

VALERIE J. HARWOOD
CURRICULUM VITAE: 2016

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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 (Recent)

2014 - U.S. Environmental Protection Agency
2012 - 2013 Microbiology Consultant: U.S. Army Corps of Engineers
2010 - Microbiology Consultant: Reedy Creek Improvement District
2007 - 2010 Microbiology (MST) Consultant: Cawthron Institute, New Zealand
2004 – 2010 Microbiology (MST) Consultant: Motley-Rice, LLC

HONORS and AWARDS (Recent)

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 Branch American Society for Microbiology.
2009 Feeley Award for Excellence in Environmental Microbiology; Southeastern Branch American Society for Microbiology.
2009 USF Faculty Award for Research, Scholarly, and Creative Excellence
2006 Phi Kappa Phi Honor Society Scholar Award

- 2005-06 President, Southeastern Branch American Society for Microbiology.
- 2004 Phi Kappa Phi Honor Society Scholar Award
- 2003 Margaret Green Outstanding Teaching Award: Southeastern Branch American Society for Microbiology

PROFESSIONAL ORGANIZATIONS

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

FUNDING: AS PRINCIPLE INVESTIGATOR (since 2010)

2016. Microbial Source Tracking to Inform the Fecal Bacteria Source Reduction Plan: Reedy Creek Improvement District. Reedy Creek Improvement District. **\$13,140.**
- 2016-2017. Determining Sources and Risk of Fecal Pollution in Tampa Bay Tributaries. Environmental Protection Commission of Hillsborough County. **\$50,000.**
- 2015-2016. Hudson Beach Bacteria Source Assessment - Phase III. Florida High Tech Corridor Industry Seed Grant. **\$59,916**
- 2012-2015. 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**
- 2013-2014 Microbial Source Tracking to Inform the Fecal Bacteria Source Reduction Plan: Reedy Creek Improvement District (II). Reedy Creek Improvement District. **\$25,000.**
2013. Microbial Source Tracking to Inform the Fecal Bacteria Source Reduction Plan: Reedy Creek Improvement District. Reedy Creek Improvement District. **\$35,000.**
2012. Microbial Source Tracking in Reedy Creek, FL*. Reedy Creek Improvement District. \$18,000 (awarded as 3 separate projects of \$6,000 each).
2012. Fecal Indicator Bacteria Persistence. U.S. Environmental Protection Agency. **\$38,447.**
2012. Tracking Fecal Pollution from Cattle in Waters of Winona County, Minnesota. Winona County, Minn. **\$6,000.**
2011. Delaware DNREC Beach Act Grant: Microbial Source Tracking. Delaware Dept. Natural Resources & Environmental Control. **\$16,740.**
2011. Quantification of a *Catelliboccus marimammalium* Fecal Marker for Seagulls by QPCR. Delaware Dept. Natural Resources & Environmental Control. **\$4,800.**
2011. Sources of Fecal Pollution in Reedy Creek Improvement District Watersheds: Phase I. Reedy Creek Improvement District. **\$6,000.**
- 2010-2011. New River Fecal Coliform Source Identification Pasco County Stormwater. **\$60,000**
- 2010-2011. Robert J. Strickland Beach Bacteria Source Assessment Phase II. Pasco County

Stormwater. **\$10,200.**

2009-2011 Determining the Relationship of Microbial Pollution and Associated Health Risks at Freshwater and Saltwater Beaches of Florida. Florida Department of Environmental Protection and the Water Environment Research Foundation. **\$403,000.**

2007-2010. Validation and Field Testing of Microbial Source Tracking Methodologies in the Gulf of Mexico US Environmental Protection Agency (Gulf of Mexico Program). **\$444,000 to Harwood; \$875,907 total** with Co-PIs at UWF & USM

2008-2010. Assessing Sources of Indicator Bacteria and Pathogen Presence at Lake Carroll, a Freshwater Beach. Environmental Protection Commission of Hillsborough County. \$101,962.

FUNDING: AS CO-PRINCIPLE INVESTIGATOR (since 2010)

2015 – 2016. EAGER: Fungal Bioleaching for Recovery of Lithium and Cobalt from Spent Lithium-Ion Batteries. \$49,998.

2008-2012. Predicting the effects of agricultural practices on waterborne human pathogens, livestock helminthes, and the health of rural water-bodies. USDA. Project role: co-P.I. with Jason Rohr. \$398,500.

2010-2012. Assessing Sources of Fecal Contamination in High Priority Creeks in the Hampton Roads Region. Hampton Roads (VA) Planning District Commission. Project role: co-PI. PI Rachel Noble, University of North Carolina. **\$80,100.**

REFEREED PUBLICATIONS (selected; out of 89 total)

(Students and postdocs supervised by Harwood are bolded; ^a denotes corresponding author; * denotes cited over 100 times)

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. 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
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.

2012. **S.M. McQuaig**, J. Griffith and V. J. Harwood^a. Association of fecal indicator bacteria with human viruses and microbial source tracking markers at coastal beaches impacted by nonpoint source pollution. *Appl. Environ. Microbiol.* 78: 6423-6432.
2012. Shanks OC, Sivaganesan M, Peed L, Kelty CA, Blackwood AD, Greene MR, Noble RT, Bushon RN, Stelzer EA, Kinzelman J, Anan'eva T, Sinigalliano C, Wanless D, Griffith J, Cao Y, Weisberg S, Harwood VJ, **Staley C**, Oshima KH, Varma M, Haugland RA. Interlaboratory comparison of real-time PCR protocols for quantification of general fecal indicator bacteria. *Environ Sci Technol.* 46:945-53.
2012. Hellein KN, Kennedy EM, Harwood VJ, **Gordon KV**, Wang SY, Lepo JE. A filter-based propidium monoazide technique to distinguish live from membrane-compromised microorganisms using quantitative PCR. *J Microbiol Methods* 89:76-78.
2011. **Z.R. Staley**, J.R. Rohr and V. J. Harwood^a. A test of direct and indirect effects of agrochemicals on the survival of fecal indicator bacteria. *Appl. Environ. Microbiol.* 77:8765-74.
2011. **B.S. Nayak**, **B. Badgley** and V.J. Harwood^a. Comparison of genotypic and phylogenetic relationships of environmental *Enterococcus* isolates by BOX-PCR typing and 16S rRNA gene sequencing. *Appl Environ Microbiol.* 77:5050-5.
2011. **E. Chase** and V.J. Harwood^a. Comparison of the effects of environmental parameters on growth rates of *Vibrio vulnificus* biotypes I, II and III by culture and quantitative PCR. *Appl Environ Microbiol.* 77:4200-4207.
2011. **C. Staley**, A.C. Wright, M.K. Jones and V.J. Harwood^a. Genetic and quantitative assessment of *Vibrio vulnificus* populations in oyster (*Crassostrea virginica*) tissues. *Environ. Microbiol. Reports* 3:543-549.
2011. Abdelzaher AM, Wright ME, Ortega C, Hasan AR, Shibata T, Solo-Gabriele HM, Kish J, Withum K, He G, Elmir SM, Bonilla JA, Bonilla TD, Palmer CJ, Scott TM, Lukasik J, Harwood VJ, **McQuaig S**, Sinigalliano CD, Gidley ML, Wanless D, Plano LR, Garza AC, Zhu X, Stewart JR, Dickerson JW, Yampara-Iquise H, Carson C, Fleisher JM, Fleming LE. Daily measures of microbes and human health at a non-point source marine beach. *J Water Health.* 2011 Sep;9(3):443-57.
2011. C.D. Cornelisen, P.A. Gillespie, M. Kirs, R.G. Young, R.W. Forrest, P.J. Barte, B.R. Knight and V.J. Harwood. Motueka River plume facilitates transport of ruminant faecal contaminants into shellfish growing waters, Tasman Bay, New Zealand. *New Zealand J Mar Freshwater Res*, 45: 477-495
2011. AH Shah, Abdelzaher AM, Phillips M, Hernandez R, Solo-Gabriele HM, Kish J, Scorzetti G, Fell JW, Diaz MR, Scott TM, Lukasik J, Harwood VJ, **McQuaig S**, Sinigalliano CD, Gidley ML, Wanless D, Ager A, Lui J, Stewart JR, Plano LR, Fleming LE. Indicator microbes correlate with pathogenic bacteria, yeasts and helminthes in sand at a subtropical recreational beach site. *J Appl Microbiol.* 110(6):1571-1583.
2011. J.L. Weidhaas, T.W. MacBeth, R.L. Olsen, and V.J. Harwood^a. Correlation of quantitative PCR for a poultry-specific *Brevibacterium* marker gene with bacterial and chemical

- indicators of water pollution in a watershed impacted by land application of poultry litter. *Appl. Env. Microbiol.* 77:2094-2102.
2011. **B.D. Badgley**, F.I.M. Thomas and V.J. Harwood^a. Quantifying environmental reservoirs of fecal indicator bacteria associated with sediment and submerged aquatic vegetation, *Env. Microbiol.* 13:932-942.
2011. **A. Korajkic**, M.J. Brownell and V.J. Harwood^a. Investigation of human sewage pollution and pathogen analysis at Florida Gulf Coast beaches. *J Appl. Microbiol.* 110:174-183.
2010. **B.D. Badgley**, **B. Nayak** and V.J. Harwood^a. The importance of sediment and submerged aquatic vegetation as potential habitats for persistent strains of enterococci in a subtropical watershed. *Water Research.* 44:5857-5866.
2010. **Z.R. Staley**, J.R. Rohr and V.J. Harwood. The effect of agrochemicals on indicator bacteria densities in outdoor mesocosms. *Environ Microbiol.* 12:3150-3158
2010. **C. Staley** and V.J. Harwood^a. A review of genetic typing studies of *Vibrio cholerae*, *V. parahaemolyticus* and *V. vulnificus*. *Journal of AOAC International.* 93:1553-1569
2010. **B.D. Badgley**, F.I.M. Thomas and V.J. Harwood^a. The effects of submerged aquatic vegetation on the persistence of environmental populations of *Enterococcus* spp. in outdoor mesocosms. *Environmental Microbiology* 12:1271-1281.
2010. J.L. Weidhaas, T. W. Macbeth, R. L. Olsen, M. J. Sadowsky, D.Norat and V. J. Harwood^a. Identification of a poultry litter-specific DNA marker gene and development of a 16S rRNA-based quantitative PCR assay. *J. Appl. Microbiol.* 109:334-347.
2010. S.D. Leskinen, M. Brownell, D.V. Lim and V.J. Harwood^a. Hollow-fiber ultrafiltration and PCR detection of human-associated genetic markers from various types of surface water in Florida. *Appl. Environ. Microbiol.* 76:4116-4117.
2010. Abdelzaher A, Wright M, Ortega C, Solo-Gabriele H, Miller G, Elmir S, Newman X, Shih P, Bonilla JA, Bonilla TD, Palmer CJ, Scott T, Lukasik J, Harwood VJ, McQuaig S, Sinigalliano C, Gidley M, Plano L, Zhu X, Wang JD, Fleming L. Presence of pathogens and indicator microbes at a non-point source subtropical recreational marine beach. *Appl. Environ. Microbiol.* 76:724-732.
2009. V. J. Harwood^a, M. Brownell, S. Wang, J. Lepo, R.D. Ellender, A. Ajidahun, K. N. Hellein, E. Kennedy, X. Ye and C. Flood. Validation and field testing of library-independent microbial source tracking methods in the Gulf of Mexico. *Water Research.* 43:4812-4819.
2009. T.M. Scott, V.J. Harwood, W. Ahmed, Y. Masago, and J.B. Rose. Comment on "Environmental occurrence of the enterococcal surface protein (*esp*) gene is an unreliable indicator of human fecal contamination. *Env. Sci. Technol.* 43:6434-6435.
2009. **A. Korajkic**, B.D. Badgley, M. Brownell, V.J. Harwood^a. Application of microbial source tracking methods in a Gulf of Mexico field setting. *J. Appl. Microbiol.* 107:1518-1527.
2009. **S.M. McQuaig**, T.M. Scott, J.O. Lukasik and V.J. Harwood^a. Development and validation of a sensitive Taqman® quantitative PCR assay for the specific detection and quantification of two human polyomaviruses (JCV and BKV) in fecal waste. *Appl. Environ Microbiol.* 75:3379-3388.

2009. **B. Nayak**, A.D. Levine, A. Cardoso and V.J. Harwood^a. Microbial population dynamics in solid waste bioreactors. *J. Appl. Microbiol.* 107:1330-1339.
2009. S. Leskinen, V.J. Harwood and D.V. Lim. Rapid dead-end ultrafiltration concentration and biosensor detection of enterococci from beach waters of Southern California. *J. Water Health.* 7:674-684
2009. A. Tatavarthy, K. Peak, W. Veguilla, T. Cutting, V.J. Harwood, J. Roberts, P. Amuso, J. Cattani, and A. Cannons. An accelerated method for isolation of *Salmonella enterica* serotype Typhimurium from artificially contaminated foods, using a short preenrichment, immunomagnetic separation, and xylose-lysine-desoxycholate agar (6IX Method). *J. Food Protect.* 72:583-590.
2008. **K. V. Gordon**, M. C. Vickery, A. DePaola, **C. Staley** and Valerie J. Harwood^a. Real-time PCR assays for quantification and differentiation of *V. vulnificus* strains in oysters and water. *Appl. Env. Microbiol.* 74:1704-1709
2008. A.D. Levine, V.J. Harwood, S. Farrah, T.M. Scott, and J.B. Rose. Pathogen and indicator organism reduction through secondary effluent filtration: Implications for reclaimed water production. *Water Environment Research:* 80:596-608.
2007. **Brownell, M.B.**, V.J. Harwood^a, R.C. Kurz, **S.M. McQuaig**, J. Lukasik, and T.M. Scott. Confirmation of putative stormwater impact on water quality at a Florida beach by microbial source tracking methods and structure of indicator organism populations. *Water Research.* 41:3747-3757.
2007. Stoeckel, D.M. and V.J. Harwood^a. Performance, design, and analysis in microbial source tracking studies. *Appl. Environ. Microbiol.* 73:2405-2415.*
2006. **S. M. McQuaig**, T. M. Scott, V. J. Harwood^a, S. R. Farrah and J. O. Lukasik. Novel method for the detection of human derived fecal pollution in environmental waters using a PCR based human polyomavirus assay. *App. Environ. Microbiol.* 72: 7567-7574.*
2006. **M. A. Anderson**, J.E. Whitlock and V.J. Harwood^a. Diversity and Distribution of *Escherichia coli* Genotypes and Antibiotic-Resistant Phenotypes in Feces of Humans, Cattle and Horses *Appl. Environ Microbiol.* 72: 6914-6922.
2006. M. Chatzidaki-Livanis, M. A. Hubbard, **K.V. Gordon**, V. J. Harwood, and A.C. Wright. Genetic distinctions among clinical and environmental strains of *Vibrio vulnificus*. *Appl. Environ. Microbiol.* 72:6136-6141.
2006. A Cardoso, A.D. Levine, **B.S. Nayak** and V.J. Harwood. Lysimeter comparison of the role of waste characteristics in the formation of mineral deposits in leachate drainage systems. *Waste Management Res.* 24:560-572.
2005. **K.L. (Hood) Anderson**, J.E. Whitlock and V.J. Harwood^a. Persistence and differential survival of fecal indicator bacteria in subtropical waters and sediments. *Appl. Environ. Microbiol.* 71: 3041-3048.*
2005. V. J. Harwood^a, A. D. Levine, T. M. Scott, **V. Chivukula**, J. Lukasik, S.R. Farrah and J.B. Rose. Validity of the indicator organism paradigm: pathogen reduction and public health protection in reclaimed water. *Appl. Environ. Microbiol.* 71: 3163-3170.*
2002. JE Whitlock, DT Jones, VJ Harwood^a. Identification of the sources of fecal coliforms in an

urban watershed using antibiotic resistance analysis. *Water Research* 36 (17), 4273-4282*

2000 V. J. Harwood^a, J. Whitlock and **V. H. Withington**. Classification of the antibiotic resistance patterns of indicator bacteria by discriminant analysis: use in predicting the source of fecal contamination in subtropical Florida waters. *Appl. Environ Microbiol.* 66: 3698-3704. *

BOOK CHAPTERS

2015. V.J. Harwood, C. Hagedorn, M. Sadowsky. Chapter 3.4.1 : The Evolving Science of Microbial Source Tracking. *In* Manual of Environmental Microbiology, 4th Edition. ASM Press, Washington, DC.

2015. J. Brandão and V.J. Harwood. Sand and Soil Sampling. *In*: Viegas, C et al. Environmental Mycology in Public Health: An Overview on Fungi and Mycotoxins Risk Assessment and Management. Elsevier

2011. V.J. Harwood and D.M. Stoeckel. Performance Criteria. *In* Microbial Source Tracking: Methods, Applications, and Case Studies. Springer-U.S., New York, NY.

2011. C. Teaf and V.J. Harwood. Legal Challenges. *In* Microbial Source Tracking: Methods, Applications, and Case Studies. Springer-U.S., New York, NY.

2011. C.M. Wapnick and V.J. Harwood. Urban and Suburban Watersheds. *In* Microbial Source Tracking: Methods, Applications, and Case Studies. Springer-U.S., New York, NY.

2011. J. Santo Domingo, H. Ryu and V.J. Harwood^a. Microbial Source Tracking. *In* The Fecal Indicator Bacteria. M.J. Sadowsky and R. Whitman, Eds. ASM Press.

2007. V.J. Harwood. Assumptions and limitations of microbial source tracking methods. *In*: J. Santo-Domingo and M. Sadowsky. Microbial Source Tracking. ASM Press, Washington, D.C.

2004. A.D. Levine, V.J. Harwood, T.M. Scott and J.B. Rose. Factors influencing removal of bacteria, viruses and protozoan pathogens from wastewater for water reuse applications. *In*: HH. Hahn, E. Hoffmann, H. Odegaard. Chemical Water and Wastewater Treatment VII. IWA Publishing.

BOOK EDITED

2011. C. Hagedorn, A.R. Blanch and V. J. Harwood, Eds. Microbial Source Tracking: Methods, Applications, and Case Studies. Springer-U.S., New York, NY. 642pp.

PEER-REVIEWED, PUBLISHED REPORTS

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.

2004. J.B. Rose, S.R. Farrah, V.J. Harwood, A.D. Levine, J. Lukasik, P. Menendez and T.M. Scott. Reduction of pathogens, indicator bacteria and alternative indicators by wastewater treatment and reclamation processes. Report 00-PUM-2T. Water Environment Research Foundation, Alexandria, VA.
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.

NON-REFEREED PUBLICATIONS INCLUDING PROCEEDINGS AND PUBLISHED REPORTS (since 2003)

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.
2009. C. M. Wapnick, V. J. Harwood, T. Singleton, G. Morrison, **C. Staley, and Z. R. Staley**. Application of the Bacteria Decision-Support Tool in the Hillsborough River Watershed. Water Environment Federation TMDL Conference Aug 9-12, 2009 Minneapolis, Minn.
2008. Cheryl M. Wapnick, Valerie J. Harwood, **Chris Staley**, and Thomas Singleton. A Cost-Effective Method for Assessing Fecal Contamination in Florida Tributaries. Stormcon '08 Conference, Aug 3-8 2008, Orlando FL. Forester Press, Santa Barbara, CA.
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/ApplicationsandDevelopment.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 2012)

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, Naperville, IL.
2014. Recreational Water Quality in the Age of Molecular Biology: New U.S. Regulations, Quantitative PCR, & the Potential of Microarray & Next-Gen Sequencing. Western NY Branch of the American Society for Microbiology, Nov 18, Buffalo, NY.
2014. The Big Three *Vibrio* Pathogens: A Study in Contrast. Virginia Branch of the American Society for Microbiology, Nov 7-8, James Madison University, Harrisonburg, VA.
2014. Recreational Water Quality in the Age of Molecular Biology - new US regulations, culture vs. qPCR, QMRA and the potential of microarray. Plenary Speaker, Trends in Environmental Microbiology on Public Health, September 18-21 Lisbon, Portugal.
2014. Microbial Source Tracking & Beyond: Assessing Waterborne Health Risks in the 21st Century. University of the Sunshine Coast, June 16, Queensland, Australia.
2014. Microbial Source Tracking: Who Poos There? USF Integrative Biology Seminar Series, Feb 6, 2014, Tampa, FL.
2014. Who Goes There? Microbial Source Tracking: A Forensic Approach to Water Quality Assessment. Tampa Bay's Tiniest Biology Microbiology Seminar Series, January 13, Tampa, FL
2013. Water Quality in the Time of Molecular Biology. Southeastern Branch American Society for Microbiology Annual Meeting, Nov 10, Auburn, AL
2013. Beyond *E. coli*: What's In Our Environmental Waters and Why It Matters. USF Global Health Seminar Series, Aug 27, Tampa FL.
2013. Vibrios Everywhere! Why You Should Care and Why We Can't Get Rid of Them. Florida Section of the American Water Works Association Aug 21, Dunedin FL.
2013. Progress and Issues in Use of Microbial Source Tracking (MST) Studies to Assess Recreational Water Quality. U.S. Recreational Water Quality Criteria: A Vision for the Future March 11–13, Honolulu, Hawaii.

2013. Site-Specific Water Quality Criteria: How Microbial Source Tracking and Quantitative Microbial Risk Assessment Can Refine Regulation of Recreational Water Quality. West Virginia University, Department of Civil and Environmental Engineering. Apr 12, Morgantown, WV.
2012. Waterborne Pathogens from Non-Human Sources and their Public Health Implications. State of the Science Symposium on Differentiating Human and Non-Human Fecal Sources and Managing Beaches Impacted Primarily by Non-Human Sources. Southern California Water Research Project Authority. Nov 28-29, Costa Mesa, CA
2012. Natural Source Exclusion Case Study: Reedy Creek, Central FL. State of the Science Symposium on Differentiating Human and Non-Human Fecal Sources and Managing Beaches Impacted Primarily by Non-Human Sources. Southern California Water Research Project Authority. Nov 28-29, Costa Mesa, CA
2012. Overview of MST Science: What We Know, What We Think We Know, What We Need To Know. Gulf of Mexico Alliance MST Workshop III. April 9-11, St. Petersburg, FL.
2012. Can't We Have It All? Tradeoffs in Method Performance. Gulf of Mexico Alliance MST Workshop III. April 9-11, St. Petersburg, FL.
2012. Microbial Source Tracking: Where Are We Now and Where Are We Heading? Delivering Healthy Waters Workshop I. March 27-28, London, England.
2012. Thick and Thin of Poultry Source Identification. 2012 Bacterial Source Tracking State of the Science Conference. Feb 28-29, New Braunfels, TX.
2012. The ABCs of BST. 2012 Bacterial Source Tracking State of the Science Conference. Feb 28-29, New Braunfels, TX.
2012. A Darwinian Tale of Microbial Source Tracking – or, Be Careful Where You Step. University of South Florida Dept. Civil & Environmental Engineering. January 23, Tampa, FL.
2012. A Darwinian Tale of Microbial Source Tracking. West Virginia University. Department of Crop & Soil Science; Dept. Civil & Environmental Engineering. January 17, Tampa, FL.

ABSTRACTS and RESEARCH PRESENTATIONS SINCE 2012

(Students and postdocs supervised by Harwood are bolded; ^a denotes award winner, ^b denotes high school student)

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. **Young, S**, Nayak, B., Weidhaas, J., Harwood, V. J. Survival of microbial source tracking markers, pathogens and antibiotic resistance genes in poultry litter microcosms. UNC Water Microbiology Conference. May 16-20, 2016. 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. American Society for Microbiology General Meeting. June 15-21, 2016. Boston, MA.
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.
2015. Conrad, JW and VJ Harwood. Evaluation of ultrafiltration as a means to concentrate indicators of fecal contamination in water bodies. Southeastern Branch of the American Society for Microbiology. November 13-15. Kennesaw, GA.
2015. Lobos, A, VJ Harwood and J Cunningham. Investigation of a Fungal Bioleaching Process for the Recovery of Lithium and Cobalt from Spent Rechargeable Li-Ion Batteries. Southeastern Branch of the American Society for Microbiology. November 13-15. Kennesaw, GA.
2015. **Young, S, Nayak, B.**, Harwood, V. J. Vancomycin resistant enterococci in sewage. Florida Branch Meeting of the American Society for Microbiology. Oct. 9-11, 2015. Cocoa Beach, FL.
2015. Harwood, VJ. Choosing the Right Suite of Analyses from the Microbial Source Tracking (MST) Toolbox: a Multi-Year Study in a Watershed Managed for Wildlife Conservation. International Water Assoc Health-Related Microbiology. September 14, Lisbon, Portugal
2015. **Nayak, B.**, Weidhaas, J, and Harwood, V. J. Seasonal Differences in the Persistence of LA35 Poultry Fecal Marker and its Correlation with Indicator Bacteria and Pathogens in Environmental Waters. 115th General Meeting of the American Society for Microbiology. May 30-Jun 2. New Orleans, LA.
2015. **Young, S., B. Nayak**, and V.J. Harwood. Vancomycin Resistant Enterococci (VRE) in Sewage Contaminated Environmental Waters in Florida. 115th General Meeting of the American Society for Microbiology. May 30-Jun 2. New Orleans, LA.
2015. **Nguyen, K, S. Young**, V. J. Harwood, W. Ahmed. Performance of the Avian-Associated GFD Marker for Microbial Source Tracking in the U.S.A. and Australia. 115th General Meeting of the American Society for Microbiology. May 30-Jun 2. New Orleans, LA
2015. L. Fang, M. Hubbard, **E. Chase**, C. Whistler, V. J. Harwood, A. Kane, A. C. Wright. Distribution and Genetic Structure of *Vibrio cholerae* in seawater and oysters from the Northern Gulf of Mexico. 115th General Meeting of the American Society for Microbiology. May 30-Jun 2. New Orleans, LA
2014. **Young, S., B. Nayak** and V.H. Harwood. Vancomycin-resistant enterococci in sewage-contaminated environmental waters. Southeastern Branch of the American Society for Microbiology Meeting. Sept 5-7. Ponte Vedra Beach, FL.
2014. **Nguyen, K., S. Young**, W. Ahmed and V.J. Harwood. Performance of the Avian-Associated GFD Marker for Microbial Source Tracking in the U.S. and Australia. Southeastern Branch of the American Society for Microbiology Meeting. Sept 5-7. Ponte Vedra Beach, FL.
2015. Harwood, VJ. Heads in the Sand? Beach-Going Pathogens and Human Health. Water Microbiology Conference, May 19, Chapel Hill, NC
2014. **Parrish, M^b, S. Young, B. Nayak** and V.J. Harwood. Design, construction and optimization of a low-cost portable enterococci test (PET) kit. Southeastern Branch of the American Society for Microbiology Meeting. Sept 5-7. Ponte Vedra Beach, FL.
2014. Weidhaas, J. L., X. Li and V. J. Harwood. Microbial Source Tracking (MST) Microarray for Advanced Pathogen Detection and Source Identification in Environmental Systems. American Society for Microbiology General Meeting. May 17-20, Boston, MA.

2014. **Young, Suzanne^a, B. Nayak** and V.J. Harwood. Assessing Animal and Human Fecal Contamination in a Watershed Managed for Wildlife Conservation. American Society for Microbiology General Meeting, May 17-20, Boston, MA.
2014. **Nayak, Bina**, Jennifer Weidhaas, and Valerie J. Harwood, 2014, Persistence of the LA35 Brevibacterium Marker for Poultry Litter Contamination is Correlated with that of Indicator Bacteria and Pathogens in Fresh and Marine Water, American Society for Microbiology General Meeting, May 17-20, Boston, MA.
2014. J. L. Weidhaas, S. Mantha, V. J. Harwood. Temporal Variation in Deposition, Growth and Decay of Pathogens, Fecal Indicator Bacteria (FIB) and Poultry Litter Marker Genes on Poultry Bedding. American Society for Microbiology General Meeting. May 17-20, Boston, MA.
2014. J. L. Weidhaas¹, S. Mantha¹, V. J. Harwood. Release, Transport and Attenuation of Pathogens, Fecal Indicator Bacteria (FIB) and Poultry Litter Marker Genes in Soil Column Studies. American Society for Microbiology General Meeting. May 17-20, Boston, MA.
2014. Harwood, V.J. and J. Weidhaas. Custom Microarray for Pathogen Detection and Microbial Source Tracking. Water Microbiology Conference: Microbial Contaminants from Watersheds to Human Exposure. May 5-7, University of North Carolina at Chapel Hill.
2014. Harwood, V.J. Ecology of *Vibrio vulnificus* in Florida Coastal Waters. National Shellfisheries Association 106th Annual Meeting. Mar 29-Apr 2, Jacksonville, FL.
2013. **Young, S., B. Nayak, C. Staley**, M. J. Sadowsky and V.J. Harwood. Characterization Of The Microbial Community In Alligator Fecal Samples Using A Metagenomics- Based Approach. American Society for Microbiology General Meeting, May 18-21, 2013, Denver, CO.
2013. **Wanjugi, P.**, G. A. Fox and V. J. Harwood. The Influence of Nutrient Levels and Natural Microbiota on the Survival of *E. coli* in Aquatic Environments. American Society for Microbiology General Meeting, May 18-21, 2013, Denver, CO.
2012. Lynn, T.J., **Wanjugi, P.**, Harwood, V.J., Ergas, S. Use of Coagulants to Enhance Biosand Filtration Performance, Proc. 85th Annual Meeting Water Environment Federation (WEFTEC 12), Sept. 29-Oct. 3., New Orleans, LA.
2012. R. Whitman, T. Edge, V.J. Harwood and H.M. Solo-Gabriele. Report of the GLBA expert workshop on fecal indicator bacteria in beach sands. Great Lakes Beach Association Annual Conference on Mackinac Island, Oct 16-18, 2012
2012. M. E. Schoen, **C. Staley, K. V. Gordon**, and V. J. Harwood. Microbial risk assessment of sewage-impacted waters: potential use of microbial source tracking assays. International Society of Exposure Sciences, Oct 28 – Nov 1, Seattle, WA.
2012. M. Larenas, E. Humphries, **K.V. Gordon** and V.J. Harwood. In Search of Gulls: An MST Case Study at Delaware's Tower Road Beach. Gulf of Mexico Alliance MST Workshop III. April 9-11, St. Petersburg, FL.
2012. **Eva Chase** and Valerie J. Harwood. Ecology of *Vibrio vulnificus* in the Tampa Bay Estuary and Relationship to Fecal Indicator Bacteria Levels. American Society for Microbiology General Meeting, June 16-19, San Francisco, CA.
2012. **P. Wanjugi** and V.J. Harwood. The Effect of Motility and Predation on the Persistence of *E. coli*, Salmonella, Enterococci Strains in Outdoor Mesocosms, American Society for Microbiology General Meeting, June 16-19, San Francisco, CA.
2012. **Z. R. Staley**, J. R. Rohr, V. J. Harwood. Effects of Agrochemicals on Bacterivorous

Predation of Protozoa in an Aquatic Environment. American Society for Microbiology General Meeting, June 16-19, San Francisco, CA.

SCIENTIFIC SERVICE (Current)

- 2015- Global Waterborne Pathogens Project (WHO and UNESCO)
 - 2014 - Fulbright Specialist Peer Review
 - 2014 - 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 - 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- Council member, American Society for Microbiology
 - 2009 - Gulf of Mexico Alliance Pathogens Workgroup
 - 2009 - University of New England Center for Land-Sea Interactions External Advisory Board
 - 2006 – Editorial Board: Applied and Environmental Microbiology
- Ad Hoc Manuscript Reviews for 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:** 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

SERVICE ON GRANT PANELS (Recent)

- 2013 National Science Foundation Grant Review Panel. Environmental Engineering 1440 Unsolicited Environmental Microbiology Panel

GRADUATE STUDENTS (completed degree)

- 2013. Pauline Wanjugi, Ph.D. Currently employed as postdoctoral research associate at US EPA, Cincinnati
- 2013. Zachery Staley, Ph.D. Currently employed as postdoctoral research associate by Environment Canada in Burlington, Ontario, Canada (co-mentored with Dr. Jason Rohr).
- 2012 Eva Chase, Ph.D. Awarded Ph.D. posthumously

- 2012 Christopher Staley, Ph.D. Currently employed as postdoctoral research associate at University of Minnesota
- 2010 Asja Korajkic, Ph.D. Currently employed as 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. Currently employed as Assistant Professor at Virginia Tech
- 2009 Bina Nayak, Ph.D. Currently employed as Water Research Manager, Pinellas County Utilities, Florida
- 2009 Shannon McQuaig, Ph.D. Currently Associate Professor at St. Petersburg College (FL)
- 2008 Katrina V. Gordon. Ph.D. Currently employed as core facility manager 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. Currently employed as laboratory manager at City of St. Petersburg Water
- 2005 Vasanta Chivukula Ph.D. in Biology. Associate Professor Atlanta Metropolitan State College, 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
Suzanne Young	Ph.D.	2012	2016
Karena Nguyen	Ph.D.	2014	2018
Aldo Lobos	Masters	2015	2017
James Conrad	Ph.D.	2015	2019