendations for a Peri Urban Region of Argentina. *International Journal of Hygiene and Environmental Health*. **218**(7): 627-638
doi:10.1016/j.ijheh.2015.06.007
13. Breuninger, K., **Weir, M.H.** (2015) Nested Dose Response Models for *Mycobacterium paratuberculosis* in Drinking Water for Humans and Cattle. *Risk Analysis*. **35**(8):1479-87. doi: 10.1111/risa.12380
12. Teske, S.S., **Weir, M.H.**, Bartrand, T.A., Huang, Y., Tamrakar, S.B., Haas, C.N. (2014) Dose Response Models Incorporating Aerosol Size Dependency for *Francisella tularensis*. *Risk Analysis*. **34**(5):911-28. doi: 10.1111/risa.12160
11. Coulliette, A.D., Enger, K.S., **Weir, M.H.** (2013) Risk Reduction Assessment of Waterborne *Salmonella* and *Vibrio* by a chlorine contact disinfectant Point-of-Use Device. *International Journal of Hygiene and Environmental Health*. **216**: 355-361
10. **Weir, M.H.**, Razzolini, M.T.P, Masago, Y., Rose, J.B. (2011) Water Reclamation Redesign For Reducing *Cryptosporidium* Risks At A Recreational Spray Park Using Stochastic Models. *Water Research* **45**(19): 6505-6514
9. **Weir, M.H.**, Haas, C.N. (2011) A model for In-vivo Delivered Dose Estimation for Inhaled *Bacillus anthracis* Spores in Humans with Interspecies Extrapolation. *Environmental Science and Technology* **45**(13): 5828-5833
8. Teske, S.S., Huang, Y., **Weir, M.H.**, Bartrand, T.A., Tamrakar, S.B., Haas, C.N. (2011) Animal and Human Dose-Response Models for *Brucella* Species. *Risk Analysis* **31**(10): 1576-1596
7. Razzolini, M.T.P, **Weir, M.H.**, Rose J.B., (2011) Risk of *Giardia* Infection in a Peri-Urban Area Drinking Water Supply in Sao Paulo, Brazil. *International Journal of Environmental Health* **21**(3): 222-234
6. Watanabe, T., Bartrand, T.B., **Weir, M.H.**, Haas, C.N. (2010) Development of a Dose-Response Model for SARS Coronavirus. *Risk Analysis* **30**(7): 1128-1138
5. **Weir, M.H.** and Haas, C.N (2009). Quantification of the Effects of Age on the Dose Response of *Variola major* in Suckling Mice. *Human and Ecological Risk Assessment*. **15** (6): 1245-1256
4. Huang, Y., Bartrand, T.A., Haas, C.N., **Weir, M.H.** (2009). Incorporating Time Post Inoculation into a Dose Response Model of *Yersinia pestis* in Mice. *Journal of Applied Microbiology*. **107**(3): 727-735
3. Bartrand, T.A., Haas C.N., **Weir, M.H.** (2008). Dose Response Models for Inhalation of *Bacillus anthracis* Spores: Interspecies Comparisons. *Risk Analysis*. **28**(4): 1115-1124

2. Bartrand, T.A., **Weir, M.H.**, Haas, C.N. (2007). Advancing the Quality of Drinking Water: Expert Workshop to Formulate a Research Agenda. *Environmental Engineering Science* 24(7): 863-872.
1. Walski, T., Bezts, W., Posluszny, E.T., **Weir, M.H.**, Whitman, B.E. (2006). Modeling Leakage Reduction Through Pressure Control. *Journal AWWA* 98(1): 147-155.

Under Revision or Review

1. **Weir, M.H.**, Lewis, M., Lin, J.A., Verhougstraete, M.P., Wilson, M.A. Under Review. Dose-Response Models for Three Health Outcomes from *Clostridioides difficile* with Extrapolation to Antibiotic Effects. *Risk Analysis*
2. **Weir**, Verhougstraete, M.P. Lewis, M. Under Review. Modeling the Mechanistic Dose-Response of *Acinetobacter baumannii* Infections in a Hospital Environment. *American Journal of Hospital Infection*.

Conference Proceedings

1. **Weir, M.H.** (2020 - published in 2021) Controlling SARS-CoV-2 on Critical Sensitive Infrastructure Lessons on Limited Environmental Data for Infectious Diseases. Proceedings of the 2020 ErgoX Symposium (in press). Session name: COVID-19 & Exoskeletons. Online delivery. 13 October 2020.
2. **Weir, M.H.**, Mitchell, J., Libarkin, J., Mraz, A.L. (2017) QMRA Wiki: An Educational Tool for Interdisciplinary Teaching of Risk Modeling in Engineering Curricula. Proceedings of the 2017 ASEE Annual Conference and Exhibition, Columbus, OH, USA. 25 - 28 June 2017. Perm URL: <https://peer.asee.org/27787>
3. Adhikari, U., Mitchell, J., Libarkin, J., **Weir, M.H.** (2017) Measuring the success of an educational program through box-and-arrow diagram: A case study of the Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute. Proceedings of the 2017 ASEE Annual Conference and Exhibition, Columbus, OH, USA. 25 - 28 June 2017. Perm URL: <https://peer.asee.org/28659>
4. Mitchell, J., **Weir, M.H.**, Libarkin, J., Rose, J.B. (2017) The Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute (QMRA III)–A Platform for Cross Disciplinary Training of Engineers with Social and Biological Scientists to Address Public Health Issues. Proceedings of the 2017 ASEE Annual Conference and Exhibition, Columbus, OH, USA, 25 - 28 June 2017. Perm URL: <https://peer.asee.org/28995>
5. Mitchell, J., **Weir, M.H.**, van Osch, W., Rose, J.B. (2014) The QMRA Wiki: A Social Media Tool for Interdisciplinary and Inter-agency Collaboration for Quantitative Microbial Risk Assessment. Proceedings of the 7th International Congress on Environmental Modelling and Software, June 15-19, San Diego, CA, USA. 15 - 19 June 2014. ISBN: 978-88-9035-744-2
6. Rose, J.B., **Weir, M.H.** (2010) Theoretical Modeling Approaches to Investigating the Spread of Disease in Airports and in Aircraft: Characterizing the Risk of Tuberculosis in Commercial Aircraft by Using Quantitative Microbial Risk Assessment. Proceedings of the Research on the Transmission of Disease in Airports and on Aircraft: A Symposium, Washington DC, 17 Sept 2009

- Walski, T., Bezts, W., Posluszny, E.T., **Weir M.**, Whitman, B. (2004) Understanding the Hydraulics of Water Distribution System Leaks. Proceedings, Critical Transitions in Water and Environmental Resources Management, Salt Lake City, UT, 27 June - 1 July 2004

Book Chapters

- Weir, M.H.** Dose-response modeling and use: challenges and uncertainties in environmental exposure. in Manual of Environmental Microbiology (2016) ASM Press
- Zarri, A., Pokhrel, L.R., Dubey, R., Scheuerman, P.R., Strongin, D.R., **Weir, M.H.**, Andersen, C.P., Rygiewicz, P., Kanel, S.R. Carbon Nanotube (CNT)-Based Novel Sensors for Mercury (II) Detection in Water. in Nanotechnology in Food Industry, Volume VIII: NanoBioSensors (2016) Springer.
- Pope, J.M., **Weir, M.H.**, Rose, J.B., History of Water and Health. in The Evolution of Water Supply Through the Millennia (2012) International Water Association. ISBN: 9781843395409

Funded Proposals

Title	Agency	Costs (to College)	Dates	Role
Active Grants to The Ohio State University (6)				
Winning the Race Against Competing Risks: Optimizing Drinking Water Disinfection to Minimize Opportunistic Pathogen & DBP Risks. Objective: Develop a robust nationally representative sampling and analysis system, and develop co-exposure risk modeling methods for both opportunistic pathogens and DBPs.	US EPA	\$2,123,000 (\$200,000)	Nov 2023 - Nov 2026	PD (MPI)
QMRA IV- Quantitative Microbial Risk Assessment Interdisciplinary Vehicle: Addressing Emerging Global Health Risks. Objective: Develop innovative risk modeling methods, and online and in-person curriculum to expand the practitioner community and standards of excellence within it.	NIH - NIGMS	\$2,565,894 (\$258,510)	Sept 2020 - 2026	PD (MPI)
CRANEES: Convergent Research for National Environmental Equity and Safety. Objective: Generate quantitative data for computational methods for risk monitoring in large buildings and low-income residential buildings.	OSU President's Catalyst Seed Grant	\$200,000	Jan 2022 - Dec 2024	PI
Collaborative Research: An integrative framework for decision support models including plumbing system dynamics and value of information to meet Legionella control goals. Objective: Derive computational models and methods to integrate multiple data streams and control conditions for <i>Legionella pneumophila</i> risk reduction.	NSF - Environmental Engineering	\$300,000 (\$30,000)	Sept 2022 - 2025	Co-I
The Assessment and Management of Risk From Non-Typhoidal <i>Salmonella</i> and Diarrheagenic <i>Escherichia coli</i> in Raw Dairy and Beef in Ethiopia (TARTARE). Objective: Develop an infection risk model to make digital twins of food risk outcomes for beef & dairy in Ethiopia.	Bill and Melinda Gates Foundation.	\$3,391,063 (\$365,000)	2019 - 2024	Co-PI
COVID-19 Response - Wastewater Monitoring Objective: Develop a risk management plan and surveillance plans to support it for inmate and staff protection in all of Ohio's 33 ODRC facilities.	OH Department of Rehabilitation and Corrections (ODRC).	\$220,000 (includes renewal)	Dec 2020 - 2024	PI
COVID-19 Dormitory Wastewater Monitoring of SARS-CoV-2 at Universities and Colleges in the State of Ohio Objective: Implement researched models for using wastewater surveillance to support campus decision making.	OH Department of Health	\$4,130,622 (\$71,573 includes renewals)	Dec 2020 - July 2024	Co-PI

Title	Agency	Costs (to College)	Dates	Role
Previous Grants to The Ohio State University (7)				
COVID-19 Wastewater-Based Epidemiology Modeling with University of Louisville Objective: Develop standards of practice for wastewater based epidemiology for COVID-19 and future pandemics.	University of Louisville	\$90,000	May 2021 - Aug 2021	PI
Renewal: COVID-19 Coronavirus Relief Fund: State of Ohio Wastewater SARS-CoV-2 Surveillance Objective: Develop computational models for the translation of surveillance data into numbers of shedders and prevalence of infection.	OH Environmental Protection Agency	\$1,790,785 (\$31,561)	Jan 2021 - Dec 2021	Co-PI
COVID-19 Response - Ventilation Assessment and Modeling Objective: Evaluate ventilation treatment technology and develop a risk model for intervention planning.	ODRC	\$85,791	July - Jan 2021	PI
COVID-19 Wastewater-Based Epidemiology (WBE) for RPM International Objective: implement WBE for 10 Ohio facilities to support staffing decision making.	RPM International	\$386,000	Jan 2021 - June 2021	PI
COVID-19 Coronavirus Relief Fund: State of Ohio Wastewater SARS-CoV-2 Surveillance Objective: Collaboratively initiate the OH WBE surveillance network throughout OH.	OH Environmental Protection Agency	\$1,790,785 (\$31,561)	July - Dec 2020	Co-PI
Development of QMRA Modeling Capacity and <i>Legionella pneumophila</i> Risk Model Development Objective: Develop QMRA modeling capacity at NSF International and support the development of a building water safety office until leadership can be found for the office.	National Sanitation Foundation	\$138,000 (\$138,000)	2017 - 2020	PI
QMRA III - Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute Objective: Develop online and in-person learning curriculum and materials, and ease of use risk modeling apps to broaden the practitioner and research community in QMRA.	NIGMS	\$791,506 (\$250,000)	2014 - 2020	PD (MPI)
Combined Surface Sampling and QMRA Modeling to Optimize Surface Cleaning Targeted HAI Reduction. Objective: Quantify environmental exposure of patients to HAI pathogens and cleaning interventions and develop a set of QMRA models to facilitate intervention simulations.	CDC	\$510,000 (\$150,000)	2018 - 2019	PI
An Integrated Strategy to Improve Green Infrastructure Approaches in Philadelphia. Objective: Develop a triple bottom line model to assess and forecast the overall health and environmental improvements from green stormwater infrastructure.	USEPA	\$1,000,000 (\$200,000)	2014 - 2018	Co-PI
Grants Funded Prior to Appointment at The Ohio State University (6)				
Sustainable Sanitation: Non-Western Approaches to Enhance Pathogen Control from Human Excreta. Objective: Develop a critical base of primary and computational data through QMRA models to understand innovative water treatment for Latin America.	P&G Inc.	\$600,000 (\$200,000)	2014 - 2018	PI
Disinfection and Pretreatment Proposed Redesign for Increased Variable Water Quality Parameters and Pathogenic Microorganisms. Objective: Evaluate a QMRA application and model developed for the Alberta Ministry and Calgary Water.	Alberta - Minister of Environmental and Sustainable Resource Development	\$15,000 (\$15,000)	2014 - 2015	PI
Stochastic Modeling of Hazardous Material Transport and Detection in Urban Gardens and Small Scale Agriculture. Objective: Quantify health risks associate with toxins and metals drawn into edible portions of plants.	P&G Inc.	\$400,000 (\$100,000)	2013 - 2015	PI
Design and Evaluation of Sustainable Storm Water Infiltration Structures for Hazardous Waste Control. Objective: Evaluate and fix issues identified with a QMRA model developed for a water resources project in Queensland Australia	CH ₂ M Hill Australia.	\$40,000	2011 - 2012	PI

Title	Agency	Costs (to College)	Dates	Role
Forecasting Beach and Nearshore Health Effects Using QMRA. Objective: Develop a QMRA modeling app to forecast risk to beach users on three beaches in the Great Lakes.	USEPA	\$65,000	2010 - 2012	Co-PI
Development of a Physiologically Based Pathogen Transport and Kinetics Model for Inhalation of Pathogens. Objective: Develop an innovative means of dose-response modeling that accounts for mechanisms of transport for <i>Bacillus anthracis</i> spores into human lungs.	DHS	\$20,000	2008 - 2010	PI

RESEARCH CONSORTIA FOUNDED

International Public Health Risk Analysis Consortium (PHRAC)

CoFounder with Marc Verhougstraete Ph.D. of University of Arizona, and Jesse Miller of Neogen Corporation. Founded in 2017 with the mission of impact-focused international health-based risk research collaboration and community level emergency response.

Accomplishments to date:

- Initiation of surface sampling and modeling initiation project
- Development of QMRA best practices guidelines and guiding documents

Healthcare Infection Transmission Systems **HITS**

Founder and board officer since 2017. Founded with primary leadership from Christine Greene Ph.D. of NSF International. Mission is to develop collaborative fundamental and applied research in an international and non-competitive environment to work towards the elimination of healthcare associated infections.

Accomplishments to date:

- First conference hosted in Ann Arbor in 2017 - 150 attendees, over 3 days
- Establishment of working groups in 2017 to target research funding options
- Chair of Water Working Group - Mark H. Weir Ph.D.
- Co-Chair of Risk Working Group - Mark H. Weir Ph.D.

Quantitative Microbial Risk Assessment (QMRA) Wiki - [QMRWiki](#)

CoFounder with Jade Mitchell Ph.D. of Michigan State University. The QMRWiki is a combination of a QMRA social network and data/model repository with learning modules contained within.

Accomplishments to date:

- Completion of microbial dose-response data and model compendium
- Establishment of the QMRA research and learning apps and tools
- Expansion to 200 unique non-bot members and users
- Linkage with NIGMS R25 QMRA institute

CONFERENCE PRESENTATIONS - 1 - represents presenter

1. Lewis, M.S., **Weir, M.H.**. Quantifying *Candida auris* and *Clostridioides difficile* infection risks in acute care settings. Society for Risk Analysis Annual Meeting. Austin TX. Dec 2024
2. Iranpour Boroujeni, N.¹, **Weir, M.H.** Risk Assessment of Coincidence and Co-occurrence of Opportunistic Pathogens with Disinfection By-products. Society for Risk Analysis Annual Meeting. Austin TX. Dec 2024
3. Xu, J.¹, **Weir, M.H.** Development of a Machine Learning Model to Support Low Cost Realtime *Legionella* Monitoring in Premise Plumbing Systems. Society for Risk Analysis Annual Meeting. Austin TX. Dec 2024

4. Shorter, K.¹, Hamilton, K., Qoun, H., **Weir, M.H.**, Mraz, A.L. From bioreactors to hospitals: incorporating bench scale studies in mechanistic models to reduce legionellosis outbreaks in healthcare facilities. Society for Risk Analysis Annual Meeting. Austin TX. Dec 2024
5. Wilson, A.¹, Morrison, D., Larkin, L., Hickenbottom, K., Shafae, M., **Weir, M.H.** Risk Perceptions of Water Reuse via Advanced Water Purification in a Large Metropolitan City in Arizona. Society for Risk Analysis Annual Meeting. Austin TX. Dec 2024
6. Xu, J.¹, **Weir, M.H.** Development of a Machine Learning Model to Support Low Cost Realtime Legionella Monitoring in Premise Plumbing Systems. AWWA Water Quality and Technology Conference. Schaumburg IL. Nov 2024
7. Lewis, M.S.¹, **Weir, M.H.** Catheter-Associated Urinary Tract Infections: a Quantitative Microbial Risk Assessment. Society for Risk Analysis Annual Meeting. Washington DC. Dec 2023
8. Lewis, M.S.¹, **Weir, M.H.** Computational Model Development and Evaluation of Infectious Disease Risk Estimates in Healthcare Contexts. Society for Risk Analysis Annual Meeting. Washington DC. Dec 2023
9. Haas, C.N. **Weir, M.H.**, Gonzalez, R., Curtis, K. Roundtable: Understanding the Potential of Wastewater-Based Epidemiology for Risk Management. Society for Risk Analysis Annual Meeting. Washington DC. Dec 2023
10. **Weir, M.H.**¹, Hibler, D.A. Biofilm Ecology Modeling Method for Improved Quantitative Microbial Risk Assessment Modeling. Society for Risk Analysis Annual Meeting. Washington DC. Dec 2023
11. **Weir, M.H.**, Mitchell, J., Chu, H., Balog-Way, D., Roundtable: Public Health Risk Modelling & Communication in the time of COVID-19: What went right and what went wrong?. Society for Risk Analysis Annual Meeting. Washington DC. Dec 2022
12. Hoque, S.¹, **Weir, M.H.**, Seong, D., Mitchell, J. Computational Fluid Dynamics Simulations Informing Risk: Implications About Viral Transmission in School Rooms. Society for Risk Analysis Annual Meeting. San Antonio, TX (online) Dec 2020
13. Lewis, M.¹, **Weir, M.H.** Incorporation of Pre-Exposure Antibiotic use in *Clostridioides difficile* Dose-Response Model. Society for Risk Analysis Annual Meeting. San Antonio, TX (online) Dec 2020
14. Wilson, A.M.¹, **Weir, M.H.** Assessment of the Dose-Response and its Use for Quantifying Safe Shift Procedures for Healthcare Workers During the COVID-19 Pandemic. Society for Risk Analysis Annual Meeting. San Antonio, TX (online) Dec 2020
15. **Weir, M.H.**¹, Wilson, M.A. Exploratory Modeling of Cumulative Dose Exposure to Determine Impacts on Severity of Outcome for COVID-19. Society for Risk Analysis Annual Meeting. San Antonio, TX (online) Dec 2020
16. **Weir, M.H.**¹ Keynote - Controlling SARS-CoV-2 on Critical Sensitive Infrastructure Lessons on Limited Environmental Data for Infectious Diseases. ErgoX Symposium. Session name: COVID-19 & Exoskeletons. Online delivery. 13 October 2020.
17. Wood, T.A.¹, **Weir, M.H.** Development of a Microcystin Drinking Water Risk Model Using an Adaptation of the Quantitative Microbial Risk Assessment (QMRA) Framework. Understanding Algal Blooms: State of the Science Conference. Toledo, OH, USA, Sept 2019

18. **Weir, M.H.**¹ Development of a Data Simulation Method to Optimize A Mechanistic Dose-Response Model for Viral Loads of Hepatitis-A. Society for Risk Analysis Annual Meeting. Arlington, VA, USA, Dec 2019
19. Hamilton, K.A.¹ & **Weir, M.H.** A Quantitative Model for Evaluating Risk Trade-offs in Legionnaires' Disease Risk, Energy Cost, and Scalding Risk for Hot Water Systems. Society for Risk Analysis Annual Meeting. Arlington, VA, USA, Dec 2019
20. **Weir, M.H.**¹, Wood, T.A. Development of a Microcystins Drinking Water Risk Model Using an Adaptation of the QMRA Framework. Society for Risk Analysis Annual Meeting. Arlington, VA, USA, Dec 2019
21. **Weir, M.H.**¹, Lin, J. Development of Health Effects Endpoint Dose Response and QMRA Models for Healthcare Associated MRSA and *Clostridioides difficile*. Society for Risk Analysis Annual Meeting. Arlington, VA, USA, Dec 2019
22. **Weir, M.H.**¹, Verhougstraete, M., Ulrich, P. An *Acinetobacter baumannii* QMRA Model Developed for Healthcare Associated Transmission. Association of Military Surgeons of the United States. Arlington, VA, USA, Dec 2019
23. **Weir, M.H.**¹ QMRA - Linking Human Health, Mathematics, and Microbiology. IWA Health Related Water Microbiology Specialty Group. Vienna Austria, Sept 2019
24. **Weir, M.H.**¹ Conceptualizing Policy Options to Address Premise Plumbing Pathogen Health Risks. Association of Environmental Engineering and Science Professor Education and Research Conference. Phoenix, AZ, USA, May 2019
25. Mraz., A.L.¹, **Weir, M.H.** Forecasting in the unseeable: understanding the lifecycle of *Legionella pneumophila* in the premise plumbing system. Association of Environmental Engineering and Science Professor Education and Research Conference. Phoenix, AZ, USA, May 2019
26. Scharff, R.L.¹, Havelaar, A., Ketma, M., Kowalcyk, B., **Weir, M.H.** Using Risk Analysis to Estimate the Economic Burden of Foodborne Disease in Africa: The Case of Ethiopia. Cape Town, South Africa, May 2019
27. Hamilton, K.A.¹, Mraz, A.L., Gurian, P.L., **Weir, M.H.** Dynamic Modeling of Legionnaires' Disease Health Risk In Hospital Hot Water Systems. Society for Risk Analysis Annual Meeting. New Orleans, LA, USA, Dec 2018
28. Dean K.¹, **Weir, M.H.**, Mitchell, J. Impacts of Showering Compliance Rates on the Risk of Infection from *Cryptosporidium spp.* in Swimming Pools. Society for Risk Analysis Annual Meeting. New Orleans, LA, USA, Dec 2018
29. Julien R.¹, **Weir, M.H.**, Brooks, Y., Huang, W., Mitchell, J. Comparing Opportunistic Premise Plumbing Pathogen Infection Risks Between Conventional and Low-Flow Fixtures. Society for Risk Analysis Annual Meeting. New Orleans, LA, USA, Dec 2018
30. Wood, T.A., **Weir, M.H.**¹, Mitchell, J. A Quantitative Microbial Risk Assessment Model for Intervention Targeting of the San Diego Homeless Population HepA Outbreak. Society for Risk Analysis Annual Meeting. New Orleans, LA, USA, Dec 2018
31. Mraz, A.¹, **Weir, M.H.** Effects of Water Chemistry on Infectivity of *Legionella pneumophila*. Society for Risk Analysis Annual Meeting. New Orleans, LA, USA, Dec 2018

32. Hamilton, K.A.¹, Mraz, A.L., **Weir, M.H.** Risk-Based Water Quality Target Concentrations for a Complex Group of Pathogens, the *Mycobacterium Avium* Complex (MAC). Water Quality Technology Conference, Toronto, Canada, November 2018
33. **Weir, M.H.**¹, Mraz, A.L. Quantitative Microbial Risk Assessment of *Legionella pneumophila* Infection During a Showering Event. Water Quality Technology Conference, Toronto, Canada, November 2018
34. Mraz, A.L.¹, **Weir, M.H.** The Effects of Disinfectants on the Infectivity of *Legionella Pneumophila* in Water Distribution Systems. Water Quality Technology Conference, Toronto, Canada, November 2018
35. **Weir, M.H.**¹, Mraz, A.L. The Assessment of Opportunistic Premise Plumbing Pathogens Demands New Dose Response Knowledge. Society for Risk Analysis, Annual Meeting, Arlington, VA, USA, Dec 2017
36. Mraz, A.L.¹, **Weir, M.H.** Meta Analysis of *Legionella pneumophila* Growth and Persistence Data. Society for Risk Analysis, Annual Meeting, Washington DC, USA, Dec 2017
37. **Weir, M.H.**¹ Development of a Combined Growth and Persistence Model for *L. pneumophila* in Drinking Water for QMRA Models. American Water Works Association, Annual Conference and Exhibition. Philadelphia, PA, USA, June 2017
38. Mitchell, J.¹, Adhikari, U., **Weir, M.H.** QMRA Wiki: An Educational Tool for Interdisciplinary Teaching of Risk Modeling in Engineering Curricula. American Society for Engineering Education Annual Meeting. Columbus, OH, USA, June 2017. Perm URL: <https://peer.asee.org/27787>
39. Adhikari, U.¹, **Weir, M.H.**, Mitchell, J. Measuring the success of an educational program through box-and-arrow diagram: A case study of the Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute. American Society for Engineering Education Annual Meeting. Columbus, OH, USA, June 2017
40. **Weir, M.H.**¹, Adhikari, U., Mitchell, J. Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute (QMRA III): A Platform for Cross Disciplinary Training of Engineers with Social and Biological Scientists to Address Public Health Issues. American Society for Engineering Education Annual Meeting. Columbus, OH, USA, June 2017
41. **Weir, M.H.**¹ Development of a Combined Growth and Persistence Model for *Legionella pneumophila* in Biofilms in Drinking Water for QMRA Models. UNC Water Microbiology Conference, Chapel Hill, NC, USA, May 2017
42. **Weir, M.H.**¹, Development of a 2-Dimensional Simulation Method for the Optimization of Dose Response Models for Uncertain Pathogens. UNC Water Microbiology Conference, Chapel Hill, NC, USA, May 2017
43. **Weir, M.H.**¹, Flynn, W., Mitchell, J. VizDR a Microbial Dose Response Modeling Application for QMRA Novices and Students. UNC Water Microbiology Conference, Chapel Hill, NC, USA, May 2017
44. **Weir, M.H.**¹, Smart Models for Resilient Water Systems. 17th National Conference and Global Forum on Science, Policy and the Environment. Washington DC, USA, Jan 2017
45. **Weir, M.H.**, Kopec, K. Development of a Combined Growth and Persistence Model for *Legionella pneumophila* in Drinking Water Biofilms for QMRA Modeling. Borchardt Conference, Ann Arbor, MI, USA, Feb 2017

46. **Weir, M.H.¹**, Kopec, K. Development of a Combined Growth and Persistence Model for *Legionella pneumophila* in Biofilms in Drinking Water for QMRA Models. Society for Risk Analysis Annual Meeting, San Diego, CA, USA, Dec 2016
47. **Weir, M.H.¹**, Development of an Air Pollutant Dose Response Model for Asthma Incidents Specific to Philadelphia for Triple Bottom Line Modeling. Society for Risk Analysis Annual Meeting, San Diego, CA, USA, Dec 2016
48. **Weir, M.H.¹**, Development of a Dynamic Triple Bottom Line Model Stage 1: Environmental Benefits Model. Society for Risk Analysis Annual Meeting, Arlington, VA, USA, Dec 2015
49. **Weir, M.H.¹**, Nappier, S., Haas, C.N. Development of an Age Dependent Dose Response Model for Three Strains of Encephalitis Viruses. Society for Risk Analysis Annual Meeting, Arlington, VA, USA, Dec 2015
50. **Weir, M.H.¹** Refinement of a Novel 2-D Simulation Method for Dose Response Model Optimization: Norovirus. Association of Environmental Engineering and Science Professors Education and Research Conference, New Haven, CT, USA, June 2015
51. **Weir, M.H.¹**, Alvarez, S.R. Development of Two Independent Methods for the Modeling of Detection Limits in QMRA. Association of Environmental Engineering and Science Professors Education and Research Conference. New Haven, CT, USA, June 2015
52. **Weir, M.H.¹**, New Method Development: Advanced 2-D Simulation Technique for Dose Response Model Optimization, Case Studies in Environmental Disinfection. Society for Risk Analysis Annual Meeting. Denver CO, USA, December 2014
53. Breuninger, K.¹, **Weir, M.H.** Modeling Health Effect Changes Contingent on Subsurface Chemistry for Groundwater and Sole Source of Drinking Water. Society for Risk Analysis Annual Meeting, Denver CO, USA, December 2014
54. Breuninger, K.¹, **Weir, M.H.** Development of a Pooled Species Dose-Response Model for *Mycobacterium avium paratuberculosis* with Johnes Disease as the Health Outcome. Society for Risk Analysis Annual Meeting, Denver CO, USA, December 2014
55. **Weir, M.H.¹**, Mitchell, J. The QMRA Wiki: A Social Media Tool for Interdisciplinary and Inter-agency Collaboration for Quantitative Microbial Risk Assessment. International Environmental Modeling and Software Society, San Diego CA, USA, June 2014
56. **Weir, M.H.¹**, Haas, C.N., Pope, J.M. Bootstrap Uncertainty Analysis of K-Nearest Neighbor Classification for Microbial Source Tracking. Association of Environmental Engineering and Science Professors Education and Research Conference, Tampa FL, USA, July 2011
57. **Weir, M.H.**, Mitchell, J.¹ Stochastic Modeling of Water Reclamation Treatment Systems Addressing *Cryptosporidium* Risks at a Recreational Spray Park. Society for Risk Analysis Annual Meeting. Charleston SC, Dec 2011
58. **Weir, M.H.¹**, Shibata, T., Masago, Y., Rose, J.B. Virus and Non-Spore Forming Bacteria QMRA of Fomites Accounting for Surface Sampling Efficiencies. Society for Risk Analysis Annual Meeting. Charleston SC, Dec 2011
59. **Weir, M.H.**, Panzl, B.¹, Rose, J.B. Use of Quantitative Microbial Risk Assessment and Predictive Modeling to Inform Beach Closures. Society for Risk Analysis Annual Meeting, Charleston SC, USA, Dec 2011

60. **Weir, M.H.**¹, Gurian, P.L., Haas, C.N., Rose, J.B. The Exposure Assessment, a Key to the QMRA Framework. International Water Association World Water Congress, Montreal, Canada, Sept 2010
61. **Weir, M.H.**¹, Haas, C.N., Rose, J.B. The Center for Advancing Microbial Risk Assessment. DHS Science and Technology Directorate Office of University Programs, Annual University Summit. Washington DC, USA, March 2010
62. Rose, J.B.¹, **Weir, M.H.** Development of an Estuary Protection Response Strategy Using QMRA. DHS Science and Technology Directorate Office of University Programs, Annual University Summit. Washington, DC, March 2010
63. **Weir, M.H.**¹, Haas, C.N. Development and Evaluation of Physiologically Based Dose Response Models for Inhalational Anthrax. Society for Risk Analysis Annual Meeting, Baltimore, MD, USA, Dec 2009
64. **Weir, M.H.**¹, Haas, C.N. Physiologically Based Dose Response Models for Inhalational Anthrax. Association of Environmental Engineering and Science Professors Education and Research Conference. Iowa City, IA, USA, July 2009
65. **Weir, M.H.**¹, Haas, C.N. Development of Mechanistic, Physiologically Based Dose Response Models for Inhalational Anthrax. American Society for Microbiology, 109th General Meeting, Philadelphia, PA, USA, June 2009
66. **Weir, M.H.**¹, Haas, C.N. Including Pathogenesis and Transport Physics for Inhalational Dose Response of *Bacillus anthracis*. DHS Science and Technology Directorate Office of University Programs, Annual University Network Summit, Washington DC, USA, March 2009
67. Bartrand T.¹, **Weir, M.H.**, Haas, C.N. *Tularemia* Dose Response Analysis for Oral Exposure of Multiple Strains. DHS Science and Technology Directorate Office of University Programs, Annual University Network Summit, Washington DC, USA, March 2009
68. Nappier, S.¹, **Weir, M.H.**, Haas, C.N. A Dose Response Model for Equine Encephalitis Viruses with Age Susceptibility Quantification. DHS Science and Technology Directorate Office of University Programs, Annual University Network Summit, Washington DC, USA, March 2009
69. Hong, T.¹, Bartrand, T. **Weir, M.H.**, Gurian, P.L., Haas, C.N. Benefit-Cost Analysis to Develop Targets for Ambient Air Sampling. Society for Risk Analysis Annual Meeting Boston, MA, USA, Dec 2008
70. **Weir, M.H.**¹, Bartrand, T., Huang, Y., Haas, C.N. Microbial Dose Response Modeling for the 21st Century: Development of Mechanistic Dose Response Models. Society for Risk Analysis Annual Meeting Boston, MA, USA, Dec 2008
71. Bartrand, T.¹ **Weir, M.H.**, Haas, C.N. Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores. Society for Risk Analysis Annual Meeting Boston, MA, USA, Dec 2008
72. Mitchell, J.¹, Bartrand, T., **Weir, M.H.**, Haas, C.N., Gurian, P.L. Bayesian Hierarchical Modeling to Estimate Interspecies Dose-Response Safety Factors. EPA and DHS, Conference on Real-World Applications and Solutions for Microbial Risk Assessment, Bethesda, MD, USA, April 2008
73. **Weir, M.H.**¹, Bartrand, T., Haas, C.N. Quantification of Host Age Effects on the Dose Response of *Variola major* (causative agent of smallpox). EPA and DHS, Conference on Real-World Applications and Solutions for Microbial Risk Assessment, Bethesda, MD, USA, April 2008

74. **Weir, M.H.¹**, Bartrand, T., Haas, C.N. Quantification of the Effect of Age on the Dose Response of *Variola major* in Suckling Mice. DHS Science and Technology Directorate Office of University Programs, Annual University Network Summit, Washington DC, USA, March 2008
 75. **Weir, M.H.¹**, Bartrand, T., Haas, C.N. Quantification of the Effect of Age on the Dose Response of *Variola major* in Suckling Mice. Society for Risk Analysis Annual Meeting, San Antonio, TX, USA, Dec 2007
 76. Mitchell, J.¹, Bartrand, T., **Weir, M.H.**, Haas, C.N., Gurian, P.L. A Bayesian Statistical Modeling Approach for *Bacillus anthracis* Dose Response Data. Society for Risk Analysis Annual Meeting, San Antonio, TX, USA, December 2007
 77. Bartrand, T.¹, **Weir, M.H.** Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores. Drexel University, Annual Research Day, Philadelphia, PA, USA, April 2007
 78. Bartrand, T.¹, **Weir, M.H.**, Haas, C.N. Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores. Drexel University, Engineering Research Symposium. Philadelphia, PA. USA, April 2007
 79. Bartrand, T.¹, **Weir, M.H.**, Haas, C.N. Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores. DHS Science and Technology Directorate Office of University Programs, Annual University Network Summit, Washington DC, USA, March 2007
 80. Bartrand, T.¹, **Weir, M.H.**, Haas, C.N. Effect of Host Species on the Dose Response of Inhaled *Bacillus anthracis* Spores. Society for Risk Analysis Annual Meeting, Baltimore, MD, USA, December 2006
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TEACHING and MENTORING

Course Designer and Director

- **Quantitative Microbial Risk Assessment Modeling.** Graduate level introduction to and use of the methods and tools of microbial risk assessment modeling using a PBL method, where R programming is taught in tandem. Offered to mixed majors at both Temple University and The Ohio State University
- **Advanced Computational Methods in Engineering and Public Health.** Graduate and honors undergraduate level, with new development for senior undergraduate students in 2019. Introductions to and use of the following methods in the cross-over of engineering and public health: simulation techniques, stochastic modeling, data visualization, advanced data analyses, decision analytics, and differential equation solving. Offered to mixed majors at Temple University and being redeveloped for The Ohio State University.
- **Foundations in Environmental Health Science.** Separate graduate and undergraduate courses. Provide the foundational knowledge required to bridge environmental sciences/engineering with environmental health concepts. Developed and successfully delivered at both Temple University and The Ohio State University. At OSU this course was completely redeveloped for asynchronous online education with consistent success.
- **Water Distribution Systems.** Undergraduate course in design and operation of water distribution systems for drinking water in urban areas. The course focuses on the fundamental knowledge required from fluid dynamics as well as use of design software for a PBL portion of the course at Temple University.

- **Biological Unit Operations.** Graduate and senior-level undergraduate course intended to develop a deeper understanding of the design and operation of biological reactors in water and wastewater treatment. Offered at Temple University
- **Water and Wastewater Treatment.** Undergraduate course developed for the design and operation of water treatment and wastewater treatment plants. Examples and PBL projects are designed around both developed and developing nation requirements. This course was developed at Temple University.
- **Environmental Fate and Transport.** Junior or senior-level undergraduate course intended to develop the skills required to quantify how chemical and microbial contaminants change in space and time in the environment. Developed at Drexel University, further refined at Temple University.
- **Groundwater Hydrology.** Graduate level course to understand the mechanisms of water transport and reaction kinetics in aquifers and subsurface flows. Developed as traditional lecture delivery at Temple University

Courses Taught at The Ohio State University

- **Primary Instructor**

- Principles of Environmental Health Science (PUBHEHS 6310) 3 credits, graduate, Autumn 2017, 2019, 2020
- Principles of Environmental Health Science (PUBHEHS 6310 *Distance Learning*) 3 credits, graduate, Spring 2017 - 2021, Autumn 2018, 2021
- Quantitative Microbial Risk Analysis Modeling (PUBHEHS 7375) 3 credits, graduate, Spring 2019, 2020

- **Team Teaching**

- Advanced Environmental Health Science (PUBHEHS 6315; 12% contribution) 3 credits, graduate, Autumn 2017, 2018, 2019, 2020
- Principles of Environmental Health Science (PUBHEHS 6310; 12% contribution) 3 credits, graduate, Autumn 2016
- Environmental Risk Assessment (PUBHEHS 3320; 6% contribution) 3 credits, undergraduate, Autumn 2016, Spring 2017, Autumn 2017
- Principles of Risk Assessment (PUBHEHS 7365; 6% contribution) 3 credits, graduate, Autumn 2016, S 2017
- Exposure Science Monitoring Techniques (PUBHEHS 7380; 2% contribution) 3 credits, graduate, Autumn 2016
- Exposure Science Monitoring Techniques (PUBHEHS 7380; 6% contribution) 3 credits, graduate, Autumn 2017, Autumn 2018

FACULTY & STAFF MENTORED

Location	Name	Research Area	Years Active	Notes
Faculty				

Location	Name	Research Area	Years Active	Notes
The College of New Jersey	Alexis Mraz Ph.D.	Environmental systems and risk modeling for premise plumbing pathogens	2020 - current	As an Assistant Professor, I am assisting in her mentorship for high quality instruction and development of her research program
Temple University	Lok Pokhrel, Ph.D.	Environmental nanomaterials in water quality technology, research and environmental health and engineering instruction	2014 - 2017	Focused on development of his research program whilst carrying a heavy teaching load. Lok is now an Assistant Professor at East Carolina University
Temple University	Susan Mirlohi, Ph.D.	Chemical hazard water quality with special emphasis on taste and odor impacting compounds	2015 - 2018	Focused on introducing her research into the classroom and environmental health curriculum needs. Susan is now an Assistant Professor at California State University, Fresno
Research Staff and Faculty				
Temple University	William Flynn MPH	Environmental modeling and software development for multiple audiences	2014 - 2019	Focused on the development of environmental and risk modeling software for broader use. William is now a research staff member at the Children's Hospital of Philadelphia
Temple University	Uma Nair, Ph.D.	Environmental exposures to cigarette and e-cigarette smoke/vapor	2014 - 2016	Focused on environmental dynamics of cigarette smoke transport indoors. Uma is now an Assistant Professor at the University of Arizona

STUDENTS MENTORED

Role	Student Name	Degree & School	Graduation Year	Thesis/Project
Doctor of Philosophy				
Advisor	Negin Iranpour Boroujeni	Environmental Sciences OSU	2025	Dissertation Research: Quantification of the Genomic Adaptation Risks and Antimicrobial Resistance Likelihood of <i>Legionella pneumophila</i> via Mutagenic Disinfection Byproduct Exposure
Advisor	Juan Xu	Environmental Sciences OSU	2025	Dissertation Research: Integration of Machine Learning and Biofilm Ecosystem Mimetic Modeling for Water Associated Health Risk Monitoring
Advisor	Madeline Lewis	Epidemiology, OSU	2025	Dissertation Research: Mechanistic and Compartmental Model Development for the Evaluation of Infection Risks Following Environmentally Mediated Transmission of <i>Clostridioides difficile</i> and <i>Candida auris</i> Through the Patient Environment
Advisor	Pattama Ulrich	Environmental Science OSU	2025	Assessment of nature based solutions as a component in food product and environmental health protection in Ethiopian abattoirs
Co-Advisor	Sonya Kozak	Environmental Health Griffith University	2025	Development and Validation of a Method to Couple Microbial Source Tracking and Risk Assessment for Recreational Exposures
Advisor	Alexis L. Mraz	Environmental Health, OSU	2018	Forecasting in the Unseeable: A Mixed Methods Model of Planktonic and Biofilm-Bound <i>Legionella pneumophila</i> in Building Water Systems
Mentor & Committee Member	Soledad R. Alvarez	Environmental Engineering Universidad Nacional de Salta	2017	Use of Risk Analysis in Water Reuse System Design and Optimization
Masters of Public Health & Masters of Science				
Advisor	Alicia Murphy	MPH Environmental Health Sciences	2020	Development of a Wastewater Based Epidemiology Modeling and Risk Management Planning Application for the Ohio Department of Rehabilitation and Corrections
Advisor	Madeline Lewis	MPH Epidemiology	2020	Mechanistic modeling shift in dose-response from patient pre-exposure to <i>Clostridioides difficile</i>

Role	Student Name	Degree & School	Graduation Year	Thesis/Project
Advisor	Makala Fioritto	MPH Environmental Health Sciences	2021	Culminating in development - focusing on firefighter health risks from controlled wildfire burns smoke exposure
Advisor	Julia Doncaster	MPH Environmental Health Sciences OSU	2020	Modeling Risks from <i>Acinetobacter baumannii</i> in Healthcare Environments.
Advisor	David Hibler	MS Environmental Health Sciences OSU	2020	Mechanistic modeling of the combined commensal and inhibitory effects of drinking water biofilm ecology on the growth of <i>Legionella pneumophila</i> .
Advisor	Traven Wood	MS Environmental Health Sciences OSU	2019	Predictive Modeling of Microcystins in Drinking Water Treatment Systems and their Related Health Effects.
Advisor	Jasmine Lin	MPH Environmental Health Sciences OSU	2019	Modeling the Dose-Response and Health Risks from MRSA and <i>Clostridioides difficile</i> in Healthcare Environments.
Advisor	Wanyu Huang	MS Environmental Sciences OSU	2018	Modeling the Health Improvement Capabilities of Green Stormwater Infrastructure
Co-Advisor	Tamka Jones	MS Environmental Engineering Temple University	2017	Efficacy of Biofuel Processing for Wastewater Treatment
Advisor	Dishani Shah	MS Environmental Health Temple University	2017	Aqueous Chemistry and the Survival or Pathogens in the Natural Environment
Co-Advisor	Claudia Setubal	MS Environmental Health Temple University	2016	The Role of Subsurface Chemistry on the Persistence and virulence of Pathogenic <i>Escherichia coli</i>
Advisor	Jamie Minich	MS Environmental Health Temple University	2015	Development of Runoff and Infiltration Model for Improved Prediction of Surface and Groundwater Impacts of <i>Mycobacterium avium</i>
Advisor	Kirk Breuninger DVM	MPH Environmental Health Temple University	2014	Development of a Water & Foodborne QMRA Model for Bovine and Human Risk from <i>Mycobacterium paratuberculosis</i>
Bachelors of Science				
Research Mentor	Sophia Matts	BS Public Health EHS OSU	2021	In development - focus on COVID-19 wastewater-based epidemiology
Research Mentor	Geordee Spilkia	BS Environmental Science Temple University	2016	Personal air quality sensors and assessment of microbiological data
Research Mentor	Hillary Cuesta	BS Public Health Temple University	2015	Cyber learning for water quality and treatment
Research Mentor	Steven Kaspin	BS Biology Temple University	2015	Cyber learning in environmental sciences and health
Research Mentor	Kelsey Balfour	BS Environmental Science Temple University	2015	Laboratory techniques, health and environmental kinetics modeling.
Research Mentor	Taiwo Adewunmi	BS Environmental Engineering Temple University	2015	Laboratory techniques, health modeling and Design.
Research Mentor	Brian M. Panzl	BS Microbiology Michigan State University	2011	Laboratory techniques and computational model and computer application development.

CONFERENCE/WORKSHOP ORGANIZATION

Meeting Organization

1. Department of Homeland Security, Science and Technology, University Summit. 2021 Summit Planning Committee.
2. Society for Risk Analysis Annual Meeting. San Antonio, TX (online) Dec 2020. Annual Meeting Organization Committee and Abstract Reviewer
3. OSU Water Research Forum. Hosted by the Sustainable, Resilient Economies (SRE) Discovery Theme. Columbus, OH November 2016

4. All Principle Investigator Meeting. Center for Advancing Microbial Risk Analysis (CAMRA). Washington DC. March 2011
5. All Principle Investigator Meeting. CAMRA. East Lansing, MI. May 2010
6. All Principle Investigator Meeting. CAMRA. Cincinnati, OH. Oct 2009

Workshop Organization

1. Future Needs of QMRA Research and Professionals: A Workshop. Co-planned with Drs. Joan B. Rose (MSU), Kerry Hamilton (ASU), and Jade Mitchell (MSU). I supported goals, attendee list, agenda setting and execution of the workshop.
2. Quantitative Microbial Risk Assessment Interdisciplinary Instructional Institute (QMRA III). Columbus, OH. Aug 2019. Co-planned with Dr. Jade Mitchell (MSU), workshop logistics, curriculum, and instructional material.
3. QMRA III. Columbus, OH. Aug 2018. Co-planned with Dr. Mitchell, workshop logistics, curriculum, and instructional material.
4. QMRA III. Seattle, WA. Aug 2017. Co-planned with Dr. Mitchell and Dr. J. Scott Meschke (University of WA), workshop curriculum, and instructional material.
5. Public Health Risk Analysis Consortium (PHRAC) Inaugural Meeting. Side Event of The UNC Water Microbiology Conference. Chapel Hill, NC. May 2017. Co-planned with Dr. Marc Verhougstraete (University of Arizona) workshop planning and material.
6. The Evolution of Quantitative Microbial Risk Assessment: How to Fully Realize its Contribution to Water Policy and Human Health Risk Reduction. Side Event of The UNC Water Microbiology Conference. Chapel Hill, NC. May 2017. Co-planned with Dr. Anna Aceituno (RTI International), workshop logistics, guest speaker invitation and presentation materials.
7. QMRA III. Columbus, OH. Aug 2016. Co-planned with Dr. Jade Mitchell, workshop logistics, curriculum, and instructional material.
8. QMRA III. Columbus, OH. Aug 2015. Co-planned with Dr. Jade Mitchell, workshop logistics, curriculum, and instructional material.
9. QMRA III. Columbus, OH. Aug 2015. Co-planned with Dr. Jade Mitchell, workshop logistics, curriculum, and instructional material.
10. Health Risk Analysis for the Risk Professional. Society for Risk Analysis Annual Meeting. Denver, CO. Dec 2014. Co-planned with Dr. Mitchell and Dr. Patrick Gurian (Drexel University) on workshop logistics, curriculum and lecture materials & breakout activities.
11. Teaching Quantitative Microbial Risk Assessment in Environmental Engineering and Science. Association of Environmental Science and Engineering Professors, Education and Research Conference. Tampa, FL. July 2011. Co-planned with Dr. Patrick Gurian and Dr. Charles N. Haas (Drexel) on workshop curriculum and materials.

12. Introduction and Use of QMRA for Addressing Safety and Security in the Water Environment: Applications for Drinking Water, Recreational Waters and Biosolids. International Water Association, World Water Congress. Montreal, Quebec, Canada, Sept 2010. Co-planned with Dr. Charles N. Haas and Dr. Joan B. Rose (MSU), curriculum and lecture material.
13. CAMRA QMRA Summer Institute. Hosted at Delft Technological University (DTU), Delft, Netherlands. June 2010. Co-planned with Dr. Gertjan Medema (DTU) curriculum, student activities and lecture materials.
14. CAMRA QMRA Summer Institute. MSU, East Lansing, MI. Aug 2009. Co-planned with Dr. Rose, logistics, curriculum, lecturers and lecture materials.

Workshop Participation (Instructor)

1. QMRA III. Columbus, OH. Aug 2019. Lectures & exercises prepared and presented: 1.) Probability and Statistics, 2.) Environmental Modeling, 3.) Markov Chain Modeling, 4.) Monte Carlo Modeling, 5.) Public Health Engineering and Mathematics: Quantifying Health Risks, 6.) R Programming, 7.) Modeling and Inclusion of Variable Uncertainty in Mechanistic Modeling
2. QMRA III. Columbus, OH. Aug 2018. Lectures & exercises prepared and presented: 1.) Environmental Modeling, 2.) Markov Chain Modeling, 3.) Monte Carlo Modeling, 4.) Public Health Engineering and Mathematics: Quantifying Health Risks, 5.) R Programming, 6.) Exposure Pathways and Modeling
3. QMRA III. Seattle, WA. Aug 2017. Lectures & exercises prepared and presented: 1.) Environmental Modeling, 2.) Markov Chain Modeling, 3.) Monte Carlo Modeling, 4.) Public Health Engineering and Mathematics: Quantifying Health Risks, 5.) R Programming, 6.) Bootstrapping for Mechanistic Dose-Response Modeling
4. QMRA III. East Lansing, MI. Aug 2016. Lectures & exercises prepared and presented: 1.) Environmental Modeling, 2.) Markov Chain Modeling, 3.) Monte Carlo Modeling, 4.) Public Health Engineering and Mathematics: Quantifying Health Risks, 5.) Crystal Ball co-taught with Dr. Michael Ryan of Drexel University.
5. QMRA III. East Lansing, MI. Aug 2015. Lectures & exercises prepared and presented: 1.) Environmental Modeling, 2.) Markov Chain Modeling, 3.) Monte Carlo Modeling, 4.) Public Health Engineering and Mathematics: Quantifying Health Risks, 5.) R Programming
6. Health Risk Analysis for the Risk Professional. Society for Risk Analysis Annual Meeting. Denver, CO. Dec 2014. Lecture prepared and presented for: Exposure Modeling in Health Risk Analysis
7. CAMRA QMRA Summer Institute. East Lansing, MI. Aug 2011. Lectures prepared and presented for: 1.) Statistics and Uncertainty, 2.) Monte Carlo and Crystal Ball, 3.) Stochastic Modeling and the Markov Processes, 4.) Public Health Engineering and Mathematics: Quantifying Health Risks, 5.) R Programming
8. Teaching Quantitative Microbial Risk Assessment in Environmental Engineering and Science. Association of Environmental Science and Engineering Professors, Education and Research Conference. Tampa, FL. July 2011. LECTURED prepared and presented for: Uncertainty Modeling in Public Health, Engineering and Risk Analysis.

9. Introduction and Use of QMRA for Addressing Safety and Security in the Water Environment: Applications for Drinking Water, Recreational Waters and Biosolids. International Water Association, World Water Congress. Montreal, Quebec, Canada, Sept 2010. Lecture prepared and presented for: Uncertainty and Exposure Modeling in Mechanistic Risk Analysis.
10. CAMRA QMRA Summer Institute. Delft Technological University. Delft, Netherlands. June 2010. Lectures prepared and presented for: 1.) Statistics and Uncertainty, 2.) Monte Carlo and Crystal Ball
11. CAMRA QMRA Summer Institute. East Lansing, MI. Aug 2009. Lectures prepared and presented for: 1.) Statistics and Uncertainty, 2.) Monte Carlo and Crystal Ball
12. CAMRA QMRA Summer Institute. East Lansing, MI. Aug 2008. Lectures prepared and presented for: 1.) Statistics and Uncertainty, 2.) Monte Carlo and Crystal Ball

Invited Lectures & Seminar Presentations

1. Wastewater for Disease Surveillance - What are the Capabilities and Future of WBE for and Beyond COVID-19. National Environmental Laboratory Accreditation Conference (NELAC) Institute. Forum on Environmental Accreditation. Wastewater Epidemiology and COVID-19 Session. January 2021
2. Environmental Considerations for COVID-19 Risks. New Albany Plains School Board. October 2020.
3. Future Directions in a Post COVID-19 World: Lessons we Should Learn from the Pandemic. SUSTAINS Learning Community - OSU. September 2020
4. Future Directions in a Post COVID-19 World: Pandemic Lessons we Need to Address. Industrial and Systems Engineering Department Retreat Keynote Lecture. July 2020
5. Making Public Health and Engineering Decisions in a Pandemic with QMRA. Hosted by EAWAG - Swiss Federal Institute of Aquatic Science and Technology. Dübendorf, Switzerland. Presented Virtually. June 2020
6. COVID-19 in Ohio: Helping to Understand and Alter the State's Curve. Sustainability Institute - OSU. April 2020
7. Building Water Quality and Health Risks - Using QMRA to Determine Management Strategies. Hosted by the Biodesign Institute, Arizona State University, Phoenix, AZ. Oct 2018
8. Smart Systems Models - Understanding how Decisions are Made under Uncertainty. Hosted by the Mel and Enid Zuckerman College of Public Health, University of Arizona, Tucson, AZ. Oct 2018
9. Case Study of Using QMRA for Engineering and Policy Decision Making. Hosted by University of Tokyo, Tokyo, Japan. May 2017
10. Smart Systems Models - Capturing System Uncertainties Through Modeling and Simulation. Hosted by the College of Engineering, Northeastern University. Boston, MA. Dec 2016.
11. Smart Water Systems - The Future of Public Health and Water Engineering. Hosted by the Faculty of Engineering, Glasgow University, Glasgow, UK. Feb 2015.

12. QMRA: The Bridge Between Environmental Engineering and Health - Presented within the course: Water and Wastewater Treatment. Department of Civil and Environmental Engineering, Temple University, Philadelphia, PA. Oct 2014
13. Water Treatment in the Developed and Developing Worlds. Presented within the course: Emergency Preparedness Response and Health. College of Public Health, Temple University, Philadelphia, PA. July 2014.
14. What is Environmental Health? - Presented within the course: Introduction to Public Health. Department of Public Health, College of Health Professions and Social Work, Temple University, Philadelphia, PA. October 2012, 2013 and 2014
15. Water Reuse Design and Optimization” Series of 4 lectures - Presented within the course: Water and Wastewater Treatment Design. Department of Civil Architectural and Environmental Engineering, North Carolina Agriculture and Technology State University, Greensboro, NC. Spring 2012
16. New Concepts in Engineering Decision Analysis: Water Treatment Processes - Presented in the course: Water Treatment Design. Department of Biosystems and Agricultural Engineering, Michigan State University, East Lansing, MI. Oct 2010

SERVICE

Current and Past Service

Agency	Committee	Role	Duration	Input Provided
National State & Local				
New Albany Plains Local Schools	New Albany COVID-19 Task Force	Inaugural Member	March 2020 - present	Inform and advise school board members and superintendent on environmental controls. Tour school and sports buildings to provide environmental assessments for: swimming, indoor sports, and classrooms.
Ohio Department of Rehabilitation and Corrections	Inmate environmental management advisement	Participant	April 2020 - present	Provide environmental control expertise for inmate and staff safety includes: HVAC controls and technology,, shifting changes, social distancing, surface cleaning, and indoor person density.
Department of the Army - Public Health Command	Ad hoc advisement group	Ad hoc advisor	March - August 2020	Provide dose-response, and environmental exposure assessment advice to key personnel for the command.
Ohio Army National Guard	Ad hoc advisement group	Ad hoc advisor	September - December 2020	Advise on environmental control and investment areas and technologies for large spaces and communal locations (e.g. school gyms and auditoriums).
Ohio Department of Agriculture	Poultry and meat packing worker safety committee	Inaugural Member	March 2020 - October 2020	Environmental control recommendations to augment and replace social distancing controls that are not possible. Introduced more appropriate experts to replace myself as input extended beyond my expertise.
Ohio Department of Health	OSU Rapid Response Modeling Team	Inaugural Member	February 2020 - August 2020	Support environmental transmission considerations and mentor Ph.D. student Madeline Lewis' activities. Exited regular meetings in August to focus on wastewater epi response.
Ohio Department of Health	Reopening assessment	Ad hoc participant	May 2020	Supported environmental considerations for reopening businesses such as HVAC controls, social distancing, surface cleaning, and indoor person density

Agency	Committee	Role	Duration	Input Provided
The Ohio State University	OSU Safe Return to Campus Task Force	Ad hoc advisor	June - August 2020	Provide environmental assessment and control expertise for: classrooms, dorms, and shared spaces.
The Ohio State University	OSU Transportation Ad hoc advisement	Ad hoc advisor	May - August 2020	Provide environmental assessment and control expertise for safe operation of OSU buses.
Professional Organizations				
Society for Risk Analysis	Microbial Risk Analysis Specialty Group	Secretary	December 2019 - Current	Manage the calendar and communications of the committee to the membership of the specialty group
Society for Risk Analysis	Education Committee	Member	December 2018 - current	Support the development of online interfaces to enhance risk education globally, work towards a standardized set of curriculum recommendations for universities interested in advancing risk education
Association of Environmental Engineering and Science Professors	Student Services Committee	Member	December 2017 - Current	Support the planning and execution of the student and post doc job placement and career workshops, both virtually annually and in-person biannually
College/Division				
Ohio State University College of Public Health & OSU Office of Military and Veterans Services	Veterans' Student Advocate	Advisor	September 2018 - Current	Provide guidance to the volunteer student advocate for the student veteran community in the College of Public Health. Provide guidance for career development and civilian life transitioning
Ohio State University College of Public Health	Graduate Studies Committee	Member	December 2017 - September 2020	Support the development of graduate student admissions and curriculum policy and provide oversight for syllabus development and approval for new and revamped courses
Temple University Division of Environmental Health, College of Public Health	Faculty Search Committee	Chair	April 2014 - May 2015	Development recruitment materials, advertisements and book said advertisements, schedule phone and in person interviews, and make itinerary and accommodations for visiting candidates.
Temple University Division of Environmental Health, College of Public Health	Curriculum Development Committee	Chair	January 2013 - June 2015	Lead the development of industry responsive curriculum changes to the environmental health program in the college
Temple University Department of Epidemiology and Biostatistics, College of Public Health	Merit Committee	Co-Chair	August 2013 - June 2015	Develop rubrics for and completion of evaluations of 1-quarter of research-active college faculty to rank merit increases
University				
Ohio State University	Conflict of Interest Committee	Member	November 2020 - Current	Support the investigation and evaluation of potential or reported conflicts of interest throughout the university
Ohio State University Office of Military and Veteran Services	Military and Veteran Mentorship Program	Mentor	September 2020 - Current	Provide mentorship for graduate students as they transition to civilian life and develop their careers and research experiences to enhance them

Science Advisory Council Meetings

1. Council expert and presenter: Department of Homeland Security, Science and Technology Directorate; Homeland Security Science and Technology Advisory Committee; National Biodefense Analysis and Countermeasures Center, Frederick, Maryland, April and June 2010

Expert Panel Participation

1. Incorporating Risk Modeling Methods Into Regulatory Needs and Future Development. Hosted by the University of Tokyo, Tokyo, Japan. May 2017

2. Regulations for Water Safety: SDWA, US EPA and Flint. Engineers Foundation of Ohio. Powell, OH. Nov 2016
3. Panel Member. Sierra Club Public Meeting on Zero Emission Buses. Sierra Club Pennsylvania Chapter, Philadelphia, PA. Nov 2015
4. Panel 3 Using QMRA to Improve Human and Environmental Resilience After a Bioterrorism Attack. DHS Science and Technology Directorate Office of University Programs, Annual University Summit. Washington DC, March 2010
5. Panel 23 Advancing Exposure Science. DHS Science and Technology Directorate Office of University Programs, Annual University Summit. Washington DC, March 2009
6. Panel 28 Advancing Consequence Modeling and Decision Modeling. DHS Science and Technology Directorate Office of University Programs, Annual University Summit. Washington DC, March 2009

Session Organization

1. Microbiology of the Built Environment: Implications for Health and Design. National Council for Science and the Environment. 17th National Conference and Global Forum on Science, Policy and the Environment. Washington DC. Jan 2017
2. Panel 3, Using QMRA to Improve Human and Environmental Resilience After a Bioterrorist Attack. DHS, Science and Technology Directorate, Office of University Programs; Annual University Network Summit on Research and Education. Washington DC. March 2010

Session Chair

1. T3-B Diverse Modeling Approaches for Exposure Assessment. Society for Risk Analysis, Annual Meeting. Washington DC. Dec 2010
2. T2-H Epidemiology and Environmental Risk Assessment. Society for Risk Analysis, Annual Meeting. Washington DC. Dec 2008

OTHER PROFESSIONAL ACTIVITIES

Media Appearances

Television

1. Governor of Ohio COVID-19 Press Conference. 22 September 2020. COVID-19 and Aerosols. Televised State-wide, multiple outlets. [Ohio Channel YouTube Video 26.52 time stamp](#)
2. Governor of Ohio COVID-19 Press Conference. 23 April 2020. COVID-19: Ohio's Safe Return. Presentation and press engagement. Televised State-wide, multiple outlets. [NBC4 Columbus YouTube Video](#)

Radio

1. All Sides With Ann Fisher, National Public Radio. 9 September 2020 - Wellness Wednesday: The Science Behind Facemasks [The Ohio Channel Link to Recording](#)
2. Radio Times, National Public Radio. 17 Dec, 2014 - 40th Anniversary of Safe Drinking Water Act Special Edition. Archive and transcript available: [NPR Link to Audio](#)

Online VideoAudio Media

1. Radio Times, National Public Radio. 17 Dec, 2014 - 40th Anniversary of Safe Drinking Water Act Special Edition. Archive and transcript available: <http://tinyurl.com/pnv68ru>

Print & Online Textual

1. Reopening of American Accelerate as States Prepare to Relax Coronavirus Restrictions. Washington Post. 25 April 2020. [Link to Article](#)
2. A Comic Strip Tour of the Wild World of Pandemic Modeling. FiveThirtyEight. 13 April 2020. [Link to Article](#)
3. Should you Sanitize Your Groceries? OSU Wexner Medical Center Blog. 1 April 2020. [Link to Article](#)
4. Why is it so Freaking Hard to Make a Good COVID-19 Model? FiveThirtyEight. 31 March 2020. [Link to Article](#)
5. Is Tap Water Safe? Here's How To Tell. Women's Health. Sept 2018. [Link to Article](#)
6. When you get one wit', what are you getting?. Philadelphia Inquirer. 18 Jan 2015. [Link to Inquirer Archives](#)
7. Hydraulic Fracturing What Are the Issues? Reading Eagle. Reading, PA. 10 Sept 2014. Archive unavailable.

AWARDS

1. Faculty Service Award *Oct 2015*
Department of Public Health
College of Health Professions and Social Work, Temple University
2. Koerner Family Fellowship *Oct 2008*
Koerner Family, Drexel University
3. Teaching Assistant of the Year Award (Highly Commended) *May 2009*
Graduate Studies Office, Drexel University
4. Student Merit Award *Dec 2009*
Biological Stressors Specialty Group, Society for Risk Analysis

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| 5. Student Travel Award
Society for Risk Analysis | <i>Dec 2007, 2008 & 2009</i> |
| 6. Graduate Assistantships in Areas of National Need (GAANN)
United States Department of Education | <i>Sept 2006 - Aug 200</i> |
| 7. Dean's Fellowship
College of Engineering, Drexel University | <i>Sept 2004</i> |
| 8. Steven Geigrich Memorial Scholarship
Giegrich Family, Drexel University | <i>March 2007</i> |
| 9. Northeastern Chemical Association Scholarship
Northeastern Chemical Association | <i>Oct 2005</i> |
| 10. Alumni Award Scholarship
College of Engineering, Drexel University | <i>Sept 2004</i> |
| 11. Extracurricular Activities Award
Geo-Environmental Sciences and Engineering Department, Wilkes University | <i>May 2003</i> |

Professional Society Memberships

- Society for Risk Analysis - Leadership outlined that that section of CV
- International Water Association
- Association of Environmental Engineering and Science Professors - Leadership outlined that that section of CV
- American Academy of Engineering Education
- American Water Works Association

Refereed Journal Board Membership

- Microbial Risk Analysis - June 2019 - current

Peer Reviewer

- Risk Analysis
- Environmental Science and Technology
- International Journal of Environmental Health Research
- Water Research
- Water Science and Technology
- Environmental Modeling and Software

Volunteerism

- Community and High School Outreach *Nov 2005 - July 2009*
Department of Civil Architectural and Environmental Engineering
Drexel University
- DHS Specialty Award Judge *June 2008*
2008 Intel International Science and Engineering Fair
- Student Ambassador *Sept 1999 - Feb 2004* Department of Admissions, Wilkes University
- Volunteer Firefighter *Jan 1997 - Dec 2008*
Weatherly Area Fire Company No. 1