

PAUL L. BISHOP

ADDRESSES:

Environmental Implications of Emerging Technologies Program Director
National Science Foundation
Division of Chemical, Bioengineering, Environmental and Transport Systems (CBET)
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Associate Vice President for Research
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EDUCATION:

<u>Degree</u>	<u>Field</u>	<u>Institution</u>	<u>Date</u>
B.S.C.E.	Civil Engineering	Northeastern University	1968
M.S.C.E.	Environmental Engineering	Purdue University	1970
Ph.D.	Environmental Engineering	Purdue University	1972

UNIVERSITY EXPERIENCE:

<u>Rank</u>	<u>Institution</u>	<u>Dates</u>
Environmental Engineering Program Director	National Science Foundation	2008 - Present
Associate Vice President for Research	University of Cincinnati	2006 - Present
Director, UC/NIEHS Superfund Basic Research Program	University of Cincinnati	2005 - 2008
Professor of Environmental Health (College of Medicine)	University of Cincinnati	2004 - 2008
Associate Dean for Graduate Studies and Research	University of Cincinnati	2000 - 2006
Herman Schneider Professor of	University of Cincinnati	1996 - 2007

Environmental Engineering

Professor of Environmental Eng. William Thoms Professor and Head of Civil and Environmental Engineering	University of Cincinnati University of Cincinnati	1993 - Present 1987 - 1993
Professor	University of New Hampshire	1982 - 1987
Guest Professor	Technical University of Denmark Lyngby, Denmark	1986 - 1987
Visiting Professor	Cornell University	1981, 1982, 1985 (Summers)
Associate Professor	University of New Hampshire	1976 - 1982
Associate Professor and Chairman	University of New Hampshire	1977 - 1980
Visiting Professor	Heriot-Watt University Edinburgh, Scotland	1980
Assistant Professor	University of New Hampshire	1972 - 1976

NON-ACADEMIC EXPERIENCE:

<u>Position Title</u>	<u>Company</u>	<u>Dates</u>
Environmental Engineering Consultant		1972 - Present
County Sanitarian	Tippecanoe County Health Dept. Lafayette, Indiana	1971 - 1972
Environmental Engineer	Metcalf & Eddy Engineers, Inc. Boston, Massachusetts	1968
Cooperative Engineer	Metcalf & Eddy Engineers, Inc. Boston, Massachusetts	1964 - 1967

PROFESSIONAL REGISTRATION:

Registered Professional Engineer in the State of New Hampshire.

PROFESSIONAL ORGANIZATIONS:

American Academy of Environmental Engineers (AAEE)
Board of Trustees, Member, 1988 - 1991, 2001-2004

Seminars Committee - Chair, 1988 - 1989
 Education Committee - Chair, 1989 - 1993; 1998 – 2008; Chair, 2005 - 2008
 By-Laws Committee, 2001-Present
 Liaison to ABET, 2005 – 2008
 ABET Engineering Accreditation Commission Commissioner, 2008 – 2011
 Body of Knowledge Task Force Committee, 2006 - 2008

Water Environment Federation (WEF)

Paul Busch Award Selection Committee, 2006-2009
 Program Committee, 1989 - 1993
 Sludge Management Subcommittee, 1989 - 1993
 Chair, 1991-1993
 Hazardous Waste Committee, 1984 - 1993
 University of Cincinnati Student Chapter Adviser; 1994 - 2004

American Society of Civil Engineers (ASCE)

Fellow, 1997 - present
 Hazardous Waste Committee, 1981 - 1993
 Cincinnati Section - Environmental Engineering Group
 Management Committee, 1992-1997

Association of Environmental Engineering and Science Professors (AEESP)

Past President, 1993-1994
 President, 1992-1993
 Vice President, 1991-1992
 Member of the Board of Directors, 1991-1994
 Audit Committee - Chair, 1976 - 1977
 AAEE Liaison, 1988 - 1991
 IWA USANC Liaison, 2002 - 2008
 Awards Committee Acting Chair, 1995
 Nominating Committee, 1993-1997

International Water Association

Board of Governors, 2002 - present
 Strategic Council, 2002 - present
 Specialist Group on Biofilm Systems, 1991 - present
 Management Group, 1994 - present
 Specialist Group on Environmental Engineering Education, 1993 - present
 Management Group, 1994 - present
 Chair, 1994 - 1998
 Conference on Environmental Engineering Education, Singapore, Chair, 1996
 U.S.A. National Council (USANC)
 Chair, 2002 - present
 Secretary/Treasurer, 2000 - 2002
 AEESP Representative, 1994-2002
 Reorganization Committee, 1999 - 2002
 USANC Founders Award Committee Chair, 1994-1996

Accreditation Board for Engineering and Technology (ABET)

Engineering Accreditation Commission Commissioner, 2008 - present
 Alternate Director, 1991 - 1998
 Program Visitor, 1989 – present
 International Program Visitor, 2006 - present
 AAEE Society Liaison, 2005 - present

American Society for Engineering Education

Engineering Research Council, 2001 - 2007

Sigma Xi

Tau Beta Pi

Chi Epsilon

EDITORIAL AND ADVISORY BOARDS:

The Environmental Engineer – Editorial Board, 2006 - Present
Re/Views in Environmental Science and Bio/Technology - Advisory Board, 2001-2006
Journal of Environmental Engineering and Science - Associate Editor, 2001 - Present
Journal of Hazardous Materials - Editorial Board, 1988 - 2006
Journal of Environmental Sciences and Health - Associate Editor, 1990 - 1996
IAWQ/IWSA Environmental Engineering Education Newsletter - Editor, 1994 - 1995

Alberta Water Research Institute – International Research Advisory Committee – 2007 - present
 Alberta Ingenuity Centre for Water Research – International Advisory Board – 2006 - 2007
 U.S. EPA Center for Clean Industrial and Treatment Technologies - Michigan Technological University -
 Science Advisory Board, 1992 - 2001
 Center for Applied Environmental Technologies, Institute of Advanced Manufacturing Sciences, Inc. -
 Steering Committee, 1991 - 2000
 WARZYN Engineering, Inc., Madison, WI - Technical Advisory Board, 1990 - 1994
 Cincinnati State Technical and Community College, Environmental Engineering Technology Advisory
 Board, 2000- present

MUNICIPAL ORGANIZATIONS:

Planning Board, Town of Lee, NH
 Member, 1975 - 1980
 Chairman, 1978 - 1980
 Consultant, 1980 - 1986

Zoning Board of Adjustment, Town of Lee, NH
 Member, 1980 - 1986

Durham - UNH Sewer Policy Board
 Member, 1979 - 1986

Metropolitan Sanitary District of Greater Cincinnati, OH
 Appellate Board, 1991 - Present
 Public Advisory Committee, 2000 - Present

Planning Advisory Committee, Anderson Township, OH
 Member, 1991 - 1997
 Vice-Chair, 1996
 Chair, 1997

Development Advisory Committee, Anderson Township, OH
 Member, 1998 - 1999
 Vice-Chair, 1998

Hamilton County Storm Water District Steering Committee, Cincinnati, OH
 Member, 2001 – present

Metropolitan Sewer District of Greater Cincinnati Combined Sewer Overflow Long Term Control Plan
 Steering Committee, 2004 - 2007

STATE BOARDS:

Ohio Governor's Task Force on Waste Minimization, 1988 - 1991

New Hampshire Solid Waste Management Council
Council Member, 1981 – 1987

State of Ohio Fernald Cleanup Initiative Leadership Team, 1991 – 1992

University Clean Energy Alliance of Ohio (UCEAO), 2006 – present

Ohio Biofuels Taskforce, Transportation Subcommittee on Automobile & Truck Manufacturers, 2007 - present

FUNDED RESEARCH:

1. Aerobic Digestion of Sludge under Cold Temperature Conditions - Office of Water Resources Research, U.S. Dept of the Interior, \$52,000, 1973 - 1976.
2. Strafford Region Solid Waste Management System - Strafford Regional Planning Commission, \$24,000, 1974 - 1976.
3. Removal of Fluoride from Water by Use of Fluidized Activated Alumina Adsorption - Center for Industrial and Institutional Development, \$9,000, 1975.
4. Water Pollution Potential of Snow Removal Operations - Town of Durham, NH, \$11,000, 1976 - 1977.
5. Water Quality Modeling in the Great Bay Estuary System - Office of Sea Grant, National Oceanic and Atmospheric Administration, \$78,000, 1978.
6. Dispersive Processes for Short Duration Discharges in the Great Bay Estuary System - Office of Sea Grant, National Oceanic and Atmospheric Administration, \$82,000, 1979.
7. Treatment of High Salinity Wastewater with Rotating Biological Contractors - Hubbard Fund, \$15,000, 1978 - 1979.
8. Environmental Engineering in the Oceans - National Science Foundation, \$92,000, 1979 - 1981.
9. Subsurface Disposal System Rejuvenation using Hydrogen Peroxide - Community Services Administration, \$11,000, 1979 - 1981.
10. Pathogen Survival During Forced Aeration Composting of Municipal Sludge - Office of Water Research and Technology, U.S. Dept. of the Interior, \$135,000, 1979 - 1982.
11. Tertiary Treatment of Municipal Wastewaters Using Seaweeds - Hubbard Fund, \$9,000, 1981 - 1982.
12. The Role of Protozoans in Rotating Biological Contactor Biofilms - National Science Foundation, \$6,000, 1981 - 1982.
13. High Energy Electron Disinfection of Municipal Wastewater Sludge Compost - High Voltage Engineering Corporation, \$2,600, 1981 - 1982.
14. Examination of a Combined Secondary and Tertiary Wastewater Treatment Process for Temperate Regions Using Aquatic Macrophytes and Their Epifloral Biofilms - National Science Foundation,

- \$343,000, 1982 - 1985.
15. Removal of Heavy Metals by Aquatic Macrophytes in Temperate Regions - National Science Foundation, \$11,000, 1983 - 1984.
 16. Evaluation of the Potential for Marine Disposal of Solidified/ Stabilized Inorganic Hazardous Wastes - National Oceanic and Atmospheric Administration, \$80,000, 1983 - 1985.
 17. Development of a Dynamic Leaching Test for Hazardous Wastes - New Hampshire Bureau of Hazardous Waste Management, \$24,000, 1984 - 1985.
 18. Radon Removal Techniques for Community Public Water Supplies in New Hampshire - U.S. Environmental Protection Agency, \$90,000, 1985 - 1987.
 19. Development of a Standard Solid Waste Leaching Test - New Hampshire Office of Waste Management, \$33,000, 1985 - 1987.
 20. Development Studies for an Automated Water Filter System - Teledyne Water Pik, \$38,000, 1986 - 1987.
 21. Removal of Trace Organics from Municipal Wastewater - Danish Council of Technical and Scientific Research, \$110,000, 1986 - 1987.
 22. Biodegradation of Azo Dyes - Ohio Board of Regents, \$90,000, 1988 - 1990.
 23. Aerobic Digestion of Recalcitrant Toxics - U.S. EPA, \$72,000, 1988 - 1990.
 24. Two-sludge Anaerobic/Aerobic Treatment of CERCLA Leachants in POTWs - U.S. EPA, \$410,000, 1988 - 1990.
 25. Biofilm Treatment of Xenobiotics - National Institute of Environmental Health Sciences, \$415,000, 1988 - 1992.
 26. Alternative Leaching Scenarios for Solidified/Stabilized Hazardous Wastes - U.S. EPA, \$87,000, 1988 - 1989.
 27. Assessment of Solidification/Stabilization for Superfund Contaminated Soils - U.S. EPA, \$133,000, 1988 - 1989.
 28. Chemical Fixation of Flue Gas Desulfurization Sludges - Ohio Coal Development Office, \$250,000, 1989 - 1991.
 29. Biodegradation of Hazardous Compounds in Rotating Biofilms (Co-PI) - U.S. EPA, \$87,000, 1989.
 30. PEI Research Subcontract - PEI, Inc. (later IT Corporation), \$2,756,000, 1989 - 1994.
 31. Program in Hazardous Waste Management - Ohio Board of Regents (Academic Challenge), \$540,000, 1989 - 1995.
 32. Assessment of Long Term Durability of Solidified/Stabilized Hazardous Waste Forms, U.S. EPA, \$525,000, 1990 - 1993.
 33. Micro-scale Environmental Conditions Present During Biodegradation of Toxic Organics in Biofilms - Ohio Hazardous Substance Research, Education and Management Institute, \$32,000, 1990 - 1992.

34. Stabilization/Solidification Technology Evaluation - E.I. DuPont deNemours and Co., Inc., \$205,000, 1990 - 1992.
35. Assessment of Solidification/Stabilization of Mixed Wastes (co-P.I.) - Westinghouse Materials Company of Ohio, \$560,000, 1990 - 1992.
36. Composting of Municipal Solid Wastes - City of Cincinnati, Ohio, \$150,000, 1990 -1992.
37. Review and Analysis of Environmental Training Plans - Westinghouse Materials Company of Ohio, \$43,000, 1991.
38. Review and Analysis of RCRA Compliance Refresher Course and Student Testing Material - Westinghouse Environmental Management Company of Ohio, \$23,000, 1991-1992.
39. Construction of a Hazardous Waste Research Facility - Ohio Board of Regents, \$2,406,000, 1991.
40. Transport and Microbial Degradation in Biofilms - National Institute of Environmental Health Sciences, \$880,000, 1992-1995.
41. Review of Operable Unit 2 Draft Remedial Investigation Baseline Risk Assessments - Westinghouse Environmental Management Company of Ohio, \$21,000, 1992.
42. Development of Industrial Workshops - Westinghouse Environmental Management Company of Ohio, \$82,000, 1992-1993.
43. UC/USEPA Cooperative Agreement - U.S. EPA, \$900,000, 1993.
44. Microbial Detoxification/Degradation of Hazardous Wastes (co-P.I.) - National Institutes of Health, \$149,000, 1993-1995.
45. Aerobic Degradation of Recalcitrant Volatile Chlorinated Chemicals in a Hydrogel Encapsulated Biomass Biofilter (co-P.I.) - U.S. Environmental Protection Agency, \$106,376, 1994-1995.
46. Investigation of Nitrification Tower Upsets at the North Regional Wastewater Treatment Plant - Miami Conservancy District, Dayton, OH, \$95,900, 1994-1996.
47. Volatile Organic Carbon Sources and Control at Metropolitan Sewer District Wastewater Treatment Plants - Metropolitan Sewer District of Greater Cincinnati, \$156,000, 1994-1996.
48. Transport and Degradation of Toxic Agents in Biofilms - National Institute of Environmental Health Sciences, \$862,753, 1995-2001.
49. Development of Conducting Polymer Ion Selective Microelectrodes for Use in Environmental and Biomedical Analyses - National Science Foundation, \$35,000, 1995-1998.
50. International Group Travel Grant, IAWQ Biennial Conference, Singapore - National Science Foundation, \$18,918, 1996-1997.
51. Incorporation of Molecular Biotechnology Concepts into Environmental Engineering - University of Cincinnati Support for Faculty Development, \$2,495, 1996-97.
52. Environmentally Conscious Engineering - Ohio Environmental Protection Agency, \$47,645, 1996-1998.

53. Stabilization/Solidification of Organically-Contaminated Hazardous Wastes Using Reactivated Carbon - National Science Foundation, \$475,000, 1996-2000.
54. Stabilization/Solidification of Organically-Contaminated Hazardous Wastes Using Reactivated Carbon - DuPont Co., Wilmington, DE, \$75,000, 1996-2000.
55. Stabilization/Solidification of Organically-Contaminated Hazardous Wastes Using Reactivated Carbon - Calgon Carbon Co., Pittsburgh, PA, \$75,000, 1996-2000.
56. Improved Aeration Efficiency at the Mill Creek Wastewater Treatment Plant - Metropolitan Sewer District of Greater Cincinnati, \$45,000, 1997-1998.
57. Pollution Prevention Program for Industrial Users of MSD Wastewater Treatment Plants - Metropolitan Sewer District of Greater Cincinnati, \$20,000, 1997-1998.
58. Evaluating the Performance of the New Biofilters at the Mill Creek Wastewater Treatment Plant - Metropolitan Sewer District of Greater Cincinnati, \$45,000, 1997-1998.
59. Use of Reclaimed Magnesium Hydroxide as a Wastewater Treatment Reagent - Ohio Coal Development Office, \$275,575, 1997-2001.
60. Use of Reclaimed Magnesium Hydroxide as a Wastewater Treatment Reagent - Cinergy Corp., \$139,976, 1997-2001.
61. Use of Reclaimed Magnesium Hydroxide as a Wastewater Treatment Reagent - Dravo Lime Co., \$65,281, 1997-2001.
62. Alternative Waste Treatment Studies for OU4 Fernald Silo Wastes - Fermco Restoration Management Corp., (with L. Reiser), \$94,999, 1997-1998.
63. Technical and Economic Comparison of Biofilter Odor Control versus Wet Scrubbing at the MSD Mill Creek Facility, Metropolitan Sewer District of Greater Cincinnati, \$71,000, 1998-2001.
64. Control of Wastewater Color through Pollution Prevention, Metropolitan Sewer District of Greater Cincinnati, \$38,400, 1998-2000.
65. Use of Oxidation-Reduction Potential for Control of Wastewater Treatment Operations at MSD, Metropolitan Sewer District of Greater Cincinnati, \$95,400, 1998-2001.
66. Stabilization and Testing of Mercury Containing Wastes, (with M. Suidan and L. Rieser), U.S. EPA, \$200,000, 1998-2000.
67. Water Chemistry at the Surface of Pipe Walls in Drinking Water Distribution Systems, U.S. EPA, \$69,000, 1999-2001.
68. Technical Support for Revisions to the Land Disposal Restrictions for Mercury Process Wastes, (with M. Suidan and L. Rieser), U.S. EPA, \$26,000, 1999-2000.
69. Technical Support for Revisions to the Land Disposal Restrictions for Mercury Wastes, Including Soil and Debris Contaminated with Mercury, (with M. Suidan and L. Rieser), U.S. EPA, \$75,000, 1999-2000.
70. Leachability of Metals from Mineral Processing Waste, U.S. EPA, \$72,627, 2000-2001.

71. Technical Support of Long Term Stewardship Meeting, Fluor Fernald, Inc., \$75,000, 2000.
72. Technical Support Services for OSDF Administrative and Engineering Services, Fluor Fernald, Inc., \$45,000, 2000-2001.
73. Support of the Fernald Post Closure Stewardship Technology Project (PCSTP) Integrating Stewardship Technology Team, Fluor Fernald, Inc., \$45,000, 2000-2001.
74. Transport and Biodegradation of Toxic Organics in Biofilms, National Institute of Environmental Health Sciences, \$1,105,567, 2001-2008.
75. Adaptation of Subsurface Microbial Biofilm Communities in Response to Chemical Stressors, (with Nancy Love, VPI&SU), U.S. EPA, \$300,000, 2001-2003.
76. Performance and Evaluation of Satellite CSO Primary Tank Units, Metropolitan Sewer District of Greater Cincinnati, \$140,000, 2001-2004.
77. Microelectrodes for Environmental Monitoring, National Institute of Environmental Health Sciences (sub-contract to Emerging Concepts, Inc.), \$132,000, 2002-2005.
78. Biological Nutrient Removal in MSD Plants, Metropolitan Sewer District of Greater Cincinnati, \$50,000, 2002-2004.
79. Control of Odors and VOCs by Recirculation of Off-Gas Emissions from Aeration Basins, Metropolitan Sewer District of Greater Cincinnati, (with Tim Keener), \$50,000, 2002-2004.
80. Integrated Microelectrode Arrays for Field-Based Environmental Monitoring, (with Ian Papautsky and Fred Beyette), National Science Foundation, \$99,775, 2002-2004.
81. Effectiveness of Chlorine Dioxide in the Disinfection of Biofilms in Pipes and Food Process Equipment, JohnsonDiversey, Inc., \$22,442, 2004-2005.
82. Potential for Pathogen Adhesion to Water Distribution Systems Biofilm Following a Bioterrorism Attack, U.S. EPA, \$87,034, 2004-2006.
83. Phosphorus Recovery from Sewage, U.S. EPA, (with D. Oerther), \$10,000, 2004-2005.
84. Improvement of Wet Weather Treatment Facility Performance with Use of Polymer Addition and UV Disinfection, Metropolitan Sewer District of Greater Cincinnati, \$40,000, 2005.
85. Integrated Multi-Analyte Microelectrode Sensors for In Situ Environmental Monitoring, National Science Foundation (with Ian Papautsky and Fred Beyette), \$328,788, 2005-2008.
86. The Ability of Chlorine Dioxide Films to Retain Their Disinfecting Concentration, JohnsonDiversey Co., \$2,500, 2006.
88. PAH Bioremediation and Monitoring in Biowalls, NIEHS, \$890,528, 2006-2009.
89. Persistence of Spore Forming Bacteria on Drinking Water Biofilm and Evaluation of Decontamination Methods, U.S. EPA, \$148,569, 2007-2008.
90. Development and Use of Microelectrodes to Evaluate Nitrification within Chloraminated Drinking Water

System Biofilms, U.S. EPA, \$127,530, 2007-2008.

91. Bench-Scale Pipe Leak Testing Experiment Station, U.S. EPA, \$225,000, 2007-2008.
92. IWA Young Water Professionals Travel Grant, National Science Foundation, \$24,000, 2008.
93. Point of Care Center for Emerging Neurotechnologies (POC-CENT), National Institute of Biomedical Imaging and Bioengineering, (Fred Beyette, PI), \$9,363,719, 2007-2012.
94. Development of a Portable Multi-Analyte Sensor to Simultaneously Measure Chloride, Potassium, ORP and pH in RO Membrane Systems, (Am Jang, PI), Gwangju Institute of Science and Technology, Korea, \$228,402, 2008-2011.

AWARDS:

College of Engineering Research Award, 2007

College of Engineering Distinguished Engineering Research Award, 2007

International Water Association (IWA) Outstanding Service Award, 2006

AEESP /Malcolm Pirnie Frontier in Research Award, 2005

American Society of Civil Engineers, Fellow, 1997

Herman Schneider Professor of Environmental Engineering, University of Cincinnati, 1996-present

University of Cincinnati Faculty Achievement Award, 1997

AEEP/Parsons Engineering Science, Inc. Outstanding Doctoral Dissertation Advisor Award, 1995

William Thoms Professor of Civil and Environmental Engineering, 1988-1993

ASTM Faculty Fellow, 1984

Diplomate - American Academy of Environmental Engineers, 1985 - present

Listed in: *Marquis Who's Who*

Marquis Who's Who in America

Marquis Who's Who in the East

Marquis Moving Up in America

Marquis Who's Who of Emerging Leaders in America

Marquis Who's Who in American Education

Marquis Who's Who in the World

Marquis Who's Who in Science and Engineering

Dictionary of International Biography

American Men and Women of Science

Who's Who in Engineering Education

PATENTS:

Method and Apparatus for Reducing Levels of Organics in Liquids, U.S. Patent No. 4,534,865

Aerobic Fluidized Bed Reactor with Internal Media Cleaning, U.S. Patent No. 5,487,829.

Potentiometric Microelectrode Sensors for In Situ Environmental Monitoring, U.S. Provisional Patent No. 60/621,504.

Micro Sensor Arrays for In Situ Measurements, U.S. Patent No. 11/257,418.

BOOKS:

1. Bishop, P.L., *Marine Pollution and Its Control*, McGraw-Hill Book Co., New York, 357 pp., 1983.
2. Colombo, P., Barth, E., Bishop, P.L., Buelt, J. and Conner, J., *Innovative Site Remediation Technology: Stabilization/Solidification*, American Academy of Environmental Engineers, Annapolis, MD, 166 pp., 1994.
3. Bishop, P.L., *Pollution Prevention: Fundamentals and Practice*, McGraw-Hill, New York, 717 pp., 2000.
4. Bishop, P.L., *Solutions Manual to Accompany Pollution Prevention: Fundamentals and Practice*, McGraw-Hill, New York, 238 pp., 2000.
5. Wuertz, S., Bishop, P.L. and Wilderer, P.A., *Biofilms in Wastewater Treatment: An Interdisciplinary Approach*, IWA Publishing, London, 400 pp., 2003.
6. Bishop, P.L., *Pollution Prevention: Fundamentals and Practice*, Waveland Press, Long Grove, IL, 2004.

BOOK CHAPTERS:

1. Bishop, P. and Kinner, N., "Aerobic fixed - film processes", Chapter 3, *Biotechnology*, Verlag Chemie, Weinheim, Germany, 114-176, 1986.
2. Brown, T., Bishop, P. and Gress, D., "Use of an upflow column leaching test to study the release patterns of heavy metals from stabilized/solidified heavy metal sludges," *Hazardous and Industrial Solid Waste Testing*, 6th volume, ASTM STP 933, edited by D. Lorenzen et al., ASTM, Philadelphia, PA, 79-92, 1986.
3. Bishop, P., Brown, T. and Shively, W., "Alkalinity releases and the leaching of heavy metals from stabilized/solidified wastes," *Chemistry for Protection of the Environment 1985*, edited by L. Pawlowski, G. Alaerts and W. Lacy, Elsevier Science Publishers, Amsterdam, 217-233, 1986.
4. Kozak, P. and Bishop, P., "The effect of mixing and aeration on the productivity of *Myriophyllum heterophyllum* Michx. (water milfoil) during aquatic wastewater treatment," *Aquatic Plants for Water Treatment and Resource Recovery*, edited by K. Reddy and W. Smith, Magnolia Publishing Inc., Orlando, FL, 445-452, 1987.
5. Eighmy, T., Jahnke, L. and Bishop, P., "Productivity and photosynthetic characteristics of *Elodea nuttallii* grown in aquatic treatment systems," *Aquatic Plants for Water Treatment and Resource Recovery*, edited by K. Reddy and W. Smith, Magnolia Publishing Inc., Orlando, FL, 453-461, 1987.
6. Bishop, P., Arvin, E. And Mortensen, E., "Biodegradation of phenoxy acids in biofilms," *Behaviour of Organic Micropollutants in Biological Waste Water Treatment*, Commission of the European Communities, Water Pollution Research Report 6, 39-64, 1987.
7. Bishop, P., Arvin, E. and Mortensen, E., "Biodegradation of phenoxy acids in biofilms,"

Behavior of Organic Micropollutants in Biological Wastewater Treatment, Commission of the European Communities Report Eur 11356, Brussels, 39-64, 1988.

8. El-Korchi, T., Gress, D., Baldwin, K. and Bishop, P., "Evaluating the freeze-thaw durability of Portland cement stabilized/solidified heavy metal waste using acoustic measurements", *Environmental Aspects of Stabilization and Solidification of Hazardous and Radioactive Wastes*, ASTM STP 1033, ASTM, Philadelphia, 184-191, 1989.
9. Kolvites, B. and Bishop, P., "Column leach testing of phenol and trichloroethylene stabilized/solidified with Portland cement," *Environmental Aspects of Stabilization and Solidification of Hazardous and Radioactive Wastes*, ASTM STP 1033, ASTM, Philadelphia, PA, 238-250, 1989.
10. Bishop, P., Watts, R. and Robson, M., "Chemical treatment of hazardous wastes," Chapter 7, *Hazardous Waste Treatment Processes*, MOP FD-18, Water Pollution Control Federation, Washington, D.C., 1990.
11. Bishop, P. "Solidification/stabilization of contaminated soils - An overview," *Contaminated Soil '90*, Kluwer Academic Publishers, Dordrecht, The Netherlands, 1265-1274, 1990.
12. Bishop, P., "Contaminant leaching from solidified/stabilized wastes - overview," *Emerging Technologies in Hazardous Waste Treatment II*, American Chemical Society, 302-315, 1991.
13. Cheng, K.Y., Bishop, P. and Isenburg, J., "Cement stabilization/solidification techniques: pH profile within acid-attacked waste form," *Waste Materials in Construction*, Elsevier Science Publishers B.V., Amsterdam, 371-372, 1991.
14. Bishop, P., Keener, T., Dusing, D. and Gong, R., "Chemical fixation of flue gas desulfurization sludges and fly ash," *Stabilization/Solidification of Hazardous, Radioactive and Mixed Wastes*, ASTM STP 1123, 103-118, 1992.
15. You, G., Sayles, G., Kupferle, M., Bishop, P. and Lipton, D., "Enhancement of anaerobic bioremediation of DDT-contaminated soil with nonionic surfactants," *Emerging Technologies in Hazardous Waste Management VI*, American Chemical Society, 658-660, 1994.
16. Bishop, P., Zhang, T. and Fu, Y., "Effect of biofilm structure, microbial distributions and mass transport on biodegradation processes," *Biological Degradation of Organic Chemical Pollutants in Biofilm Systems*, Erik Arvin, editor, Elsevier Science, Inc., Tarrytown, NY, 1995.
17. You, G., Sayles, G., Kupferle, M. and Bishop, P., "Anaerobic bioremediation of DDT-contaminated soil with non-ionic surfactant," *Bioremediation of Recalcitrant Organics*, ed. by R. Hinchee, Battelle Press, Columbus, OH, 3: 137-144, 1995.
18. Bishop, P. and Zhang, T., "Effect of biofilm structure, microbial distributions and mass transport on biodegradation processes," *Biodegradation of Organic Chemical Pollutants in Biofilm Systems*, IWA Publications, London, UK, 1995.
19. Gibbs, J. and Bishop, P., "A method for describing biofilm surface roughness using geostatistical techniques," *Biofilm Structure, Growth and Dynamics*, M. van Loosdrecht, editor, Elsevier Science, New York, NY, 1996.
20. Hinsenveld, M. and Bishop, P., "Use of the shrinking core/exposure model to describe the leachability from cement stabilized wastes," *Stabilization and Solidification of Hazardous, Radioactive and Mixed Wastes*, ASTM STP 1240, ASTM, Philadelphia, 528-539, 1996.

21. Cheng, K. and Bishop, P., "Morphology and pH changes in leached solidified/stabilized wastes," *Stabilization and Solidification of Hazardous, Radioactive and Mixed Wastes*, ASTM STP 1240, ASTM, Philadelphia, 73-79, 1996.
22. Cheng, K. and Bishop, P., "Property changes of cement based waste forms during leaching," *Stabilization and Solidification of Hazardous, Radioactive and Mixed Wastes*, ASTM STP 1240, ASTM, Philadelphia, 375-387, 1996.
23. You, G., Sayles, G., Kupferle, M. and Bishop, P., "Surfactant effects on the anaerobic DDT transformation by mixed microbial cultures and hematin," *Emerging Technologies in Hazardous Waste Management VIII*, American Chemical Society, Birmingham, AL, 1996.
24. Bishop, P., "Asphalt blending," *Standard Handbook of Hazardous Waste Treatment and Disposal*, McGraw Hill, New York, NY, 8.107-8.117, 1997.
25. Bishop, P., "Biofilm structure and kinetics," *Biofilm Systems III*, ed. by P. Harremoes, Elsevier Science, New York, 1997.
26. Coughlin, M., Tepper, A., Kinkle, B. and Bishop, P., "Characterization of aerobic azo-dye degrading bacteria and their activity in a wastewater biofilm," *Biofilm Systems III*, ed. by P. Harremoes, Elsevier Science, New York, 1997.
27. Palsdottir, G. and Bishop, P., "Nitrifying biotower upsets due to snails and their control," *Biofilm Systems III*, ed. by P. Harremoes, Elsevier Science, New York, 1997.
28. Zhou, Q. and Bishop, P., "Determination of oxygen profiles and diffusivity in encapsulated biomass k-carrageenan gel beads," *Biofilm Systems III*, ed. by P. Harremoes, Elsevier Science, New York, 1997.
29. Yu, T., Bishop, P., Galal, A. and Mark, H., "Fabrication and evaluation of a sulfide microelectrode for biofilm studies," Chapter 19, *Polymers in Sensors: Theory and Practice*, Akmal, N. and Usmani, A., editors, American Chemical Society, Washington, D.C., 231-247, 1998.
30. Galal, A., Atta, N.F., Bishop, P.L. and Mark, H.B., "Sensors based on conducting polymer electrodes," Chapter 18, *Polymers in Sensors: Theory and Practice*, Akmal, N. and Usmani, A., editors, American Chemical Society, Washington, D.C., 210-230, 1998.
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UNPUBLISHED PRESENTATIONS:

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2. Kinner, N. and Bishop, P., "Microbiology of rotating biological contactors treating high salinity wastewater," presented at Water Industry '81 International Conference, Brighton, England, 1981.
3. Andrews, T. and Bishop, P., "The use of hydrogen peroxide for failed soil absorption system rehabilitation," presented at New England Water Pollution Control Association Annual Meeting, Whitefield, New Hampshire, October 1981.

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5. Bishop, P., "Marine disposal of solidified/stabilized inorganic hazardous wastes," Marine Pollution Conference, Durham, NH, September 1983.
6. White, M. and Bishop, P., "Temperate climate aquaculture wastewater treatment," BioEnergy 84 World Conference, Gothenburg, Sweden, June 18-21, 1984.
7. Bishop, P., "Nitrogen transformations during sludge composting," 1984 New England Workshop on Composting and Land Application, Boston, MA, March 28-30, 1984.
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17. Bishop, P., "Biological treatment of micropollutants: case study," presented to Hygiejneteknisk Faggruppe (Danish Society of Civil Engineers), Copenhagen, Denmark, 21 pp., December 2, 1986.
18. Bishop, P., "Statistisk forsøgsplægning og bearbejdelse," presented to the Groundwater and Soil Pollution Research Group, Dansk Tekniske Højskole, Lyngby, Denmark, January 1987.
19. Bishop, P., "Solidification/stabilization of hazardous wastes," Seminarraekke om Kemikalieaffald og Slamkompostering, Lyngby, Denmark, 44 pp., March 1987.

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