

Flynn W. Picardal

School of Public and Environmental Affairs
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EDUCATION

University of Rochester, Rochester, NY
Bachelor of Arts (B.A.) in Biology

Stevens Institute of Technology, Hoboken, NJ
Master of Engineering (M.Eng.) in Environmental Engineering, 1988

University of Arizona, Tucson, AZ
Doctor of Philosophy (Ph.D.) in Civil (Environmental) Engineering
Dissertation: Mechanisms of Reductive Dehalogenation of Carbon Tetrachloride
by *Shewanella putrefaciens*, 1992

Swiss Federal Institute for Water Resources and Water Pollution Control (EAWAG)
Postdoctoral Research Scientist, 11/92 to 8/93

PROFESSIONAL DEVELOPMENT

Visiting Scientist, Environmental Microbiology Department
Technical University–Berlin, Berlin Germany (2008-2009)

Visiting Scientist, Biogeochemistry Department
Max Planck Institute for Marine Microbiology, Bremen, Germany (2001-2002)

Short-Term Faculty Exchange Program
Bayreuth Institute of Terrestrial Ecology (BITÖK)
University of Bayreuth, Bayreuth, Germany (1999)

Department of Energy 13 Week Summer Research Practicum
Savannah River Laboratory, Aiken, SC. (1991)

Summer Course in Microbial Ecology and Diversity
Marine Biological Laboratory, Woods Hole, MA. (1989)

ACADEMIC APPOINTMENTS

Indiana University, School of Public and Environmental Affairs, Bloomington, IN
Associate Professor of Environmental Affairs, 6/99 to Present
Assistant Professor of Environmental Affairs, 8/93 to 5/99
Member - Graduate Faculty
Adjunct Associate Professor - Department of Biology
Senior Fellow - Indiana Molecular Biology Institute

OTHER APPOINTMENTS

The University of Arizona, Civil Engineering Department, Tucson, AZ
Graduate Research Assistant / Teaching Assistant, 8/88 to 10/92
AIG Consultants, Inc., 72 Wall St., New York, NY
Director of Product Management, 1/87 to 8/88
Manager of Casualty Services, 5/85 to 1/87
Loss Control Consultant, 1/83 to 5/85
Insurance Company of North America, 1840 W. 49th St., Hialeah, FL
Loss Control Representative, 6/77 to 1/83

PROFESSIONAL SOCIETIES

American Society for Microbiology
American Chemical Society
Association of Environmental Engineering and Science Professors

HONORS

Fulbright Senior Scholar - Germany Program, 2001-2002
SPEA Undergraduate Teaching Award. 1997
Indiana University Teaching Excellence Recognition Award (TERA). 1997

TEACHING ASSIGNMENTS

Regular Assignments

E544 Subsurface Microbiology and Bioremediation
E552 Environmental Engineering
E570 Environmental Soil Science
E431 Water Supply and Wastewater Treatment

Past Assignments

E562 Solid and Hazardous Waste Management
E542 Hazardous Materials Control
E537 Environmental Chemistry Laboratory
E162 Environment and People

SELECTED SERVICE ACTIVITIES

Editorial Board - Applied and Environmental Microbiology (2005-2010)

Ad Hoc Journal Peer Review for Environmental Science and Technology, Archives of Microbiology; Environmental Engineering Science, Water Research, Geochemical et Cosmochimica Acta, Environmental Microbiology, Science, Naturwissenschaften, Journal of Industrial Microbiology; Biodegradation, Environmental Toxicology and Chemistry, Bioremediation Journal, Geomicrobiology, Advances in Environmental Research, Water Resources Research, Bulletin of Environmental Contamination and Toxicology, Journal, Policy and Management Review, Research in Microbiology, Journal of Environmental Engineering.

Selected Peer Review Panels and Committees

Environmental Protection Agency review panel for proposals submitted to the GRO and STAR fellowship programs. Silver Spring, MD, Feb 27-28, 2006.

National Science Foundation review panel for Unsolicited Proposals Program in Environmental Engineering and Technology (EET). Washington, DC, February 10-11, 2005

Chemistry Committee, Specialist Peer Review Committee for Fulbright Scholar Applications, Council for International Exchange of Scholars (2005 and 2006)

Chemistry Committee, Specialist Peer Review Committee for Fulbright Distinguished Chairs Applications, Council for International Exchange of Scholars (2007)

Selection Panel (Final Interviews) for German Student Applicants for Fulbright Scholarships for the Academic Year 2002-2003 at American Universities, Berlin, Germany, Oct. 11, 2001.

National Institute of Environmental Health Science review panel for proposals submitted to the program, "Molecular Assessment of the Structure and Function of Ecological Populations in the Sequestration/Degradation of Environmental Contaminants", July 2003, Research Triangle Park, NC.

National Science Foundation review panel for proposals submitted to the Environmental Engineering section of the faculty Early Career Development Program, Washington D.C., 1996, 1998, 1999 (3 panels)

National Science Foundation review panel for proposals submitted to the Small Business Innovation Research (SBIR) panel for Environmental Systems: Biological, Washington, D.C., 1997

National Science Foundation review panel for proposals submitted to the Bioengineering and Environmental Systems section of the NSF/EPA Partnership for Environmental Research and Technology for a Sustainable Environment, 1996, 1997 (2 panels)

Other Professional Service

Scientific and Business Advisory Board, Microvi Biotech LLC, Overland Park, Kansas (2005 - 2007)

Fulbright Academy of Science and Technology (FAST). Member of the Board of Directors (2003 - 2009) and Treasurer (2003, 2004). Member of the International Advisory Board - 2009

GRANTS, FELLOWSHIPS AND AWARDS

- "Establishment of Sycamore Creek as a CRES watershed research area." Co-Investigator with Jeff White and Todd Royer. Indiana University Center for Research in Environmental Sciences. 12/09 – 12/10 \$36,635
- "Biogenic coalbed methane production: Determination of chemical compound classes supporting microbial methanogenesis". American Chemical Society Petroleum Research Fund. 9/1/09 – 9/1/11 \$100,000
- "Production of bacterial nanowires as a community response to electron acceptor limitation in biofilms" Indiana University Faculty Research Support Program. 5/1/07 – 11/30/08 \$75,000
- "Investigating Morphological and Isotopic Biosignatures of Terrestrial Iron Bacteria – A Potential Mars Analog". National Aeronautic and Space Administration. 10/1/05 to 3/12/09. \$24,753 (my portion). Co-Investigator with J. Schieber of IU Geological Sciences Dept.
- "Adaptive response of microbial communities and Fe biomineralization pathways to anaerobic redox cycling of Fe and N in sediments", National Science Foundation Division of Earth Sciences. 9/1/2005-2/28/09. \$246,552
- Fulbright Senior Scholar Fellowship to conduct research at the Max Planck Institute for Marine Microbiology, Bremen, Germany. Fulbright Commission, US State Department, 2001-2002.
- Manufactured Gas Plant / Soil Vapor Extraction Technical Services Project. Battelle Memorial Institute. Funded 9/1/01 - 8/31/02. \$53,824.
- Demonstration and Evaluation of Air Sparging and Soil Vapor Extraction for Remediation of Contaminated Soil at a Manufactured Gas Plant. Battelle Memorial Institute. Funded 10/1/2000 - 9/30/2001. \$45,000.
- Field Support of Demonstrating Multiple Technologies for Remediating Soils Contaminated with Manufactured Gas Plant Wastes. Battelle Memorial Institute. Funded 6/1/99 - 9/30/2001. \$103,000.
- Influence of Microbial Nitrate Reduction on Subsurface Iron Biogeochemistry, Microbial Chromium Reduction, and Chromium Redox Chemistry. Co-PI with Eric Roden, Univ. Alabama US Department of Energy. Funded 1997-2001. \$ 661,260.
- Short-Term Faculty Exchange Program award for research at the Bayreuth Institute for Terrestrial Ecology (BITÖK) at the University of Bayreuth, Germany. Summer 1999.
- Biodegradation and Biologically Mediated Transformation of Polychlorinated Biphenyls. National Science Foundation. 1 year. 1996 \$18,000.
- Factors Affecting the Adaptation Period Preceding Aerobic Degradation of Chlorinated Benzenes. National Science Foundation Fellowship for Postdoctoral Research at Foreign Centers of Excellence. 1992-93
- US Department of Energy Environmental Restoration and Waste Management Fellowship. 1990-92

PATENTS

United States Patent No. US6,537,797 B1, "Compositions and Methods Useful in Bioremediation of Polychlorinated Biphenyls", Flynn Picardal and Sanggoo Kim, Awarded March 25, 2003.

PUBLICATIONS

Gößner, A. S., F. Picardal, R. S. Tanner, and Harold L. Drake. (2008). Carbon metabolism of the moderately acid-tolerant acetogen *Clostridium Drakei* isolated from peat. FEMS Microbiology Letters 287:236-242.

Strapoć, D., Picardal, F.W., Turich, C., Schaperdoth, I., Macalady, J.L., Lipp, J.S., Lin, Y.-S., Ertefai, T.F., Schubotz, F., Hinrichs, K.-U., Mastalerz, M., Schimmelmann, A., (2008). Methane-producing microbial community in a coal bed of the Illinois Basin. Applied and Environmental Microbiology 74, 2424-2432.

Adebusoye, S. A., M. O. Ilori, F. W. Picardal, and O. O. Amund. (2008). Extensive biodegradation of polychlorinated biphenyls in Aroclor 1242 and electrical transformer fluid (Askarel) by natural strains of microorganisms indigenous to contaminated African systems. Chemosphere 73:126-132.

Adebusoye, Sunday A., Ilori, M. O., Picardal, F. W., and O. O. Amund. (2008) Evidence of aerobic utilization of *di-ortho*-substituted trichlorobiphenyls as growth substrates by *Pseudomonas* sp. SA-6 and *Ralstonia* sp. SA-4. Environmental Microbiology 10(5): 1165-1174

Adebusoye, Sunday A., Ilori, M. O., Picardal, F. W., and O. O. Amund. (2008) Influence of chlorobenzoic acids on the growth and degradation potentials of PCB-degrading microorganisms. World J of Microbiology and Biotechnology 24(7): 1203-1208

Adebusoye, Sunday A., Ilori, M. O., Picardal, F. W., and O. O. Amund. (2008) Cometabolic degradation of polychlorinated biphenyls (PCBs) by axenic cultures of *Ralstonia* sp. strain SA-5 and *Pseudomonas* sp. strain SA-6 obtained from Nigerian contaminated soils. World J of Microbiology and Biotechnology 24(1): 61-68

Adebusoye, Sunday A., Ilori, M. O., Picardal, F. W., and O. O. Amund. (2008) Metabolism of chlorinated biphenyls: Use of 3,3'- and 3,5-dichlorobiphenyl as sole sources of carbon by natural species of *Ralstonia* and *Pseudomonas*. Chemosphere 70: 656-663.

Adebusoye, Sunday A., Picardal, F. W., Ilori, M. O., Amund, O.O., and C. Fuqua (2008) Characterization of multiple novel aerobic polychlorinated biphenyl (PCB)-utilizing bacteria strains indigenous to contaminated tropical African soils. Biodegradation 19: 145-159.

- Adebusoye, Sunday A., Picardal, F. W., Ilori, M. O., Amund, O.O., Fuqua, C. and N. Grindle (2007) Growth on *ortho*-substituted dichlorobiphenyls with chlorine substitution on each ring by tropical bacteria. Applied Microbiology and Biotechnology 74:484-492.
- Adebusoye, Sunday A., Picardal, F. W., Ilori, M. O., Amund, O.O., Fuqua, C. and N. Grindle (2007) Aerobic degradation of di- and trichlorobenzenes by two bacteria isolated from polluted tropical soils. Chemosphere 66(1): 1939-1946
- Cooper, D. Craig, Coby, A.J., and F. W. Picardal (2006) Interactions between Microbial Iron Reduction and Metal Geochemistry: Effect of Redox Cycling on Transition Metal Speciation in Iron Bearing Sediments. Environmental Science and Technology 40(6): 1884-1891
- Coby, A.J. and F. W. Picardal. (2006) Influence of sediment components on the immobilization of Zn during microbial Fe-(hydr)oxide reduction. Environmental Science and Technology. 40(12) 3813-3818.
- Coby, Aaron J. and Flynn W. Picardal (2005) Inhibition of NO_3^- and NO_2^- Reduction by Microbial Fe(III) Reduction: Evidence of a Reaction Between NO_2^- and Cell Surface-Bound Fe^{2+} . Applied and Environmental Microbiology 71(9): 5267-5274
- Cooper, D. C., Neal, A. L., Kukkadapu, R.K., Brewe, D., Coby A., and F.W. Picardal. (2005) Effects of surface area and sediment mineralogy on microbially mediated changes in divalent metal speciation: Importance of ferrihydrite Geochimica et Cosmochimica Acta 69(7): 1739-1754
- Cooper, D.C., Picardal, F.W., Schimmelmann, A., and A. J. Coby. 2003. Chemical and Biological Interactions During Nitrate and Goethite Reduction by *Shewanella putrefaciens* 200. Applied and Environmental Microbiology 69(6):3517-3525
- Weber, K. A., Picardal, F. W., and E. E. Roden. 2001. Microbially-Catalyzed Nitrate - Dependent Oxidation of Biogenic Solid-Phase Fe(II) Compounds. Environmental Science and Technology 35: 1644-1650
- Kim, S. and Picardal, F. 2001 Microbial Growth on Dichlorobiphenyls Chlorinated on Both Rings as a Sole Carbon and Energy Source. Applied and Environmental Microbiology 67(4): 1953-1955
- Kim, S. and Picardal, F. 2000 A Novel Bacterium that Utilizes Monochlorobiphenyls and 4-Chlorobenzoate as Growth Substrates. FEMS Microbiology Letters 185: 225-229

- Cooper, D. C., Picardal, F. W., Rivera, J, and Talbot, C. 2000 Zinc Immobilization and Magnetite Formation Via Ferric Oxide Reduction by *Shewanella putrefaciens* 200. Environmental Science and Technology 34: 100-106
- Collins, R., and Picardal, F. 1999. Enhanced Anaerobic Biotransformation of Carbon Tetrachloride by Soil Organic Matter. Environmental Toxicology and Chemistry 18(12): 2703-2710.
- Kim, S., and Picardal, F. 1999. Enhanced Anaerobic Biotransformation of Carbon Tetrachloride in the Presence of Reduced Iron Oxides. Environmental Toxicology and Chemistry 18(10): 2142-2150.
- Backhus, D., Picardal, F., Johnson, S., Knowles, T., Collins, R., Radue, A., and S. Kim. 1997. Soil- and Surfactant-Enhanced Reductive Dechlorination of Carbon Tetrachloride in the Presence of *Shewanella putrefaciens* 200. Journal of Contaminant Hydrology 28:337-361.
- Picardal, F, S. Kim, A. Radue, and D. Backhus. 1997. Anaerobic Transformations of Carbon Tetrachloride: Combined Bacterial and Abiotic Processes. In: Emerging Technologies in Hazardous Waste Management VII (American Chemical Society Special Symposium Book). Ed: Tedder and Pohland. Plenum Press, New York.
- Picardal, F. W., Bryan Huey, and R. G. Arnold (1995). Effects of Electron Donor and Acceptor Condition on the Reductive Dehalogenation of Tetrachloromethane by *Shewanella putrefaciens* 200. Applied and Environmental Microbiology 61:8-12.
- Enzien, M. V., F. W. Picardal, T. C. Hazen, R. G. Arnold, and C. F. Fliermans (1994). Reductive Dechlorination of Trichloroethylene and Tetrachloroethylene under Aerobic Conditions in a Sediment Column. Applied and Environmental Microbiology 60 (6): 2200-2204.
- Picardal, F. W., R. G. Arnold, H. Couch, A. M. Little, and M. E. Smith (1993). Involvement of Cytochromes in the Anaerobic Biotransformation of Tetrachloromethane by *Shewanella putrefaciens* 200. Applied and Environmental Microbiology 59 (11): 3763-3770.
- Arnold, R. G., M. R. Hoffman, T. J. DiChristina, and F. W. Picardal (1990). Regulation of Dissimilatory Fe(III) Reduction Activity in *Shewanella putrefaciens*. Applied and Environmental Microbiology 56: 2811-2817.
- Kupillas, G. E., K. G. Pill, F. W. Picardal, and R. G. Arnold (1991). A Multiparameter Chemical Toxicity Test Using *Salmonella typhimurium* and *Spirochaeta aurantia*. Environmental Toxicology and Water Quality 6: 293-308.
- Pill, K. G., G. E. Kupillas, F. W. Picardal, and R. G. Arnold (1991). Estimating the Toxicity of Chlorinated Organic Compounds Using a Multiparameter Bacterial

Assay. Environmental Toxicology and Water Quality 6:271-291.

Other Publications

Picardal, F. and D. C. Cooper. (2005) *Microbially Mediated Changes in the Mobility of Contaminant Metals in Soils and Sediments*. In: Heavy Metal Contamination of Soil: Problems and Remedies; Editors: I. Ahmad, S. Hayat, and J. Pitchel. Science Publishers, USA

Presentations at Meetings and Conferences (Past 5 years)

F. Picardal. 2009 Microbially-mediated redox cycling of iron in sediments. Presented at the Dept. Limnology of Stratified Lakes, IGB-Neuglobsow, Stechlin, Germany, July 22, 2009.

Coby, A., E. Shelobolina, H. Zu, E. Roden, and F. Picardal . Microbially-mediated anaerobic redox cycling of iron and nitrogen in sediments. Presented at the Goldschmidt Conference 2009, June 21-26, Davos, Switzerland.

Regberg, A., K. Singha, F. Picardal, Q. Yheng, D. Bond, and S. Brantley. Electrical conductivity associated with dissimilatory iron reduction: Do biofilms decrease resistivity? Presented at the Goldschmidt Conference 2009, June 21-26, Davos, Switzerland.

F. Picardal. 2009 Microbially-mediated redox cycling of iron in sediments. Presented at the Nordic Center for Earth Evolution (NordCEE), Institute of Biology, University of Southern Denmark, Odense, Denmark, May 20, 2009.

F. Picardal. 2009 Microbially-mediated redox cycling of iron in sediments. Presented at "Microbiology of River Associated Wetlands", Brandenburgische Akademie, Schloss Criewen, Swedt, Germany, May 11-13, 2009.

F. Picardal. Chair of Research and Development Panel, Fulbright Academy of Science and Technology 2009 Annual Meeting at FON University in Skopje, Macedonia March 24-27, 2009

A. Regberg, Q. Zheng, F. Picardal, K. Singha, S. Brantley. 2008. Anomalous electrical signals associated with microbial activity: Results from iron and nitrate reducing columns. Presented at the American Geophysical Union (AGU) 2008 Fall Meeting, San Francisco, California, 15–19 December 2008

M. Barlett, M. F. Stefan, F. Picardal. 2008. Formation of cell clusters and connective

- appendages in *Agrobacterium tumefaciens* under oxygen-limiting conditions. Presented at the 2008 Joint Spring Meeting of the Indiana Branch and Ohio Branch of the American Society for Microbiology at Ball State University, March 28-29, 2008.
- Coby, A, J. Dockrey, E. Roden, F. Picardal, S. Mohanty, and E. Shelobolina. 2008. Anaerobic redox cycling of iron in flow-through reactors. Presented at the 108th General Meeting of the American Society for Microbiology, Boston, MA, June 1-5, 2008
- F. Picardal. Chair of session, "Microbiology and Energy", at the Fulbright Academy of Science and Technology 2008 Annual Meeting in Boston, February 14-17, 2008.
- Coby, A, F.W. Picardal, E.E. Roden. 2007. Microbially-mediated anaerobic redox cycling of iron in culture and resulting microbial community. Presented at the 107th Annual General Meeting of the American Society for Microbiology, Toronto, Ontario, Canada, May 21-25, 2007.
- Strąpoć, Dariusz, F. Picardal, I. Schaperdoth, J. Macalady, C. Turich, M. Mastalerz, and A. Schimmelmann. 2007. Coalbed methane-producing microbial community in the Illinois Basin. Presented at the 107th Annual General Meeting of the American Society for Microbiology, Toronto, Ontario, Canada, May 21-25, 2007.
- Strąpoć, Dariusz, F. Picardal, Y.-S. Lin, K.-U. Hinrichs, I. Schaperdoth, J. Macalady, C. Turich, K. H. Freeman, M. Mastalerz, and A. Schimmelmann. 2007. Microbial Coalbed Methane in the Illinois Basin: Substrate Competition Among Genetic Pathways. Presented at the 23rd International Meeting on Organic Geochemistry, September 9 -14, 2007, Torquay, Devon, UK.
- Roden, E.E., A.J. Coby, and F.W. Picardal. 2007. Microbially-mediated anaerobic redox cycling of iron in sediments. 10th International Symposium on Wetland Biogeochemistry, Annapolis, MD, April 1-4, 2007.
- Coby, A., Roden, E., and F. Picardal. Biogeochemical Interactions during Microbial Iron and Nitrogen Cycling in Anoxic Sediments. 2007 Presented at the Center for Biodiversity and Conservation's 12th Annual Symposium, "Small Matters: Microbes and their Role in Conservation", on April 26-27 2007 at the American Museum of Natural History, New York, New York.
- Coby, A., Roden, E., and F. Picardal. Biogeochemical Interactions during Microbial Iron and Nitrogen Cycling in Anoxic Sediments. Presented at the Fulbright Academy of Science and Technology 2007 Annual Conference on March 2, 2007, in Panama City, Panama.
- Picardal F. and E. Roden, Symposium Organizers and Chairs, "Microbially Mediated Redox Dynamics in the Shallow Subsurface". Division of Environmental

Chemistry, American Chemical Society Annual Meeting, San Francisco, CA.
September 10-14, 2006

Picardal, F. Microbial degradation and biological treatment of chlorinated organic pollutants in wastewaters and sludges. Presented at the APEC Medium & Small Enterprises Technology Conference and Fair, Qingdao, China. May 18-19, 2006

Adebusoye, S. A., Picardal, F.W., Amund, O.O., Ilori, M.O., Oyetibo, G.O., Obayori, O., and E. A. Omotayo. Metabolism of polychlorinated biphenyls (PCBs) by novel organisms isolated from polluted soils: Evidence for growth on *ortho*-substituted di- and trichlorobiphenyls. Presented at the 2006 Society for Industrial Microbiology Annual Meeting, Baltimore, MD. July 30-Aug 3, 2006.

Picardal, F. Biogeochemical Interactions in the Transformation of Pollutants. Presented at the Fulbrighters in Science Conference sponsored by the Fulbright Academy of Science and Technology in Berlin, Germany, on March 3-5, 2006.

Adebusoye, S. A., Amund, O.O., Ilori, M.O., Fuqua, C, Grindle, N., and F. W. Picardal. Aerobic Dechlorination of Di- and Trichlorobenzenes by Two Novel PCB-Degrading Bacterial Strains Isolated from Contaminated Tropical Soil. Presented at the 105th Annual Meeting of the American Society for Microbiology in Atlanta on June 5-9, 2005.

Coby, A. and F. Picardal. Factors Influencing the Bio-Immobilization of Zn in Natural Sediments by the Iron-Reducing Bacterium *Shewanella putrefaciens*. Presented at the 105th Annual Meeting of the American Society for Microbiology in Atlanta on June 5-9, 2005.

Cooper, D. C., Picardal, F.W., and A. Coby. Interactions Between Microbial Iron Reduction and Metal Geochemistry: Effect of Redox Cycling on Transition Metal Speciation in Iron Reducing Systems. Presented at the Joint International Symposia for Subsurface Microbiology (ISSM 2005) and Environmental Biogeochemistry (ISEB XVII), Jackson Hole, Wyoming, August 14-19, 2005.