

## Curriculum Vita for Daryl F. Dwyer

**Personal:** University of Toledo, Department of Environmental Sciences  
2801 West Bancroft Street, Toledo, OH 43606-3390  
Tel: (419) 530-2661; email: daryl.dwyer@utoledo.edu  
Languages: English, German

**Curriculum:** Ph.D. (1986) Microbiology  
M.A. (1981) Environmental Biology  
B.S. (1978) Biology, Psychology

### Employment:

2008 Associate Professor, Department of Environmental Sciences, and Director, Stranahan Arboretum, The University of Toledo, Toledo, OH  
2001 Associate Professor, Department of Earth, Ecological and Environmental Sciences, The University of Toledo, Toledo, OH  
1993 Associate Professor, Department of Civil Engineering, University of Minnesota, Minneapolis, MN  
1988 Project Leader in Applied Microbial Ecology, Federal Institute for Biotechnological Research (GBF), Germany  
1987 Maitre d'Assistant, University of Geneva, Switzerland  
1986 Research Assistant, University of Geneva, Switzerland  
1981 Research and Teaching Assistant, Michigan State University  
1978 Research and Teaching Assistant, State University of New York at Buffalo  
1976 Laboratory and Teaching Assistant, Wilkes College, PA

### Education:

1987 NSF Postdoctoral Fellowship: "Genetic analysis of the response of soil bacterial ecosystems to 2,4-dichloro-phenoxyacetic acid and other xenobiotic ether compounds"  
1986 Ph.D. (Michigan State Univ.), Thesis: "Anaerobic biodegradation of ether compounds by ether bond-cleaving bacteria and methanogenic consortia", Advisor: Prof. James M. Tiedje  
1981 M.A. (SUNY/Buffalo), Thesis: "Synergistic effect of light, temperature and copper on the growth of *Scenedesmus quadricauda*", Advisor: Prof. John F. Storr. Activities: Graduate Council Representative  
1978 B.S. (Wilkes College), Activities and Awards: Academic Standing Co., Curriculum Co., President's Council on Teacher Effectiveness, President of American Institute of Biological Sciences Chapter, Wilkes College Biological Research Award, Sigma XI, Who's Who in American Colleges and Universities, Student Council Representative

### Professional Societies:

American Chemical Society, American Society for Microbiology, Sigma Xi

### Research Experience:

Environmental Restoration, Brownfield Remediation, Bioremediation, Phytoremediation, Natural Attenuation of Environmental Pollutants, Applied Microbial Ecology and Physiology, Design and Risk Assessment of Genetically Engineered Microorganisms, Molecular Biology, Anaerobic Microbiology, Limnology, Marine Reef Ecosystem Studies

## Research Projects

Research projects are centered on developing strategies for the bioremediation and restoration of polluted environments. Projects initiated prior to 2001:

1. Addition of non-indigenous bacteria, including genetically engineered microorganisms, to a contaminated aquifer. This project was in cooperation with the U.S. Geological Survey at the U.S.G.S. Groundwater Contamination Study Site (Cape Cod, MA). Primary goals were to define:
  - (a) *in situ* conditions that are conducive to rapid degradation of target pollutants by non-indigenous microorganisms, and
  - (b) ecological and bioremediative effects which follow addition of genetically engineered microorganisms to aquifers.
2. Development of techniques using molecular biology to identify and track target microbes in the environment and to measure the effect of man's activities on the structure and activity of indigenous microbial ecosystems.
3. Genetic and physiological analysis of diaryl ether-degrading bacteria. Genes encoding a dioxygenase responsible for the catalytic cleavage of diaryl rings have been cloned and sequenced. Bacteria with genetically modified catabolic pathways capable of degrading recalcitrant pesticides were developed and their fate and activities analyzed in soils containing phenoxybenzoate-based chemicals.
4. Modeling natural attenuation of TCE in a marshland receiving TCE-contaminated groundwater. Additional objectives were to analyze the potential for oxidation of TCE by methanotrophs and to observe any influence on the rate of degradation of TCE by vegetation.
5. Analysis of biostimulation of indigenous microorganisms used to accelerate the removal of organic wastes from a contaminated aquifer that threatens to impact the Cedar River (IA). The organic compounds were waste products from a former manufactured gas plant.
6. Development of an organo-solv process for the recovery of industrial products from oat hull residues. This project was done in cooperation with and funded by the Biological Process Technology Institute, University of Minnesota.

Projects initiated at the University of Toledo:

7. Assessing the source(s) and modeling the occurrence of *Escherichia coli* in Maumee Bay, Lake Erie. The influence of applying sewage sludge to agricultural fields is a top priority with respect to fecal contamination-induced beach closings at Maumee Bay State Park, Ohio.
8. Bioremediation of the King Road Landfill, Sylvania, Ohio. Long-term goals for the landfill include restoration and containment of waste. The project resulted in acceptance of an alternative closure plan by Ohio EPA that uses our design of an evapotranspiration cover. The UT bike trail is being expanded through the landfill to allow for public outreach and education for the project.
9. Development of a passive, biological treatment process for arsenic contaminated water and soil. Pant species native to Ohio were identified as able to remove arsenic from soils and were incorporated into a pilot-scale wetland to treat industrial wastes; unfortunately, a multi-national firm purchased the company with which we were partnered and interest in treatment lapsed.

10. Restoration of a small watershed to reduce levels of phosphorus and *Escherichia coli* entering Lake Erie at Maumee Bay State Park (MBSP), Oregon, OH. Two proposals were funded through the Great Lakes Restoration Initiative (US EPA) to construct wetlands and restore a section of Wolf Creek with the aim of improving water quality at the lakeside swimming beaches. Construction was completed in 2015; water quality is being monitored to determine if treatment will result in delisting of this beneficial use impairment (BUI) for the Maumee AOC.
11. A GLRI-funded proposal was obtained through the Forest Service (USDA) to remediate two brownfields in Toledo, Ohio. A bioswale to treat surface runoff along the shore of the Ottawa River was constructed at the site of the former Jeep Plant and a bioberm to treat cyanide in groundwater before it reaches Swan Creek was constructed at the site of a former manufactured gas plant. Both projects use phytoremediation for contaminant uptake and containment.

## Courses Taught

### University of Toledo

Course Number	Date	Title (Enrollment)
EEES 49/6980-001	Spring 2002	Phytoremediation
EEES 49/6980-002	Spring 2002	Environmental Microbiology
EEES 49/6980-002	Fall 2002	Bioremediation
EEES 41/51/7150-001	Spring 2003	Evolution/Organic Evolution
EEES 49/6980-002	Spring 2003	Environmental Microbiology
EEES 49/69/8980-002	Fall 2003	Bioremediation
EEES 2150	Fall 2003	Biodiversity
EEES 41/51/7150	Spring 2004	Evolution/Organic Evolution
EEES 49/6980	Spring 2004	Environmental Microbiology
EEES 2150	Fall 2004	Biodiversity
EEES 69/8980	Spring 2005	Remediation and Restoration Ecology
EEES 2150	Fall 2005	Biodiversity
EEES 2160	Fall 2005	Biodiversity Laboratory (3 sections)
EEES 69/8980	Spring 2006	Remediation and Restoration Ecology
EEES 49/6980	Fall 2006	Bioremediation
EEES 69/8980	Spring 2007	Remediation and Restoration Ecology
EEES 49/6980	Summer 2007	Phytoremediation – Field Course
EEES 2150	Fall 2008	Biodiversity (440)
EEES 69/8980	Spring 2009	Restoration Ecology (9)
EEES 2150	Fall 2009	Biodiversity (313)
EEES 69/8980	Spring 2010	Restoration Ecology (10)
EEES 2150	Fall 2010	Biodiversity (71)
EEES 66/8600	Fall 2010	Foundations of Ecology (10)
EEES 45/5510	Spring 2011	Environmental Microbiology (9)
EEES 2150	Fall 2011	Biodiversity (260)
EEES 3900	Spring 2012	Lit and Comm in Enviro Sci WAC (25)
EEES 2150	Fall 2012	Biodiversity (51)
EEES 45/5510	Fall 2012	Environmental Microbiology (15)
EEES 3900	Spring 2013	Lit and Comm in Enviro Sci WAC (23)
EEES 45/5510	Fall 2013	Environmental Microbiology (5)
EEES 3900	Spring 2014	Lit and Comm in Enviro Sci WAC (24)
EEES 49/69/8980	Spring 2014	Restoration Ecology (10)
EEES 49/69/8980	Fall 2014	Restoration Ecology (4)

EEES 3900	Spring 2015	Lit and Comm in Enviro Sci WAC (22)
EEES 2150	Fall 2015	Biodiversity

### **University of Minnesota**

Course Number and Title:

CE 3500	Introduction to Environmental Engineering
CE 5501	Analysis and Design of Wastewater Systems
CE 5507	Environmental Engineering Laboratory*
CE 5515	Water and Wastewater Microbiology
CE 8508	Groundwater Microbiology*
CE 8509	Environmental Microbiology*

\*Courses having a laboratory component

### **Technical University of Braunschweig**

Laboratory Course in Ecology and Physiology of Microorganisms

### **University of Geneva**

Microbiology for Medical Students

### **Michigan State University**

Microbial Ecology

### **Graduate Student Supervision**

#### **University of Toledo**

#### **Completed Ph.D. Degrees**

Jordan Rofkar: "An ecologically engineered system for remediation of arsenic-contaminated water: selecting plant species for northwest Ohio." Ph.D. Start date: 1/06. Defense date: 4/10

Kris Barnswell: "Determining preliminary components for a landfill evapotranspiration cover." Ph.D. Candidate. Start date: 1/06. Defense date: 4/10.

#### **Completed M.S. Degrees (Research Theses)**

Jordan Rofkar: "Arsenic accumulation by plant species selected for growth in northwest Ohio." MS Candidate in Ecology. Start date: 9/03. Defense date: 8/05.

Kris Barnswell: "Phytoremediation potential at an inactive landfill in northwest Ohio." MS Candidate in Ecology. Start date: 9/03. Defense date: 8/05.

Jona Scarbro: "Microbial transport through the vadose zone of a biosolid amended cropland: implications for land application of class B biosolids and surface water quality." Start date: 8/04. Defense date: 8/06.

Pamela Struffolino: "Identifying Sources of *Escherichia coli* to Maumee Bay, Oregon, Ohio." Start date: 5/03. Defense date: 8/07.

Matthew Gorr: "Arsenic Remediation Using Constructed Treatment Wetlands." Start date: 9/09. Defense date: 12/11.

Danielle Long: "The Role of Retention Time and Soil Depth on the Survival and Transport of *Escherichia coli* and *Enterococcus* spp. in Biosolid-amended Agricultural Soil." Start date: 8/11. Defense date: 4/14.

Ryan Jackwood: "Predicting Fate and Transport of Fecal Bacteria through Soils Using an Advection-Dispersion Model." Start date: 8/11. Defense date: 12/13.

### **Completed M.S. Degrees (Non-research Theses)**

Harrison Murbi: "Use of geospatial technology to map invasive species in the Great Lakes Region." Start date: 8/04. Defense date: 6/06.

Sara Mierzwiak: "Enhanced in situ bioremediation of a TCE hotspot using a dilute vegetable oil emulsion." Co-Advised with J. Martin-Hayden. Start date: 9/05. Defense date: 8/06.

Mary Lynn Muehleisen: "Restoration of hydrology in the Florida Everglades." Start date 6/09. Defense date: 5/12.

### **University of Minnesota**

#### **Completed Ph.D. Degrees**

Rolf Halden: "Soil microcosm studies designed to determine the fate and activity of non-indigenous, diaryl ether degrading bacteria." Started 1/4/93. Defense May 1997.

Marc Von Keitz: "Resource recovery in the food processing industry: simultaneous production of dietary fiber and xylose for xylitol fermentation from oat hulls." Started 9/15/94. Defense June 2000. Presently employed as research assistant, BioProcess Technology Institute, University of Minnesota, MN.

Don E. Richard: "Natural attenuation of manufactured gas plant (MGP) residuals in a shallow aquifer at the site of the Waterloo Coal Gassification Plant." Started 9/15/97. Defense September 2003. Presently employed as Principal Investigator, Barr Engineering, Minneapolis, MN.

#### **Completed M.S. Degrees (Research Theses)**

Erik Peters: "Fate and activity of *Pseudomonas pseudoalcaligenes* strain POB310 in soils contaminated with phenoxybenzoates." Started 9/15/93. Defense May 1997. Presently employed by Bonestroo Rosene Anderlik & Associates, Inc.

Gary Mundfrom: "Development of nucleic acid probes for detection of genes encoding the 16S rDNA and 4POB-dioxygenase of *Pseudomonas pseudoalcaligenes* strain POB310 in environmental samples." Started 1/4/93. Defense August 1997. Presently employed by Delta Environmental Consultants.

Keith Anderson: "Parameters affecting the transport of bacteria in aquifer sediment columns." Started 9/15/93. Defense August 1997. Presently employed by Minnesota Extension Service, Water Resources Branch.

Sandra Tepp: "Survival and activity in soil of *Pseudomonas* sp. strain B13 (pPOB): a bacterium designed for the degradation of phenoxybenzoates." Started 9/15/95. Defense January 1998. Presently employed by Remediation Technologies, Inc.

Julie Sullivan: Modeling the subsurface transport of genetically engineered microorganisms in a sand-gravel aquifer, Cape Cod, MA. Started 6/15/96. Defense August 1999. Presently employed by Barr Engineering, Co.

Jamie Bankston: Bioattenuation of trichloroethylene by methanotrophic bacteria in a TCE-contaminated marshland. Started 9/15/97. Defense August 1999. Presently employed by Camp, Dresser and McKee, Inc.

Troy Twesme: Modeling natural attenuation of a TCE plume in subsurface sediments and a wetland ecosystem. Started 6/15/98. Defense August 1999. Presently with the U.S. Air Force, Korea.

### **Completed M.S. Degrees (Non-research Theses)**

Zelma Ziemann: "*In situ* bioremediation of a contaminated site: A proposed evaluation plan." 1994.

Rolf Ulrich Halden: "Biotransformation of polychlorinated dibenzo-p-dioxins, dibenzofurans, and diphenyl ethers." 1994.

Scott Abrams: "Data analysis of off-gas from an air-sparged landfill to be used for determining rates of biodegradation." 1997.

William Raatz: "Use of genetically engineered microorganisms for *in situ* bioaugmentation." 1999.

Dean Langenfeld: "Modification of the Twesme subsurface contaminant-transport model for use in heterogeneous environments." 2000.

Jennifer Kersten: "Polycyclic Aromatic Hydrocarbons (PAHs): Bacteria and Their Target Compounds." 2001.

### **Gesellschaft für Biotechnologische Forschung (Germany):**

#### **Completed Ph.D. Degrees**

Mary Lou Krumme: "Development of aquifer microcosms and *in situ* methods to test the fate and function of pollutant-degrading microorganisms." 1993.

Jörg Egestorff: "Establishment and standardization of aquifer microcosms used to predict *in situ* survival, function and ecological effects of GEMs designed to degrade environmental pollutants." 1993.

Uwe Dehmel: "Genetic analysis of the catabolic pathway for 4-phenoxybenzoate in *Pseudomonas pseudoalcaligenes* strain 310." 1994.

#### **Completed M.S. Degrees**

Klaus Nüßlein: "Development of activated sludge microcosms for predicting the *in situ* fate of microorganisms." 1990.

Maren Brunke: "Kinetic analysis of the microbial degradation of substituted aromatic compounds in a microcosm." 1991.

## **Recent Research Funding:**

### **Projects funded at the University of Toledo:**

Reduction of Sediment and Bacteria Loadings to Public Beaches at Maumee Bay State Park via Enhanced Riparian Habitat. (\$472,491). 2012-2016. USEPA. PI: Daryl F. Dwyer

Phytoremediation of Brownfields in Toledo, Ohio. (\$478,276). 2012-2014. US Forest Service, Ohio Department of Natural Resources. PI: Daryl F. Dwyer.

Bathing Beach Monitoring Project, Maumee Bay State Park. (\$13,146). 2012. Ohio Department of Health. PI: Daryl F. Dwyer.

Maumee AOC, Wolf Creek: Passive Treatment Wetland to Improve Nearshore Health and Reduce Nonpoint Source Pollutants. (\$1,348,945). 2011-2016. USEPA. PI: Daryl F. Dwyer.

Prevention of Surface Water Contamination from Biosolids Application. (\$550,228). 2010-2013. USEPA. PI: Kevin Czajkowski, co-PI's Daryl Dwyer, Allison Spongberg, Von Sigler

Lake Erie wetlands and shoreline restoration: MBSP phytoremediation. (\$504,504). 2009-2012. U.S. Department of Agriculture. PI: Daryl F. Dwyer.

Monitoring agricultural sewage sludge application, OH. (\$836,503). 2008-2011. U.S. Department of Agriculture. PI: Kevin Czajkowski, Co-PI's: Michael Bisesi, Robert Vincent, Sherri Milz, Von Sigler, Alison Spongberg, Daryl F. Dwyer, Ashok Kumar, Sadik Khuder, Brian Fink, Farhang Akbar, Hiro Iseki, Brian Alam, Brian Harrington.

Phytoremediation and plant research, OH: Wetlands. (\$537,221). 2008-2012. U.S. Department of Agriculture. PI: Daryl F. Dwyer, Co-PI's: Von Sigler, Alison Spongberg, Defne Apul.

Stream gage installation, Maumee River GIS. (\$120,038). 2007- 2010. Natural Resources Conservation Service. PI: Daryl F. Dwyer.

Phytoremediation, Design of treatment wetlands. (\$511,475). 2007-2008. U.S. Department of Agriculture. PI: Daryl F. Dwyer, Co-PI's: David Krantz, Timothy Fisher, Kevin Egan, Alison Spongberg.

Sewage sludge application. (\$845,017). 2007-2008. U.S. Department of Agriculture. PI: Kevin Czajkowski, Co-PI's: Alison Spongberg, Von Sigler, Daryl F. Dwyer, Robert Vincent, and Michael Bisesi.

Remediation of sites containing mixed contaminants. (\$721,853). 2006-2010. U.S. Department of Agriculture. PI: Daryl F. Dwyer, CO-PI's Kevin Czajkowski and Jonathan Bossenbroek.

Maumee Bay State Park shoreline and wetland restoration plan. (\$14,649). 2006-2007. Ohio Department of Natural Resources. PI: Daryl F. Dwyer, Co-PI: Kevin Egan.

Monitoring Agricultural Sewage Sludge, Ohio. (\$1,192,586). 2006-2010. U.S. Department of Agriculture. PI: Kevin Czajkowski, Co-PI's: Alison Spongberg, Daryl F. Dwyer, and Von Sigler.

Development of a passive phytoremediation treatment system for arsenic contaminated water. 2005-2009. (\$728,882), U.S. Department of Agriculture. PI: Daryl F. Dwyer; Co-PI's: Johan Gottgens, James Martin-Hayden, Defne Apul.



Monitoring of agricultural sewage sludge applications and possible health effects in NW Ohio. 2005-2008. (\$1,194,995). U.S. Department of Agriculture. PI: Kevin Czajkowski, Co-PI's: Alison Spongberg, Von Sigler, and Daryl F. Dwyer.

Population-based molecular-tracking of fecal coliform reservoirs in Maumee Bay. 2005-2007. (\$61,467). Ohio Lake Erie Commission. PI: Von Sigler, Co-PI: Daryl F. Dwyer.

Phytoremediation Plant Research III. 2004-2006. (\$532,233). U.S. Department of Agriculture. PI: Daryl F. Dwyer, Co-PI's: Alison Spongberg, David Krantz, and Von Sigler.

Restoration of King Road Landfill, Lucas County, Ohio. 2003-2005. (\$595,156). U.S. Department of Agriculture. PI: Daryl F. Dwyer, Co-PI's: Alison Spongberg and David Krantz.

Identification of proximate sources of fecal contamination to Maumee Bay by determining concentrations of *Escherichia Coli* in sediments. 2003-2005. (\$141,414). Ohio Water District Association through TMACOG (Toledo Metropolitan Area Council of Governments). PI: Daryl F. Dwyer

Phytoremediation plant research. 2002-2004. (\$282,020). U.S. Department of Agriculture. PI: Daryl F. Dwyer, Co-PI's: Alison Spongberg and Deborah Neher.

Molecular characterization of bacterial communities in contaminated soils. 2002. (\$5,000). Ohio Board of Regents. PI: Daryl F. Dwyer.

#### **Selected projects funded prior to coming to the University of Toledo:**

Natural Bioremediation of MPG residues at the Waterloo Coal Gassification Plant Site, 1998-2000. (\$157,200). MidAmerican Energy Co.

Intrinsic bioremediation of trichloroethylene. 1997-1999. (\$72,596). Alliant Engineering, Inc.

*In situ* bioremediation of aquifers by introduced bacteria. 1994-1998. (\$306,195). U.S. Environmental Protection Agency.

Bioremediation of diaryl ethers by *Pseudomonas pseudoalcaligenes* strain POB 310. 1994-1998. (\$208,729). National Science Foundation.

In situ biodegradation of diaryl ethers by *Pseudomonas pseudoalcaligenes* POB 310 - II. 1994-1995. (\$17,300). Graduate School of the University of Minnesota. PI.

In situ biodegradation of diaryl ethers by *Pseudomonas pseudoalcaligenes* POB 310. 1993-1994. (\$17,380). Graduate School of the University of Minnesota. PI.

Establishment of methods for molecular microbial ecology. 1991-1993. (DM 3,850,000) German Ministry for Research and Technology. Written with Prof. Dr. K.N. Timmis and others to establish a general research program in microbial ecology in the Department of Microbiology, GBF.

Genetic engineering of PCB-degrading bacteria and analysis of their biological safety, PCB-degrading activity and gene stability in rhizosphere and river sediment microcosms. 1991-1993. (DM 320,000) European Community Grant. Cooperative project with Prof. F. O'Gara, University College Cork, Ireland.

Analysis of *in situ* behavior of genetically engineered bacteria in standardized microcosms. 1989-1991. (DM 220,000) European Community Grant. Development of activated sludge microcosms for risk assessment concerning introduction of GEMs into the environment. Cooperative project with Dr. J. L. Ramos, CSIC, Granada, Spain.

Development of aquifer microcosms and *in situ* methods to test the fate and function of pollutant-degrading microorganisms. 1988-1991. (\$123,344) U.S. Department of Energy. Cooperative project with Prof. J. M. Tiedje, MSU, Michigan and Dr. R. L. Smith, U.S.G.S., Boulder, CO.

**Invited Speaker:**

1. Laboratory evolution of *Pseudomonas* strains able to decompose environmental pollutants, and their behavior in model ecosystems. 1988. International Pseudomonas-symposium. Lund University, Malmo, Sweden.
2. Detection and enumeration of genetically engineered microorganisms in aquatic microcosms. 1989. Biochemical and gene technological methods in studies in microbial ecology. Danish Research Academy, Copenhagen, Denmark.
3. Problems with the release of genetically altered microorganisms. 1989. ECOINFORMA. Bayreuth, Germany.
4. Einsatz gentechnisch modifizierter Mikroorganismen in der Umwelt, einschliesslich der Freisetzungsproblematik. 1989. GBF Internal Seminar. Braunschweig, Germany.
5. Development and testing of a chloro- and methyl-benzoate degrading *Pseudomonas*. 1990. Gentechnology. Kopenhagen, Denmark.
6. Genetically engineered microorganisms and their potential use in bioremediation processes. 1990. EC Comett Workshop: The Impact of Biotechnology in the 1990's. University College Cork, Cork Ireland.
7. Fate and behavior in an activated sludge microcosm of genetically-engineered microorganisms. 1990. Italian Association of Biologists: Transfer of genetic informations and fate of engineered microorganisms in natural ecosystems. Giardini di Naxos, Italy.
8. Development of genetically engineered microorganisms and testing of their fate and activity in microcosms. Eurocourse: Scientific-Technical backgrounds for Biotechnology Regulation. CEC Joint Research Centre, Ispra, Italy.
9. Application of Biotechnology for Environmental Pollution Treatment. 1991. Dublin, Ireland.
10. Development of genetically engineered microorganisms and testing of their fate and activity in microcosms. 1992. 2nd International Symposium on the Biosafety Results of Field Tests of Genetically Modified Plants and Microorganisms. Goslar, Germany.
11. Studies used to predict the potential applicability of genetically engineered microorganisms for *in situ* bioremediation. 1994. Department of Microbiology. University of Montana, Bozeman, MT.
12. Bioremediation of contaminated soils and aquifers using genetically engineered microorganisms. 1996. Department of Environmental Engineering Sciences. California Institute of Technology, Pasadena, CA.

13. *In situ* bioremediation of aquifers: Bioaugmentation using genetically engineered microorganisms. 1996. Gordon Research Conference, Environmental Sciences - Water, NH.
14. Bioremediation: Using bacteria in clean-up efforts. 2002. Taking the brown out of brownfields, Legal Institute of the Great Lakes, University of Toledo, OH.
15. Maumee Bay bacterial studies. 2005. Lake Erie Center, University of Toledo, Oregon, OH.
16. Quality and sustainability of the Great Lakes: restoration, legislation and research. 2006. League of Women Voters. Holland, OH.
17. Maumee Bay Bacterial Studies. 2006. SE Michigan Environmental Health Directors' Meeting. Ann Arbor, MI.

**Invited Workshop Participant:**

1. Molecular Approaches to Ecosystems Research. 1991. U.S.D.O.E. Workshop. Asilomar, CA.
2. Strategies and Mechanisms for Field Research in Environmental Bioremediation. 1993. American Academy of Microbiology (ASM). San Antonio, TX.
3. EPA Workshop on Environmental Release of Genetically Engineered Microorganisms. 1996. Washington, DC.
4. Phytoremediation and bioremediation of brownfields. 2012. Ohio Brownfield Conference. Columbus, OH. May 2012.

**Symposia/Workshops Organized:**

Environmental Biotechnology, 1990: EERO-GBF Sponsored Symposium, Braunschweig, Germany.

Molecular Microbial Ecology, 1990: EERO Workshop, Braunschweig, Germany.

Sigma Xi Symposium, 2002-4: Division Chair for Biological Sciences, University of Toledo, Toledo, OH.

Director of the Regional Sigma Xi Symposium, 2005-010, University of Toledo, Toledo, OH

**Publications:**

1. Lovley, D. R., D. F. Dwyer, and M. J. Klug. 1982. Kinetic analysis of competition between sulfate reducers and methanogens for hydrogen in sediment. *Applied and Environmental Microbiology*. **43**:1371-1379.
2. Dwyer, D. F. and J. M. Tiedje. 1983. Degradation of ethylene glycol and polyethylene glycols by methanogenic consortia. *Applied and Environmental Microbiology*. **46**:185-190.

3. Dwyer, D. F., M. L. Krumme, S. A. Boyd, and J. M. Tiedje. 1986. Kinetics of phenol biodegradation by an immobilized methanogenic consortium. *Applied and Environmental Microbiology*. **52**:345-351.
4. Dwyer, D. F. and J. M. Tiedje. 1986. Metabolism of polyethylene glycol by two anaerobic bacteria, *Desulfovibrio desulfuricans*, and a *Bacteroides* sp. *Applied and Environmental Microbiology*. **52**:852-856.
5. Dwyer, D. F., E. Aerssens, D. R. Shelton, and J. M. Tiedje, 1988. Bioenergetic conditions of butyrate metabolism by an obligately syntrophic anaerobic bacterium in coculture with hydrogen-oxidizing methanogenic and sulfidogenic bacteria. *Applied and Environmental Microbiology*. **54**:1354-1359.
6. Dwyer, D. F., F. Rojo, and K. N. Timmis. 1988. Bacteria with new pathways for the degradation of pollutants and their fate in model ecosystems, p. 100-109. *In* W. Klingmueller (ed.), *Risk Assessment for Deliberate Releases*. Springer-Verlag, Berlin.
7. Dwyer, D. F., S. W. Hooper, F. Rojo, and K. N. Timmis. 1988. Fate of genetically-engineered bacteria in activated sludge microcosms, p. 267-276. *In* J. M. Lopez-Pila, E. Seeber, and K. Jander (eds.), *Viren und Plasmide in der Umwelt*. Gustav Fischer Verlag, Stuttgart, Germany.
8. Timmis, K. N., F. Rojo, J. L. Ramos, M. L. Krumme, and D. F. Dwyer. 1988. Laboratory engineering of bacteria designed to degrade pollutants, p. 251-266. *In* J. M. Lopez-Pila, E. Seeber, and K. Jander (eds.), *Viren und Plasmide in der Umwelt*. Gustav Fischer Verlag, Stuttgart, Germany.
9. Dwyer, D. F., F. Rojo, and K. N. Timmis. 1988. Fate and behaviour in an activated sludge microcosm of a genetically-engineered micro-organism designed to degrade aromatic compounds, p. 77-88. *In* M. Sussman, C. Collins, F. A. Skinner, and D. E. Stewart-Tull (eds.), *Release fo Genetically-Engineered Micro-Organisms*. Academic Press, London.
10. Dwyer, D. F. and K. N. Timmis. 1990. Engineering microbes for function and safety in the environment. *In* H. Mooney and G. Bernardi (eds.), *Genetically-Designed Organisms in the Environment*. John Wiley and Sons, Ltd., New York.
11. Ramos, J. L., C. Michan, F. Rojo, D. Dwyer, and K. N. Timmis. 1990. Signal-regulator interactions. Genetic analysis of the effector binding site of *xyfS*, the benzoate-activated positive regulator of *Pseudomonas* TOL plasmid *meta*-cleavage pathway operon. *Journal of Molecular Biology*. **211**:373-382.
12. Dwyer, D. F., D. Maris, and K. Nuesslein. 1990. Fate and behavior of genetically-engineered microorganisms in an activated sludge microcosm, p. 153-158. *In* S. Dumontet and E. Landi (eds.), *Ingegneria Genetica e Rischio Ambientale*. Fotolito Moggio, Rome.
13. Krumme, M. L., K. N. Timmis, and D. F. Dwyer. 1991. Development of microcosms designed to evaluate the effects of adding microorganisms to aquifers as bioremediation agents, p. 7-117 to 7-128. *In* C. B. Fliermans and T. C. Hazen (eds.), *Proceedings of the First International Symposium on Microbiology of the Deep Subsurface*. Jan. 15-19, 1990, Orlando, FL. WSRC Information Services, Aiken, SC.
14. Krumme, M. L., R. L. Smith, and D. F. Dwyer. 1991. Survival of a model pollutant-degrading microorganism in a sand and gravel aquifer and in microcosms, p. 144-147. *In* G. E. Mallard

- (ed.), U.S. Geological Survey Toxic Substances Hydrology Program: Proceedings of the Technical Meeting, March 11-15, 1991, Monterey, CA. U. S. Geological Survey Water-Resources Investigations. 91-4034.
15. Wagner-Döbler, I., R. Pipke, K. N. Timmis, and D. F. Dwyer. 1992. Evaluation of aquatic sediment microcosms and their use in assessing possible effects of introduced microorganisms on ecosystem parameters. *Applied and Environmental Microbiology*. **58**:1249-1258.
  16. Pipke, R., I. Wagner-Döbler, K. N. Timmis, and D. F. Dwyer. 1992. Survival and function of a genetically engineered *Pseudomonad* in aquatic sediment microcosms. *Applied and Environmental Microbiology*. **58**:1259-1265.
  17. Nüßlein, K., D. Maris, K. N. Timmis, and D. F. Dwyer. 1992. Expression and transfer of engineered catabolic pathways harbored by *Pseudomonas* spp. introduced into activated sludge microcosms. *Applied and Environmental Microbiology*. **58**:3380-3386.
  18. Karlson, U., D. F. Dwyer, S. W. Hooper, E. R. B. Moore, K. N. Timmis, and L. D. Eltis. 1993. Two independently regulated cytochromes P-450 in a *Rhodococcus rhodochrous* strain that degrades 2-ethoxyphenol and 4-methoxybenzoate. *Journal of Bacteriology*. **175**:1467-1474.
  19. Krumme, M. L., K. N. Timmis, and D. F. Dwyer. 1993. Degradation of trichloroethylene by *Pseudomonas cepacia* G4 and the constitutive mutant strain G4 5223 PR1 in aquifer microcosms. *Applied and Environmental Microbiology* **59**:2746-2749.
  20. Dowling, D. N., R. Pipke, and D. F. Dwyer. 1993. A DNA module encoding *bph* genes for the degradation of polychlorinated biphenyls (PCBs). *FEMs Microbiological Letters*. **113**:149-154.
  21. Krumme, M. L., R. L. Smith, J. Egestorff, S. A. Thiem, J. M. Tiedje, K. N. Timmis, and D. F. Dwyer. 1994. Behavior of pollutant-degrading microorganisms in aquifers; predictions for genetically engineered organisms. *Environmental Science and Technology*. **28**:1134-1138.
  22. Dehmel, U., K.-H. Engesser, K. N. Timmis, and D. F. Dwyer. 1994. Cloning and analysis of the nucleotide sequence of genes encoding a novel dioxygenase involved in metabolism of carboxybiphenyl ethers by *Pseudomonas pseudoalcalignes* POB310. *Archives Microbiology*. **163**:35-41.
  23. Dwyer, D. F. 1995. Development of genetically engineered microorganisms and testing of their fate and activity in microcosms, p. 23-30. *In* F. Campanari *et al.*, (eds.), *Scientific-Technical Backgrounds for Biotechnology Regulations*. Kluwer Academic Publishers, Dordrecht, The Netherlands.
  24. Heuer, H., D. F. Dwyer, K. N. Timmis, and I. Wagner-Döbler. 1995. Efficacy in aquatic microcosms of a genetically engineered pseudomonad applicable for bioremediation. *Microbial Ecology*. **29**:203-220.
  25. Halden, R. U., G. W. Mundfrom, E. G. Peters and D. F. Dwyer. 1995. Monitoring the fate and activity of diaryl ether-degrading bacteria in soil, p. 57-64. *In* R. F. Wukash (ed.), *50th Purdue Industrial Waste Conference Proceedings*. Lewis Publishers, Chelsea, MI.
  26. Winkler, J., L. D. Eltis, D. F. Dwyer, M. Rohde. 1995. Quaternary structure and cellular location of catechol 2,3-dioxygenase. *Archives Microbiology*. **163**:65-69.

27. Halden, R. U., B. G. Fischer and D. F. Dwyer. 1996. Degradation of carboxydiphenyl ether via bioaugmentation. Proceedings of the North American Water and Environment Congress '96, Anaheim, CA.
28. Halden, R. U. and D. F. Dwyer. 1997. Biodegradation of dioxin-related compounds: A review. *Bioremediation Journal*. **1**:11-25.
29. Halden, R. U., B. G. Halden and D. F. Dwyer. 1999. Removal of dibenzofuran, dibenzo-*p*-dioxin, and 2-chlorodibenzo-*p*-dioxin from soils inoculated with *Sphingomonas sp.* strain RW1. *Applied and Environmental Microbiology*. **65**:2246-2249.
30. Bankston, J. L. and D. F. Dwyer. 1999. Natural attenuation of trichloroethylene by indigenous wetland bacteria and plants. *Purdue Industrial Waste Conference Proceedings*.
31. Halden, R. U., S. R. Tepp, B. G. Halden, and D. F. Dwyer. 1999. Degradation of 3-phenoxybenzoic acid in soil by *Pseudomonas pseudoalcaligenes* POB310 and two modified *Pseudomonas* strains. *Applied and Environmental Microbiology*. **65**:3354-3359.
32. Halden, R. U., E. G. Peters, B. G. Halden, and D. F. Dwyer. 2000. Transformation of mono- and dichlorinated phenoxybenzoates by phenoxybenzoate dioxygenase in *Pseudomonas pseudoalcaligenes* POB310 and a modified diarylether-metabolizing bacterium. *Biotechnology and Bioengineering*. **69**:107-112.
33. Richard, D. E. and D. F. Dwyer. 2001. Biological removal of iron and PAHs from MGP-impacted groundwater. pp:219-225. Sixth International In-Situ and On-Site Bioremediation Symposium. Battelle Press, Vol 6(3).
34. Bankston, J. L., D. R. Sola, A. K. Komorr, and D. F. Dwyer. 2002. Degradation of trichloroethylene in wetland microcosms containing broad-leaved cattail and eastern cottonwood. *Water Research*. **73**:673-679.
35. Richard D. E. and D. F. Dwyer. 2002. Aerated biofiltration for simultaneous removal of iron and polycyclic aromatic hydrocarbons from groundwater. *Water Environment Research*. **36**:1539-1546.
36. Francy, D. S., P. Struffolino, A. Brady, and D. F. Dwyer. 2005. A spatial multivariable approach for identifying proximate sources of *Escherichia coli* to Maumee Bay, Lake Erie, Ohio. U.S.G.S. Open File Report 2005-1386.
37. Rofkar, J.R., D.F. Dwyer, and J.M. Frantz. 2007. Analysis of arsenic uptake by plant species selected for growth in northwest Ohio by inductively coupled plasma-optical emission spectroscopy. *Communications in Soil Science and Plant Analysis*. **38**:2505-2517.
38. Barnswell, K.D. and D.F. Dwyer. 2007. Vascular flora of the King Road landfill in northwest Ohio. *Ohio Journal of Science*. **107**:91-103.
39. Chowdhury, R., D. Apul, and D.F. Dwyer. 2009. Preliminary studies for designing a wetland for arsenic treatment. In: *Groundwater Modeling, Management, and Contamination*; L. F. Konig and J.L Weiss, eds. pp. 187-202.

40. Rofkar, J.R. and D.F. Dwyer. 2010. Effects of light regime, temperature, and plant age on uptake of arsenic by *Spartina pectinata* and *Carex stricta*. *International Journal of Phytoremediation*. **13**:528-537.
41. Barnswell, K.D. and D.F. Dwyer. 2011. Assessing the performance of evapotranspiration covers for municipal solid waste landfills in Northwest Ohio. *Journal of Environmental Engineering*. **137**:301- 305
42. Awondo, S.N., K.J. Egan, and D.F. Dwyer. 2011. Increasing beach recreation benefits by using wetlands to reduce contamination. *Marine Resource Economics*. **26**:1-15.
43. Barnswell, K. and Dwyer D. 2012. Two-year performance by evapotranspiration covers for municipal solid waste landfills in northwest Ohio. *Waste Management*. **32**:2336-2341.
44. Rofkar, J.R. and D.F. Dwyer. 2013. Irrigation of three wetland plant species and a hyperaccumulating fern with arsenic-laden solutions: observations of growth, arsenic uptake, nutrient status, and chlorophyll content. *International Journal of Phytoremediation*. **15**:561-572.
45. Rofkar J.R., D.F. Dwyer, and D.M. Bobak. 2014. Uptake and toxicity of arsenic, copper, and silicon in *Azolla caroliniana* and *Lemna minor*. *International Journal of Phytoremediation*. **16**:155-166.
46. Egan, K.J., J.R. Corrigan, and D.F. Dwyer. 2015. Three reasons to use annual payments in contingent validity, discount rates, and meant accounting. *Journal of Environmental Economics and Management*. **72**:123-136.

#### **Presentations and Posters (current 10 years):**

##### **2015 Local**

Jackwood, R. and D.F. Dwyer. Restoration projects to reduce phosphorus and *E. coli* loadings into Lake Erie: From concept to implementation. Spring Forum on Environmental Health. Toledo-Lucas County Health Department. St. Luke's Hospital, Maumee, OH. April 10, 2015.

Struffolino, P., R. Jackwood, and D.F. Dwyer. Improving water quality for Maumee Bay: Restoring ecosystems for health. Midwest Workshop for Sanitarians. Ohio Department of Health. Quest Conference Center, Columbus, OH. March 19, 2015.

##### **2015 Regional**

Jackwood, Ryan, Daryl F. Dwyer. Restoration *Projects to Reduce Phosphorus Loadings into Lake Erie: From Concept to Implementation (poster)*. Midwest Graduate Research Symposium. University of Toledo, Toledo, OH. March 21, 2015.

##### **2015 International**

Jackwood, R. and D.F. Dwyer. Restoration projects to reduce phosphorus loadings into Lake Erie: From concept to implementation. International Association for Great Lakes Research Annual Conference. University of Vermont, Burlington, VT. May 2015.

##### **2014 International**

Jackwood, Ryan, Daryl F. Dwyer, Matthew Mayher . *Natural Treatment Systems to Improve Nearshore Health and Reduce Nonpoint Source Pollution (poster)*. Binational Lake Erie **Public** Forum. Maumee Bay State Park, Oregon, OH. September 2014.

### **2013 Local**

Long, D.M. and D.F. Dwyer. Restoring Wetlands at Maumee Bay State Park Clean Water, Safe Beaches. Earth Fest. University of Toledo, Toledo, OH. April 22, 2013.

### **2013 Regional**

Long, D.M., R.W. Jackwood, J. Rofkar, P.M. McLain, and D.F. Dwyer. Predicting the Roles of Soil Depth and Type on Transport of Escherichia coli and Enterococcus spp. Using an Advection Dispersion Model. Ohio Academy of Science. University of Findlay, Findlay, OH. April 6, 2013.

Long, D.M and Dwyer, D.F. Predicting the Roles of Soil Depth and Type on Transport of Escherichia coli and Enterococcus spp. Using an Advection Dispersion Model. Midwest Graduate Research Symposium. University of Toledo, Toledo, OH. April 20, 2013

### **2013 National**

Dwyer, Daryl F., A. L. Spongberg, and C. E. Brothers. Effectiveness of Rice Hull Biochar on the Adsorption of Soluble Phosphorus in a Batch Equilibrium Study. 125th Anniversary Meeting of The Geological Society of America . Denver, CO. October 27 – 30, 2013.

Jackwood, R.W. and D.F. Dwyer. Role of Retention Time and Soil Depth on Transport and Survival of Escherichia coli. National Nonpoint Source Monitoring Conference and Workshops. Cleveland, OH. October 28-30, 2013.

### **2013 International**

Rofkar J.R., D.F. Dwyer, and W.G. Petruzzi. A bioberm for remediation of groundwater at the site of a former manufactured gas plant. 10<sup>th</sup> International Phytotechnology Conference. Syracuse, NY.

### **2012 Regional**

Struffolino, P., D.F. Dwyer, and A. Brady. Continuing Efforts to Improve a Water-Quality Model for a Recreational Beach. 12<sup>th</sup> Annual Great Lakes Beach Conference Mackinac, MI. October 16 – 18, 2012.

### **2012 International**

Barnswell, K.D., Dwyer, D. F., Struffolino, P. S. Increased Accuracy in Predicting Water Quality at Swimming Beaches Using a Time –Adjusted, Environmental Model. International Association of Great Lakes Research, Cornwall, ON Canada, May 2012

### **2011 National**

Pamela Struffolino, Daryl F. Dwyer, Amie Brady, & Kristopher Barnswell. Development of a Predictive Water-Quality Model for Recreational Beaches. EPA's National Beach Conference. Miami, FL, March 2011.

### **2010 Regional**



Struffolino, P., Dwyer D. F., & Brady, A. Continuing Efforts to Improve a Water-Quality Model for a Recreational Beach. Great Lakes Beach Association. 12<sup>th</sup> Annual Conference, Mackinac Island, MI, Oct. 16-18, 2010

Barnswell, K.D., and Dwyer, D.F. Designing a constructed wetland system to enhance water quality at Maumee Bay State Park. Great Lakes Beaches Association. 10th Annual Conference, Erie, PA, Oct. 19-21, 2010.

Pamela Struffolino, Daryl F. Dwyer, & Amie Brady. Development of a Predictive Water-Quality Model for Recreational Beaches. 10<sup>th</sup> Great Lakes Beach Association Conference. Erie PA, October 2010.

Koloini, Kristopher and Daryl F. Dwyer. Monitoring loadings of *Escherichia coli*, total phosphorus, and total suspended solids entering Maumee Bay via the Wolf Creek Watershed. Posters at the Capitol, Columbus, OH, April 15, 2010.

Struffolino, Pamela, Amie Brady, and Daryl F. Dwyer. Developing a predictive recreation water-quality model for beaches at Maumee Bay State Park. Lake Erie Beach Conference, Parma, OH. January 22, 2010.

### **2009 International**

Barnswell, Kristopher D. and Daryl F. Dwyer. Field water balance of evapotranspiration covers in Northwest Ohio. The 65th International Phytotechnology Conference, St. Louis, MO. December 2-4, 2009.

Barnswell, Kristopher D. and Daryl F. Dwyer. Manufactured soil for a landfill evapotranspiration cover using dredged sediment. Tenth International In Situ and On-site Bioremediation Symposium, Baltimore, MD. May 5-8, 2009.

Choc, Steven, Adam R. Waltz, and Daryl F. Dwyer. Water quality trends and models for the design of wetlands used to treat drainage water entering Lake Erie. International Association of Great Lakes Research, Toledo, OH. May 18-22, 2009.

Duncan, Alexander M., Matthew W. Gorr, Jordan R. Rofkar, Kristopher D. Barnswell, Johan F. Gottgens, and Daryl F. Dwyer. Plant mediated reductions of arsenic levels in flow-through wetlands. International Association of Great Lakes Research, Toledo, OH. May 18-22, 2009.

Gorr, Matthew and Daryl F. Dwyer. Modeling and design of wetland microcosms to use in design of arsenic remediation. The 25<sup>th</sup> International Conference on Soils, Sediments, Water and Energy, Amherst, MA. October 19-22, 2009.

Krantz, David E., Abby N. Norton, Jessica L. Knapp, Alison L. Spongberg, Timothy G. Fisher, and Jonathan A. Fuller. Upper Quaternary stratigraphy and post-glacial history of western Lake Erie. International Association of Great Lakes Research, Toledo, OH. May 18-22, 2009.

Rofkar, Jordan R., Alexander M. Duncan, Kristopher D. Barnswell, Patricia M. Armenio, Jonathan Frantz, and Scott A. Heckathorn. Effects of nitrogen on boron toxicity in *Azolla caroliniana*. International Association of Great Lakes Research, Toledo, OH. May 18-22, 2009.

Rofkar, Jordan and Daryl F. Dwyer. Kinetics of arsenic uptake by plant species selected for phytoextraction in northwest Ohio. Tenth International In Situ and On-site Bioremediation Symposium, Baltimore, MD. May 5-8, 2009.

Rofkar, Jordan, Daryl F. Dwyer, Alexander M. Duncan, and Deanna M. Bobak. Effects of silicon on arsenic uptake and toxicity in *Azolla caroliniana*. The 65th International Phytotechnology Conference, St. Louis, MO. December 2-4, 2009.

Stierman, Donald J. and David E. Krantz. Geophysical methods for Quaternary research and environmental investigations in the Great Lakes basin. International Association of Great Lakes Research, Toledo, OH. May 18-22, 2009.

## **2009 National**

Duncan, Alexander M., Johan F. Gottgens, and Daryl F. Dwyer. *Azolla caroliniana*: a model for arsenic remediation. Ecological Society of America Annual Meeting, Albuquerque, NM. August 2-7, 2009.

Shalabi, Jill and Defne Apul. Toward a sustainable treatment system for arsenic-laden wastewater. Air and Waste Management Association 102nd Annual Conference and Exhibition, Detroit, MI. June 16-19, 2009.

## **2009 Local**

Barnswell, Kristopher D. and Daryl F. Dwyer. Field water balance for evapotranspiration covers in northwest Ohio. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. October 24, 2009.

Gorr, Matthew and Daryl F. Dwyer. Modeling arsenic remediation in wetlands. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. October 24, 2009.

Rofkar, Jordan and Daryl F. Dwyer. Effects of silicon on uptake and toxicity of arsenic and copper in *Lemna minor*. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. October 24, 2009.

Sapkota, Pratibha, Defne Apul, and Daryl F. Dwyer. Agent-based model for diffusion in water and porous media. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. October 24, 2009.

## **2008 International**

Choc, Steven and Daryl F. Dwyer. *Escherichia coli* and sediment load monitoring in Berger Ditch with implications for reduction of water quality advisories at Maumee Bay State Park, Oregon, OH. International Association of Great Lakes Research, Peterborough, Ontario. May 19-23, 2008.

Duncan, Alexander and Johan F. Gottgens. Evaluation of the fern *Azolla caroliniana* to phytofiltrate arsenic from contaminated water. Landscape Ecology and Forest Management: Challenges and Solutions International Conference, Chengdu, Sichuan, P.R. China. September 16, 2008.

Rofkar, Jordan and Daryl F. Dwyer. Rates of uptake by plant species selected for phytoextraction of arsenic in northwest Ohio. The Sixth International Conference on Remediation of Chlorinated and Recalcitrant Compounds, Monterey, CA. May 19-22, 2008.

## **2008 National**

Choc, Steven and Daryl F. Dwyer. Source identification and monitoring for a wetlands solution to reduce

*Escherichia coli* at Maumee Bay State Park, Oregon, OH. American Society for Microbiology, Boston, MA. June 1-5, 2008.

Wright, Robert E., Jr., Andrew G. Heydinger, and Daryl F. Dwyer. An Assessment Of Alternative Cap Covers For The King Road Landfill. GeoCongress 2008: The Challenge of Sustainability in the Geoenvironment, New Orleans, LA. March 9-12, 2008.

### **2008 Regional**

Barnswell, Kristopher D. and Daryl F. Dwyer. Vascular plants of the King Road Landfill, Lucas County, Ohio. Ohio Academy of Science, Toledo, OH. April 12-13, 2008.

de Saint Victor, Colin and Daryl F. Dwyer (given by Steven Choc). *Escherichia coli* in recreational waters of Maumee Bay State Park: source identification and a treatment solution. Ohio Academy of Science, Toledo, OH. April 12-13, 2008.

Krantz, David E., Mario R. Castanada, James Fisher, and Timothy G. Fisher. Stratigraphy and sediment processes of Maumee Bay and the adjacent shoreline, Western Lake Erie, Ohio. Geological Society of America North-Central Section Meeting: Evansville, IN. April 24-25, 2008.

Oyewumi, Oluyinka and Alison L. Spongberg. Comparative study of cadmium, copper and nickel adsorption in three brownfield sites, northwest Ohio. Geological Society of America North-Central Section Meeting: Evansville, IN. April 24-25, 2008.

Rofkar, Jordan and Daryl F. Dwyer. Screening plant species for phytoremediation of arsenic in northwest Ohio. Ohio Academy of Science, Toledo, OH. April 12-13, 2008.

### **2008: Local**

Barnswell, Kristopher D. and Daryl F. Dwyer. Manufactured soil for a landfill evapotranspiration cover using dredged sediment. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

Choc, Steven and Daryl F. Dwyer. Water monitoring, hydrologic models and wetland design in Berger Ditch. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

Duncan, Alexander M. and Johan F. Gottgens. Evaluation of the fern *Azolla caroliniana* to phytofiltrate arsenic from contaminated water. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

Nelson Jr., Don E. and Alison L. Spongberg. Polycyclic aromatic hydrocarbons in sediments of recreational boating marinas, Western Basin, Lake Erie, U.S.A. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

Rofkar, Jordan and Daryl F. Dwyer. Uptake kinetics of arsenic in a wetland grass native to northwest Ohio (*Spartina pectinata*). Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008. Best Student Poster: Life Sciences Division award winner.

Sapkota, Pratibha, Defne Apul, and Daryl F. Dwyer. Bromide transport through lysimeters at Stranahan Arboretum. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

Waltz, Adam R., Pam Struffolino, Scott Denham, and Daryl F. Dwyer. Comparison of water quality variables for Maumee Bay State Park. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. November 1, 2008.

**2007: International**

Saunders, Joshua, Jona Scarbro, and Daryl F. Dwyer. Effect of Class B biosolid application on *E. coli* survivability. International Association of Great Lakes Research, University Park, PA. May 28-June 1, 2007.

**2007: Regional**

Gallant, Patricia, Donald J. Stierman, Daryl F. Dwyer, and Timothy Fisher. Linking geophysical signatures to sediment properties in Lucas County, Ohio. Geological Society of America North-Central and South-Central Joint Annual Meeting, Lawrence, KS. April 11-13, 2007. Best Student Poster award winner.

**2007: Local**

Chowdhury, Raja and Defne Apul. Design of a wetland for the treatment of arsenic laden wastewater – Preliminary studies. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. September 15, 2007.

de Saint Victor, Colin and Daryl F. Dwyer. Microbial contamination in public waters at Maumee Bay State Park. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. September 15, 2007.

\*Dwyer, Daryl. Wetlands- Agents for improving water quality and human health. Maumee Bay State Park Wetland Restoration Public Meeting, Maumee Bay State Park Lodge. October 2, 2007.

Egan, Kevin, Daryl Dwyer, and Sebastain Awondo. Evaluating the economic benefits of wetland restoration at Maumee Bay State Park. Maumee Bay State Park Wetland Restoration Public Meeting, Maumee Bay State Park Lodge. October 2, 2007.

Oyewumi, Oluyinka and Alison L. Spongberg. Adsorption characteristics of brownfield soils from Northwest Ohio. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. September 15, 2007.

**2006: International**

Rofkar, Jordan R., Joseph Hickey, and Daryl F. Dwyer. Screening plant species for uptake of arsenic in northwest Ohio. International Conference on Environmental Science and Technology, Houston, TX. August 19-23, 2006.

Scarbro, Jona, Daryl F. Dwyer, and William Von Sigler. Microbial transport through the vadose zone of a biosolid- amended cropland: implications for Maumee Bay water quality. International Association of Great Lakes Research, Windsor, Ontario, Canada May 22-26, 2006.

**2006: Regional**

\*Dwyer, Daryl F. Maumee Bay bacterial studies. SE Michigan Environmental Health Directors' Meeting. Ann Arbor, MI. May 2006.

\*Dwyer, Daryl F. Quality and sustainability of the Great Lakes: restoration, legislation and research. League of Women Voters. Holland, OH. January 2006.

**2006: Local**

Barnswell, Kristopher D., and Daryl F. Dwyer. Potential use of evapotranspiration covers in northwest Ohio. Oak Openings Region Research Symposium. Toledo, OH. January 20-21, 2006.

Bobak, Deanna M. and Alison L. Spongberg. Polycyclic aromatic hydrocarbon characterization from point and non-point sources in Otter Creek, OH. Sigma Xi Graduate Research Symposium at the

University of Toledo, Toledo, OH. April 22, 2006. Best Student Presentation: Life Sciences Division award winner.

Hickey, Joseph, Jordan Rofkar, and Daryl F. Dwyer. Uptake of metals by selected plant species in northwest Ohio. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 22, 2006.

Scarbro, Jona and Daryl F. Dwyer. Microbial transport through the vadose zone of a biosolid- amended cropland: implications for land application of Class B biosolids and surface water quality. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 22, 2006.

#### **2005: International**

Francy, Donna, Pamela Struffolino, Amie Brady, and Daryl F. Dwyer. Identification of proximate sources of fecal contamination to Maumee Bay, Lake Erie, Ohio by determining concentrations of *Escherichia coli* in water and sediments and identifying related environmental and water-quality factors. International Association of Great Lakes Research Annual Meeting, Ann Arbor, MI. May 23-27, 2005.

Kassem, Issmat, William Von Sigler, and Daryl F. Dwyer. Characterization of the microbial communities in dredge sediment from a confined disposal facility. IUMS XI International Congress of Bacteriology and Applied Microbiology, San Francisco, CA. July 23-28, 2005.

#### **2005: National**

Bobak, Deanna M. and Alison L. Spongberg. 2005. A Comparison of Polycyclic Aromatic Hydrocarbon Contamination in Urban and Rural Areas in Northwest Ohio. Soil Science Society of America Annual Conference, Salt Lake City, UT. Nov. 6-10.

Kassem, Issmat, William Von Sigler, and Daryl F. Dwyer. Molecular and enzymatic analysis of the microbial communities in dredged sediments. 105<sup>th</sup> General Meeting of the American Society for Microbiology, Atlanta, GA. June 5-9, 2005.

#### **2005: Regional**

\*Dwyer, Daryl F. Maumee Bay bacterial studies. Lake Erie Center, University of Toledo, Oregon, OH. October 2005.

Gallant, Patricia and Don Stierman. Gravity investigation of the King Road Landfill, Lucas County, Ohio. Geological Society of America North-Central Annual Meeting, Minneapolis, MN. May 19-20, 2005.

Wilt, Amy S., Don Stierman, and Daryl F. Dwyer. Geophysical mapping the top of bedrock at the King Road Landfill, Lucas County, Ohio. Geological Society of America North-Central Annual Meeting, Minneapolis, MN. May 19-20, 2005.

#### **2005: Local**

Barnswell, Kristopher D. and Daryl F. Dwyer. Vegetation on a non-capped landfill in the Oak Openings Region. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 15, 2005.

Kassem, Issmat, William Von Sigler, and Daryl F. Dwyer. The impact of sediment dredging on the microbial communities in Toledo Harbor. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 15, 2005.

Struffolino, Pamela. and Daryl F. Dwyer. 2005. Source Tracking *Escherichia Coli* to a Public Beach in Northwest Ohio. Sigma Xi Student Symposium at the University of Toledo, Toledo, OH. April 16, 2005.

**2004: National**

\*Francy, Donna, Amie Brady, Pamela Struffolino, and Daryl F. Dwyer. Identification of proximate sources of fecal contamination to Maumee Bay, Lake Erie. Major Accomplishments and Future Directions in Public Health Microbiology, United States Geological Survey, Columbus, OH. February 15-18, 2004.

\*Struffolino, Pamela, Von Sigler, and Daryl F. Dwyer. The role of suspended sediments in *E. coli* transport. Major Accomplishments and Future Directions in Public Health Microbiology at the United States Geological Survey, Columbus, OH. February 15-18, 2004.

Struffolino, Pamela, Von Sigler, and Daryl F. Dwyer. Novel sediment traps reveal role of suspended sediment in *E. coli* transport. National Beaches Conference, San Diego, CA. October 15, 2004.

**2004: Regional**

Brady, Amie, Donna Francy, Pamela Struffolino, and Daryl F. Dwyer. Concentrations of *Escherichia coli* in water and bed sediments in Maumee Bay, Toledo and Oregon, Ohio (2003–2005); Great Lakes Beach Conference, Parma, OH; November 30, 2004.

\*Dwyer, Daryl F. and Pamela Struffolino. Source tracking of *E. coli* entering Maumee Bay: overview of research from 2003-2004. Maumee Bay Bacterial Task Force Public Meeting. Oregon, OH. December 2004.

\*Francy, Donna, Greg Koltun, Amie Brady, Pamela Struffolino, and Daryl F. Dwyer. Source tracking of *E. coli* entering Maumee Bay: future research directions. Maumee Bay Bacterial Task Force Public Meeting. Oregon, OH. December 2004.

Struffolino, Pamela, Von Sigler, and Daryl F. Dwyer. The role of suspended sediment in *E. coli* Transport. Great Lakes Beach Conference: Parma, OH; November 30, 2004.

**2004: Local**

Barnswell, Kristopher D., Jordan Rofkar, and Daryl F. Dwyer. Phytoremediation at the King Road Landfill: current progress and future work. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 24, 2004.

Kassem, Issmat, William Von Sigler, and Daryl F. Dwyer. Structural and functional assessment of microbial communities at King Road Landfill. Sigma Xi Graduate Research Symposium at the University of Toledo, Toledo, OH. April 24, 2004.

**Previous to 2004 there are over one hundred abstracts for presentations.**