

# Krista Rule Wigginton

## 1. Personal Information

### Education Background

- Ph.D., Environmental Engineering, Virginia Tech, Blacksburg, VA, 2008
- MS, Environmental Engineering, Virginia Tech, Blacksburg, VA, 2004
- BS, Professional Chemistry, University of Idaho, Moscow, ID, 2001

### Employment Background

- Associate Professor of Environmental Engineering in the Department of Civil and Environmental Engineering, University of Michigan, starting September 2019
- Shimizu Visiting Professor of Environmental Engineering in the Department of Civil and Environmental Engineering, Stanford University, August 2019-June 2020.
- Assistant Professor of Environmental Engineering in the Department of Civil and Environmental Engineering, University of Michigan, 2013-present.
- Pedro E. Wasmer Assistant Professor of Environmental Engineering in the Department of Civil and Environmental Engineering, University of Maryland, 2011-2012.
- Postdoctoral Researcher, EPFL, Lausanne, Switzerland, 2008-2010.
- Analytical Chemist, Anatek Labs, Inc., Moscow, ID, 2001-2002.

## 2. Research, Scholarly & Creative Activities

### a. Articles in Refereed Journals

1. Arts, P. J., Kelly, J. D., Midgley, C. M., Anglin, K., Lu, S., Abedi, G. R., Andino, R. N., Bakker, K. M., Banman, B., Boehm, A., Briggs-Hagen, M., Brouwer, A. F., Davidson, M. C., Eisenberg, M. C., Garcia, M. A., Knight, S. K., Peluso, M. J., Pineda-Ramirez, Tassetto, M., Diaz-Sanchez, R., Martin, J. N., & **Wigginton, K. R.** (2023). Longitudinal and Quantitative Fecal Shedding Dynamics of SARS-CoV-2, Pepper Mild Mottle Virus and CrAssphage. *mSphere*, accepted and in press.
2. Boehm, A., Wolfe, M., **Wigginton, K.**, Bidwell, A., White, B., Hughes, B., Duong, D., Chan-Herur, V., Bischel, H., Naughton, C. (2023) "Human viral nucleic acids concentrations in wastewater solids from Central and Coastal California, USA," *Scientific Data*, accepted and in press.
3. Rodriguez, E. E., Bott, C. B., **Wigginton, K. R.**, & Love, N. G. (2023). In Vitro Bioassays to Monitor Complex Chemical Mixtures at a Carbon-Based Indirect Potable Reuse Plant. *Water Research*, 120094.
4. Tarpeh, W. A., Du, Y., Carpenter, C. M., Rodriguez, E. E., Helbling, D. E., Aga, D. S., Love, N. G., & **Wigginton, K. R.** (2023). A Unit Process Approach to Nontarget Screening of Organic Contaminants during Urine Treatment. *ACS ES&T Engineering*, 3(4), 590-601.
5. Li, L., Cai, J., Eisenberg, J. N., Goetsch, H. E., Love, N. G., & **Wigginton, K. R.**

- (2023). Virus Emissions from Toilet Flushing: Comparing Urine-Diverting to Mix Flush Toilets. *ACS ES&T Water*, 3(2), 457-464.
6. Szczuka, A., Horton, J., Evans, K., DiPietri, V., Sivey, J., **Wigginton, K.R.**, (2022). Chloride enhances DNA reactivity with chlorine at conditions relevant to water treatment, *Environmental Science & Technology*, 56(18), 13347-13356.
  7. Soller, J., Jennings W., Schoen, M., Boehm, A., **Wigginton, K.R.**, Gonzalez, R., Graham, K., McBride, G., Kirby, K. and Mattioli, M., (2022). Modeling infection from SARS-CoV-2 wastewater concentrations: promise, limitations, and future directions. *Journal of Water and Health*, 20(8) 1197-1211.
  8. Wolfe MK, Duong D, Bakker KM, Ammerman M, Mortenson L, Hughes B, Arts P, Luring AS, Fitzsimmons WJ, Bendall E, Hwang CE. Martin, M.T., White, B.J., Boehm, A.B., **Wigginton, K.R.**, (2022). Wastewater-Based Detection of Two Influenza Outbreaks. *ES&T Letters*, 2022 9(8), 687-92.
  9. Hegarty, B. E., Dai, Z., Raskin, L., Pinto, A. J., **Wigginton, K.**, Duhaime, M. B. (2022). A Snapshot of the Global Drinking Water Virome: Diversity and Metabolic Potential Vary with Residual Disinfectant Use, *Water Research*, 218, 118484.
  10. Huisman, J.S., Scire, J., Caduff, L., Fernandez-Cassi, X., Ganesanandamoorthy, P., Kull, A., Scheidegger, A., Stachler, E., Boehm, A.B., Hughes, B. Knudson, A., Topol, A., **Wigginton, K.R.**, Wolfe, M.K., Kohn, T., Ort, C., Stadler, T., Julian, T (2022). Wastewater-based estimation of the effective reproductive number of SARS-CoV-2. *Environmental Health Perspectives*, 130(5), 057011.
  11. Yu, A.T., Hughes, B., Wolfe, M.K., Leon, T., Duong, D., Rabe, A., Kennedy, L.C., Ravuri, S., White, B.J., **Wigginton, K.R.**, Boehm, A.B., 2022. Estimating Relative Abundance of 2 SARS-CoV-2 Variants through Wastewater Surveillance at 2 Large Metropolitan Sites, United States. *Emerging Infectious Diseases*, 28(5), 940-947.
  12. Delgado Vela, J., McClary-Gutierrez, J.S., Al-Faliti, M., Allan, V., Arts, P., Barbero, R., Bell, C., D'Souza, N., Bakker, K., Kaya, D. and Gonzalez, R., Harrison, K., Kannoly, S., Keenum, I., Li, L. Pecson, B., Philo, S.E., Schneider, R., Schussman, M., Shreetha A., Stadler, L., **Wigginton, K.**, Boehm, A., Halden, A., Bibby, K. (2022). Impact of disaster research on the development of early career researchers: Lessons learned from the wastewater monitoring pandemic response efforts. *Environmental Science & Technology*, 56(8), 4724-4727.
  13. Wolfe, M., Hughes, B., Duong, D., Chan-Herur, V., **Wigginton, K. R.**, White, B., Boehm, A. B. (2022). Detection of SARS-CoV-2 variant Mu, Beta, Gamma, Lambda, Delta, Alpha, and Omicron in wastewater settled solids using mutation-specific assays is associated with regional detection of variants in clinical samples, *Applied and Environmental Microbiology*, 88(8), e00045-22.
  14. Hughes, B., Duong, D., White, B. J., **Wigginton, K. R.**, Chan, E. M., Wolfe, M. K., Boehm, A. B. (2022). Respiratory Syncytial Virus (RSV) RNA in wastewater settled solids reflects RSV clinical positivity rates. *Environmental Science & Technology Letters*, 9(2), 173-178.
  15. Kim, S., Kennedy, L. C., Wolfe, M. K., Criddle, C. S., Duong, D. H., Topol, A.,

- White, B.J., Kantor, R.S., Nelson, K.L., Steele, J.A., Langlois, K., Griffith, J., Zimmer-Faust, A.G., McLellan, S., Schussman, M.K., Ammerman, M., **Wigginton, K.R.**, Bakker, K.M., Boehm, A. B. (2022). SARS-CoV-2 RNA is enriched by orders of magnitude in primary settled solids relative to liquid wastewater at publicly owned treatment works. *Environmental Science: Water Research & Technology*, 8(4), 757-770.
16. Rodriguez, E., Tarpeh, W., **Wigginton, K. R.**, Love, N. (2022). Application of plasma for the removal of pharmaceuticals in synthetic urine. *Environmental Science: Water Research & Technology*, 8(3), 523-533.
17. Qiao, Z., Ye, Y., Szczuka, A., Harrison, K. R., Dodd, M. C., **Wigginton, K. R.** (2021). Reactivity of viral nucleic acids with chlorine and the impact of virus encapsidation. *Environmental Science & Technology*, 56(1), 218-227.
18. Martinez Paz, E. F., Tobias, M., Escobar, E., Raskin, L., Roberts, E. F., **Wigginton, K. R.**, Kerkez, B. (2021). Wireless sensors for measuring drinking water quality in building plumbing: deployments and insights from continuous and intermittent water supply systems. *ACS ES&T Engineering*, 2(3), 423-433.
19. Wolfe, M. K., Topol, A., Knudson, A., Simpson, A., White, B., Vugia, D. J, Yu, A., Li, L., Balliet, M., Stoddard, P., Han, G., **Wigginton, K.**, Boehm, A. B. (2021). High-frequency, high-throughput quantification of SARS-CoV-2 RNA in wastewater settled solids at eight publicly owned treatment works in northern California shows strong association with COVID-19 incidence. *Msystems*, 6(5), e00829-21.
20. Simpson, A., Topol, A., White, B. J., Wolfe, M. K., **Wigginton, K. R.**, Boehm, A. B. (2021). Effect of storage conditions on SARS-CoV-2 RNA quantification in wastewater solids. *PeerJ*, 9, e11933.
21. Borchardt, M. A., Boehm, A. B., Salit, M., Spencer, S. K., **Wigginton, K. R.**, Noble, R. T. (2021). The environmental microbiology minimum information (EMMI) guidelines: qPCR and dPCR quality and reporting for environmental microbiology. *Environmental Science & Technology*, 55(15), 10210-10223.
22. Loeb, S. K., Jennings, W. C., **Wigginton, K. R.**, Boehm, A. B. (2021). Sunlight inactivation of human norovirus and bacteriophage MS2 using a genome-wide PCR-based approach and enzyme pretreatment. *Environmental Science & Technology*, 55(13), 8783-8792.
23. Wolfe, M. K., Archana, A., Catoe, D., Coffman, M. M., Dorevich, S., Graham, K. E., **K.R. Wigginton**, Boehm, A. B. (2021). Scaling of SARS-CoV-2 RNA in settled solids from multiple wastewater treatment plants to compare incidence rates of laboratory-confirmed COVID-19 in their sewersheds. *Environmental Science & Technology Letters*, 8(5), 398-404.
24. Rockey, N. C., Henderson, J. B., Chin, K., Raskin, L., **Wigginton, K. R.** (2021). Predictive modeling of virus inactivation by UV. *Environmental Science & Technology*, 55(5), 3322-3332.
25. Crossette, E., Gumm, J., Langenfeld, K., Raskin, L., Duhaimé, M., **Wigginton, K.R.** (2021). Metagenomic quantification of genes with internal standards. *MBio*, 12(1),

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27. Rockey, N. C., Shen, Y., Haig, S. J., Wax, M., Yonts, J., **Wigginton, K. R.**, Raskin, L., Olson, T. M. (2021). Impact of service line replacement on lead, cadmium, and other drinking water quality parameters in Flint, Michigan. *Environmental Science: Water Research & Technology*, 7(4), 797-808.
28. Schueler, J., Lansing, S., Crossette, E., Naas, K., Hurst, J., Raskin, L., **Wigginton, K.**, Aga, D. S. (2021). Tetracycline, sulfadimethoxine, and antibiotic resistance gene dynamics during anaerobic digestion of dairy manure, 50(3), 694-705.
29. Langenfeld, K., Chin, K., Roy, A., **Wigginton, K.**, Duhaime, M. B. (2021). Comparison of ultrafiltration and iron chloride flocculation in the preparation of aquatic viromes from contrasting sample types. *PeerJ*, 9.
30. Graham, K. E., Loeb, S. K., Wolfe, M. K., Catoe, D., Sinnott-Armstrong, N., Kim, S., Yamahara, K.M., Sassoubre, L. M., Mendoza L.M., Roldan-Hernandez, L., Langenfeld, K., **Wigginton, K. R.**, Boehm, A. B. (2020). SARS-CoV-2 RNA in wastewater settled solids is associated with COVID-19 cases in a large urban sewershed. *Environmental science & technology*, 55(1), 488-498.
31. Rockey, N., Arts, P. J., Li, L., Harrison, K. R., Langenfeld, K., Fitzsimmons, W. J., Luring, A. S., Love, N. G., Kaye, K. S., Raskin, L., Roberts, W. W., Hegarty, B., **Wigginton, K. R.** (2020). Humidity and deposition solution play a critical role in virus inactivation by heat treatment of N95 respirators. *Msphere*, 5(5), e00588-20.
32. Larsen, D. A., **Wigginton, K. R.** (2020). Tracking COVID-19 with wastewater. *Nature Biotechnology*, 38(10), 1151-1153.
33. Bivins, A., North, D., Ahmad, A., Ahmed, W., Alm, E., Been, F... **Wigginton, K.**, Zhu, K., & Bibby, K. (2020). Wastewater-based epidemiology: global collaborative to maximize contributions in the fight against COVID-19.
34. **Wigginton, K. R.**, & Boehm, A. B. (2020). Environmental engineers and scientists have important roles to play in stemming outbreaks and pandemics caused by enveloped viruses. *Environmental Science & Technology*.
35. Petrovich, M. L., Zilberman, A., Kaplan, A., Eliraz, G. R., Wang, Y., Langenfeld, K., Duhaime, M., **Wigginton, K.**, Poretsky, R., Avisar, D., Wells, G. F. (2020). Microbial and viral communities and their antibiotic resistance genes throughout a hospital wastewater treatment system. *Frontiers in microbiology*, 11, 153.
36. Rockey, N., Young, S., Kohn, T., Pecson, B., Wobus, C. E., Raskin, L., **Wigginton, K. R.** (2020). UV Disinfection of human norovirus: evaluating infectivity using a genome-wide PCR-based approach. *Environmental science & technology*, 54(5), 2851-2858.

37. Goetsch, H. E., Love, N. G., **Wigginton, K. R.** (2020). Fate of extracellular DNA in the production of fertilizers from source-separated urine. *Environmental Science & Technology*, 54(3), 1808-1815.
38. Ye, Y., Zhao, L., Imperiale, M. J., **Wigginton, K. R.** (2019). Integrated cell culture-mass spectrometry method for infectious human virus monitoring. *Environmental Science & Technology Letters*, 6(7), 407-412.
39. Xia, T., Kleinheksel, A., Lee, E. M., Qiao, Z., **Wigginton, K. R.**, Clack, H. L. (2019). Inactivation of airborne viruses using a packed bed non-thermal plasma reactor. *Journal of Physics D: Applied Physics*, 52(25), 255201.
40. Rockey, N., Bischel, H. N., Kohn, T., Pecson, B., **Wigginton, K. R.** (2019). The utility of flow cytometry for potable reuse. *Current Opinion in Biotechnology*, 57, 42-49.
41. Hurst, J. J., J. P. Oliver, J. Schueler, C. Gooch, S. Lansing, E. Crossette, **K. Wigginton**, L. Raskin, D. S. Aga, L. M. Sassoubre. (2019) Trends in antimicrobial resistance genes in manure blend pits and long-term storage across dairy farms with comparisons to antimicrobial usage and residual concentrations. *Environmental Science & Technology* 53(5) 2405-2415.
42. Qiao, Z., Ye, Y., Chang, P. H., Thirunarayanan, D., **Wigginton, K. R.** (2018). Nucleic acid photolysis by UV<sub>254</sub> and the impact of virus encapsidation. *Environmental Science & Technology*, 52(18), 10408-10415.
43. Ye, Y., Chang, P. H., Hartert, J., **Wigginton, K. R.** (2018). Reactivity of enveloped virus genome, proteins, and lipids with free chlorine and UV<sub>254</sub>. *Environmental science & Technology*, 52(14), 7698-7708.
44. Nelson, K. L. Boehm, A. B., Davies-Colley, R.J., Dodd, M. C., Kohn, T., Linden, K. G., Liu, Y., Maraccini, P. A., McNeill, K., Mitch, W. A., Nguyen, T. H., Parker, K. M., Rodriguez, R. A., Sassoubre, L. M., Silverman, A. I., **Wigginton, K. R.**, Zepp, R. G., Sunlight-mediated inactivation of health-relevant microorganisms in water: a review of mechanisms and modeling approaches. *Environmental Science: Processes & Impacts* 20, no. 8 (2018): 1089-1122.
45. Pruden, A., Alcalde, R., Alvarez, P.I., Asholt, N., Bischel, H., Capiro, N., Crossette, E., Frigon, D., Grimes, K., Hass, C., Ikuma, K., Kappeli, A., Lapara, T., Seo, L., Sobsey, M., Sozzi, E., Navab-Daneschmand, Raskin, L., Riquelme, M., Vikesland, V., **Wigginton, K.**, Zhou, Z., An environmental science and engineering framework for combating antimicrobial resistance, *Environmental Engineering Science*, 35(10), 1005-1011.
46. Goetsch, H.E., Zhao, L., Gnegy, M., Imperiale, M.J., Love, N.G., **Wigginton, K.R.**, (2018). Fate of the urinary tract virus BK Human Polyomavirus in source-separated urine. *Applied and Environmental Microbiology*, Vol. 84, pp. e02374-17.
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48. Mullen, R. A., **Wigginton, K. R.**, Noe-Hays, A., Nace, K., Love, N. G., Bott, C. B., Aga, D. S. (2017). Optimizing extraction and analysis of pharmaceuticals in human urine, struvite, food crops, soil, and lysimeter water by liquid chromatography-tandem mass spectrometry. *Analytical Methods*, 9(41), 5952-5962.
49. Chang, P. H., Juhrend, B., Olson, T. M., Marrs, C. F., **Wigginton, K. R.** (2017). Degradation of extracellular antibiotic resistance genes with UV254 treatment. *Environmental Science & Technology*, 51(11), 6185–6192.
50. Cable, R. N., Beletsky, D., Beletsky, R., **Wigginton, K.**, Locke, B. W., Duhaime, M. B. (2017). Distribution and modeled transport of plastic pollution in the Great Lakes, the world's largest freshwater resource. *Frontiers in Environmental Science*, 5, 45-54.
51. Bibby, K., Aquino de Carvalho, N., **Wigginton, K.** (2017) Research needs for wastewater handling in virus outbreak response. *Environmental Science & Technology*, 51(5), 2534-2535
52. Ye, Y., Ellenberg, M., Graham, K, **Wigginton K.** (2016) Survivability, partitioning, and recovery of enveloped viruses in untreated municipal wastewater. *Environmental Science & Technology*, Vol. 50, pp. 5077-5085.
53. Lahr, R., Goetsch, H., Haig, S. Noe-Hays, A., Love, N., Aga, D., Bott, C., **Wigginton, K.** (2016) Urine bacterial community convergence through fertilizer production: storage, pasteurization, and struvite precipitation. *Environmental Science & Technology*, 50(21), 11619-11626.
54. Qiao, Z., **Wigginton, K.** (2016) Direct and indirect photochemical reactions in viral RNA measured with RT-qPCR and mass spectrometry. *Environmental Science & Technology*, 50(24), 13371-13379.
55. **Wigginton, K.**, Ye, Y., Ellenberg, M. (2015) Emerging Investigators Series: The source and fate of pandemic viruses in the urban water cycle, *Environmental Science: Water Science and Technology*, 1(6), pp. 735-746.
56. Noe-Hays, A., Nace, K., Patel, N., Lahr, R., Goetsch, H., Mullen, R., Love, N., Aga, D., Bott, C., Foxman, B., Jimenez, J., Luo, T., Ramadugu, K., **Wigginton, K.** (2015) Urine diversion for nutrient recovery and micropollutant management: Results from a regional urine recycling program. *Proceedings of the Water Environment Federation*, 19, 3993-4002.
57. Donham, J., Rosenfeldt, E., **Wigginton, K.**, (2014) Photometric hydroxyl radical scavenging analysis of standard natural organic matter isolates, *Environmental Science: Processes and Impacts*, Vol. 16, pp. 764-769.
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- inactivation mechanisms: impact of disinfectants on virus function and structural integrity, *Environmental Science & Technology*, 46(21), 12069-12078.
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  63. Mattle, M.J., Crouzy, B., Brennecke M., **Wigginton, K.R.**, Perona, P., Kohn, T. (2011). Impact of virus aggregation on inactivation by peracetic acid and implications for other disinfectants. *Environmental Science and Technology*, 45(18), 7710-7717.
  64. **Wigginton, K.R.**, Menin, L., Montoya, J.P., Kohn, T. (2010) Oxidation of virus proteins during UV<sub>254</sub> and singlet oxygen mediated inactivation. *Environmental Science and Technology*, Vol. 44, 5437–5443.
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  66. **Wigginton, K.R.**, Vikesland, P.J. (2010) Gold-coated polycarbonate membrane filter for pathogen concentration and SERS-based detection. *The Analyst*, 135(6), 1320-1326.
  67. **Rule, K.L.**, Vikesland, P.J. (2009) Surface-enhanced resonance Raman spectroscopy for the rapid detection of *Cryptosporidium parvum* and *Giardia lamblia*, *Environmental Science and Technology*, 43(4), 1147-1152.
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## **b. Talks, Abstracts, and Other Professional Papers Presented**

### **i. Invited Talks**

1. Wigginton, K. "Environmental surveillance of viruses: recent advances in technologies and applications", University of Pennsylvania Institute for Infectious and Zoonotic Diseases, March 2023, Philadelphia, PA.
2. Wigginton, K. "How a mechanistic understanding of virus fate helps prepare us for pandemics," University of Wisconsin, Madison Environmental Engineering Seminar, November 2022 (virtual).

3. Wigginton, K. "Modernizing Virus Detection and Environmental Surveillance", Colorado School of the Mines Department of Civil and Environmental Seminar Series, March 2022 (virtual).
4. Wigginton, K., "Challenges and Opportunities Involved with Measuring Viruses in the Environment," NIST Workshop on Standards for Microbiome and Multiomics Measurements, August 2022 (virtual).
5. Wigginton, K. "How a mechanistic understanding of virus fate helps prepare us for pandemics," Marquette University Workshop on Emerging Contaminants, October 2022 (virtual).
6. Wigginton, K., "Leveraging a mechanistic understanding of virus inactivation by UVC to build predictive models," American Chemical Society Midwest Region Conference, October, 2022, Iowa City, IA.
7. Wigginton, K. "Wastewater sampling for sensitive and high-resolution infectious disease surveillance", U-M COE Faculty Meeting, February 2022.
8. Wigginton, K. "The Detection and Mechanistic Fate of Viruses in the Environment", Gordon Research Conference, Environmental Sciences: Water, June 2022, Holderness, N.H.
9. Wigginton, K. "Leveraging a mechanistic understanding of virus inactivation by UVC to build predictive models", International Ultraviolet Association Research Innovation Symposium, May 2022, Boulder, CO.
10. Wigginton, K. "Modernizing Virus Detection and Environmental Surveillance," Virginia Tech Civil and Environmental Engineering Seminar Series, April 2021 (virtual).
11. Wigginton, K. "How Environmental Engineers have Helped Address COVID-19", Wayne State University Water@Wayne Webinar Series, April 2021 (virtual).
12. Wigginton, K., "How virus structure and chemistry impact environmental fate," Royal Society of Chemistry Seminar Series, October 2020 (virtual).
13. Wigginton, K., "SARS-CoV-2 measurements in sewage for possible COVID-19 Surveillance," CLEAN 2020 Summit, August 2020 (virtual).
14. Wigginton, K., "Recent advances in environmental virology," Wilamette University Department of Chemistry seminar, November 2020 (virtual).
15. Wigginton, K., "Recent advances in environmental virology," USC Department of Civil and Environmental Engineering departmental seminar, January 2020, Los Angeles, CA.
16. Wigginton, K.W., "The Status of Virus Detection Methods for Water Reuse Applications," Trussell Technologies, Inc. Seminar, October 2019, Oakland, CA.
17. Wigginton, K.W., "Virus disinfection: how to kill the nonliving," Gordon Research Conference, Water Disinfection, By-Products, and Health, July 2019, South Hadley, MA.
18. Wigginton, K.R. "The challenges and future of environmental virus monitoring"



Association of Public Health Laboratories Annual Meeting, June 2019, St. Louis, MO.

19. Wigginton, K.R. “Recent advances in environmental virology”, Plenary presentation at UNC Water Microbiology, June 2019, Chapel Hill, NC.
20. Wigginton, K.R. “How virus particle structures control their persistence in the environment,” Alfred P. Sloan Workshop on Viruses in the Built Environment, May 2019, Alexandria, VA.
21. Wigginton, K.R. “How virus particle structures control their persistence in the environment,” Texas A&M Department of Civil and Environmental Engineering Seminar, February 2019.
22. Wigginton, K.R. “Plagued by viruses: how to detect the unculturable and kill the nonliving,” MIT Department of Civil and Environmental Engineering Parsons Seminar, December 2018.
23. Wigginton, K.R. “Plagued by viruses: how to detect the unculturable and kill the nonliving,” Duke Department of Civil and Environmental Engineering, November 2018.
24. Wigginton, K.R. “Small but fierce: How virus particle structures control their persistence in the environment”, invited talk at the 2018 Gordon Research Conference, Microbiology of the Built Environment, July 2018, Portland, ME.
25. Wigginton, K.R. “Nucleic acid reactivity and functional fate in water treatment processes”, invited talk at the American Chemical Society annual conference, New Orleans, March 2018.
26. Wigginton, K. “Biomolecule pollutants and their fate in water treatment processes”, CEE departmental seminar at CU Boulder, October, 2017.
27. Wigginton, K.R. (2017, October) “Biomolecule pollutants and their fate in water treatment processes,” University of Colorado Department of Civil and Environmental Engineering Seminar.
28. Wigginton, K.R. (2017, January) “Biomolecule pollutants and their fate in water treatment processes,” Stanford University Department of Civil and Environmental Engineering Seminar.
29. Wigginton, K.R. (2017, January) “The fate of biomolecule pollutants in water treatment processes,” Seminar for UC Berkeley Environmental Engineering program.
30. Wigginton, K.R. (2016, May) “The Role of Environmental Engineering and Science in Pandemic Preparedness.” Invited talk at the NSF-AEESP Grand Challenges Workshop, Arlington, VA.
31. Wigginton, K.R. (2016, May), “Fate of enveloped and non-enveloped surrogate viruses in WW treatment”, NSF Workshop on Ebola Preparedness, Arlington, VA.
32. Wigginton, K.R. (2016, December) “Systems View of Nutrient Management –

- Nutrient Recovery from Human Urine.” EPA SSWR Water Research Seminar.
33. Wigginton, K.R., (2016, September) “Viruses in the urban water cycle” Indian Institute of Sciences (IISc), Chemistry Departmental Seminar, Bangalore, India.
  34. Wigginton, K.R., (2016, May), “Emerging Contaminant Studies in Environmental Biotechnology Using High Resolution LC-MS,” Thermo Webinar Series on the Analysis of Emerging Contaminants.
  35. Wigginton, K., November 2015, “Viruses in the urban water cycle,” Civil and Environmental Engineering Department Seminar Series, University of Iowa, Iowa City, IA.
  36. Wigginton, K., March 2015, “The Fate of Emerging Biochemical Contaminants in Wastewater Disinfecting Treatments,” Pittcon Conference, New Orleans.
  37. Wigginton, K. November 2014, “Biological and Chemical Fate of Viruses in Water Treatment Processes”, Civil and Environmental Engineering Department Seminar, University of Pittsburgh, Pittsburgh PA.
  38. Wigginton, K.R., March 2014, “A closer look at waterborne viruses”, Civil and Environmental Engineering Department Seminar, Syracuse University, Syracuse, NY.
  39. Wigginton, K.R., January 2014, “The presence and fate of viruses in drinking water and wastewater treatment,” Environmental and Water Resources Program Seminar, Virginia Tech, Blacksburg, VA.
  40. Wigginton, K.R., October 2013, “A closer look at waterborne viruses,” Women in Science & Engineering Leadership Institute Lecture for Environmental Chemistry & Toxicology Program, University of Wisconsin, Madison, WI.
  41. Wigginton, K.R., April 2013, “Routes to Protein Damage with UVC”, ReNUWit Workshop on Sunlight Degradation of Biomolecules and Microorganisms, Stanford, CA.
  42. Wigginton, K.R., December 2011, “How to “kill” a virus: degradation of viral components during disinfection,” Metrology of Microbial Systems Seminar, National Institute of Standards and Technology, Gaithersburg, MD.
  43. Wigginton, K.R., September 2011, “How to “kill” a virus: mechanisms of virus inactivation with heat, UV, and chemical oxidants,” Department of Geography and Environmental Engineering M. Gordon Wolman Seminar, The Johns Hopkins University, Baltimore, MD.
  44. Wigginton, K.R., April 2011, “Virus Inactivation Mechanisms Upon Exposure to Heat, Oxidants, and UV-irradiation,” Department of Environmental Engineering and Earth Sciences, Clemson University, Anderson, SC.
  45. Wigginton, K.R., November 2008, "A nanotechnology-enabled strategy for waterborne pathogen detection,” Department of Civil and Environmental Engineering, University of Michigan, Ann Arbor, MI.

**ii. Refereed conference proceedings (all oral presentations)**

1. Martinez Paz, E.F., Raskin, L., Wigginton, K., and Kerkez, B., "Adaptive Flushing of Building Drinking Water Taps Using Real-Time Oxidation-Reduction Potential and Temperature Signals," Hydroinformatics Conference, July 2022.
2. Harrison, K., Wigginton, K. "The Impact of Virus Capsids on Genome Stability in Wastewater," AEESP Annual Conference, St. Louis, July 2022.
3. Li, L., Love, N., Wigginton, K., "Virus emissions from toilet flushing: comparing urine diverting to mix flush toilets," AEESP Conference, St. Louis, MO, July 2022.
4. Snead, D., Wigginton, K. "Predicting Virus Log Reduction Levels in Sub-residual Ozone Treatment," AEESP Conference, St. Louis, MO, 2022.
5. Hegarty, B, Raskin, L., Duhaime, M., Wigginton, K. "Implications and Applications of Viral Infection Networks in Drinking Water", AEESP Conference, St. Louis, MO, July 2022.
6. Szczuka, A., Wigginton, K. "UV reactions of viral genomes," AEESP Conference, July 2022. St. Louis, MO.
7. Szczuka, A., Wigginton, K., "Chloride enhances viral genome and virus chlorination at conditions relevant to water treatment," International Society of Food and Environmental Virology, Santiago de Compostela, Spain, May 2022.
8. Arts, P., Kelly, D., Boehm, A., Wolfe, M., Bakker, K., Brouwer, A., Wigginton, K., "Estimating sewershed prevalence of SARS CoV 2, PMMoV, and crAss phage fecal shedding using models informed by measurements from COVID 19 patient samples and wastewater solids," International Society of Food and Environmental Virology, Santiago de Compostela, Spain, May 2022.
9. Langenfeld, K., Duhaime, M., Wigginton, K., "A rigorous quantitative DNA virus metagenomic method and its limitations," International Society of Food and Environmental Virology, Santiago de Compostela, Spain, May 2022.
10. Wigginton, K., Rockey, N., Raskin, L., "Predictive models for the disinfection of nonculturable and difficult-to-culture viruses," International Society of Food and Environmental Virology, Santiago de Compostela, Spain, May 2022.
11. Li, L., Rockey, R., Arts, P., Love, N., Wigginton, K. "Humidity and Deposition Solution Play a Critical Role in Virus Inactivation by Heat Treatment of N95 Respirators". ACS National Meeting, April 2021.
12. Wigginton, K.R., "Virus Detection Methods for Water Reuse Applications," 12th IWA International Conference on Water Reclamation and Reuse, Berlin, June 2019.
13. Crossette, E., Gumm, J., Duhaime, M., Raskin, L., Wigginton, K.R., "A Metagenomic Tool for Absolute Quantification of Resistance Genes," Chapel Hill, NC, May 2019.
14. Rockey, N., Wigginton, K.R., "Near Real-Time Monitoring of Virus Particles

with Flow Virometry in Water Reuse Applications,” AEESP Education and Research Conference, Tempe AZ, May 2019.

15. Ye, Y., Zhao, L., Imperiale, M. Wigginton, K.R., “Mass Spectrometry Method for Monitoring Infectious Human Viruses in Environmental Samples,” AEESP Education and Research Conference, Tempe AZ, May 2019.
16. Rockey, N., Young, S., Kohn, K., Pecson, B., Wobus, C., Raskin, L., Wigginton, K.R., Infectivity of Human Norovirus Through Water Reuse Disinfection Processes, The Water Research Foundation Conference, Atlanta GA, May 2018.
17. Langenfeld, K., R. Cable, M. Duhaime, K. Wigginton “Comparison of virus concentration methods from various water matrices for detecting the viral resistome”, ACS National Meeting, New Orleans LA, March 2018.
18. Qiao, Z., P. Chang, K. Wigginton, “Impact of higher order nucleic acid structure on reactivity with UV254”, ACS National Meeting, New Orleans, March 2018.
19. Ye, Y., K. Wigginton “Enveloped virus inactivation by UV and chlorine disinfection,” ACS National Meeting, New Orleans, March 2018.
20. Tarpeh, W., D.S. Aga, K. Wigginton, N. Love, “Assessing risks from pharmaceuticals and transformation products in urine-derived fertilizers”, ACS National Meeting, New Orleans, March 2018.
21. Rockey, N., Kohn, K., Pecson, B., Wobus, C., Raskin, L., Wigginton, K.R., Infectivity of Human Norovirus Through Water Reuse Disinfection Processes, AWWA Potable Reuse Conference, Austin, TX., January 2018.
22. Ye, Y., Wigginton, K., “Model enveloped virus inactivation by free chlorine,” 2017 Water Microbiology Conference and the 19<sup>th</sup> IWA-HRWM Symposium, Chapel Hill, N.C., May 2017.
23. Goetsch, H. ; N. G. Love; M. Imperiale; K. Wigginton, “Fate of human BK polyomavirus through urine diverted for fertilizer use”, International Resource Recovery Conference 2017, New York City, August, 2017.
24. Qiao, Z. D. Thirunarayanan; K. R. Wigginton, “Reactions in viral RNA during water disinfection treatments”, 2017 AEESP Research and Education Conference, June 2017.
25. H. Goetsch ; N. G. Love; M. Imperiale; K. Wigginton, “Fate of human BK polyomavirus through urine diverted for fertilizer use”, 2017 AEESP Research and Education Conference, June 2017.
26. Rockey, N., Kohn, K., Wobus, C., Wigginton, K. “Infectivity of Human Norovirus through Water Reuse Disinfection Processes” IWA International Symposium on Health-Related Water Microbiology, Chapel Hill, NC, May 2017.
27. Goetsch, H., Wigginton, K., Love N., Mullen, R., Gagnon, A., Lahr, R., Felek, A., Aga, D., Bott, C., Jimenez, J., Nace, K., Noe-Hays, A., “Nutrient Recovery through Development of Urine-derived Fertilizers: Fate of Trace Contaminants”, Borchardt Conference, Ann Arbor, MI, February 2017.

28. Qiao, Zhong, K.R., Wigginton, “Direct and indirect photochemical reactions in viral RNA measured with RT-qPCR and mass spectrometry”, ACS National Conference, San Francisco, CA, April 2016.
29. Goetsch, H., Love, M., Imperiale, M., Wigginton, K., “Fate of human BK polyomavirus through urine diverted for fertilizer,” ACS National Conference, San Francisco, CA, April 2017.
30. Ye, Yinyin, Wigginton, K. “Fate and Recovery of Enveloped Viruses in Municipal Wastewater” Water Microbiology Conference 2016, Chapel Hill, N.C., May 2016.
31. Wigginton, K.R., Ye, Y., “Comparisons of the behavior of enveloped and non-enveloped viruses in wastewater treatment” International Society of Food and Environmental Virology Conference, Kusatsu, Japan, September 2016.
32. Rockey, N., Yonts, J., Haig, S., Wigginton, K., Raskin, L., “Characterizing Opportunistic Bacterial Pathogens in a Domestic Hot Water Pipe Loop System ,” AWWA WQTC Conference, Indianapolis, IN, November 2016.
33. K.R. Wigginton, Z. Qiao, “Implications of PCR techniques for measuring the fate of viruses and ARGs in UV-treated waters,” Pacifichem, December 2015.
34. Jeyaratnam, J., Wigginton, K., “Bacteriophage-assisted ARG Transfer Within Drinking Water Distribution Systems,” WQTC, November 2015.
35. Wigginton, K.R., “The presence and fate of enveloped viruses in municipal wastewater treatment,” IWA International Symposium on Health-Related Water Microbiology, September 2015.
36. Goetsch, H. Mullen, R., Lahr, R., Noe-Hays, A., Aga, D., Bott, C., Foxman, B. Jimenez, J., Love, N., Luo, T., Nace, K., Ramadugu, Wigginton, K., “Fate of pharmaceutical and biological contaminants through the preparation and application of urine derived fertilizers,” WEFTEC Annual Conference, September 2015.
37. Goetsch, H. Mullen, R., Lahr, R., Noe-Hays, A., Aga, D., Bott, C., Foxman, B. Jimenez, J., Love, N., Luo, T., Nace, K., Ramadugu, Wigginton, K., “The Fate of pharmaceutical and biological contaminants through the preparation and application of urine derived fertilizers,” IWA Resource Recovery Conference, Gent, August 2015.
38. Ye, Y., Wigginton, K., “Methods for the Detection of Infective Enveloped Viruses in Municipal Wastewater”, ACS National Fall Conference, Boston, August 2015.
39. Wigginton, K., Ye, Y., “The implications of a virus pandemic on wastewater and drinking water treatment”, AEESP Conference, New Haven, June 2015.
40. Qiao, Z., Wigginton, K., “Examination of Reactions in Viral RNA During UV Disinfection With RT-QPCR and Mass Spectrometry,” AWWA ACE 2015, Anaheim, June 2015.
41. Wigginton, K., Qiao, Z., “Chemical Fate of Nucleic Acids During Disinfecting

Treatments,” International Symposium on Waterborne Pathogens Program, Savannah, April 2015.

42. Wigginton, K., Nucleic Acid Pollutant Fate in Disinfecting Treatments,” 2014 Borchardt Conference, Ann Arbor, February 2014.
43. Donham, J., Rosenfeldt, E., Wigginton, K., “Analysis of  $k_{\text{NOM-OH}}$  for NOM isolates and drinking water samples with rapid background scavenging technique,” ACS National Spring Meeting, New Orleans, April 2013.
44. Donham, J., Rosenfeldt, E., Wigginton, K., “Variability of Background Hydroxyl Radical Scavenging in Drinking Water,” IUVA 2012 Americas Conference, August, 2012.
45. Wigginton, K.R., Pecson, B.M, Sigstam, T., Bosshard, F., Kohn, T., August 2011, “Virus inactivation upon exposure to heat, oxidants, and UV irradiation,” American Chemical Society Fall Meeting, Denver, CO.
46. Wigginton, K.R., Kohn, T., Pecson, B., Sigstam, T., Bosshard, F., July 2011, “Quantitative Assessment of virus protein and genome damage upon inactivation by common disinfectants,” AEESP Education and Research Conference, Tampa, FL.
47. Wigginton, K.R., Kohn, T., Pecson, B., Sigstam, T., Bosshard, F., May 2011, “The Mechanisms Responsible for Virus Inactivation Upon Exposure to Oxidants, Germicidal UV, and Heat,” American Society for Microbiology General Meeting, New Orleans, LA.
48. Wigginton, K.R., October 2010, “The kinetics and products of virus protein degradation during water disinfection,” COST-929 Symposium, Istanbul, Turkey.
49. Wigginton, K.R., Pecson, B.M, Kohn, T., March 2010, “Virus oxidation in sunlit waters,” American Chemical Society Spring Meeting, San Francisco, CA.
50. Wigginton, K.R., Vikesland, P.J., August 2008, "A nanotechnology enabled detection method for *Cryptosporidium parvum* and *Giardia lamblia*," American Chemical Society Fall Meeting, Philadelphia, PA.
51. Rule, K.L., Vikesland, P.J., April 2008, "SERS-based method for pathogen monitoring in drinking water," American Chemical Society Spring Meeting, New Orleans, LA.
52. Rule, K.L., Rectanus, H.V., Vikesland, P.J., July 2007, "Development of a SERS immunoassay for the detection of *Cryptosporidium* in drinking waters," American Water Works Association Annual Conference and Exposition, Toronto, Canada.
53. Rule, K.L., Rectanus, H.V., Vikesland, P.J., March 2007, "A SERS based immunoassay for the detection of *Cryptosporidium parvum* in drinking water," American Chemical Society Spring Meeting, Chicago, IL.
54. Rule, K.L., Vikesland, P.J., November 2006, "The development of an immunoassay for the detection of *Cryptosporidium parvum* in drinking waters," AIChE Annual Meeting, San Francisco, CA.

55. Rule, K.L., Greynshock, A.E., Vikesland, P.J., August 2004, “The mechanisms, kinetics, and products Of Triclosan-disinfectant reactions,” American Chemical Society Fall Meeting, Philadelphia, PA.
56. Rule, K.L., Ebbett, V.R., Greynshock, A.E., Vikesland, P.J., November 2003, “The mechanisms, kinetics, and products of Triclosan-disinfectant reactions,” American Water Works Association Water Quality and Technology Conference, Philadelphia.

**c. Contracts and Grants.**

1. Michigan Department of Health and Human Services, Centers for Disease Control and Prevention (2022-2023), \$993,066, “FY23-Project L (SEWRB-UM): ELC SEWER Network Project,” PIs: **Krista Wigginton**, Marisa Eisenberg (\$496,533).
2. National Philanthropic Trust, (2022-2025), \$4,981,906. “Multidisciplinary InvesTIGATION of Transmission to Ease inFLUenza (MITIGATE FLU)”, PIs: Linsey Marr, Seema Lakdawala, Emily Martin, **Krista Wigginton**, Co-PIs: Herek Clack, Adam Luring, Michael Hayashi, Andrew Hashikawa, Melissa Duhaime (\$1,233,412).
3. Environmental Protection Agency (2021-2024), \$1,239,976, “Developing surrogate-based crediting frameworks for virus control through water recycling facilities,” PI: **Krista Wigginton**, Co-PIs: Daniel Gerrity, Charles Haas, Brian Pecson (\$619,228).
4. Michigan Department of Health and Human Services (2021-2022), \$1,353,562, “COVID: Wastewater based epidemiology focused on wastewater treatment plants in Michigan,” PIs: **Krista Wigginton** and Kevin Bakker (\$416,374).
5. Michigan Department of Health and Human Services, Centers for Disease Control and Prevention (2022-2023), \$4,375,000, “FY22-Project CD (ELCEDE-UM) University of Michigan Genomic Surveillance and Epidemiology Partnership,” PIs: Marisa Eisenberg, Betsy Foxman, Adam Luring, Emily Martin, Lona Mody, Evan Snitkin, Jenna Wiens, **Krista Wigginton**, Robert Woods, Jon Zelner (\$59,859).
6. CareEvolution, Inc, (2021-2022), \$47,369, “Understanding COVID-19 dynamics from wastewater based epidemiology,” PIs; Kevin Bakker and Krista Wigginton (\$10,000).
7. EGLE (2020-2021), \$1,353,562, “COVID: Wastewater based epidemiology focused on wastewater treatment plants in Michigan,” PIs: **Krista Wigginton** and Kevin Bakker (\$676,781).
8. National Science Foundation, (2020-2023) \$349, 999, “Predictive models for determining the fate of nonculturable and difficult-to-culture viruses in

- disinfection processes,” PI: **Krista Wigginton**.
9. National Science Foundation, (2020-2021), \$68,591, “Rapid: Coronavirus persistence, transmission, and circulation in the environment,” PI: **Krista Wigginton**, Co-PIs; Alexandria Boehm, Craig Criddle.
  10. Water Research Foundation, “DPR-3: Feasibility of Collecting Pathogens in Wastewater During an Outbreak”, (2020-2021), \$63,000, PI: **Krista Wigginton**.
  11. Hampton Roads Sanitation District, (2019-2020), \$74,562, “Wigginton/Hampton Roads Sanitation District Collaboration on Improved Assessment of Virus Reductions,” PI: **Krista Wigginton**.
  12. University of Michigan College of Engineering (2019-2022) \$2,500,000, “Blue Sky: Remaking Water Infrastructure by Focusing on Microbial Biomes,” PI: Lut Raskin, Co-PIs: Steven Skerlos, Branko Kerkez, Seth Guikema, **Krista Wigginton** (\$400,000).
  13. NSF (2018 – 2019) \$224,982, “STTR Phase I: Protecting Livestock from Airborne Disease Transmission Using Non-thermal Plasma Airstream Disinfection,” PI: Herek Clack, Co-PIs: Krista Wigginton.
  14. National Science Foundation (2017-2021), \$999,089, “RAISE: Neighborhood Environments as Socio-Techno-bio Systems: Water Quality, Public Trust, and Health in Mexico City,” PI: Elizabeth Roberts, Co-PIs: Branko Kerkez, Brisa Sanchez, **Krista R. Wigginton**, Martha M. Tellez-Rojo (\$161,844).
  15. Water Reuse Research Foundations (2017-2019), \$349,794, “Methods for Measurement of Infectivity and Concentration of Pathogens,” PI: **Krista Wigginton**, Co-PIs: Tamar Kohn, Brian Pecson, Christiane Wobus (\$194,194).
  16. National Science Foundation (2016-2020), \$2,999,968 “INFEWS/T3: Advancing Technologies and Improving Communication of Urine-Derived Fertilizers for Food Production Within a Risk-Based Framework,” PI: Nancy Love, Co-PIs: Diana Aga, Charles Bott, Abe Noe-Hayes, **Krista Wigginton** (\$500,000).
  17. Water Reuse Research Foundations (2015-2016), \$50,000, “Review of Non-Culture-Based Methods for Pathogen Monitoring in Potable Reuse,” PI: **Krista Wigginton**, Co-PIs: Michael Dodd, Tamar Kohn, Brian Pecson (\$20,000).
  18. USDA (2016-2018), \$999,921, “Evaluating Different Manure Management Practices in Controlling Spread of Antibiotic Resistance,” PI: Diana Aga, Co-PIs: Gary Felton, Curt Gooch, Lauren Sassourbe, Lut Raskin, Stephanie Lansing, Krista Wigginton.
  19. National Science Foundation (2015-2020), \$3,600,000, “PIRE: Halting



Environmental Antimicrobial Resistance Dissemination (HEARD),” PI: Peter Vikesland, Co-PIs: Diana Aga, Pedro Alvarez, Amy Pruden, **Krista Wigginton** (\$417,809).

20. National Science Foundation EAGER (2014-2015), \$63,405 “Dose-Response Disinfection Curves for Human Norovirus with Novel Mouse Model,” PI: **Krista Wigginton**, Co-PIs: Christiane Wobus, Tamar Kohn (\$23,405).
21. University of Michigan UMOR MCUBED (2015), \$60,000 “Antibiotic Resistance Gene Degradation Mechanisms,” PI: Terese Olson, co-PIs: Carl Marrs, **Krista Wigginton**.
22. UM Third Century Initiative Global Challenges Grant (2014), \$2,993,832 “REFRESCH: Researching Fresh Solutions to the Energy/Water/Food Challenge in Resource-Constrained Environments,” PI: Johannes Schwank, Co-PIs: Donald Scavia, Mark Barteau, Andrew Hoffman, Galen Fisher, Shelie Miller, Peter Adriaens, Aileen Huang-Saad, Eric Hill, Joseph Trumpey, Nancy Love, Lutgarde Raskin, Roy Clarke, Steve Skerlos, James Diana, Andrew Tadd, **Krista Wigginton** (\$50,000).
23. University of Michigan UMOR Faculty Grant (2014), \$15,000 “Seasonal variability of respiratory viruses in wastewater treatment processes”, **PI: Krista Wigginton**.
24. Environmental Protection Agency Star Grant for Nutrient Management (2014-2016), \$2,200,000, “WERFs National Center for Resource Recovery and Nutrient Management” Lead PI: WERF, Co-PIs: **Krista Wigginton** (\$330,034), Craig Frear, David Stensel, David Sedlak, Kartik Chandran.
25. National Science Foundation CAREER Award (2014-2019), \$400,000, “Wastewater Treatment as a Conduit and Control of Emerging Respiratory Viruses in the Environment,” PI: **Krista Wigginton**.
26. University of Michigan Water Center Grant (2014-2015), \$250,000, “Microplastics in the Great Lakes: Towards establishing a long-term multidisciplinary research platform to assess the impact of microplastics on Laurentian Great Lakes ecosystem health,” Lead PI: Melissa Duhaime, Co-PIs: **Krista Wigginton** (\$34,831), Dmitry Beletsky
27. University of Michigan Water Center Grant (2013-2014), \$50,000, “High resolution orbitrap mass spectrometry for expanding U-M freshwater research,” PI: **Krista Wigginton**.
28. National Science Foundation BRIGE Award (2012-2014), \$174,365, “A reductionist approach to enterovirus disinfection,” **PI: Krista Wigginton**.

29. UMD Advance Seed Grant (2012-2013), \$20,000, “Multiscale characterization of virus adsorption onto fomites,” PI: **Krista Wigginton** (\$10,000), Co-PI: Sylvina Matysiak.
30. District of Columbia Water and Sewer Authority (2011-2012), \$24,277, “Transition from a Class B to a Class A Biosolids Treatment Train at the Blue Plains Wastewater Treatment Plant: Impact on Emerging Pathogen Concentrations,” PI: **Krista Wigginton**.
31. National Science Foundation International Postdoctoral Fellowship (2009-2010), \$143,000, “Virus inactivation in sunlight-treated waters: An investigation on the reactions between singlet oxygen ( $^1\text{O}_2$ ) and virus capsid proteins”, PI: **Krista Wigginton**.

**d. Research Fellowships and Awards**

1. University of Michigan College of Engineering Miller Faculty Scholar (2022-2024)
2. University of Michigan College of Engineering Ted Kennedy Family Team Excellence Award for work on UM’s N95 recycling program for COVID-19 (2020-2021)
3. The Water Research Foundation Paul L. Busch Award (2018)
4. Virginia Tech Via Department of Civil and Environmental Engineering Outstanding Young Alumni Award (2015).
5. NSF CAREER Award (2014-2019); listed under Contracts and Grants).
6. Borchardt and Glysson Water Treatment Faculty Scholar (2013-present).
7. NSF BRIGE Award (2012; listed under Contracts and Grants).
8. AWWA Academic Achievement Award, Second Place for Best Dissertation (2010).
9. Best Poster Award at the Environmental Sciences: Water Gordon Research Conference (2008).
10. ACS Ellen Gontter Environmental Chemistry Award (2008).
11. Philanthropic Educational Organization (PEO) Scholar Fellowship (2007-2008).
12. National Science Foundation AdvanceVT Ph.D. Fellowship (2007-2008).
13. American Chemical Society Graduate Student Award in Environmental Chemistry (2004).
14. Virginia Tech Department of Civil and Environmental Engineering Via Scholar (2004-2007).
15. National Science Foundation Graduate Research Fellowship (2003-2006).
16. Chi Epsilon National Civil Engineering Honor Society (2003 - present).

**e. Editorships, Editorial Boards, & Reviewing Activities for Journals and Other Learned Publications.**

1. Associate Editor at Environmental Sciences: Water Research & Technology (2018-2022).
2. Reviewer for *Environmental Science and Technology*, *Nature Biotechnology*, *Applied and Environmental Microbiology*, *Journal of Environmental Monitoring*, *Micron*, *Applied Microbiology*, *Biochemistry*, *Water Research*, *Environmental Engineering Science*.
3. Editorial Board of *Chemosphere* (2010-2015).

**3. Teaching, Mentoring, and Advising**

**a. Courses taught in the last five years.**

1. Fall 2022, University of Michigan, Principles of Environmental Engineering (CEE 365), Enrollment = 84.
2. Winter 2022, University of Michigan, Water Process Engineering (CEE 465), Enrollment = 30.
3. Fall 2021, University of Michigan, Environmental Organic Chemistry (CEE 597), Enrollment = 12.
4. Winter 2019, University of Michigan, Environmental Organic Chemistry (CEE 597), Enrollment = 12.
5. Fall 2018, University of Michigan, Environmental Engineering Seminar Series (CEE 880), Enrollment = 68.
6. Winter 2018, University of Michigan, Environmental Engineering Seminar Series (CEE 880), Enrollment = 55.
7. Winter 2017. University of Michigan, Environmental Organic Chemistry (CEE 597), Enrollment = 14.
8. Fall 2016. University of Michigan, Environmental Engineering Principles (CEE 365), Enrollment = 74.
9. Winter 2016. University of Michigan, Physical and Chemical Processes in Water Quality Engineering (CEE 580), Enrollment = 9
10. Fall 2015. University of Michigan, Environmental Engineering Principles (CEE 365), Enrollment = 63.
11. Winter 2015. University of Michigan, Physical and Chemical Processes in Water Quality Engineering (CEE 580), Enrollment = 13.
12. Winter 2014. University of Michigan, Environmental Organic Chemistry (CEE 597), Enrollment = 9.
13. Fall 2013. University of Michigan, Environmental Engineering Principles (CEE 365), Enrollment = 92.
14. Spring 2013. University of Michigan, Environmental Organic Chemistry, (CEE 682),

Enrollment = 12.

15. Fall 2012. University of Maryland, Introduction to Environmental Engineering, (ENCE 310), Enrollment = 39.
16. Spring 2012. University of Maryland, Environmental Microbiology: Waterborne Pathogens (ENCE 688N). Enrollment = 12.
17. Fall 2011. University of Maryland, Introduction to Environmental Engineering (ENCE 310). Enrollment = 48.
18. Spring 2011. University of Maryland, Introduction to Environmental Engineering (ENCE 310). Enrollment = 62.

**b. Advising:**

- a. Undergraduates.** Katherine Graham (2014-2016), Lauren Eastes (2014-2016), Salonia Dagli (2014-2016), Mariah Gnegy (2015-2016), Ishi Keenum (2015-2017), John Hartert (2015-2017), Dylan Raye-Leonard (2017- 2019), Ariel Roy (2018 – 2020), Michael Mata (2018 – 2020), Brianna Hansen (2020-2021), Yan Du (2018 – 2019), Jessica Zhang (2021 – 2022), Anna Kilts (2022 - 2023), Sterling Knight (2022 – 2023), Bradley Gatov, Melissa Arreola, Lexi Bandy, Kaming Leung, Avery Sanchez.
- b. Masters.** Eric Liang (2013, UMD), Joel Donham (2013, UMD), HK Stephens (2015, UMD), Yinyin Ye (2014), Brianna Juhrend (2014), Miles Ellenberg (2015), Joy Jeyaratnam (2015) Pin Chang (2016), Devibaghya Thirunarayanan (2016), Enrique Rodriguez (2018), Ernesto Paz-Martinez (2019), Kaitlyn Chin (2021), Peter Arts (2021), Jinyi Cai (2021), Byron Banman (2022).
- c. Ph.D.** Zhong Qiao (2018), Yinyin Ye (2018), Heather Goetsch (2018), Emily Crosse (2021), Nicole Rocky (2020), Kathryn Langenfeld (2022), Enrique Rodriguez (2022), Ernesto Paz Martinez (expected 2023), Lucinda Li (expected 2023), Kate Harrison (expected 2024), Peter Arts (expected 2024) Mira Chaplin (expected 2025), Delaney Snead (expected 2026).
- d. Postdoctoral Researchers.** Rebecca Lahr (2014- 2015), William Tarpeh (2017-2018), Bridget Hegarty (2019 – 2022), Alex Szczuka (2020 – 2022), Ke Zhang (2022 – present), Felipe de Paula (2022 – present).
- e. Research Scientists.** Michelle Ammerman (2021 – present).

**c. Guest Lectures**

- a. “What is Biological Water Quality,” September 2020, CEE 501.
- b. “Water Quality and Pathogen Detection,” January 2018, Water Process Engineering, CEE 465.
- c. “Environmental Viruses”, February 19, 2014, Microbiology 415: Virology.
- d. “Overview of the Environmental Engineering Field,” March 18, 2015, CEE 200.

**d. Teaching Initiatives and Awards**

- a. ASCE ExCEED Teaching Fellow (2014)
- b. Developed teaching module on peer review for graduate and undergraduate

- environmental engineering courses (2015)
- c. MSC Case Study developed for urine diversion technologies (2018)
  - d. University of Michigan ASCE Student Chapter Professor of the Year Award (2019)

#### **4. Service**

##### **a. Professional**

##### **i. Reviewing activities for agencies**

1. NSF Environmental Engineering Unsolicited Panels (2012, 2013), NSF Environmental Engineering CAREER Panel (2014, 2020).
2. NIH R21 Proposal Panel (2020).
3. EPA Star Panel (2012)
4. US-Israel Agricultural Research & Development Fund external reviewer
5. Swiss NSF external reviewer

##### **ii. Other non-University committees and panels**

1. National Academies' Committee on Community Wastewater-based Infectious Disease Surveillance, 2022 – present.
2. 2023 Borchardt Conference Organizing Committee, 2022-2023.
3. Water Research Foundation Paul Busch Award Selection Committee, 2022.
4. Panelist for NAE Web Conference titled “Wastewater Monitoring for COVID-19 Disease Surveillance”, May 2020.
5. Co-organizer of NSF-sponsored workshop titled “Predictive Intelligence for Pandemic Prevention (PIPP)”, February 2021.
6. Working group member of Water Research Foundation International Summit on Environmental Surveillance of COVID-19 Indicators in Sewersheds.
7. AEESP Membership and Demographics Committee member (2014-2020), chair (2018-2019).
8. Session organizer for the Japan America NAE Frontiers of Engineering 2018 meeting. Session title “Water Treatment Revolution”.
9. Session chair at Gordon Research Conference on Disinfection Byproducts (July 2017).
10. Organized and conducted workshop titled “NSF CAREER Proposals” at AEESP Conference, June 2019.
11. Member of American Water Works Association Joint Section Research Committee (2015-present)

12. Symposium organizer along with K. Bibby, "Detection and Fate of Health-Related Microorganisms in Water," August 2015, Fall ACS National Meeting, Boston, MA.
13. AEESP Reviewer for Faculty Application Packages 2014, 2015
14. Poster judge at 2014 GRC Environmental Science: Water
15. Senior Discussion Leader at 2014 GRS Environmental Science: Water
16. 2014 Borchardt Conference Planning Committee, 2013-present.
17. Symposium organizer along with M. Dodd, "Innovative Materials and Technologies for Detection and Inactivation of Environmental Pathogens," August 2012, Fall ACS National Meeting, Philadelphia, PA.
18. Panel member for "Academia" session at EPA Star 2011 Star Graduate Conference, September 2011, Washington D.C
19. Symposium organizer along with K. McNeill and T. Kohn, "Degradation of Biomolecules in the Environment," August 2011, Fall ACS National Meeting, Denver, CO.

**b. Campus**

**i. Departmental**

1. Launch Committee of Joshua Jack (2022-2023)
2. Associate Chair of Graduate Studies (2022-present)
3. Master's Chair (2020-2021)
4. Executive Committee (2020-2021)
5. Strategic Planning Committee (2017-2019)
6. Faculty Search Committee (2020-2021)
7. Facilities and Research Committee (2017-2019)
8. One-Years Masters Committee (2015).
9. Masters Committee (2014-2017).
10. Graduate Student Committee (2013- 2017).
11. Faculty Search Committee (Spring 2011).
12. Visiting Student Weekend Committee (Spring 2013).
13. Faculty Search Committee (Spring 2012).

**ii. College**

1. CEE Chair Search Committee (2016-2017)
2. Panel Discussion Leader for UM NextProf (May 2015).
3. A. James Clark Hall Steering Committee (2012).

**iii. University**

1. MCIDT Search Committee (2022-2023).
2. Institutional Biosafety Committee (2021-present).
3. Rackham Mental Health & Wellbeing Advocate Program (2022-present)
4. Commencement participation: University of Michigan Marshal for December 2013 Commencement, 2014 Annual Honors Convocation,

December 2017 Commencement, May 2018 Rackham Commencement, May 2019 Rackham Commencement; Platform party for December 2021 Commencement.

5. Guest speaker for Undergraduate Opportunity Program (March 2015).

**c. Outreach**

- i. American Chemical Society's Tiny Matters Podcast titled "Using Wastewater to Track Disease," <https://www.acs.org/pressroom/tiny-matters/tracking-disease-using-wastewater.html>.
- ii. NSF Podcast titled "Monitoring SARS-CoV-2 in Wastewater", [https://www.nsf.gov/news/mmg/mmg\\_disp.jsp?med\\_id=186435&linkId=88982581](https://www.nsf.gov/news/mmg/mmg_disp.jsp?med_id=186435&linkId=88982581), May 2020.
- iii. Organized urine collection outreach on University of Michigan campus to educate students and public on resource recovery from human waste. Details at <http://dme.engin.umich.edu/toilettotable/> (2015).
- iv. Activities focused on students from underrepresented backgrounds
  1. UM College of Engineering representative at Hispanic Professional Engineers National Conference (2015).
  2. Panel Discussion Leader for UM NextProf program focused on graduate students and postdocs interested in academic careers (May 2015).
  3. Participation in hands-on summer research activities focused on underrepresented high school, college, and graduate students.
    - a. College 101 (2013)
    - b. UMD ESTEEM Research Presentation and Lab Tours, (2012).
  4. Instructor volunteer for WitsOn Mentoring Program, an online mentoring forum for female scientists (2012).