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EDUCATION

Ph.D. Hydrology/Hydraulics, Department of Civil Engineering, Auburn University, 1992
M.S. Geoscience, Desert Research Institute, University of Nevada, Las Vegas, 1988
B.S. Geophysics, Department of Geological Sciences, University of California, Santa Barbara, 1986

PROFESSIONAL CREDENTIALS

Professional Engineer, State of Florida, Registration Number 53926

PROFESSIONAL EXPERIENCE

Auburn University, Department of Civil Engineering, Associate Professor, 2015-present
Auburn University, Department of Civil Engineering, Associate Research Professor, 2010-2015
Hayworth Engineering Science, Inc., President, 1999-2010
U.S. Air Force Research Laboratory (AFRL), Research Scientist, 1993-1999
Tennessee Valley Authority (TVA) Engineering Laboratory, Post-Doctoral Fellow, 1992-1993
Auburn University, Department of Civil Engineering, Doctoral Fellow, 1989-1992

PUBLICATIONS

Peer Reviewed Scientific Journals

Mulabagal, V., Wilson*, C., Hayworth, J.S., 2016. An UHPLC-MS/MS quantitative method for trace analysis of potential endocrine disrupting steroid hormones in estuarine sediments. *Rapid Communications in Mass Spectrometry*, accepted, 2016.

Yin*, F., Hayworth J.S., Clement, T.P., 2015. A tale of two recent spills – Comparison of 2014 Galveston Bay and 2010 Deepwater Horizon oil spill residues. *PLoS ONE*, 10(2): e0118098. doi:10.1371/journal.pone.0118098.

Yin*, F., John*, J.F., Hayworth, J.S., Clement, T.P., 2015. Long-term monitoring data to describe the fate of polycyclic aromatic hydrocarbons in Deepwater Horizon oil submerged off Alabama's beaches. *Science of the Total Environment*, 508(2015), 46-56.

Hayworth, J.S., Clement, T.P., Yin*, F., John*, G.F., 2015. Fate of Deepwater Horizon oil in Alabama's beach system: Understanding physical evolution processes based on observational data. *Marine Pollution Bulletin*, 90(2015), 95-105.

John*, G.F., Yin*, F., Mulabagal*, V., Hayworth, J.S., Clement, T.P., 2014. Development and application of an analytical method using gas chromatography-triple quadrupole mass spectrometry for characterizing alkylated chrysenes in crude oil samples. *Rapid Communications in Mass Spectrometry*, 28(8), 948-956.

Zheng*, M., Ahuja, M., Bhattacharya, D., Clement, T.P., Hayworth, J.S., Dhanasekaran, M., 2014. Evaluation of differential cytotoxic effects of the oil spill dispersant Corexit 9500. *Life Sciences*, 95(2), 108-117.

Mulabagal*, V., Yin*, F., John*, G.F., Hayworth, J.S., Clement, T.P., 2013. Chemical fingerprinting of petroleum biomarkers in Deepwater Horizon oil spill samples collected from Alabama shoreline. *Marine Pollution Bulletin*, 7(1-2), 147-154.

Hayworth, J.S., Clement, T.P., 2012. Provenance of COREXIT-related chemical constituents found in nearshore and inland Gulf Coast waters. *Marine Pollution Bulletin*, 64(10), 2005-2014.

Goswami, R., Clement, T.P., Hayworth, J.S., 2012. Comparison of numerical techniques used for simulating variable-density flow and transport experiments. *Journal of Hydrologic Engineering*, 17(2), 272-282.

Hayworth, J.S., Clement, T.P., 2011. BP's Operation Deep Clean—Could dilution be the solution to beach pollution? *Environmental Science & Technology*, 45(10), 4201-4202.

Hayworth, J.S., Clement, T.P., Valentine, J.F., 2011. Deepwater Horizon's impact on Alabama's beaches. *Hydrology and Earth Systems Sciences*, 15, 3639-3649.

Newman*, M.A., Hatfield, K., Hayworth, J.S., Rao, P.S.C., Stauffer, T.B., 2006. Inverse characterization of NAPL source zones, *Environmental Science & Technology*, 40(19), 6044-6050.

Newman*, M.A., Hatfield, K., Hayworth, J.S., Rao, P.S.C., Stauffer, T.B., 2005. A hybrid method for inverse characterization of subsurface contaminant flux. *Journal of Contaminant Hydrology*, 81(1-4), 34-62.

Crumbling, D.M., Hayworth, J.H., Johnson, R., Moore, M., 2004. The Triad Approach: A catalyst for maturing remediation practice. *Remediation: The Journal of Environmental Cleanup Costs, Technologies and Techniques*, 5(1), 3-19.

Crumbling, D.M., Hayworth, J.S., Call, B.A., Davis, W.M., Howe, R., Miller, D.S., Johnson, R., 2004. The maturing of the Triad Approach: Avoiding misconceptions. *Remediation: The Journal of Environmental Cleanup Costs, Technologies and Techniques*, 14(4), 81-96.

Hayworth, J.S., Burris, D.R., 1997. Nonionic surfactant-enhanced solubilization and recovery of organic contaminants from within cationic surfactant-enhanced sorbent zones: 2. Numerical Simulations. *Environmental Science and Technology*, 31(5), 1284-1289.

Hayworth, J.S., Burris, D.R., 1997. Nonionic surfactant-enhanced solubilization and recovery of organic contaminants from within cationic surfactant-enhanced sorbent zones: 1. Experiments. *Environmental Science and Technology*, 31(5), 1277-1283.

Hayworth, J.S., Burris, D.R., 1996. Modeling cationic surfactant transport in porous media. *Ground Water*, 34(2), 274-282.

Rose, K.A., Brenkert, A.L., Schohl, G.A., Onishi, Y., Hayworth, J.S., Holly, F., Perkins, W., Beard, L., Cook, R.B., Waldrop, W., 1994. Multiple model analysis of sediment transport and contaminant distribution in the Clinch River/Watts Bar Reservoir, Tennessee, USA. *Water Science & Technology*, 28(8-9), 65-78.

Oostrom, M., Hayworth, J.S., Güven, O., Dane, J.H., 1992. Behavior of dense aqueous phase leachate plumes in homogeneous porous media. *Water Resources Research*, 28(8), 2123-2134.

Oostrom, M., Dane, J.H., Güven, O., Hayworth, J.S., 1992. Quantitative investigation of dense contaminant plumes in an unconfined aquifer model. *Water Resources Research*, 28(9), 2315-2326.

Taylor, K., Wheatcraft, S., Hess, J., Hayworth, J.S., Molz, F.J., 1990. Evaluation of methods for determining the vertical distribution of hydraulic conductivity. *Ground Water*, 28(1), 88-98.

Taylor, K., Hess, J., Mazzella, A., Hayworth, J.S., 1990. Comparison of three methods to determine the vertical stratification of pore fluid. *Ground Water Monitoring Review*, Winter, 91-95.

Bloomsburg, G., Williams, R., Osiensky, J., Taylor, K., Wheatcraft, S., Hess, J., Hayworth, J.S., Molz, F.J., 1990. Permeability and Capillarity. *International Water Power & Dam Construction*, 42, 41-45, 1990.

* Graduate student or postdoctoral author

Books, Book Chapters, and Technical Research Reports

Hayworth, J.S., John, J., Clement, T.P., Mulabagal, V., 2013. Laboratory-Scale Investigation of a Method for Enhancing the Effectiveness of Oil Dispersants in Destabilizing Water-in-Oil Emulsions. U.S. Department of Interior, Bureau of Safety and Environmental Enforcement, Oil Spill Response Research Program, Project Number 681.

Hayworth, J.S., Clement, T.P., Anderson, J.B., LeBleu, C., 2013. Administrative & Technical Support in Evaluating Public Input on Potential Enhancements to the State Solid Waste Program, Phase 2. Framework for Changing Alabama's Approach to Solid Waste Management. Alabama Department of Environmental Management, G00006817.

Hayworth, J.S., Clement, T.P., Anderson, J.B., LeBleu, C., 2013. Administrative & Technical Support in Evaluating Public Input on Potential Enhancements to the State Solid Waste Program, Phase I. Potential Enhancements to the Alabama Solid Waste Landfill Permitting Process. Alabama Department of Environmental Management, G00006817.

Newman, M., Hayworth, J.S., Stauffer, T.B., 2002. Dense Nonaqueous Phase Liquid (DNAPL) Physical Modeling Study. U.S. Air Force Research Laboratory, AFRL/MLQR-TR-2002-0001.

Hayworth, J.S., Burris, D.R., 1997. Cationic Surfactant-Enhanced Sorption and Nonionic Surfactant-Enhanced Solubilization of Hydrophobic Organic Contaminants in Groundwater. United States Air Force Research Laboratory, AL/EQ-TR-1996-0054.

Rabideau, A.J., Andrews, C.B., Chiang, C., Grathwol, P., Hayworth, J.S., Culligan-Hensley, P., Manassero, M., Mercer, J.W., Mott, H., Schroeder, P.R., Shackelford, C., Teutsch, G., van Meurs, G.A.M., Wilhelm, R., Zheng, C., 1996. Containment Transport Modeling. In: Assessment of Barrier Containment Technologies, R. E. Rumer and J. K. Mitchell, Eds. PB96-180583. Springfield, Va.: National Technical Information Service.

Güven, O., Dane, J.H., Oostrom, M., Hayworth, J.S., 1992. Physical Model Studies of Dense Solute Plumes in Porous Media. Electric Power Research Institute, EPRI TR-101387.

Güven, O., Hayworth, J.S., 1990. A note on the roles of advection, transverse dispersion, and longitudinal dispersion in three-dimensional solute transport in porous media. Transport and Mass Exchange Processes in Sand and Gravel Aquifers: Field and Modeling Studies, G. Moltyaner, Editor, Atomic Energy of Canada, AECL-10308, 2, 469-494.

Invited Presentations

Hayworth, J.S., Anderson, J.B., 2015. Findings from the Alabama Solid Waste Management Study, Alabama Recycling Coalition Conference, Prattville, AL, July 16-17, 2015.

Hayworth, J.S., 2015. Alabama and Florida beaches and the Deepwater Horizon oil spill. Mississippi-Alabama Sea Grant, National Oceanic and Atmospheric Administration (NOAA), Navigating Shifting Sands: Oil on our Beaches workshop, Pensacola, Florida, August 5, 2015.

Hayworth, J.S., Clement, T.P., 2012. Deepwater Horizon Oil Spill Impacts on Alabama Beaches. Fifty-Fifth Annual Transportation Conference, Auburn University Samuel Ginn College of Engineering, Montgomery, Alabama February 23, 2012.

Hayworth, J.S., 2012. Alabama Solid Waste Study. Solid Waste Association of North America (SWANA), Alabama Chapter Spring Forum, Perdido Resort, Orange Beach, Alabama, November, 2012.

Hayworth, J.S., 2012. Alabama Solid Waste Study. Solid Waste Association of North America (SWANA), Alabama Chapter Fall Forum, Lake Guntersville, Alabama, November, 2012.

Hayworth, J.S., 2002. Dynamic Site Assessment and the EPA's Triad Approach. Air Force Center for Environmental Excellence (AFCEE), June 2002.

Hayworth, J.S., Anderson, M., 2000. Innovative Remediation Technologies in Military Applications. International Brownfields Conference, Atlantic City, NJ.

Presentations, Abstracts, and Proceedings

Mulabagal, V., Wilson, C., Hayworth, J.S., 2016. An UHPLC-MS/MS quantitative method for trace analysis of potential endocrine disrupting steroid hormones in estuarine sediments. 25 Years of Endocrine Disruption Research: Past Lessons and Future Directions, National Institute of Environmental Health Sciences (NIEHS), Bethesda, MD, September 18-20, 2016.

John, G.F., Yin, F., Mulabagal, V., Hayworth, J.S., Clement, T.P., 2014. Development of a Novel Analytical Method Using Gas Chromatography-Tandem Mass Spectrometry for Characterizing Alkylated Chrysenes in Crude Oil Samples. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Mobile, AL, January 26-29, 2014.

Yin, F., John, G.F., Mulabagal, V., Hayworth, J.S., Clement, T.P., 2014. A Long-Term Investigation of Spatial and Temporal Distribution of Polycyclic Aromatic Hydrocarbons in Deepwater Horizon Oil Spill Samples Collected from Alabama Shoreline. Gulf of Mexico Oil Spill and Ecosystem Science Conference, Mobile, AL, January 26-29, 2014.

Clement, T.P., Hayworth, J.S., 2013. What can the petroleum hydrocarbon remediation industry learn from Deepwater Horizon oil spill (and vice versa)? MODFLOW and MORE 2013 Conference, Translating Science into Practice, Colorado School of Mines, June 2-5, 2013.

John, G., Clement, T.P., Hayworth, J.S., Mulabagal, V., Yin, F., 2013. Fate of Deepwater Horizon submerged oil and the associated tar balls in Alabama's beach environment. ASCE 2013 World Environmental & Water Resources Congress, Cincinnati, Ohio, May 19-23, 2013.

Clement, T.P., Hayworth, J.S., Mulabagal, V., Yin, F., John, G., 2013. NAPL contamination of beach environment—Lessons learned from the Deepwater Horizon oil spill. IAHS International Groundwater Quality Conference (GQ13), University of Florida, April 21-26, 2013.

Mulabagal, V., Yin, F., John, G., Hayworth, J.S., Clement, T.P., 2013. Chemical fingerprinting of hopane biomarkers in Deepwater Horizon oil spill samples collected along Alabama shoreline. Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA, January 21-23, 2013.

Yin, F., John, G., Mulabagal, V., Hayworth, J.S., Clement, T.P., 2013. Quantitation of USEPA priority PAHs in Deepwater Horizon oil spill samples using GC/MS/MS methods. Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA, January 21-23, 2013.

John, G., Yin, F., Mulabagal, V., Hayworth, J.S., Clement, T.P., 2013. Detection and quantitation of alkylated PAHs in Deepwater Horizon oil spill samples by GC/MS/MS methods. Gulf of Mexico Oil Spill & Ecosystem Science Conference, New Orleans, LA, Jan 21-23, 2013.

Clement, T.P., Hayworth, J.S., Mulabagal, V., Yin, F., John, G., 2012. Impacts of Hurricane Isaac and Tropical Storm Lee on mobilizing Deepwater Horizon oil spill residues along Alabama's beaches. Special Symposium on Deepwater Horizon/MC252 Well Incident Update: What Have We Learned? Society of Environmental Toxicology and Chemistry Annual Meeting (SETAC), Long Beach, California, Nov 11-15, 2012.

Hayworth, J.S., 2012. Impacts of Deepwater Horizon Oil Spill On Beaches—An Analysis of the Past, Present, and Future Status of Alabama's Beaches, NGWA Focus Conference on Gulf Coast Groundwater Issues, National Ground Water Association.

Newman, M., Hatfield, K., Hayworth, J.S., Stauffer, T., 2001. Contaminant Mass Flux Estimation Using Down-Gradient Monitoring. EOS, Transactions, American Geophysical Union, 1, 0365.

Burris, D.R., Lorah, M., Dyer, L.J., Hayworth, J.S., Antworth, C.P., 1999. Natural attenuation of chlorinated solvents in wetlands. SERDP/ESTCP-Partners in Environmental Technology Technical Symposium and Workshop, Arlington, VA, Nov. 30-Dec. 2, 1999.

Hayworth, J.S., Stauffer, T.B., Hatfield, K., 1997. Dissolution of multiple DNAPL residual zones in three-dimensional subsurface flow systems: Experiments. EOS, Transactions, American Geophysical Union, 78(17).

Newman, M.A., Hatfield, K., Hayworth, J.S., Stauffer, T.B., 1997. Contaminant prediction errors derived from ill-defined groundwater contaminant sources characterized by inverse modeling. EOS, Transactions, American Geophysical Union, 78(17).

Hayworth, J.S., Burris, D.R., 1996. Cationic and nonionic surfactant-enhanced remediation of contaminants in groundwater. Emerging Technologies in Hazardous Waste Management VIII, Extended Abstracts, Special Symposium, Industrial & Engineering Chemistry Division, Birmingham, Alabama.

Hayworth, J.S., Newman, M.A., Stauffer, T.B., 1996. An experimental investigation of multicomponent residual-phase DNAPL dissolution in three-dimensional subsurface systems. Annual Meeting of the Geological Society of America, Denver, Colorado.

Hayworth, J.S., Burris, D.R., 1996. Nonionic surfactant-enhanced solubilization of organic contaminants from within cationic surfactant-enhanced sorbent zones. EOS, Transactions, American Geophysical Union, 77(16).

Newman, M.A., Hayworth, J.S., Hatfield, K., Stauffer, T.B., 1996. Modeling subsurface source uncertainty. EOS, Transactions, American Geophysical Union, 77(16).

Hayworth, J.S., Burris, D.R., 1994. Modeling the transport of a cationic surfactant in porous media: Implications for enhanced sorption zone technology. 15th Annual Meeting of the Society of Environmental Toxicology and Chemistry, Denver, Colorado.

Dane, J.H., Güven, O., Oostrom, M., Hayworth, J.S., Leijnse, A., 1994. Dense aqueous phase contaminant plume behavior near the groundwater table. International Conference on Future Groundwater Resources at Risk, IAHS Publications-Series of Proceedings and Reports-Intern Assoc Hydrological Sciences, Finnish Ministry of Environment, Helsinki, Finland 222, 333-340.

Rose, K.A., Brenkert, A.L., Hayworth, J.S., Schohl, G.A., Onishi, Y., Holly, F., Perkins, W., Waldrop, W.R., Beard, L.M., Cook, R.B., 1993. Multiple model analysis of sediment transport and contaminant distribution in the Clinch River/Watts Bar Reservoir, Tennessee. Proceedings of the Conference on Contaminated Aquatic Sediments: Historical Records, Environmental Impact, and Remediation, Milwaukee, WI, June, 1993.

Hayworth, J.S., Güven, O., Dane, J.H., 1993. A physical and numerical model study of three-dimensional behavior of dense solute plumes in porous media. EOS, Transactions, American Geophysical Union, 74(16).

Hayworth, J.S., Oostrom, M., Güven, O., Dane, J.H., Melville, J.G., 1991. Visualization studies of dense leachate plumes in porous media. National Conference on Hydraulic Engineering and International Symposium on Groundwater, American Society of Civil Engineers (ASCE), Nashville, Tennessee.

Hayworth, J.S., Güven, O., Dane, J.H., Oostrom, M., 1991. Experimental studies of dense solute plumes in porous media. EOS, Transactions, American Geophysical Union, 72(16).

Dane, J.H., Güven, O., Oostrom, M., Hayworth, J.S., 1991. Stability and mixing of dense aqueous phase plumes in porous media. EOS, Transactions, American Geophysical Union, 72(16).

Oostrom, M., Dane, J.H., Güven, O., Hayworth, J.S., Hill, W.E., 1991. Concentration measurements in dense leachate plumes using a gamma radiation system. In: Proceedings of the International Symposium on Groundwater. G.P. Lennon, Ed. American Society of Civil Engineers, New York, NY, 287-292.

Oostrom, M., Dane, J.H., Hayworth, J.S., Missildine, B.C., 1991. Quantitative analysis of dense leachate plumes in a porous medium. Soil Science Society of America, Annual Meeting, Denver, Colorado.

Missildine, B.C., Oostrom, M., Dane, J.H., Güven, O., Hayworth, J.S., 1991. Flow visualization studies of dense leachate plumes in homogeneous porous media. Soil Science Society of America, Annual Meeting, Denver, Colorado.

Taylor, K., Molz, F., Hayworth, J.S., 1988. A single well electrical tracer test for the determination of hydraulic conductivity and porosity as a function of depth. Proceedings of the Second National Outdoor Action Conference on Aquifer Restoration, Ground Water Monitoring, and Geophysical Methods, National Water Well Association, Dublin, OH, 925-938.

HONORS AND AWARDS

United States Department of Energy Doctoral Research Fellowship (1991-1993)

Outstanding Graduate Student, Auburn University (1991-1992)

George B. Maxey Award in Water Resources, Desert Research Institute (1987)

Outstanding Thesis/Dissertation Award, University of Nevada (1988)

Phi Kappa Phi (1987)

PROFESSIONAL MEMBERSHIPS

American Geophysical Union

American Society of Professional Engineers

MILITARY SERVICE

United States Air Force Special Operations, Pararescue, 1977-1981.