

Orin C. Shanks, Senior Research Geneticist in EPA's National Risk Management Research Laboratory

Water Systems Division

[Mailing Address](#)

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Areas of Expertise:

Development, standardization, and implementation of molecular technologies for environmental water quality management and public health risk assessment. Current research activities focus on the identification of host-associated genetic markers of fecal pollution, assessment of environmental antibiotic resistance gene occurrence, development of quantitative real-time PCR technologies, fate and transport of nucleic acids, as well as novel molecular data analysis and visualization approaches. I also provide technical assistance to EPA program offices and regions, states, tribes, and other local groups with an interest in clean and safe waters.

Select Publications:

Coa, Y., M. Sivaganesan, C.A. Kelty, D. Wang, A.B. Boehm, J.F. Griffith, S.B. Weisberg, and O.C. **Shanks** (2018). [A human fecal contamination score for ranking recreational sites using the HF183/BacR287 quantitative real-time PCR method](#). *Water Research*. 128: 148-156.

Wanjugi, P., M. Sivaganesan, A. Korjkic, B. McMinn, C.A. Kelty, E. Rhodes, M. Cyterski, R. Zepp, K. Oshima, E. Stachler, J. Kinzelman, S.A. Kurdas, M. Citriglia, F. Hsu and O.C. **Shanks** (2018). [Incidence of Somatic and F+ Coliphage in Great Lake Basin Recreational Waters](#). *Water Research*. 140:200-210.

Mayer, R.E., G.H. Resicher, S.K. Ixenmaier, J.E. Ebdon, R. Linke, L. Egle, W. Ahmed, A.R. Blanche, D. Byamukama, M. Savill, D. Mushi, H.A. Cristobal, J. Edge, T. Edge, M.A. Schade, A. Aslan, Y. Brooks, R. Sommer, Y. Masago, M.I. Sato, H. Taylor, J.B. Rose, S. Wuertz, O.C. **Shanks**, R.L. Mach, M. Zessner, and A.H. Farnleitner (2018). [Global Distribution of Human-Associated Fecal Genetic Markers in Reference Samples from Six Continents](#). *Environmental Science & Technology*. 52:5076-5084.

Stachler, E., C. Kelty, M. Sivaganesan, X. Li, K. Bibby, and O.C. **Shanks** (2017). [Quantitative CrAssphage PCR assays for human fecal pollution measurement](#). *Environmental Science & Technology Letters*. 51:9146-9154.

Wanjugi, P., M. Sivaganesan, A. Korajkic, C.A. Kelty, B. McMinn, R. Ulrich, V.J. Harwood, and O.C. **Shanks** (2016). [Differential decomposition of bacterial and viral fecal indicators in common human pollution types](#). *Water Research*. 15:591-601.

Shanks, O.C., C.A. Kelty, R. Oshiro, R.A. Haugland, T. Madi, L. Brooks, K.G. Field, and M. Sivaganesan (2016). [Data acceptance criteria for standardized human-associated fecal source identification quantitative real-time PCR methods](#). *Applied and Environmental Microbiology*. 82:2773-2782.

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Education:

- PhD., Oregon State University, Corvallis, OR; Genetics, 2003
- M.A., University of Wyoming, Laramie, WY; Anthropology, 1997
- B.S., University of Wyoming, Laramie, WY; Zoology and Physiology, 1995

Professional Experience:Workgroup and Project Leads

- EPA Research Action Plan Safe and Sustainable Water Research Task Leader for 3.02a Research to develop and improve human health Ambient Water Quality Criteria for pathogens and other contaminants (2015-present).
- United Nations Educational, Scientific and Cultural Organization, Global Water Pathogen Project. Indicator and Source Tracking Marker team member (2014-present).

Committees and Affiliations

- University of North Carolina Water Microbiology Advisory Board member (2018-present)
- State of Washington Water Commission Board Technical Oversight Committee member for implementation of Microbial Source Tracking (2017-present).
- International Water Association, Health-Related Water Microbiology Advisory Board Member (2011-2017).
- Courtesy Faculty Member, Department of Microbiology, Oregon State University (2012-present).

Honors and Awards:

- U.S. EPA Bronze Medals for Commendable Service (2014, 2015, and 2017)
- Federal Laboratory Consortium for Technology Transfer Excellence in Technology Transfer Award for EPA Microbial Source Tracking Technology Transfer (2016)
- U.S. EPA Office of Research & Development Honor Award (2014)
- Scientific and Technical Achievement Awards: Level 1 (2010) and Level II (2014)

Patents

- **Shanks**, O.C. and Hyatt Green (2017). Host-Associated DNA Sequences, Primers, and Probes for PCR-Based Identification of Dog Fecal Pollution Sources. United States Patent No: 9,816,141.
- **Shanks**, O.C., E. Stachler, and K. Bibby (2016). Cross-Assembly Phage DNA Sequences, Primers, and Probes for PCR-Based Identification of Human Fecal Pollution Sources. Patent Application No: 15/530,122.

[Science Matters: Microbial Source Tracking – How did that get in there?](#)