VALERIE J. HARWOOD
CURRICULUM VITAE: 2024

University of South Florida
Department of Integrative Biology, SCA 110
4202 East Fowler Ave., Tampa, Florida 33620

Telephone: (813) 974-6229

e-mail: vharwood@usf.edu

EDUCATION

1992 **Ph.D.** Biomedical Sciences. Old Dominion University & Eastern Virginia Med School
1983 **B.A.** in Biology. State University of New York at Plattsburgh
1980 **B.A.** in French**.** Iowa State University

ACADEMIC POSITIONS

2014 - Chair and Professor, USF Department of Integrative Biology
2010 - Professor, University of South Florida Department of Integrative Biology
2004- 2010 Associate Professor, University of South Florida Department of Biology
1998 - 2004 Assistant Professor, University of South Florida Department of Biology
1995 - 1998 Assistant Professor: University of North Florida Dept. Natural Sciences
1992 - 1995 Postdoctoral: University of Maryland Center of Marine Biotechnology

CONSULTING (Selected)

2019 Coppin-Monroe – *Vibrio vulnificus*
2017 Goldberg-Segalla - *Legionella*
2016-2017 Boehl Stopher and Graves, LLP - MRSA
2014 - U.S. Environmental Protection Agency
2012 - 2013 U.S. Army Corps of Engineers
2005-2010 Motley-Rice LLC – Poultry fecal contamination of Illinois River

HONORS and AWARDS (Since 2013)

2022 American Academy of Microbiology Fellow

2021 American Academy for the Advancement of Science (AAS) Fellow

2019 USF Outstanding Graduate Faculty Mentor Award (Honorable Mention)

2015 USF Outstanding Faculty Award

2014 Fulbright grant with CSIRO, Brisbane, Australia

2014-2015 USF Faculty Senate Vice President

2014 - 2016 American Society for Microbiology Distinguished Lecturer

2013-2018 Fulbright Specialist Roster

2012 Ivan Roth Award for Outstanding Contributions to the Branch; Southeastern

PROFESSIONAL ORGANIZATIONS

2015- International Water Association
2004- Phi Sigma Iota Honor Society
1989 - American Society for Microbiology

FUNDING: AS PRINCIPAL INVESTIGATOR (since 2015)

2022 – 2025. Advanced Microbial Source Tracking and Fecal Source Apportionment. US EPA Gulf of Mexico Program (Agreement MX - 02D18022). **$446,312**

2022-2023. City of Tampa Microbial Source Tracking for Hamilton Creek. City of Tampa. **$60,000**

2021-2023. New Methods to Enhance Fecal Source Detection in Water Bodies by Microbial Source Tracking. Environmental Protection Commission of Hillsborough County. **$50,000.**

2022. Gulf Beaches Study. US Environmental Protection Agency. **$60,142**

2020-2021. Microbial Source Tracking for Selected Water Bodies within Hillsborough County. Hillsborough County Environmental Services. **$75,000.**

2019-2023. Microbial Source Tracking for Consent Order in St Petersburg, FL. City of St. Petersburg. Funded in two increments: $37,500 & 40,000 for a total of **$77,500.**

2019-2020. Microbial Source Tracking in Frenchman's Creek, St. Petersburg, FL. City of St. Petersburg **$34,075.**

2017-2019. Microbial Source Tracking in Salt Creek, St Petersburg, FL. City of St. Petersburg. **$43,800.**

2016-2018. Determining Sources and Risk of Fecal Pollution in Tampa Bay Tributaries. Environmental Protection Commission of Hillsborough County. **$50,000.**

2016. Microbial Source Tracking to Inform the Fecal Bacteria Source Reduction Plan: Reedy Creek Improvement District. Reedy Creek Improvement District. **$13,140.**

2015-2016. Hudson Beach Bacteria Source Assessment - Phase III. Florida High Tech Corridor Industry Seed Grant. **$59,916**

2012-2016. Collaborative Research: Quantifying and Correlating Pathogens and a Poultry Feces Marker Gene in Environmental Waters National Science Foundation. **$166,903** to Harwood (collaboration with J. Weidhaas atWVU).

2014-2015. Microbial Source Tracking to Inform the Fecal Bacteria Source Reduction Plan: Reedy Creek Improvement District (II). Reedy Creek Improvement District. Two increments: **$12,000** and **$40,000**

FUNDING: AS CO-PRINCIPLE INVESTIGATOR (since 2015)

2020 – 2022 Gut Microbiome, Enteric Infections and Child Growth across a Rural Urban Gradient. Natl Inst of Allergy and Infectious Disease. Project role: collaborator with Karen Levy, University of Washington. **$204,037** to Harwood.

2020 – 2022. Standardizing Methods with QA/QC Standards for Investigating the Occurrence and Removal of Antibiotic Resistant Bacteria/Antibiotic Resistance Genes (ARB/ARGs) in Surface Water, Wastewater, and Recycled Water. Water Research Foundation. Project role: co-PI with Amy Pruden, VA Tech. **$62,636** to Harwood.

2018-2019. Critical Barriers to Antibiotic Resistance during Water Reclamation and Reuse. Centers for Disease Control. Project role: co-PI with Amy Pruden, VA Tech. **$88,611** to

Harwood out of total $277,000.

2016-2021. Coastal SEES Collaborative Research: Integration of Human Behavior and Perception into a Risk-based Microbial Water Quality Management Approach. National Science Foundation. Project role: co-P.I. with Mya Breitbart (USF Marine Science). Total award $999,995, **$379,164** to Harwood.

2015 – 2016. EAGER: Fungal Bioleaching for Recovery of Lithium and Cobalt from Spent Lithium-Ion Batteries. National Science Foundation. Project role: co-P.I. with Jeff Cunningham (USF Engineering) $49,998.

REFEREED PUBLICATIONS (<u>selected with emphasis on most recent and highly cited</u>; out of 130 total)

(Students & postdocs supervised by Harwood are bolded; [a] denotes corresponding or senior author;

* denotes papers cited over 100 times (n=33)

2024. Lobos AE, Brandt AM, Gallard-Góngora JF, Korde R, Brodrick E, Harwood VJ*. Persistence of sewage-associated genetic markers in advanced and conventional treated recycled water: implications for microbial source tracking in surface waters. mBio. 2024 Jul 17;15(7):e0065524. doi: 10.1128/mbio.00655-24.

2024. Calarco J, Pruden A, Harwood VJ. Comparison of methods proposed for monitoring cefotaxime-resistant Escherichia coli in the water environment. Appl Environ Microbiol. 2024 May 21;90(5):e0212823. doi: 10.1128/aem.02128-23.

2024. Keenum I, Calarco J, Majeed H, Hager-Soto EE, Bott C, Garner E, Harwood VJ, Pruden A. To what extent do water reuse treatments reduce antibiotic resistance indicators? A comparison of two full-scale systems. Water Res. 2024 Mar 5;254:121425. doi: 10.1016/j.watres.2024.121425.

2023. Korajkic A, McMinn BR, Harwood VJ. The effect of protozoa indigenous to lakewater and wastewater on decay of fecal indicator bacteria and coliphage. Pathogens. 25;12(3):378. doi: 10.3390/pathogens12030378.

2023. **González-Fernández** A, Symonds EM, **Gallard-Gongora JF**, Mull B, Lukasik JO, Rivera Navarro P, Badilla Aguilar A, Peraud J, Mora Alvarado D, Cantor A, Breitbart M, Cairns MR, Harwood VJ[a]. Risk of gastroenteritis from swimming at a wastewater-impacted tropical beach varies across localized scales. Appl Environ Microbiol. 29;89(3):e0103322. doi: 10.1128/aem.01033-22.

2023. Liguori K, **Calarco J**, Maldonado Rivera G, Kurowski A, Keenum I, Davis BC, Harwood VJ, Pruden A. Comparison of Cefotaxime-Resistant *Escherichia coli* and *sul*1 and *intI*1 by qPCR for Monitoring of Antibiotic Resistance of Wastewater, Surface Water, and Recycled Water. Antibiotics (Basel). 2023 Jul 29;12(8):1252. doi: 10.3390/antibiotics12081252.

2023. Milligan EG, **Calarco J**, Davis BC, Keenum IM, Liguori K, Pruden A, Harwood VJ[a]. A Systematic Review of Culture-Based Methods for Monitoring Antibiotic-Resistant

Acinetobacter, *Aeromonas*, and *Pseudomonas* as Environmentally Relevant Pathogens in Wastewater and Surface Water. Curr Environ Health Rep. Jun;10(2):154-171. doi: 10.1007/s40572-023-00393-9.

2022. Davis BC, Keenum I, **Calarco J**, Liguori K, Milligan E, Pruden A, Harwood VJ[a]. Towards the standardization of *Enterococcus* culture methods for waterborne antibiotic resistance monitoring: A critical review of trends across studies. Water Res X. 2022 Nov 19;17:100161. doi: 10.1016/j.wroa.2022.100161.

2022. **Gallard-Gongora J, Lobos A, Conrad JW, Peraud J,** Harwood VJ[a]. An assessment of three methods for extracting bacterial DNA from beach sand. J Appl Microbiol. 132:2990-3000. doi: 10.1111/jam.15423.

2022. **Conrad JW** and Harwood VJ[a]. Sewage promotes *Vibrio vulnificus* growth and alters gene transcription in *Vibrio vulnificus* CMCP6. Microbiol Spectrum. 23;10(1):e0191321. doi: 10.1128/spectrum.01913-21.

2022. Maiga, Y., **Young, S**., Orner, K.D., Mihelcic, J.R., Harwood, V.J. and Ouattara, A.S. Isolation and Assessment of Cyanide Biodegradation Potential of Indigenous Bacteria from Contaminated Soil. Journal of Environmental Protection 13: 716-731. https://doi.org/10.4236/jep.2022.1310046

2022. Liguori K, Keenum I, Davis BC, **Calarco J**, Milligan E, Harwood VJ, Pruden A. Antimicrobial Resistance Monitoring of Water Environments: A Framework for Standardized Methods and Quality Control. Environ Sci Technol. 56:9149-9160. doi: 10.1021/acs.est.1c08918.

2022. Ahmed W, Simpson SL, Bertsch PM, Bibby K, Bivins A, Blackall LL, Bofill-Mas S, Bosch A, Brandão J, Choi PM, Ciesielski M, Donner E, D'Souza N, Farnleitner AH, Gerrity D, Gonzalez R, Griffith JF, Gyawali P, Haas CN, Hamilton KA, Hapuarachchi HC, Harwood VJ, Haque R, Jackson G, Khan SJ, Khan W, Kitajima M, Korajkic A, La Rosa G, Layton BA, Lipp E, McLellan SL, McMinn B, Medema G, Metcalfe S, Meijer WG, Mueller JF, Murphy H, Naughton CC, Noble RT, Payyappat S, Petterson S, Pitkänen T, Rajal VB, Reyneke B, Roman FA Jr, Rose JB, Rusiñol M, Sadowsky MJ, Sala-Comorera L, Setoh YX, Sherchan SP, Sirikanchana K, Smith W, Steele JA, Sabburg R, Symonds EM, Thai P, Thomas KV, Tynan J, Toze S, Thompson J, Whiteley AS, Wong JCC, Sano D, Wuertz S, Xagoraraki I, Zhang Q, Zimmer-Faust AG, Shanks OC. Minimizing errors in RT-PCR detection and quantification of SARS-CoV-2 RNA for wastewater surveillance. Sci Total Environ.;805:149877. doi: 10.1016/j.scitotenv.2021.149877.

2022. Keenum, I, Krista Liguori, **Jeanette Calarco**, Benjamin C. Davis, Erin Milligan, Valerie J. Harwood & Amy Pruden. A framework for standardized qPCR-targets and protocols for quantifying antibiotic resistance in surface water, recycled water and wastewater, Critical Reviews in Environmental Science and Technology, 52:24, 4395-4419, DOI: 10.1080/10643389.2021.2024739

2022. Sivaganesan M, Willis JR, Karim M, Babatola A, Catoe D, Boehm AB, Wilder M, Green H, Lobos A, Harwood VJ, Hertel S, Klepikow R, Howard MF, Laksanalamai P, Roundtree A, Mattioli M, Eytcheson S, Molina M, Lane M, Rediske R, Ronan A, D'Souza N, Rose JB, Shrestha A, Hoar C, Silverman AI, Faulkner W, Wickman K, Kralj

JG, Servetas SL, Hunter ME, Jackson SA, Shanks OC. Interlaboratory performance and quantitative PCR data acceptance metrics for NIST SRM® 2917. Water Res. 2022 Oct 15;225:119162. doi: 10.1016/j.watres.2022.119162.

2021. **Nguyen, Karena H**., Philipp H. Boersch-Supan, Rachel B. Hartman, Sandra Y. Mendiola, Valerie J. Harwood, David J. Civitello, Jason R. Rohr. Interventions can shift the thermal optimum for parasitic disease transmission. Proceedings of the National Academy of Sciences Mar 2021, 118 (11) e2017537118; DOI: 10.1073/pnas.2017537118

2021. Laureano-Rosario AE, **Symonds EM, González-Fernández** A, Lizano R OG, Mora Alvarado D, Rivera Navarro P, Badilla-Aguilar A, Rueda-Roa D, Otis DB, Harwood VJ, Cairns MR, Muller-Karger FE. The relationship between environmental parameters and microbial water quality at two Costa Rican beaches from 2002 to 2017. Mar Pollut Bull. 163:111957.

2021. **González Fernández A**§, **EM Symonds**§, **J F Gallard-Gongora**, B Mull, JO. Lukasik, P Rivera Navarro, A Badilla Aguilar, J Peraud, ML Brown, D Mora Alvarado, M Breitbart, MR Cairns and VJ Harwood[a].. Relationships among microbial indicators of fecal pollution, microbial source tracking markers, and pathogens in Costa Rican coastal waters. Water Research 188: 116507. doi: 10.1016/j.watres.2020.116507

§Co-first authors

2020. **Nieuwkerk DM**, Korajkic A, **Valdespino EL**, Herrmann MP, Harwood VJ[a]. Critical review of methods for isothermal amplification of nucleic acids for environmental analysis. J Microbiol Methods. 179:106099.

2020. **Lobos A**, Harwood VJ, Scott KM, Cunningham JA. Tolerance of three fungal species to lithium and cobalt: Implications for bioleaching of spent rechargeable Li-ion batteries. J Appl Microbiol. 2021 Aug;131(2):743-755. doi: 10.1111/jam.14947. Epub 2021 Jan 9. PMID: 33251646.

2020. Korajkic A, McMinn BR, Staley ZR, Ahmed W, Harwood VJ[a]. Antibiotic-Resistant *Enterococcus* Species in Marine Habitats: A Review. Curr Opin Environ Sci Health. 2020 Aug 1;19:92-100.

2019. **Young S**, Rohr JR, Harwood VJ[a]. Vancomycin resistance plasmids affect persistence of *Enterococcus faecium* in water. Water Res. 2019 Dec 1;166:115069. doi: 10.1016/j.watres.2019.115069. Epub 2019 Sep 7.

2019. Korajkic A, P Wanjugi, L Brooks, Y Cao and VJ Harwood[a]. Persistence and decay of fecal microbiota in aquatic habitats. Microbiol and Molec Biol Rev. 83(4) pii: e00005-19. doi: 10.1128/MMBR.00005-19. Print 2019 Nov 20.

2019. Weiskerger CJ, Brandão J, Ahmed W, Aslan A, Avolio L, Badgley BD, Boehm AB, Edge TA, Fleisher JM, Heaney CD, Jordao L, Kinzelman JL, Klaus JS, Kleinheinz GT, Meriläinen P, Nshimyimana JP, Phanikumar MS, Piggot AM, Pitkänen T, Robinson C, Sadowsky MJ, Staley C, Staley ZR, Symonds EM, Vogel LJ, Yamahara KM, Whitman RL, Solo-Gabriele HM, Harwood VJ[a]. Impacts of a changing earth on microbial dynamics and human health risks in the continuum between beach water and sand. Water Res. 162:456-470

2019. **Conrad JW**, Harwood VJ[a]. Comparison of DNA methylation in *Vibrio vulnificus* cells

grown in human serum with those grown in seawater. Microbiol Resour Announc. Jul 18;8(29). pii: e00419-19

2019. **Senkbeil JK**, Ahmed W, **Conrad J**, Harwood VJ[a]. Use of *Escherichia coli* genes associated with human sewage to track fecal contamination source in subtropical waters. Sci Total Environ. 686:1069-1075.

2019. Zhang Q, **Gallard J**, Wu B, Harwood VJ, Sadowsky MJ, Hamilton KA, Ahmed W. Synergy between quantitative microbial source tracking (qMST) and quantitative microbial risk assessment (QMRA): A review and prospectus. Environ Int 130:104703.

2019. Korajkic A, McMinn BR, Ashbolt NJ, Sivaganesan M, Harwood VJ, Shanks OC. Extended persistence of general and cattle-associated fecal indicators in marine and freshwater environment. Sci Total Environ. 650(Pt 1):1292-1302. DOI: 10.1016/j.scitotenv.2018.09.108

2018. Korajkic A, McMinn BR, Harwood VJ. Relationships between microbial indicators and pathogens in recreational water settings. Int J Environ Res Public Health. 15(12). doi: 10.3390/ijerph15122842*

2018. Ahmed, W., Q. Zhang, **A. Lobos, J. Senkbeil**, M. J. Sadowsky, V.J. Harwood, N. Saeidi, O. Marinoni, S.Ishii. Precipitation Influences Pathogenic Bacteria and Antibiotic Resistance Genes Abundance in Storm Drain Outfalls in Coastal Sub-Tropical Waters. Environment International 116:308-318.

2018. **Nguyen KH,** Senay C**, Young S, Nayak B, Lobos A, Conrad J**, Harwood VJ. Determination of wild animal sources of fecal indicator bacteria by microbial source tracking (MST) influences regulatory decisions. Water Res. 144:424-434.

2018. Symonds EM, **Nguyen KH**, Harwood VJ, Breitbart M. Pepper mild mottle virus: A plant pathogen with a greater purpose in (waste)water treatment development and public health management. Water Res. 144:1-12.

2018. Ahmed W, Hamilton KA, **Lobos A**, Hughes B, Staley C, Sadowsky MJ, Harwood VJ. Quantitative microbial risk assessment of microbial source tracking markers in recreational water contaminated with fresh untreated and secondary treated sewage. Environ Int. 117:243-249.

2018. Ahmed W, **Lobos A, Senkbeil J, Peraud J, Gallard J**, Harwood VJ. Evaluation of the novel crAssphage marker for sewage pollution tracking in storm drain outfalls in Tampa, Florida. Water Res.131:142-150.

2018. Staley C, Kaiser T, **Lobos A**, Ahmed W, Harwood VJ, Brown CM, Sadowsky MJ. Application of SourceTracker for Accurate Identification of Fecal Pollution in Recreational Freshwater: A Double-Blinded Study. Environ Sci Technol. 52:4207-4217.

2018. Teaf CM, Flores D, Garber M, Harwood VJ. Toward Forensic Uses of Microbial Source Tracking. Microbiol Spectr. 2018 Jan;6(1). doi: 10.1128/microbiolspec.EMF-0014-2017

2017. Harwood, VJ, Shanks, O., Korajkic, A., Verbyla, M., Ahmed, W. and Iriate, M. General and host-associated bacterial indicators of fecal pollution. In: J.B. Rose and B. Jiménez-Cisneros, (eds) Global Water Pathogens Project. http://www.waterpathogens.org (A.Farnleitner, and A. Blanch (eds) Part 2 Indicators and Microbial Source Tracking

Markers) http://www.waterpathogens.org/book/bacterial-indicators Michigan State University, E. Lansing, MI, UNESCO.

2017. Mantha S, Anderson A, Acharya SP, Harwood VJ, Weidhaas J. Transport and attenuation of *Salmonella enterica*, fecal indicator bacteria and a poultry litter marker gene are correlated in soil columns. Sci Total Environ. 598:204-212.

2017. Kirs M, Kisand V, Wong M, Caffaro-Filho RA, Moravcik P, Harwood VJ, Yoneyama B, Fujioka RS. Multiple lines of evidence to identify sewage as the cause of water quality impairment in an urbanized tropical watershed. Water Res. 116:23-33.

2017. Symonds EM, **Young S**, Verbyla ME, McQuaig-Ulrich SM, Ross E, Jiménez JA, Harwood VJ, Breitbart M. Microbial source tracking in shellfish harvesting waters in the Gulf of Nicoya, Costa Rica. Water Res. 2017 Jan 3;111:177-184.

2016. Kirs M, Caffaro-Filho RA, Wong M, Harwood VJ, Moravcik P, Fujioka RS.Human-Associated *Bacteroides* spp. and Human Polyomaviruses as Microbial Source Tracking Markers in Hawaii. Appl Environ Microbiol. 2016 82(22):6757-6767.

2016. Wanjugi P, Sivaganesan M, Korajkic A, Kelty CA, McMinn B, Ulrich R, Harwood VJ, Shanks OC. Differential decomposition of bacterial and viral fecal indicators in common human pollution types. Water Res. 105:591-601. doi: 10.1016/j.watres.2016.09.041.

2016. **Wanjugi** P, Fox GA, Harwood VJ[a]. The Interplay Between Predation, Competition, and Nutrient Levels Influences the Survival of Escherichia coli in Aquatic Environments. Microb Ecol. 72:526-37. doi: 10.1007/s00248-016-0825-6.

2016. **Young S,** Nayak B, Sun S, Badgley BD, Rohr JR, Harwood VJ[a]. 2016. Vancomycin-Resistant Enterococci and Bacterial Community Structure following a Sewage Spill into an Aquatic Environment. Appl Environ Microbiol. 2016 Aug 30;82(18):5653-60.

2016. Ahmed W, B Hughes and VJ Harwood. Current status of marker genes of *Bacteroides* and related taxa for identifying sewage pollution in environmental waters. Water: 8:231; doi:10.3390/w8060231.

2016. Li X, Harwood VJ, **Nayak B**, Weidhaas JL. Ultrafiltration and Microarray for Detection of Microbial Source Tracking Marker and Pathogen Genes in Riverine and Marine Systems. Appl Environ Microbiol. 82(5):1625-35.

2016. Ahmed W, Harwood VJ, **Nguyen K**, Young S, Hamilton K, Toze S. Utility of *Helicobacter* spp. associated GFD markers for detecting avian fecal pollution in natural waters of two continents. Water Res. 88:613-22.

2016. Haugland RA, Siefring S, Varma M, Oshima KH, Sivaganesan M, Cao Y, Raith M, Griffith J, Weisberg SB, Noble RT, Blackwood AD, Kinzelman J, Anan'eva T, Bushon RN, Stelzer EA, Harwood VJ, **Gordon KV**, Sinigalliano C. Multi-laboratory survey of qPCR enterococci analysis method performance in U.S. coastal and inland surface waters. J Microbiol Methods. 123:114-25.

2015. **Staley ZR**, Harwood VJ, Rohr JR. A synthesis of the effects of pesticides on microbial persistence in aquatic ecosystems. Crit Rev Toxicol. 2015 Nov;45(10):813-36.

2015. Li X, Harwood VJ, **Nayak B**, **Staley C**, Sadowsky MJ, Weidhaas J. A novel microbial source tracking microarray for pathogen detection and fecal source identification in environmental systems. Environ Sci Technol. 49:7319-29.

2015. **Nayak B**, Weidhaas J, Harwood VJ[a]. LA35 Poultry fecal marker persistence is correlated with that of indicators and pathogens in environmental waters. Appl Environ Microbiol. 81:4616-25.

2015. **Chase E, Young S,** Harwood VJ[a]. Sediment and Vegetation as Reservoirs of Vibrio vulnificus in the Tampa Bay Estuary and Gulf of Mexico. Appl Environ Microbiol. 81:2489-94.

2015. Solo-Gabriele H, Harwood VJ, João C. Brandão et al. Beach sand and the potential for infectious disease transmission: observations and recommendations. Journal of the Marine Biological Association of the United Kingdom. 96:101-120

2015. Ahmed W, Harwood VJ, Gyawali P, Sidhu JP, Toze S. Concentration methods comparison for quantitative detection of sewage-associated viral markers in environmental waters. Appl Environ Microbiol. 81:2042-49

2015. Weidhaas J, Mantha S, Hair E, **Nayak B**, Harwood VJ. Evidence for extra-intestinal growth of *Bacteroidales* originating from poultry litter. Appl Environ Microbiol. 81:196-202.

2014. **Wanjugi P** and Harwood VJ[a]. Protozoan predation is differentially affected by motility of enteric pathogens in water vs. sediments. Microb Ecol. 2014 Nov;68(4):751-60.

2014. R.L. Whitman, V. J. Harwood, T. A. Edge, M. B. Nevers, M. Byappanahalli, K. Vijayavel, J. Brandão, M. J. Sadowsky, E. W. Alm, A. Crowe, D. Ferguson, Z. Ge, E. Halliday, J. Kinzelman, G. Kleinheinz, K. Przybyla-Kelly, C. Staley, Z. Staley, H. M. Solo-Gabriele. Microbes in beach sands: integrating environment, ecology and public health. Reviews in Environmental Science and Bio/Technology 13: 329-368.*

2014. Weidhaas J, Garner E, Basden T, Harwood VJ. Run-off studies demonstrate parallel transport behaviour for a marker of poultry fecal contamination and *Staphylococcus aureus*. J Appl Microbiol. 117:417-29.

2014. **Staley C** and Harwood VJ[a]. Differential expression of a sodium-phosphate cotransporter among *Vibrio vulnificus* strains. Microb Ecol. 2014 Jan;67(1):24-33

2014. Oliver DM, van Niekerk M, Kay D, Heathwaite AL, Porter J, Fleming LE, Kinzelman JL, Connolly E, Cummins A, McPhail C, Rahman A, Thairs T, de Roda Husman AM, Hanley ND, Dunhill I, Globevnik L, Harwood VJ, Hodgson CJ, Lees DN, Nichols GL, Nocker A, Schets C, Quilliam RS. Opportunities and limitations of molecular methods for quantifying microbial compliance parameters in EU bathing waters. Environ Int. 4;64C:124-128

2014. Ryu H, Elk M, Khan IU, Harwood VJ, Molina M, Edge TA, Domingo JS. Comparison of two poultry litter qPCR assays targeting the 16S rRNA gene of *Brevibacterium* sp. Water Res. 1;48:613-21.

2014. Harwood VJ[a], **Staley C, Badgley BD**, Borges K, **Korajkic A**. Microbial source tracking markers for detection of fecal contamination in environmental waters: relationships to pathogens and human health outcomes. FEMS Microbiol Rev. 38:1-40*

2013. **Korajkic A, Wanjugi P,** Harwood VJ. Indigenous microbiota and habitat influence *Escherichia coli* survival more than sunlight in simulated aquatic habitats. Appl Environ Microbiol. 79: 5329-5337

2013. **Staley ZR, Chase E**, Mitraki C, Crisman TL, Harwood VJ[a]. Microbial water quality in freshwater lakes with different land use. J Appl Microbiol. 115:1240-1250.

2013. Harwood VJ[a], Boehm AB, Sassoubre LM, Vijayavel K, Stewart JR, Fong TT, Caprais MP, Converse RR, Diston D, Ebdon J, Fuhrman JA, Gourmelon M, Gentry-Shields J, Griffith JF, Kashian DR, Noble RT, Taylor H, Wicki M. Performance of viruses and bacteriophages for fecal source determination in a multi-laboratory, comparative study. Water Res. 47:6929-43

2013. Korajkic A, McMinn BR, Harwood VJ, Shanks OC, Fout GS, Ashbolt NJ. Differential decay of enterococci and *Escherichia coli* originating from two fecal pollution sources. Appl Environ Microbiol. 79:2488-92.

2013. T. J. Lynn, **P. Wanjugi**, V. J. Harwood, S. J. Ergas. Dynamic Performance of Biosand Filters. J Am Waterworks Assoc. 105:E587-E595

2013. **K.V. Gordon,** M. Brownell, S. Wang, J.E. Lepo, J.A. Mott, R.R. Nathaniel, M. Kilgen, K.N. Hellein, E. Kennedy, V. .J Harwood[a]. Relationship of human-associated microbial source tracking markers with enterococci in Gulf of Mexico waters. Water Research. 47:996-1004.

2013. **P. Wanjugi** and V.J. Harwood[a]. The influence of predation and competition on the survival of commensal and pathogenic fecal bacteria in aquatic habitats. Env. Microbiol. 15:517-26

2013. **C. Staley, E. Chase** and V.J. Harwood[a]. Detection and differentiation of *Vibrio vulnificus* and *V. sinaloensis* in water and oysters of a Gulf of Mexico estuary.Environ Microbiol. 15:623-33.

2012. **E. Chase, C.M. Staley**, J. Hunting and V.J. Harwood[a]. Microbial source tracking to identify human and ruminant sources of fecal pollution in an ephemeral Florida river. J. Appl. Microbiol. 113:1396-406

2012. **C. M. Staley, K.V. Gordon**, M.E. Schoen and V.J. Harwood[a]. Performance of two human-associated microbial source tracking qPCR methods in various Florida water types and implications for microbial risk assessments. Appl. Environ. Microbiol. 78:7317-26.*

2012. M. Byappanahali, M.N. Nevers, A. Korajkic, **Z. Staley** and V.J. Harwood[a]. Enterococci in the environment. Mol. and Microbiol. Rev.76:685-706. DOI:10.1128/MMBR.00023-12 *

2012. **C.M. Staley,** K.H. Reckhow, J. Lukasik and V.J. Harwood[a]. Assessment of sources of human pathogens and fecal contamination in a Florida freshwater lake. Water Res. 46:5799-812.

2012. **Z.R. Staley, J.K. Senkbeil**, J.R. Rohr and V.J. Harwood[a]. Lack of direct effects of agrochemicals on zoonotic pathogens and fecal indicator bacteria. Appl Environ Microbiol. 2012 Nov;78(22):8146-50.

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2023. Key Reports:

2023. Liguori, K., I. Keenum, B. Davis, E. Milligan, L. S. Heath, A. Pruden, J. Calarco, and V. J. Harwood. 2023. Standardizing Methods with QA/QC Standards for Investigating the Occurrence and Removal of Antibiotic Resistant Bacteria/Antibiotic Resistance Genes

(ARB/ARGs) in Surface Water, Wastewater, and Recycled Water. Denver, CO: The Water Research Foundation Project 5052. 239 pp. ISBN: 978-1-60573-619-8.

2011. V.J. Harwood. Validation of Rapid Methods for Enumeration of Markers for Human Sewage Contamination in Recreational Waters. WERF Report PATH3C09. Water Environment Research Foundation, Alexandria, VA.

2009. V.J. Harwood, A.D. Levine and G.A. Fox. Collecting, Exploring, and Interpreting Microbiological Data Associated with Reclaimed Water Systems. Report WRF-04-012. The Water Reuse Foundation, Alexandria, VA.

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2004. A.C. Cannons and V.J. Harwood. Sensor technology for water quality monitoring: fiber optic biosensor. Report 2004-07-31.Water Environment Research Foundation, Alexandria, VA.

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2016. Suzanne Young and V.J. Harwood. How do antibiotic-resistant bacteria get into the environment? The Conversation Sept 21, 2016. https://theconversation.com/how-do-antibiotic-resistant-bacteria-get-into-the-environment-63856

2009. **Z. R. Staley, C. Staley,** C. Wapnick and V. J. Harwood. A weight of evidence approach allows more accurate assessment of sources of fecal indicator bacteria in surface waters. Water Environment Federation TMDL Conference Aug 9-12, 2009, Minneapolis, Minn.

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2007. C.M. Wapnick, **A. Korajkic** and V.J. Harwood. Application of Microbial Source Tracking (MST) Methods in Assessment of the Sources of Fecal Pollution in Tributaries 9th Biennial Conference on Stormwater Research and Watershed Management, May 2-3, 2007 Orlando, FL. Published online: http://www.stormwater.ucf.edu/conferences/9thstormwaterCD/documents/ApplicationsanddDevelopment.pdf

2007. T. Younos, J. Falkinham and V.J. Harwood. Pathogens in Natural and Engineered Water Systems: Emerging Issues. Water Resources IMPACT 9:11-14.

2005. V.J. Harwood, T. Edge, D. Stoeckel, M. Molina and M. Jenkins. Assumptions and limitations of MST methods. ***In*** USEPA Guide Document on Microbial Source Tracking. United States Environmental Protection Agency, Cincinnati, OH. EPA/600/R-05/064

2005. V.J. Harwood and D.V. Lim. Real-Time Detection of Human Pathogens in the Guana-Tolamato-Matanzas National Estuarine Research Reserve. NOAA/UNH Cooperative Institute for Coastal and Estuarine Environmental Technology (CICEET).

2003. A.D. Levine, T.M. Scott, V.J. Harwood and J.B. Rose. Keeping the bugs at bay. Water Environ. Technol. 15:63-66.

INVITED SPEAKER (Since 2015)

2023. What's in Your Water? Using Microbial DNA to Identify Pollution Sources in Surface Water. USF Environmental Engineering March 24

2022. New Findings on Antibiotic Resistance in Built and Natural Aquatic Habitats. US EPA Office of Research and Development, Cincinnati, OH. Nov 8

2022. A 'Whodunit' Case at the Beach? Tracking Sources of Fecal Contamination in Water. Trailblazer Series, USF College of Arts and Sciences. April 13.

2021. Getting Around the Recycled Water Issue: Using *E. coli* H8 as a Viable Marker of Sewage Contamination in Environmental Waters. Center for Watershed Protection's National Watershed & Stormwater Conference (Online). Apr 16

2021. MERA - An Integrated, Transdisciplinary Study of Water Quality and Human Health at a Tropical Beach. US EPA National Recreational Water Quality Workshop (Online). Apr 6-8.

2021. Out of Sight Is Out of Mind: Antibiotic-Resistant Bacteria and Resistance Genes in Sewage and Recycled Water. Department of Microbiology and Molecular Genetics, Oklahoma State University, March 8.

2020. Whodunit at Our Beach? Microbial Source Tracking Goes Beyond Fecal Indicator Bacteria. Tampa Bay Estuary Program, Tampa, FL. March 25

2019. In Hot Water: Predicted Effects of Climate Change on Waterborne Pathogens and Toxins Southeastern Regional Chapter of the Society of Toxicology, Tampa, FL, Oct 24-25.

2019. When Sewage and Water Mix – Human Health Risks. Oceans and Human Health Workshop. Joint Institute for Gulf of Mexico Studies, St Petersburg, FL, March 27

2019. Antibiotic Resistance in the Environment: More Work to Be Done! Florida Water Reuse Association Workshop Tampa, Fl May 15

2017. What's in Your Water? A Circular Tale of a Serendipitous Research Career. Department of Biology, Valdosta State University Nov 14.

2017. Antibiotic Resistance in the Environment: A Work in Progress. Keynote Speech, Southeastern Branch of the American Society for Microbiology, St. Petersburg FL. Nov 10.

2017. Emerging and Re-Emerging Threats of Antibiotic Resistant Pathogens in Water. Florida Water Resources Conference. West Palm Beach, FL. Apr 25.

2016. What's In Your Water? Microbial Source Tracking. Florida Stormwater Association Winter Conference, Dec 7, Tampa, FL.

2016. Tampa Bay Perspective & Environmental Assessment of Antibiotic Resistance. 31st

Annual WateReuse Symposium. Sept 13, Tampa, FL.

2016. Life and Death in a Tough Spot: Persistence of Fecal Microbiota in the Environment. Water Microbiology Conference. May 20, UNC Chapel Hill **(Keynote).**

2016. The Big Three *Vibrio* Pathogens: A Study in Contrast. May 4, Dept Medical Microbiology and Immunology, University of Toledo, Toledo OH (student invitee).

2016. What's in Your Water? Microbial Source Tracking. April 8, Ohio Branch American Society for Microbiology.

2016. Tracking Sources of Bacteria in Central Florida. Keiser University, March 29, Tampa FL.

2016. Tracking Sources of Bacteria in Reedy Creek. Reedy Creek Improvement District Water Quality Board. Feb 25, Kissimmee, FL.

2016. Stormwater Impacts on Surface Water Quality. Tampa Bay Regional Planning Council's Agency on Bay Management. March 10, Pinellas Park, FL.

2015. What's In Your Water? Microbial Source Tracking. North Central Branch American Society for Microbiology. Oct 23, La Cross, Wisconsin.

2015. The Big Three *Vibrio* Pathogens: A Study in Contrast. Northeastern Branch American Society for Microbiology. Oct 20, Randolph, Mass.

2015. Tracking Sources of Fecal Pollution in Surface and Subsurface Waters. Midwest Environmental Enforcement Association Meeting, July 2 Madison, Wisc.

2015. Recreational Water Quality in the Age of Molecular Biology: New U.S. Regulations, Culture vs. qPCR, QMRA and the Potential of Microarray. Puerto Rico Branch of the American Society for Microbiology, June 19, San Juan Puerto Rico.

2015. What's In Your Water? Microbial Source Tracking. Puerto Rico Branch of the American Society for Microbiology, June 18, San Juan Puerto Rico.

2015. The Life and Times of "Swamp Death" – *Vibrio vulnificus* Ecology and Virulence. Illinois Branch of the American Society for Microbiology, May 7, Napierville, IL.

ABSTRACTS and RESEARCH PRESENTATIONS SINCE 2016

(Students and postdocs supervised by Harwood are bolded; [a] denotes award winner, [b]denotes high school student, (P) indicates poster and (T) indicates talk)

2023. **Brandt, A.M**., Harwood, V.J. Culturable *Escherichia coli* H8 Corroborates HF183 Detection in Surface Waters of Tampa Bay, Florida: A Tool That Links Regulatory Organisms to Microbial Source Tracking Markers. Great Lakes Beach Association Conference. October 16 - 18, 2023. Sturgeon Bay, WI. (P)

2023. **Brodrick, E**., Gonzalez Fernandez, A. Harwood, V.J. Frequency of Ampicillin- and Multidrug-Resistant *Escherichia coli* and *Enterococcus* spp. in Costa Rican Wastewater and Surface Water. ASM Microbe. June 15-19, 2023. Houston, TX (P).

2023. **Lobos, A**., Harwood, V.J. Environmental Persistence of Sewage-Associated Gene Targets Sourced from Untreated Sewage and Recycled Water. ASM Microbe. June 15-19, 2023. Houston, TX (P).

2023. Korajkic, A, McMinn, BR, Harwood, VJ. The effect of protozoa source and sunlight on decay of fecal indicator bacteria and coliphages. ASM Microbe. June 15-19, 2023.

Houston, TX (P).

2023. Sivaganesan M, …Harwood VJ, **Lobos A**, Shanks OC et al (33 authors total). Interlaboratory Performance of NIST SRM® 2917 with recreational water faecal pollution monitoring qPCR assays. IWA Health Related Water Microbiology Conference. June 4-8, Darwin, Australia. (T)

2023. Liguori K, Keenum I, …Harwood VJ and Pruden A. Validation of qPCR-Based Monitoring of Antimicrobial Resistance Genes *sul*1 and *intI*1in wastewater, recycled water, and surface waters across the United States. 2023 AEESP Research and Education Conference June 20-23 Boston, MA (T)

2022. **Nieuwkerk, D.M., Lobos, A.E., Gallard-Góngora, J.F**., Harwood, V.J. Recovery Efficiency of Polyester, Nylon-flocked, and Sponge Swabs for Recovering Fecal Bacteria from Untreated Sewage Influent. Southeastern Branch Am Society for Microbiol Conference, Savannah GA Nov 4-6, (P).

2022. **Salute,K, Korde, R, Lobos, A**, Harwood, V.J. Detection of Human-Associated H8 from *Escherichia coli* in Sewage Spiked Surface Water. Florida Branch Am Society for Microbiol Conference, Orlando FL Oct 21-23 (P).

2022. **Tabuchi, M**, Harwood, VJ, Luba KD, Paperno, R, Cody, TT. Prevalence and antibiotic resistance characteristics of the indicator bacteria, *Enterococcus* species and *Escherichia coli* isolated from coastal marine sport fish in Florida. American Fisheries Society Florida Meeting Haines City, FL Apr 5-7 (T).

2022. Jesser, K.J., V. Alban, **A. Lobos, J. Gallard-Góngora**, G. Trueba, V.J. Harwood, K. Levy. Microbial source tracking of human and animal fecal contamination in household settings in northern Ecuador. American Society of Tropical Medicine and Hygiene Annual Meeting. Seattle, WA. Oct 30-Nov 3. (P)

2022. Liguori, K., Keenum, I., **Calarco, J**., Davis, B.C., Milligan, E., Maldonado Rivera, G., Kurowski, A., Harwood, V. J., Pruden, A. Multi-lab Validation of Standardized Methods for Antibiotic Resistance Monitoring of Wastewater, Recycled Water, and Surface Water. Sixth conference on the Environmental Dimension of Antibiotic Resistance (EDAR6) | Gothenburg, Sweden | September 23-27

2022. Liguori, K., Keenum, I., **Calarco, J**., Davis, B.C., Milligan, E., Maldonado Rivera, G., Kurowski, A., Harwood, V. J., Pruden, A. Towards Standardizing Antimicrobial Resistance Monitoring of Water Environments: an expert survey, expert workshop, and multi-lab validation study. Poster presented at: The 2022 Association of Environmental Engineering and Science Professors (AEESP) Research and Education Conference. June 28-30; St Louis, MO.

2022. Harwood, VJ and A Lobos. Persistence of Human-Associated Genetic Markers in Conventional and Advanced Treated Wastewater: Implications for Microbial Source Tracking in Surface Waters. ASM Microbe June 9-13; Washington DC

2020. **K.H. Nguyen**, P. Boersch-Supan, V.J. Harwood, J.R. Rohr. Mismatches in thermal optima of *Schistosoma mansoni* and *Biomphalaria* spp. life-history traits shift the thermal optimum of human schistosomiasis transmission under different intervention scenarios. Am Soc Tropical Med Hygiene Annual Conference Online. November 17-20, 2020.

2020. **J. Calarco**, J. Peraud, I. Keenum, E. D. Garner, A. Pruden, V. J. Harwood. Multi-drug Resistant Pathogens Isolated from Recycled Water Treatment Trains. ASM Microbe Meeting Online. July 2020

2020. **J. Gallard-Góngora**, A. Lobos, J. Peraud, V.J. Harwood. Comparing methods of bacterial DNA extraction from sand. American Society for Microbiology General Meeting. ASM Microbe Meeting Online July 2020.

2019. González-Fernández, A., Gallard-Góngora J., Mora-Alvarado, D., Rivera-Navarro, P., Lukasik J.O., Mull B, Brown M., Peraud, J., Symonds E.M., Breitbart M., Cairns M.R., Harwood, V.J. Precipitation Influences Human Pathogens and MST Markers in Costa Rica. UNC Water Microbiology Conference. May 14-16, 2019. Chapel Hill, NC (T)

2019. Calarco, J., Peraud, J., Keenum, I., Majeed, H., Garned, E.D., Pruden, A., Harwood, V.J. ESKAPE Pathogens in Reclaimed Water Treatment Train and Distribution System. UNC Water Microbiology Conference. May 14-16, 2019. Chapel Hill, NC (P)

2019. Nieuwkerk, D.M., Hoeglund, A.E., Hubbard, K.A., Paul, J.H., Harwood, V.J. Molecular Quantification of the Red Tide Dinoflagellate Karenia brevis. UNC Water Microbiology Conference. May 14-16, 2019. Chapel Hill, NC (T)

2019. Lobos, A., Peraud, J., Harwood, V.J. Microbial Source Tracking in the Salt Creek Watershed. UNC Water Microbiology Conference. May 14-16. Chapel Hill, NC (T)

2019. Conrad, J. W., Harwood, V. J. Does Gene Expression Modulation in Vibrio vulnificus Support Habitat Plasticity?. UNC Water Microbiology Conference. May 14-16, 2019. Chapel Hill, NC (T)

2019. **Gallard-Gongora, J., Lobos**, A., Harwood, V.J. The Most Efficient and Reproducible Method of Extracting DNA from Sand. UNC Water Microbiology Conference. May 14-16, 2019. Chapel Hill, NC

2019. Harwood, Valerie J. Culturing Antibiotic-Resistant Pathogens from Wastewater and Reclaimed Water: No Mean Feat. American Waterworks Association International Symposium on Waterborne Pathogens, Tampa, FL, April 29-30, 2019

2018. **Conrad, J. W.**[a] and V. J. Harwood. Environmental Effects on Virulence Associated Gene Expression in *Vibrio vulnificus* and Potential for Epigenetic Regulation. Florida Branch American Society for Microbiology. Oct 19-21, 2018 Orlando, FL (T)

2018. **Lobos, A.** and V.J. Harwood. Tracking Sources of Fecal Pollution in a Tidally Influenced Urban Watershed. Florida Branch American Society for Microbiology. Oct 19-21, 2018 Orlando, FL (T)

2018. **Wilson, C.,** Peraud, J.E. and Harwood, V.J. Pathogens in Reclaimed Water and the Potential for Antimicrobial Resistance, Florida Branch American Society for Microbiology. Oct 19-21, 2018 Orlando, FL (T)

2018. **Gonzalez-Fernandez, A**., **Gallard-Gongora, J.**, Mora-Alvarado, D., Rivera-Navarro, P., Lukasik, J., Mull, B., Peraud, J., Symonds, E.M., Ulmer, G., Brown, M., Breitbart, M., Cairns, M., Harwood, V.J. Fecal Indicator and Pathogen Analysis to Inform an Interdisciplinary Study of Water Quality and Human Health Risk in Costa Rica. UNC Water Microbiology Conference. May 21-24, 2018. Chapel Hill, NC

2018. **Lobos, A**., Harwood, V.J., Ahmed, W., Zhang, Q., **Senkbeil, J**., Sadowsky, M. J., & Ishii, S. Increase in Genes Associated with Pathogenic Bacteria and Antibiotic Resistance Following Rainfall in Tampa Bay, Florida. Oral presentation. UNC Water Microbiology Conference. May 22-24, 2018. Chapel Hill, NC. 2017.

2018. **Conrad, J. W**. and Harwood, V. J. Methylation of virulence associated genes in the opportunistic human pathogen *Vibrio vulnificus*: transition from seawater to human serum. UNC Water Microbiology Conference. May 22-24, 2018. Chapel Hill, NC.

2018. **Senkbeil, Jacob K**., Dawei Tang, David L. Lewis, Valerie J. Harwood. Microbial Source

Tracking and Nutrient Level Assessment in Two Impaired Tampa Bay Tributaries. UNC Water Microbiology Conference. May 22-24, 2018. Chapel Hill, NC. 2017. (T)

2017. W. Ahmed, **A. Lobos, J. Senkbeil**, J. Peraud, **J. Gallard**, and V.J. Harwood. Novel CrAssphage Marker Assessed for Microbial Source Tracking (MST) Applications in Tampa, FL. Southeastern Branch of the American Society for Microbiology 103rd Annual Meeting. St. Petersburg, FL. 10-12 November.

2017. **Nguyen, K**., C. Senay, **S. Young**, B. Nayak, **J. Senkbeil, A. Lobos, J. Conrad**, V.J. Harwood. Detection of Wild Animal Sources of Fecal Indicator Bacteria by Microbial Source Tracking (MST) Influences Regulatory Decisions. Southeastern Branch of the American Society for Microbiology 103rd Annual Meeting. St. Petersburg, FL. 10-12 November.

2017. **Conrad, J. W**. and V. J. Harwood. DNA Methylation is a Potential Regulator of Virulence Associated Gene Expression in Vibrio vulnificus. Oral. American Society for Microbiology Southeastern Branch Meeting. St. Petersburg, Florida. 10-12 November. (T)

2017. **Conrad, J. W**. and V. J. Harwood. Epigenetic Modifications are Potential Regulators of Virulence Associated Gene Expression in Vibrio vulnificus. Oral. Florida Branch American Society for Microbiology. Clearwater, Florida. 13 October. (T)

2017. **Conrad, J.** and Harwood, V.J. Potential for epigenetic modifications to influence *Vibrio vulnificus* virulence. FEMS Microbiology Conference 2017, July 9-13, Valencia, Spain

2017. **Young, S**., V. J. Harwood, J. Rohr. Resistance Elements & Nutrient Concentrations Impact Survival of Vancomycin Resistant Enterococci in Aquatic Environments. ASM Microbe. Jun 1-5. New Orleans, LA.

2017. **Lobos, A.,** J. Cunningham, V.J. Harwood. Fungal Bioleaching of Lithium and Cobalt from Spent Rechargeable Li-ion Batteries: Are Leached Metals Toxic to the Fungi? ASM Microbe. Jun 1-5. New Orleans, LA.

2017. Korajkic, A, B R McMinn, V J Harwood, N J Ashbolt, M Sivaganesan and O C Shanks. Differential Decay of Cattle-associated Fecal Indicator Bacteria and Microbial Source Tracking Markers in Fresh and Marine Water. ASM Microbe. Jun 1-5. New Orleans, LA.

2017. **Senkbeil, J.K**. and V. J. Harwood. Human-Associated *Escherichia coli* Marker Genes Are Useful for Microbial Source Tracking in Florida. International Symposium on Health-Related Water Microbiology and UNC Water Microbiology Conference May 15-19.

2016. Harwood, VJ. Measurement Component of Side Session: Closing Knowledge Gaps in Global Health Research: Sector Consensus on Priorities for Improvement of Enteric Pathogen Exposure and Health Measurement and Modeling. UNC Water and Health Conference. October 10-14, Chapel Hill, NC.

2016. **Young, S., Senkbeil, J** and Harwood, VJ. Effects of Nutrients and Resistance Elements on Survival of Vancomycin Resistant Enterococci in Ambient Waters. Florida Branch of the American Society for Microbiology. October 15-16. Miami, FL.

2016. **Lobos, A**., Cunningham, J., and Harwood, V.J. Suitability Of Mold Species For Bioleaching Assessed Acid Production and Li Tolerance. Florida Branch of the American Society for Microbiology. October 15-16. Miami, FL.

2016. **Senkbeil, J.** and V.J. Harwood. Human-Associated *Escherichia coli* and *Bacteroides* HF183 Track Human Fecal Contamination through an Industrial Wastewater Treatment

Facility. American Society of Microbiology Florida Branch Meeting. October 14-16, 2016, Coral Gables, FL.

2016. **K. Nguyen, J. Senkbeil, A. Lobos, J. Conrad, S. Young**, and V.J. Harwood. A Multi-Year Comparison of Fecal Indicator Bacteria and Microbial Source Tracking Methodologies at a Wildlife Conservation Site in Central Florida. Florida Branch of the American Society for Microbiology, October 14-16, Miami, FL.

2016. **Lobos, A**., Cunningham, J., and Harwood, V.J. Quantification of biomass production and organic acid production for three fungal candidates. American Society for Microbiology, 116 annual meeting. June 16-20.Evaluation of Ultrafiltration as a Means to Concentrate Indicators of Fecal Contamination in Water Bodies. ASM Microbe. Jun 16-Jun 20. Boston, MA.

2016. **Conrad JW** and VJ. Harwood. Evaluation of ultrafiltration and elution solutions as a means to concentrate indicators of fecal contamination in water bodies. ASM Microbe. Jun 16-Jun 20. Boston, MA.

2016. **Young, S, Nayak, B**, Weidhaas, J, Harwood, VJ. Persistence of DNA encoding antibiotic resistance genes in poultry litter. ASM Microbe. Jun 16-Jun 20. Boston, MA.

2016. Weidhaas, J.L. 1, Li, Xiang 2, **Nayak, B**.3, Harwood, V.J. Ultrafiltration, whole genome amplification and microarrays for detection of pathogens in environmental systems. ASM Microbe. Jun 16-Jun 20. Boston, MA.

2016. **Senkbeil J** and VJ Harwood. Performance Characteristics of Human Host-Associated *E. coli* Markers in Microbial Source Tracking in Florida. Water Microbiology Conference. May 16-20, 2016. UNC Chapel Hill, NC.

2016. **Young, S**, Nayak, B., Weidhaas, J., Harwood, V. J. Survival of microbial source tracking markers, pathogens and antibiotic resistance genes in poultry litter microcosms. Water Microbiology Conference. May 16-20, 2016. UNC Chapel Hill, NC.

2016. **Young, S**, Harwood, V. J. Vancomycin resistant enterococci in a domestic sewage spill in South Florida. EPA Recreational Waters Conference. April 12-15, 2016. New Orleans, LA.

2016. Wanjugi P., Sivaganesan M., Kelty, CA, Korajkic, A, Ulrich, R., Harwood, VJ, Shanks, OC. Differential Decay of Bacterial and Viral Fecal Indicators in Common Human Pollution Sources. EPA Recreational Waters Conference. April 12-15, 2016. New Orleans, LA.

2015. Harwood, V.J**., Young, S., Nguyen, K.,** and **Nayak, B.** Using Library-Independent Microbial Source Tracking (MST) Methodologies to Identify the Right Suite of Analyses for a Wildlife Conservation Site in Central Florida. Southeastern Branch of the American Society for Microbiology. November 13-15. Kennesaw, GA.

SCIENTIFIC SERVICE (Selected)

2023	Tampa Bay Water Technical Ad Hoc Committee
2023	Member, M48 Workgroup, American Water Works Association
2022 -	Editor, mBio (ASM Press)
2021	Review promotion application for US Environmental Protection Agency
2019	Southern California Stormwater Monitoring Coalition Expert Panel
2015-	Global Waterborne Pathogens Project (WHO and UNESCO)

2014 - 2018 Fulbright Specialist Peer Review

2014 -2017 American Society for Microbiology Council Policy Committee

2014 - Review editor, Frontiers in Environmental Science and Public Health

2014-2015 Chair, Division Q, American Society for Microbiology

2014-2016 Technical Advisory Committee (TAC) for the SCCWRP Microbial Source Identification Marker Degradation Study

2012 - 15 Division Councilor-at-Large, American Society for Microbiology

2012 – 2014 National Academy of Sciences Airport Cooperative Research Program Scientific Advisory Panel.

2011 - 2014 ADVANCE Program Young Faculty Mentor, West Virginia University, Dept. Civil & Environmental Engineering (J. Weidhaas)

2010- 2015 Council member, American Society for Microbiology

2009 - Gulf of Mexico Alliance Pathogens Workgroup

2009 - 2011 University of New England Center for Land-Sea Interactions External Advisory Board

2006 – 2018 Editorial Board: Applied and Environmental Microbiology

Ad Hoc Manuscript Reviews for journals including Letters in Applied Microbiology, Journal of Applied Microbiology, Environmental Science and Technology, Water Research, Journal of Environmental Quality, Journal of Virology, Environmental Microbiology, Plos One

Grant reviews for organizations including Austrian Academy of Sciences, Australian Antarctic Program, South Africa Medical Research Council, U.S. Environmental Protection Agency, U.S. Department of Agriculture, National Science Foundation

GRADUATE STUDENTS (17 PhD and 9 Master's completed degree)

2022. Javier Gallard, Ph.D. Postdoc at University of North Carolina

2022. Adriana Gonzalez Fernandez, Ph.D. Postdoc at Southern California Coastal Water Research Project.

2022. Jennifer Sabater, M.S. Project Manager at Water Environment Foundation.

2020. James Conrad, Ph.D. Postdoc at University of Texas Medical Branch, Galveston TX

2019. Karena Nguyen, Ph.D. Assistant Director for Postdoctoral Services, Georgia Institute of Technology

2018. Jacob Senkbeil, M.S. Currently a Ph.D. candidate, University of Brasilia, Brazil.

2017. Suzanne Young, Ph.D. Postdoc at École Polytechnique Fédérale de Lausanne, Switzerland.

2017. Aldo Lobos, MS. Currently a Ph.D. candidate, Integrative Biology, USF

2013. Pauline Wanjugi, Ph.D. Research Scientist at New York State Department of Health, Albany, NY.

2013. Zachery Staley, Ph.D. Currently employed as Scientist, US Environmental Protection Agency (co-mentored with Dr. Jason Rohr).

2012 Eva Chase, Ph.D. Awarded Ph.D. posthumously

2012 Christopher Staley, Ph.D. Assistant Professor, Department of Surgery, University of Minnesota

2010 Asja Korajkic, Ph.D. Microbiologist at U.S. Environmental Protection Agency, Cincinnati, OH.

2010 Keith Michael Garman, Ph.D. President, Garman Engineering Company, LLC. (co-mentored with Dr. James Garey).

2009 Brian Badgley, Ph.D. Associate Professor at Virginia Tech, Blacksburg VA.

2009 Bina Nayak, Ph.D. Currently employed as Water Research Manager, Pinellas County Utilities, Florida

2009 Shannon McQuaig, Ph.D. Professor at St. Petersburg College (FL)

2008 Katrina V. Gordon. Ph.D. Core facility manager (Microscopy Core and Discovery Core) at University of North Texas Health Science Center at Fort Worth.

2008. Phoebe Koch. Master's degree in Microbiology. Currently employed as secondary school teacher, Hillsborough County, FL.

2006 Miriam Brownell. Master's degree in Microbiology. Retired; previously employed as laboratory manager at City of St. Petersburg Water

2005 Vasanta Chivukula Ph.D. in Biology. Centers for Disease Control, Atlanta GA.

2004 Robert Ulrich. Masters degree in Microbiology. Received Ph.D. at USF (Marine Science), CRO of Pure Molecular.

2003 Matthew Anderson. Masters degree in Microbiology. Currently employed as research associate at Algenol Biofuels, Bonita Springs, FL.

2003 Kimberly L. Hood. Masters degree in Microbiology. Completed Ph.D. at University of Maryland in 2009. Currently employed as scientist at Algenol Biofuels, Bonita Springs, FL.

2001 John M. Pisciotta Masters degree in Biology.
Ph.D. from Johns Hopkins University, Baltimore, MD; employed as Assistant Professor, West Chester University, West Chester, PA.

2001 Michael Harris (co-Major Professor) Ph.D. in Chemistry. Currently research scientist at Los Alamos National Laboratories. (co-mentored with Dr. Li-June Ming).

GRADUATE STUDENTS (current)

	Degree	**Began**	**Scheduled Completion**
Aldo Lobos	Ph.D.	2018	2022
Maki Tabuchi*	Ph.D.	2018	2022

Dana Nieuwkerk*	Ph.D.	2018	2020
Jeanette Calarco	Ph.D.	2019	2024
Eleanor Brodrick	M.S.	2022	2024
Alexandra Smith[a]	Ph.D.	2023	2028

***** Tabuchi and Nieukerk transferred from the Marine Science program at USF to Integrative Biology in 2018. Tabuchi is a part-time graduate student employed at Fish and Wildlife Service.

[a]Alexandra Smith co-mentored by Dr. Daniel Yeh, USF Civil & Environmental Engineering