

## **MICHAEL R. OVERCASH**

### **EDUCATION**

Ph.D. 1972    Chemical Engineering                      University of Minnesota  
                 Business Administration  
                 (minor)

Development of Couette oxygenator for enhanced artificial lung performance during surgical procedures. Modeling blood damage-oxygenation phenomena in artificial lungs.

M.Sc. 1967    Fulbright Scholar                      University of New South Wales  
                 Chemical Engineering                      Sydney, Australia

Development and optimization of cyclone-flotation process for coal cleaning.

B.S. 1966    Chemical Engineering                      North Carolina State University  
                 Honors Engineering Program

### **EXPERIENCE**

2007 - present    Visiting Scholar, Industrial and Manufacturing Engineering, Wichita State University

1992-1993    Visiting Professor, Department of Chemical Engineering Imperial College, England

1992-1993    Office of Naval Research, London, England

1984-1985    Visiting Professor, Department of Chemical Engineering University of Cambridge, England

1985    Visiting Fellow, Trinity College, Cambridge, England

1981- 2007    Professor, Chemical Engineering (Undergraduate Administrator 1981-1984)

1976-1981    Associate Professor, Biological and Agricultural Engineering

Associate Professor, Chemical Engineering North Carolina State University

1972-1976    Assistant Professor, Biological and Agricultural Engineering

Assistant Professor, Chemical Engineering, North Carolina State University,  
Raleigh, North Carolina

1966 Scott Paper Company, nonwoven materials development  
(summer)

1965 Eastman Kodak, film processing R&D  
(summer)

1961-1964 American Viscose Corp., process development for zinc recovery, cellulose  
(summers) preparation, and rayon manufacture

### **LANGUAGES**

Languages studied: Japanese (2-1/2 years), Spanish (4 years), French (translation Ph.D. qualifier), German (translation Ph.D. qualifier)

### **AWARDS**

Fulbright Scholar

Pi Mu Epsilon

National Defense Education Scholarship

Order of Saint Patrick

Phi Kappa Phi

Tau Beta Pi

AIChE Scholarship Award

Young Researcher Award, American Society of Agricultural Engineers and Farm and Industrial Equipment Institutes, - for dedicated use of scientific methodology to seek out facts or principles significant to agriculture and engineering, 1984.

U. S. Environmental Protection Agency Distinguished Scientist Award, 1986.

Selected as Special Advisor to Patriotic Health Campaign Committee of the Peoples Republic of China for the infant mortality and public health improvement of large municipalities recycling wastes to land. Scientific visits 1987 - 1989 throughout provinces of China.

Sigma Xi, full member, 1987

NCSU Executive Committee, 1990

American Institute of Chemical Engineers, 1990 Institute Environment Award

U. S. Environmental Protection Agency, 1990 National Wastewater Management Excellence

Award, one of two awards for Research Activities in Beneficial Sewage Sludge Use.

## **PROFESSIONAL SOCIETIES**

Association for Standards and Testing Materials (ASTM) 1981-1983

American Society of Agricultural Engineers (elected full member, 1979)

- ♣ Environmental Quality Coordinating Committee
- ♣ Disposal of Waste on Land Committee
- ♣ International Relations Committee

American Institute of Chemical Engineers (elected full member, 1979) (1964 - present)

- ♣ Environmental Division, Chairman 1979 & Vice Chairman 1977-1978
- ♣ Environmental Division, Peer Review-Government Program Chairman 1978
- ♣ AID/LIFE Committee, Chairman 1977-1983
- ♣ Environmental Division Dynamic Objectives, Chairman 1979
- ♣ Government Interaction Committee
- ♣ Environmental Division, Solid and Hazardous Waste Section, Chairman 1981-1982
- ♣ Environmental Division, Director 1983-1985
- ♣ Marketing Division, 1981- 1986
- ♣ Research Committee, 1989 - present
- ♣ Nominating Committee, 1990

Institute of Chemical Engineers, London (1967 - present)

International Water Resources Association (1980 - 1984)

Water Pollution Control Federation (1981 - 1985)

International Humic Substances Society (1983 -1992)

North Carolina Academy of Sciences (1988 -1992)

History of Science Society (1989 -1994)

Sigma Xi

NCSU Executive Committee (1990-1992)

International Society of Industrial Ecology, Founding Member (2002 – present)

**CONSULTANT ON POLLUTION PREVENTION, WASTE MANAGEMENT,  
AND LIFE CYCLE TECHNOLOGY TO:**

Monsanto	Royston Manufacturing
Union Carbide	DuPont
Stauffer Chemicals	Merck Chemicals
NOVO Biochemicals	Shenandoah Recycling
Amoco Chemicals	Leather and Tanning Industry Association
Kimberly Clark	Revere Copper and Brass
Milliken Textiles	Shell Oil
Milliken Chemicals	Engineered Food Systems
Seneca Lincoln Foods	Almond Brothers Poultry
Procter Chemicals	Litho Industries
Webster Poultry	American Enka
Lumbie Poultry	General Tire and Rubber
Reynolds Aluminum	Lifesavers Manufacturing, Inc.
American Petroleum Institute	Cuddy Foods
Sohio	Syntex
Monsanto Fiber Intermediates Co.	Seattle, METRO
Allied Corporation	Virginia Fibre
Weyerhaeuser Corporation	Zenon Environmental
NSC Corporation	Union Carbide Industrial Gas Corp.
Hunton and Williams	National Starch Chemical Company
Pfizer	Central Insurance Company
Trinity American Corporation	Kinross-Delamar Mining
McGlancey Seasoning, Inc.	Searle Corporation
Biokyowa	Patagonia
BOC	ConPro Corporation
Georgia Pacific	Logic Environmental
Searle, Corp.	LeBoeuf, Lamb, Greene & MacRae
NRG Energy	Hanes Dye and Finishing, Co.
City of Dalton, GA	Montgomery Watson
Falcon Industries	NutraSweet, Co.
DuPont Nylon	Solutia
DuPont Minerals & Pigments	Hobbs, Upchurch, & Associates
Barr Engineering Co.	NRG Energy, Inc.
Tenaska, Inc.	Grede Foundry
Trenton Municipal Utilities	HON Industries
Shaw Contract Group	International Design Center for

	Environment
Mannington Commercial	National Renewable Energy Laboratory
IMC Phosphate Co.	Swiss Federal Laboratories for Material
Carpet & Rug Institute	Testing and Research
Milliken Carpet	Boral Material Technology
Paper Recycling Coalition	Boustead Consulting & Associates

### **SCIENTIFIC REVIEW COMMITTEES AND STUDY SECTIONS**

National Academy of Science, Committee on National Needs for Research and Development Related to Hazardous Wastes, 1981-83.

National Academy of Science, Committee on National Needs for Priority Mechanisms in Toxicity Evaluations, 1982-83.

North Carolina Academy of Science, Committee on Review of Land Disposal Technologies for Governor Jim Hunt, 1983.

National Academy of Science, Committee on Institutional Considerations in Reducing the Generation of Hazardous Industrial Wastes, 1983-84.

Science Advisory Board of the U.S. Air Force, Committee on Assessment of Overall Hazardous Waste Management and Site Remediation, 1984-86.

National Science Foundation Panel, Source Reduction and Beneficiation for Hazardous Waste, 1986.

U. S. Environmental Protection Agency, Committee on Risk Assessment for Municipal Sludge Land Treatment, Subcommittee on Toxic Organics, 1986.

Science Advisory Board of the U.S. Air Force, Committee on Air Force Current and Long-term Response to Hazardous Materials - Waste Minimization in Systems Acquisition, 1986.

National Research Council, Board on Environmental Studies and Toxicology Assessment of Research Needs for Hazardous Waste Management, 1986.

National Science Foundation, Environmental Engineering and Small Business Innovative Research (twenty proposals), 1986.

National Academy of Science, Committee to Evaluate Mass Balance Information for Facilities Handling Toxic Substances, 1987-1989.

National Academy of Science, Committee to Provide Interim Oversight of the DOE Nuclear

Weapons Complex, 1988-1990, Security Q Clearance.

National Academy of Science, Committee on Research Needs for Waste Reduction, 1989.

National Academy of Science, Study Design Committee for Improving the Compatibility of Environmental and Industrial Goals, 1991.

National Academy of Science, Study Design Committee on Environmental Chemistry and Chemical Engineering, 1991.

National Science Foundation and U.S. Environmental Protection Agency, Committee for the Review of Technology for a Sustainable Environment Program, 1999.

National Science Foundation, Review of Engineering Research Centers Program FY 1999 - 2000 Competition, Manufacturing Systems, 1999

Advisory Board, Environmental Pollution Prevention Project (EP3) U.S. Agency for International Development, 1999-2004.

Special Emphasis Panel: Superfund Basic Research Program Review, National Institute of Environmental Health Sciences, Oct. 1999, 10 proposals.

Beneficial Reuse Research Panel, Water Environment Research Foundation, 4 proposals, 1999. Pollution Prevention Research Review Panel, U.S. EPA, 7 proposals, Jan. 2000.

NSF EPSCOR Centers of Excellence, Louisiana Board of Regents, 5 proposals, Panel Chair, May, 2000.

U.S. EPA Panel, Nano Materials and Clean Technology Review, Sept., 2000.

U.S. EPA, review of Process Design Manual for Land Treatment of Municipal Wastewater, 2002-2003

NIH, Scientific Review Panel, Technologies for Environmental Monitoring, Nov. 5, 2004

Sustainable Carpet Standard Committee, May 18, 2006.

## **EDITORIAL AND TECHNICAL REVIEW**

1976-1980      Associate Editor, Structures and Environment, Transactions of American Society of Agricultural Engineers.

- 1984-1996 Editorial Board of Journal of Hazardous Wastes and Hazardous Materials
- 1986-1993 Associate Editor, Advances in Environmental Science, Springer-Verlag
- 1988-1996 Associate Editor, Journal of Environmental Quality
- 1992-1996 Editorial Board, Critical Reviews in Environmental Control, CRC Press
- 1993-present Editorial Board and Associate Editor, Critical Reviews in Environmental Science and Technology
- 1995-present Cleaner Production Editor, Journal of Cleaner Production, Elsevier
- 1996-present Journal of Chemical Technology and Biotechnology, Cleaner Production Editor and member of Executive Editorial Board.
- 1996-2004 Advances in Environmental Research, Editorial Advisory Board
- 1997-2004 Environmental Engineering Science (Clean Technology Editor)
- 1976-1983 edited and reviewed numerous papers for:
- ♣ Journal of Environmental Quality
  - ♣ Water Resources Research Institute of North Carolina
  - ♣ McGraw-Hill
  - ♣ U.S. Council for Agricultural Science and Technology
  - ♣ U.S. Environmental Protection Agency
  - ♣ Transactions of the American Society of Agricultural Engineers
- 1976-1983 reviewed proposals or research programs for:
- National Science Foundation
  - U.S.D.A. Cooperative States Research Service
  - Research Review of N.C. A&T University
  - U.S. Environmental Protection Agency
  - Water Resources Research Institute of North Carolina
  - National Aeronautics and Space Administration (Closed Environmental Life Support Systems)
- 1983-1984 reviewed the following major documents:
- U.S. Environmental Protection Agency Process Manual, Land Application of Municipal Sludge, 1983
  - Hazardous Waste Land Treatment, book by K. W. Brown et al., 1984

- National Academy of Science Report on Land, Sea, and Air Options for the Disposal of Industrial and Domestic Wastes, 1983
- State of Texas Land Treatment Guidelines for Solid Wastes

1984-1986      Scientific Peer Review of ten Articles for Journal of Hazardous Waste and Environmental Science and Technology, Journal of Environmental Quality, and Canadian Agricultural Engineering

1986-1992      Journal of Environmental Quality Book Reviews (2)

1987            Review Committee, Waste Minimization Program Guide and Audit Manual, U.S. EPA

Peer Review:

- ♣ two papers for International Conference on Drilling Wastes
- ♣ one paper for J. Canadian Soc. Agr. Eng.
- ♣ one paper for Trans. Amer. Society of Agr. Engrs.
- ♣ one book for Environmental Progress
- ♣ one report for U.S. EPA, Ada, OK

1988            Chairman, EPA region 1 & 2 Hazardous Substance Research Center Review Panel, U.S. EPA

Peer Review:

- Journal of Environmental Quality (2 books, 1 paper)
- Chemical Engineering Communications (2 papers)
- AIChE Journal (1 paper)
- Hazardous Wastes and Materials Journal (1 paper)

1989            Texas Advanced Research Program, Proposal Review (30) in Environmental Science and Engineering

New York State Research Program for Hazardous Waste Management - Proposal Review (2) in Waste Minimization

1990            Proposal and Report Peer Review - Risk Reduction Engineering Laboratory (2 proposals, 1 report).

Peer Review:

- Journal of Environmental Quality (2 books, 1 paper)



- Chemical Engineering Communications (1 paper)
- International Journal of Biological Wastes (1 paper)
- Reviewed 38 research proposals for World Wildlife Fund, We Care for America Program
- Journal Hazardous Wastes and Hazardous Materials (2 papers)
- NSF (1 proposal)
- Book Review, Preventing Pollution through Technical Assistance, Inform, Inc.

1991

Peer Review:

- ♣ Review of EPA Center for Environmental Policy, Education, and Research (Clark-Atlanta University)
- ♣ NSF (3 proposals)
- ♣ Yankee Ingenuity Initiative proposal (Connecticut)
- ♣ Hazardous Waste and Hazardous Materials Journal (6 papers)
- ♣ Environmental Science and Technology (1 paper)
- ♣ Texas Agricultural Experiment Station proposal
- ♣ New York Center for Hazardous Waste Management (1 proposal)

1993

Peer Review

- two articles, J. Hazardous Waste & Hazardous Materials
- proposal for N.Y. Center for Hazardous Waste Management

1994

Peer Review

- 3 articles, J. Hazardous Waste & Hazardous Materials
- proposal for N.Y. Center for Hazardous Waste Management
- Nat'l Inst. of Env. Health Sciences,
- Center proposal review panel (12 proposals for NSF)

1995

Peer Review:

- 1 proposal for NSF
- 1 proposal for NC Technical Development Authority
- 1 article each for Archives of Environmental Contamination and Toxicology
- Hazardous Waste & Hazardous Materials
- J. Cleaner Production
- Soil Science Journal

1996

Peer Review

- 4 articles for Journal of Cleaner Production
- 1 article each for

Chemical Engineering Communications  
 Environmental Toxicology and Chemistry  
 Ground Water Monitoring and Remediation  
 Academic Promotion Review  
     1 - Kuwait University  
     1 - Korea University  
 Proposal Evaluation  
     1 - NSF  
     1 - Advance Technology Program, Dept. of Commerce  
     3 - U.S. EPA

1997      Peer Review  
         9 articles for Journal of Cleaner Production  
         2 articles for Environmental Engineering Science  
         2 articles for Journal of Chemical Technology and Biotechnology  
         1 article for Environmental Science and Technology  
         Proposal Evaluation  
             1 - NSF  
             12 - U.S. EPA

1998      Peer Review  
         11 articles for Journal of Cleaner Production  
         6 articles for Environmental Engineering Science  
         2 articles for Journal of Chemical Technology and Biotechnology  
         1 article for Journal of Industrial Ecology  
         1 proposal for NSF GOALI Program  
         1 article for Journal of Environmental Management  
         2 articles for Critical Reviews in Environmental Science and Technology  
         26 proposals for U.S. EPA SBIR Grants Program on Pollution Prevention  
         4 proposals for World Environment Research Council

1999/2000      Peer Review  
         18 articles for Journal of Cleaner Production  
         6 articles for Environmental Engineering Science  
         1 article for Journal of chemical Technology and Biotechnology  
         4 articles for Critical Reviews in Environmental Science and Technology  
         4 articles for Industrial & Engineering Chemistry Research  
         2 proposals for NSF

Peer Review – 2000/2001  
     7 articles for Journal of Cleaner Production  
     1 article for Transactions of the ASAE  
     5 articles for Journal of chemical Technology and Biotechnology

- 1 article for Environmental Science and Technology
- 2 articles for Critical Reviews in Environmental Science and Technology
- 1 report for Water Resources Research Institute
- 1 article for Environmental Engineering Science
- 1 article for Clean Products and Processes

\*2001 – present Clean Technologies and Environmental Policy (Editorial Board)

Peer Review – 2001/2002

- 1 book proposal, John Wiley & Sons, Ltd.
- 1 article for Journal of Environmental Management
- 1 article for Environmental Pollution
- 1 article for Industrial & Engineering Chemistry Research
- 3 articles for Critical reviews in Environmental Science and Technology
- 1 article for J. Chem. Technology and Biotechnology
- 6 articles for J. of Cleaner Production

Peer Review – 2002/2003

- 10 articles for J. of Cleaner Production
- 1 article for J. Chemical Technology and Biotechnology
- 1 article for Critical Reviews in Environmental Science and Technology
- 1 article for Environmental Science and Technology
- 1 article for J. of Industrial Ecology

Peer Review – 2003/2004

- 2 articles for Journal of Environmental Quality
- 2 articles for Industrial and Engineering Chemistry Research
- 19 articles for Journal of Cleaner Production
- 4 articles for Critical Reviews in Environmental Science and Technology
- 1 article for Process Safety & Environmental Protection/ Trans. of the Inst. of ChE
- 1 proposal California Energy Commission

Peer Review – 2004/2005

- 29 articles for Journal of Cleaner Production
- 1 article for Environmental Progress
- 3 articles for J. of Chemical Technology and Biotechnology
- 1 article for Industrial and Engineering Chemistry Research
- 2 articles for The International Journal of Life Cycle Assessment
- 1 article for Environmental Science & Technology
- 3 articles for Critical Reviews in Environmental Science

Peer Review – 2005/2006

- 35 articles for Journal of Cleaner Production

1 Clean Technology and Environmental Policy  
1 articles for J. of Chemical Technology and Biotechnology  
1 article for Industrial and Engineering Chemistry Research  
1 articles for The International Journal of Life Cycle Assessment  
1 thesis review, National University of Singapore  
3 articles for Critical Reviews in Environmental Science

## **GOVERNMENT INTERACTIONS**

UNEP, Life Cycle Initiative, LCI Taskforce, 2004 – present.

U.S. EPA, review of The Greening Curve, Lessons Learned in the Design of the New EPA Campus in North Carolina, 2001.

National Renewable Energy Laboratory of Dept. of Energy, Development and review of U.S. Life cycle inventory project, Phase 1, January 2001.

Briefing, Life Cycle for use in Decision Making for Animal Waste Management, Director of N.C. Department of Environment and Health Resources, Bill Holman, Jan, 2000

EPA Hazardous Waste Identification Rule Risk Assessment, Critical Review for EPA Office of Solid Waste, Nov. 1998

EPA Public Meeting Testimony on Proposed Rulemaking for TRI 3, Review of National Academy Committee Report on Mass Balance Reporting for Industries, Boston, MA, 13p. October 16, 1996.

U.S. Agency for International Development, Advisory Board, Environmental Pollution Prevention Project (EP3), 1993-1997.

Committee to assist North Carolina Department of Agriculture and Northampton County review, Thermalken Incinerator Proposal, July-September 1991.

EPA Industrial Pollution Prevention Project Focus Group - National Effluent Guidelines, September 1991.

Public Assistance and Presentation for Siting Hazardous Waste Recovery Facility, Enfield, NC, March 26, 1991.

North Carolina Legislator Briefing, Hazardous Waste Management, Regional Plans, and Alternatives, January 8, 1991.

North Carolina Board of Science and Technology Forum for Decision-Makers on Cutting the Cost of Waste, Presentation on Technical Assistance for Waste Reduction, September 12, 1990.

Legislative Staff Briefing, U. S. Congress, RCRA Regulation and Land Treatment, Washington, D.C., July 26, 1990.

Addressed delegates from sixteen states at the Southern Legislature Conference, Committee on Environmental Quality and Natural Resources, topic: Waste Minimization and Recycling, Asheville, NC, July 24, 1990.

Testimony before U. S. House of Representatives, Subcommittee of Science, Space, and Technology Committee, Pollution Prevention Research - Future Potential, Washington, D.C., April 1990.

Peer Review for Arkansas Science and Technology Authority of proposal on agricultural nonpoint source modeling, 1989.

Peer Review for EPA six state-wide research plans to develop waste minimization technologies (Washington, Minnesota, Illinois, Connecticut, New Jersey [2]), 1988-1989.

Peer Review Committee for EPA 40CFR Parts 257 and 503, Proposed Regulations for Land Application, Distributing and Marketing, Monofill, Surface Disposal; Subcommittee Chairman for Non-agricultural Land Application, 1989.

Delaware Environmental Appeals Board, testimony on compost regulations, 1989.

Presentation to joint Select Committee of N. C. Legislature on Low-Level Radioactive Wastes, "Incentive Compensation to Build Community Support as a Host Site for Low-Level Radioactive Wastes", 2 p., 1988.

Review and written technical response for twenty-five detailed reviews of Delaware Rules of Practice for Land Treatment of Sludges and Sludge Products, December 1987 - February 1988.

Drafted Guidance Document for Land Treatment of Sludges and Sludge Products, Division of Water Resources, Dover, DE, 30 p. 1987.

Drafted Rules of Practice for Land Treatment of Sludges and Sludge Products, Regulations of the State of Delaware, Division of Water Resources, Dover, DE, 76 p. 1987.

Delegate of American Institute of Chemical Engineers on United States of America National Committee (USANC) for Representation to the International Association on Water Pollution Research and Control, 1987- 1994

Member, North Carolina State Inactive Sites Data and Prioritization Committee, N. C. Dept. of Human Resources, August - November 1987.

Public Hearing Presentation on Sludge Land Treatment, State of Delaware, Dover, DE, July 1987 and December 1987.

Testimony, Protection of public health safety and welfare in proposed Delaware Guidance and Rules of Practice for Land Treatment, State of Delaware House of Representatives, Natural Resources Committee, May 1987.

Consultant, United Nations, World Health Organization, Western Region, March 1987.

Background Technical Briefing Material on Pollution Prevention in Petrochemical Industry, National Materials Advisory Board of the National Academy of Science, 1986.

Liaison to the State of North Carolina Hazardous Waste Treatment Commission from the Governor's Waste Management Board, 1985-1986.

Member of North Carolina Governor's Waste Management Board, 1984-1986

- member of Industrial Liaison Subcommittee, 1984-1986
- member of Public Information/Participation Subcommittee, 1984-1986
- member of Technical Subcommittee, 1984-1986
- member of Siting ad hoc subcommittee, 1984-1986

Testimony, U.S. House of Representatives Staff briefing with Industry Cost Recovery Coalition.

Hazardous Waste Land Treatment Location Guidance Manual - peer review, 1985.

Land Treatment Technology Transfer Program, Region IV.

Resource-Conservation Recovery Act Review - land farming basis and subsequent section revision (U.S. EPA).

Effluent Guidelines Development Document - Feedlot Category, Swine Subcategory (U.S. EPA).

Land Treatment training session for regulatory staff in Tennessee, Missouri, North Carolina, Virginia, Alabama, Washington, Minnesota, Delaware, Idaho, and Puerto Rico.

Developed State Guidelines for land treatment in Virginia, Delaware and North Carolina.

Assisted State of North Carolina *in-situ* management of hazardous waste spills, including:

- abandoned drums - 1981
- herbicide fire residues - 1982
- styrene contaminated fertilizer - 1983
- tetrachloroethylene subsurface contamination of dry cleaners - 1987

Testimony before Committee of Science and Technology, United States Congress, March 30, 1983, regarding the technologies for eliminating or treating hazardous wastes and the reasons such technologies have not impacted landfill usage in the United States.

Testimony to North Carolina Legislative Commission on Hazardous Wastes:

- October 1983 - Hazardous Waste Management and Implications for State Policy
- December 1983 - Pollution Prevention, State-wide Needs and Format for Solutions

Member of North Carolina Goals and Policy Board, Hazardous Substances and Waste Group, 1983.

Assistance in developing Pollution Prevention Pays Program for North Carolina Department of Natural Resources and Community Development, 1983-84.

EPA Public Meeting Testimony on Proposed Rulemaking for TRI 3, Review of National Academy Committee Report on Mass Balance Reporting for Industries, Boston, MA, 13p. October 16, 1996.

EPA Hazardous Waste Identification Rule Risk Assessment, Critical Review for EPA Office of Solid Waste, Nov. 1998

### **CONTINUING EDUCATION COURSES**

Conducted American Institute of Chemical Engineers Today Series Course and American Society of Agricultural Engineers Series for Continuing Education, entitled "Industrial Waste Land Application" (18 times since 1976).

Land Treatment of Hazardous and Non-Hazardous Industrial Wastes, one- and two-day course taught with Dr. Nutter (25 times since 1976).

Integrated Hazardous Waste Management, two-day course taught with Don Miller for American Institute of Chemical Engineers (15 times since 1981).

Reducing Volume and Toxicity of Hazardous Material and Waste, one-day course taught with Dr. Wayne Turner and Dr. Richard Webb for Oklahoma State University Engineering Extension (1987).

Hazardous Waste Management Summer Institute, four-day course taught with staff from Missouri (1987).

Prevention, Management, and Compliance for Hazardous Wastes, two-day course taught with Don Miller for American Institute of Chemical Engineers (11 times since 1987).

"Ask the Experts", Hazardous Materials and Waste Management Update, one-day teleconference to 70 locations in U. S., March 1988.

World Bank Training Course for Water Sector Engineers, On-site Systems, part of two-week course by University of North Carolina, Chapel Hill, February 1988.

SARA Title III Advanced AIChE course, taught with Dr. J. Schroy for American Institute of Chemical Engineers (2 times since 1988).

Municipal Sludge Land Treatment - Design and Regulations (taught 2 times in Delaware for consultants and state personnel) 1989.

Sludge Stabilization and Microbial Disinfection Prior to Land Application (taught 2 times for Ministry of Health, Peoples Republic of China [Beijing and Shenyang]) 1987, 1988.

Teleconference on Hazardous Materials and Waste Management, Oklahoma State University (200 sites, 2,500 participants) 1989.

Teleconference "Ask the Experts 1990" Hazardous Materials and Waste Management Update, 60 locations in U. S., May 1990.

Teleconference and Panel Presentations, North Carolina Town Meeting on Solid Waste Management, Keep America Beautiful, Raleigh, April, 1990.

Land Treatment Design, short course, Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico, September 26, 1990.

Pollution Prevention, short course, Susquehanna Section of Amer. Inst. of Chem. Engr, Jan. 27-28, 1994

Minimization of Residues, short course for industry and government, Mexico City, Feb. 10-11, 1994.

Pollution Prevention Technology, short course for industry and academics, taught 15 times from 1994 to 1998.



Chemical industry pollution prevention technology, short course, Texas Eastman Chemical Company, Longview, TX, 1994.

Cleaner Production in the Automobile Industry, Melbourne, short course, Australia, June 20, 1995, 7 participants

Cleaner Technology, Principles and Implementation, Workshop, Melbourne, Australia, June 22, 1995, 14 participants

Pollution Prevention for Industrial Facilities, short course, Sydney, Australia, June 27, 1995, 23 participants

Pollution Prevention for Government and Industry, Brisbane, Australia, June 29, 1995, 20 participants

Training Workshop on Cleaner Production, with D. Huisingh, University of New South Wales, July 12-14, 1995, 41 participants.

Design and Implementation of Cleaner Production, Workshop, Royal Melbourne Institute of Technology, July 31 - August 1, 1995, 8 participants.

Cleaner Production Technology, University of Suwon, short course, Seoul, Korea, Jan. 26-27, 1995, 120 participants

Research and Implementation of Pollution Prevention, Instituto Tecnológico y de Estudios Superiores de Monterrey, Jan. 4-6, 1995, 18 participants.

Training Course on Land Treatment for Regulatory and Government Personnel  
January 15, 1997, Boise, Idaho, 55 participants

Training Course on Land Treatment for Industry and Consultants  
January 16, 1997, Boise, Idaho, 145 participants (Continuing Education Units certified)

Training Course on Land Treatment for Regulatory and Government Personnel  
May 6, 1997, Jefferson City, Missouri, About 45 participants

Training Course on Land Treatment for Industry and Consultants  
May, 7, 1997, Jefferson City, Missouri, About 60 participants (Continuing Education Units certified)

Cleaner Production and Prevention of Contamination, May 13 and 14, 1997, Santiago Chile, 49 participants

Life Cycle Approaches to Building Materials and Furniture, IDCE/Earth Pledge, Durham, NC, 13 participants, May, 2001.

Furniture and Life cycle for Sustainability, HON Industries, Muscatine, IA, 55 participants, July, 2001.

Industrial Ecology Initiatives in the USA, Monash University, Melbourne, Australia, 243 participants, Sept. 20, 2001.

Life Cycle Concepts Training, New Mexico Dept. of Environment, 12 participants, Nov. 20, 2002.

Life Cycle Technologies, Carpet and Rug Institute, Dalton, GA, 27 participants, Feb. 6, 2003 (with Dr. E.Griffing).

Fugitive Emissions from Chemical Process Industries, USEPA/India Central Pollution Control Board, Research Triangle Park, 22 participants, May 16, 2003.

Perspectives on pollution prevention, Instituto Tecnologico y de Estudios Superiores de Monterrey, Monterrey, Mexico, 75 participants, Feb. 25, 2005.

Your Complete Guide for Clean Production, Melbourne, Australia, 25 participants, June 15, 2006.

### **PROJECTS (Investigator or Co-Investigator)**

Design Criteria for Swine Waste Treatment (OWRT)	\$150,000
Lagoon Aeration (Pork Producers Council)	2,000
Demonstration System for Total Waste Management of Swine Wastes (Lexington Swine Breeders Corp.)	2,000
Lagoon Treatment Enhancement (Ecological Associates)	9,600
Alternative Animal Waste Pretreatment - Land Disposal Systems Land Disposal Systems (USDA-CSRS)	75,000
Overland Flow Poultry Manure Treatment System (OWRT)	50,000
Swine Waste State-of-the-Art and Rainfall Runoff (U.S. EPA)	35,000

Survey Design for Pollution from Rural Land Runoff (U.S. EPA)	490,000
Mechanism and Control of Rainfall Runoff Impact from Land Application Sites (U.S. EPA)	56,600
Nonpoint Source Model: Watershed Input from Land Areas Receiving Animal Wastes (U.S. EPA)	165,000
Factors Affecting Viability of Sewage Spray Aerosols (OWRT)	72,000
Land Application of Industrial Wastes (OWRT)	84,000
Economic and Technical Evaluations of Animal Waste Management Systems which Comply with Water Pollution Regulations (N.C. WRRI)	19,000
AID/LIFE project on solutions to environmental and waste recycling for protein in less-developed countries (U.S. State Department)	2,000
Land Application of Organic Priority Pollutants (OWRT)	100,000
Joint Research Assessment - Malaysia, Thailand (NSF)	2,000
Hazardous Wastes Land Treatment Review (American Petroleum Institute)	26,000
Toxic and Priority Pollutant Organics in Municipal Sludge Land Treatment Systems (U.S. EPA)	497,000
Field and Laboratory Evaluation of Petroleum Land Treatment System Closure (American Petroleum Institute)	422,000
Pollution Prevention Technology (N.C. Board of Science and Technology)	50,000
Expansion of Data Bases for Waste Elimination Technologies Technologies (N.C. DHR)	1,300
Use of Photodecomposition in Reducing Toxic Organic Contaminants in Soils (U.S. EPA)	176,000
A Novel Interfacial Recovery of Metals from Aqueous	30,700

Waste Solutions (N.C. Board of Science and Technologies)	
Basic Boron Tolerance on Improved Loblolly Pine (Monsanto Corporation)	37,000
Development and Technical Assistance on Hazardous Waste Prevention and Treatment (U.S. EPA)	315,000
Land Treatment for Old Town Gasifiers and Soil Decontamination (Southern California Edison)	207,000
Research Needs Workshop on Waste Minimization 12,000 (National Science Foundation)	
Chlorinated solvent and toxic chemical management in air emissions using process modifications (N.C. Board of Science and Technology)	30,000
Center for Waste Minimization and Management (U.S. EPA)	3,158,464
Plant-soil studies of consumer product ingredients (The Procter & Gamble Company)	59,000
Improved Manufacturing Productivity through Waste Reduction-Finish Oil Utilization and Efficiency (DuPont)	14,100
Methodology to remove and predict behavior for sources of hydrophobic organic compounds contaminating soil (Southern California Edison)	140,664
Specialized Greenhouse Chemical Studies (The Procter & Gamble Company)	17,800
Plant Soil Studies (The Procter & Gamble Company)	29,000
Determination of total organic chlorine in Paper Industry Sludges and Soil/Sludge Matrices (S. D. Warren Company)	58,000
Process Improvement and Pollution Prevention Cooperative Research (S. D. Warren Company)	109,964
NC SARA Database Analysis (NC Pollution Prevention Program, DENR)	31,000

Waste Minimization - Legal, Technical & Human Factor - Course Development (NC Pollution Prevention Program, DENR)	31,000
Pollution Prevention Research Center	229,964
Minimization of Volatile Organic Air Emissions from Flexible Polyurethane Foam Plants (S. C. Johnson Wax and Sons, Inc.)	35,065
Alternatives for Recycling Newspaper (Raleigh News and Observer)	11,000
Boron Behavior in Land Treatment Systems (Monsanto Corp.)	65,000
Waste Minimization Research (DuPont)	10,000
Alternatives for Reuse of Accumulated Scrap Tile (Mannington Ceramic Tile)	13,900
Plant Response to Specific Organics in Compost-Amended Soil (The Procter & Gamble Company)	194,188
Waste Minimization of Volatile Organic Air Emissions from Flexible Polyurethane Foam Plants: Post-Tunnel Losses (World Wildlife Fund)	35,000
Liaison Scientist Program (Office of Naval Research)	179,852
Fugitive Emissions from Operating Equipment (Exxon)	10,000
Life Cycle Software (SmithKline Beecham)	6,000
Pollution Prevention Enhancement for Advanced Degree Education (U.S. Environmental Protection Agency)	6,666
EcoPro Life Cycle System, I (EMPA, St. Gallen)	15,000
Zeus Life Cycle System, (Fraunhofer-Institut Fur Lebensmitteltechnologie und Verpackung)	20,000
Life Cycle in Chiral Route Evaluation (Pfizer Corporation)	90,595

Research on Solvents in the Pharmaceutical Industry, (SmithKline Beecham)	118,250
Industrial Ecosystem Development Project, Phase I, (U.S. EPA), Joint Project with Triangle J Council of Governments, UNC, and Duke	192,184
Life Cycle PEMS Software System (Major Research Equipment Acquired) (SmithKline Beecham)	10,000
Life Cycle of 1,1,1 Trichloroethane (Indirect funding from University of Jordan)	2,700
DuPont Science Grant for Life Cycle Study of Beneficial Reuse of Byproducts	60,000
Life Cycle Evaluation of Process Equipment (Indirect funding from Korean Institute of Science and Technology)	12,000
Methylene Chloride Removal Equipment Database 5,000 (Jacobs Engineering)	
Life Cycle and full Cost Accounting for Improvement of Garment Cleaning Technology - A Design for Environment Approach (U.S. EPA)	39,593
Investigation of Pollution Prevention Alternative Technologies in the Garment and Textile Care Industries , with College of Textiles (U.S. EPA)	450,000
Life Cycle Methodology Development and Software (Swiss Federal Materials Research and Testing Laboratories, St. Gallen, Switzerland)	22,900
Industrial Ecosystem Development Project, Phase I PIs: J. Kincaid, M. Overcash, P. Berke, M. Powell U.S. EPA Joint Project with Triangle J Council of Governments, UNC, and Duke \$192,184 May, 1997 - April 1999 Abstract: Project will demonstrate the value of specific tools and techniques in achieving local partnerships between businesses that will reduce the amount and cost of waste and pollution within a six-county region of	

North Carolina.

Undergraduate support (5 students)

0% release time

Reuse of CRTs by prevention of leak through detection

PIs: R. Sanwald, M. Overcash, J. Hren

IBM, RTP

\$7,000

July, 1998 - Nov., 1998

Abstract: Research to prevent the premature manufacturing or consumer production of scrap CRTs is being studied. Direct measure of leaks, locations, and mechanisms for premature failure are developed. We seek to reduce the raw material inputs through extension of CRT life

One undergraduate student

0% release time

Reduction of manufacturing waste for PC assembly

PIs: R. Sanwald, A. Kelley, and M. Overcash

IBM, RTP

\$6,800

Nov., 1998 - Mar. 1999

Abstract: Manufacturing waste during assembly is costly and often involves whole devices. This project examines the methodology for determining failure modes on PC fan assemblies to prevent this through improved design.

2 students

0% release time

Clean Products and Processes

PI: M. Overcash

NATO

\$2,015

Dec. 1998 - June 1999

Abstract: The NATO countries are increasingly interested in adoption of clean products and pollution prevention. This project is to share the experience of the Pollution Prevention Research Center, at NCSU, with 21 members of NATO and to develop improved technology transfer in this field.

0 students supported

0% release time

. Recycle of connectors from post-consumer personal computers

PIs: R. Sanwald and M. Overcash

IBM, Endicott, NY

\$9,000

Dec. 1998 - July 1999

Abstract: As computers are returned to the manufacturers as a part of take back programs, the opportunities to reuse devices within these machine must increase. This project examines connectors as describe the ease of removal, the expected life remaining and the markets for reuse.

1 graduate student

0% release time

#### Software Testing for Advanced Life Cycle Inventory Evaluations

PI: M. Overcash

Ecobalance, Inc.

\$6,000

Dec. 22, 1999 - Dec. 21, 2000

Abstract: The development of large life cycle chemical trees with high transparency has allowed researchers to evaluate individual chemical emissions across large arrays of manufacturing plants. The TEAM software will be studied to assess the graphical capabilities to depict chemical emission profiles.

0% release time

#### Pollution Prevention Research Center

PIs: J. Ferrell, M. Overcash, et. al.

Eastman Chemicals, S.D. Warren, Union Carbide Industrial Gases

\$229,964

Feb., 1990 - 1999

Abstract: Center for coordination of pollution prevention research and technology transfer activities . With over 8 faculty in the Chemical Engineering Department working in pollution prevention, the Center seeks to identify industrial and other support.

0 students supported

0% release time

#### Life Cycle and full Cost Accounting for Improvement of Garment Cleaning Technology - A

Design for Environment Approach

PI: M. Overcash

U.S. EPA

\$39,593

September, 1997 - May, 1999

Abstract: Commercial fabric care is offered with four technologies which are essentially different solvent/surfactant systems for removing soil. These are perchloroethylene, petroleum solvent, carbon dioxide, and water. A



life cycle comparison is being made of these technologies to understand the potential evolution of fabric care in the U.S.

One post-doc

1.3% release time

#### Investigation of Pollution Prevention Alternative Technologies in the Garment and Textile Care Industries

PIs: Perry Grady, Gary Mock, Robert McCall, M. Overcash

U.S. EPA

\$450,000

May, 1998 - April, 2001

Abstract: Concern over perchloroethylene has led to development and testing of alternative technologies for cleaning clothes labeled Adry clean only@. The dry cleaning community has asked for help in the identification of potentially promising technologies and information on making decisions. This work s to provide guidance for the evaluation of the cleaning systems, to identify a feasible technology, and provide the required support to make it successful

one graduate student in Chemical Engineering

3% release

#### Clean Products and Processes - History of the NATO nations

PI: M. Overcash

NATO/CCMS

\$7,500

Mar. 2000 - Mar. 2003

Abstract: As countries work on the development of pollution prevention, this project will document the historical development of this field in general and for specific industrial sectors. The sectors are textiles, metal finishing and electroplating, and food/agriculture. The output will be journal articles providing a review of this field.

0% release time

#### Technical and Economic Evaluation of Alternatives for Animal Waste Management

PI: M. Overcash, K. Zering, M. Renkow

U.S. Geologic Survey

\$40,000

Mar. 1, 2000 - Feb. 28, 2001

Abstract: The pressure to select alternatives for managing animal waste is increasing and the changes are likely to be complex. This project will investigate the direct environmental consequences of five primary technologies for the treatment or utilization of animal waste using a life cycle approach. These are lagoon/land application; upflow biofilters;

sequencing batch reactors; covered lagoons; and constructed wetlands.

1 post-doc

1 graduate student

11.5% release time

#### Technical Alternatives for Animal Waste Management

PI: M. Overcash

Animal and Poultry Waste Management Center

\$10,000

Mar. 1, 2000 - Feb. 28, 2001

Abstract: A life cycle approach will be taken to establish the full environmental emissions associated with new technology proposed for the industry. These must be significantly better than the current lagoon/land application approach to justify change. Technical criteria will be taken from the ongoing research supported by the Center.

0% release time

#### Airborne Exposure Chamber Development

PI: M. Overcash, R. Sanwald, R. Nagel

Underwriters Laboratory

\$58,100

Mar. 1, 2000 - Dec. 31, 2000

Abstract: New and recycled products are exposed to corrosive gases in indoor environments. We seek to study the effects on electronic products and surfaces with the design and construction of a chamber for controlled low concentration gases such as chlorine and sulfur dioxide.

1 post-doc

7.5% release time

#### Life Cycle in Chiral Route Evaluation

PI: M. Overcash

Pfizer Corporation

\$112,611

May, 1995 - July, 2002

generated,  
of  
Abstract: Studies of eight chiral routes using chemical emissions, wastes and energy use parameters to provide a life cycle analysis. Evaluations alternatives are sought with greater life cycle improvements and potential design changes

one graduate student supported

one undergraduate student supported

0% release time

#### Research on Solvents in the Pharmaceutical Industry

PI: M. Overcash  
SmithKline Beecham  
\$116,100

April, 1995 - July 2002

greater Abstract: Life cycle examination of solvent manufacturing and use to achieve process efficiency. Included are processes for solvent exchange and recycle/reuse. Information is sought for design chemists to improve environmental choices

1 post-doc  
5 undergraduates  
0% release time

#### Beneficial Reuse of Industrial Byproducts

PI: M. Overcash  
Dupont Science Grant  
\$105,000

Oct. 1997 - Sept. 2003

Abstract: Utilization of byproducts in agricultural production is studied as a beneficial reuse concept. The life cycle approach examines the avoided burdens of manufacture of fertilizer constituents, and the avoided burdens of alternative waste management. The research will examine direct and indirect effects on chemical losses and energy requirements. A life cycle assessment is also planned.

One post-doc  
0% release time

#### Environmental Evaluation of Alternatives for Animal Waste Management

PI: M. Overcash  
Water Resources Research Institute  
\$58,460

Mar. 1, 2001 – July 30, 2002

Abstract: Newly developed and larger animal waste management options are being tried in North Carolina field studies. This project will expand the life cycle inventory and assessment of these to help determine which are net environmental benefits.

1 post-doc  
20% release time

#### Carbon dioxide and uses for extraction – life cycle analyses

M. Overcash  
Kenan Institute  
Aug. 15, 2002 – Feb. 1, 2004  
\$21,660

Abstract: Research is undertaken to document the full life cycle advantages of CO<sub>2</sub> extraction versus conventional processes. Examples in soybeans and tar sands are to be used.

1 graduate student

0 release time

Environmentally Superior Technology,

Co-PI - M. Overcash, Co-Investigator with USS GmbH

Animal and Poultry Waste Management Center and Smithfields Foods

Sept. 1, 2001 – Dec. 31, 2002

\$57,500

Abstract: Achieving the goals of swine waste management in North Carolina involves treatment of pathogen, odor, and nitrogen. An

ultrasonic plasma

resonator system developed in Germany is to be

studied and an assessment

made regarding performance and attributes as an

environmentally

superior alternative.

1 post-doc

10% release time

Industrial solvents and working fluids – industrial ecology of organic materials

CoPI – M. Overcash with N. Darnall and R. Handfield

NSF Mat. Use, Science, Engineering & Society Program

Aug. 31, 2002 – Sept. 1, 2004

\$129,995

Abstract: A coordinated development of supply chain, organizational decision-making and life cycle models is to be developed. The focus is on solvents and the industrial ecological cycle in manufacturing.

1 post-doc and 2 graduate students

0% release time

Workshop: research for multi-disciplinary principles for manufacturing

Co-PI – B. Bras (Georgia Tech) and J. Isaacs (Northeastern Univ.)

NSF Mat. Use, Science, Engineering & Society Program

Sept. 1, 2002 – Sept. 2, 2004

\$100,000

Abstract: A network of U.S. and international researchers in environmentally benign manufacturing is to be developed. This conference is a

first step

and will involve about 60 engineers and scientists to

discuss this overall

field.

0 graduate students

0 release time

#### Environmental life cycle techniques for new weapons acquisition systems

M. Overcash

Army Research Office

Aug. 15, 2003 – Aug. 14, 2004

\$50,000

Abstract: Research studies are undertaken on chemicals and materials occurring in munitions as a part of an integrated life cycle study for new DOD acquisitions. Joint research is with Swedish Defense Agency.

0 graduate students

1 post-doc

#### ONGOING AND NEW PROJECTS

\* 1. Life cycle inventory research in carpet and textiles

M. Overcash

Shaw Contract/Engineering Foundation

Feb. 2004

\$72,000

Abstract: A fundamental and transparent life cycle approach is required in describing advances in the carpet industry. This open-ended research effort is to develop needed life cycle inventories.

1 graduate student

0 post-doc

\* 2. Environmental stewardship in carpet products – research on robust life cycle and reuse approaches

M. Overcash and M. Realff

Georgia Institute of Technology

July 1, 2004 – June 30, 2006

\$55,687

Abstract: Development of core information on representative carpets will allow the industry to move forward on sustainability issues. Research

will include all life cycle stages and a substantial technology exchange with industry.

1 graduate student

0 post-doc

\* 3. Health protective textiles: bridging the disposable/reusable divide

M. Overcash in collaboration with Univ. of CA Davis as lead institution

NSF

Sept. 15, 2004 – Aug 31, 2009

\$345,263

Abstract: Hospital textiles can be improved in environmental impacts through developments of biocidal surfaces. Uses can be single application or reusable over 50 – 70 cycles. Life cycle studies are to be used to enhance the R&D efforts.

1 graduate student  
0 post-doc

## **TEACHING**

CHE 598 Biomedical Engineering Rheology of Physiologic Fluids (partial)

CHE 515 Transport Phenomena, Fall 1973, Spring 1983

E120 Freshman Engineering Projects (9 students), 1974

BAE 578 Agr. Waste Mgmt., Fall 1975, Fall 1976, Fall 1977 (partial)

CHE 432 Senior Research Projects (6 students) 1977

CHE 425 Process Systems Analysis & Control, Fall 1981, Fall 1982

CHE 311 Transport Phenomena I, Spring 1982, Fall 1983, Spring 1986, Fall 1986, Spring 1988, Spring 1992, Spring 94, Fall 95, Fall 96, Fall 2005

CHE 312 Transport Phenomena II, Fall 94, Spring 95, Spring 97, Spring 99, Spring 04, Spring 05, Spring 2006

CHE 330 Laboratory I, Spring 96, Fall 96, Fall 97, Spring 98, Spring 98

CHE 331 Laboratory II, Fall 95, Fall 96

CHE 598 Management of Hazardous Chemicals and Low-Level Radioactive Wastes, Fall 1981, Fall 1982 (partial)

CHE 497 Senior Research Projects 1982 - 1992

CHE 598O Pollution Prevention, Spring 94, Spring 96, Spring 98  
( now 475/575)

CHE 450 Chemical Engineering Design I, Fall 95, Fall 97, Fall 98, Fall 00, Fall 02, Fall 05

CHE 451 Chemical Engineering Design II, Spring 97, Spring 98, Spring 99

CHE 597A Life Cycle and the Environment, Spring 01, Spring 02, Sum 02, Sum

03

#### Special Activities in Teaching

1. First U.S. application of life cycle principles for ChE Design Course
2. Development of Aspen absorber problem for Transport Processes II.
3. Satellite lectures on life cycle analysis - Monterrey Institute of Technology, Mexico
4. Development of industrial analysis problem (Amoco Refinery, Yorktown, VA) for ChE 475/598O
5. Introduction of project team management into chemical engineering design course (ChE 451)
6. New graduate/undergraduate video/internet class on life cycle for the environment

#### **GRADUATE STUDENT RESEARCH ADVISOR**

- |                             |                                                                                           |
|-----------------------------|-------------------------------------------------------------------------------------------|
| R. L. Phillips, M.S., 1975  | - Dairy waste runoff management                                                           |
| D. M. Covil, M.S., 1976     | - Nitrogen removal and transformations in the overland flow treatment of poultry wastes   |
| T. D. Miller, M.S., 1977    | - Swine waste degradation by surface aeration                                             |
| S. C. Bingham, M.S., 1978   | - Effects of grass buffer zone length on runoff of pollutants from land application areas |
| J.G. Nepumoceno, M.S., 1978 | - Mathematical modeling of the flow behavior of red blood cells in a saline solution      |
| J. S. Wang, Ph.D., 1978     | - Nutrients transportation in soil profile for wastewater land application                |
| R. C. Sims, Ph.D., 1981     | - Land Treatment of polynuclear aromatic compounds                                        |
| M. J. Tilchin, M.S., 1983   | - Dye Degradation in land-applied textile                                                 |

dyeing wastewaters

- |                              |                                                                                                                                                                       |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| M. L. DeHertogh, M.S., 1984  | - Waste elimination in the chemical industry                                                                                                                          |
| W. H. Petke, M.S., 1986      | - The capabilities of selected soil systems to provide treatment of color and chlorinated organics from the first extraction stage of a wood pulp bleaching operation |
| M. A. Vancil, M.S., 1986     | - Pollution Prevention Strategies for Reducing the Environmental Impact of Toxic and Reactive Wastes                                                                  |
| J. L. Marshall, M.S., 1990   | - The effect of shade cloth solar emissivity on heat transfer through a double layer polyethylene enclosed structure.                                                 |
| V. G. Martin, M.S., 1990     | - Methylene chloride recovery in the polyurethane foam process.                                                                                                       |
| E. J. Dougherty, Ph.D., 1991 | - In-situ decontamination of soil containing 2,3,7,8-tetrachlorodibenzo-p-dioxin: physical parameter analysis and mathematical model                                  |
| A. Perka, M.S., 1991         | - A mass-transfer model to predict reflux cleaning rates in process vessels                                                                                           |
| C. S. Claiborn, Ph.D., 1991  | - Atmospheric-biospheric interactions of ambient H <sub>2</sub> O <sub>2</sub> : climatology at Mt. Mitchell, NC and transport into needles of red spruce             |
| S. Lucas, M.S., 1992         | - Fugitive emissions from valves: a study of the capillary-flow mechanism using acetone mixtures                                                                      |
| E. Cohen-Hubal, MS. 1992     | - Net waste reduction analysis applied to air pollution control technologies and zero water discharge systems                                                         |
| Y. Li, PhD. 1994             | -Plant response to 14C-labeled 2,2',4,4'-tetrachlorobiphenyl and benzo[a]pyrene in a compost-amended soil                                                             |



C. Jimenez-Gonzales, PhD, 2000 – Life Cycle Assessments in Pharmaceutical Applications

M. Davie, M. Eng., Dec. 2002- Chemical Engineering

**COMMITTEE, REGIONAL PROJECT, SESSION AND CONFERENCE ORGANIZING RESPONSIBILITIES**

International Conference on Environmentally Benign Design and Manufacturing, with G.Seliger, N. Nasr, J. Issacs, and B. Bras, Rio de Janeiro, Brazil, 2006.

Global Conference on sustainable Development and Life Cycle Engineering, Organizer with N. Nasr, G. Seliger, B. Bras, and J. Issacs, Berlin, Germany, Sept. 29-Oct 1, 2004.

Program Committee (begun 2002), International Conference on Waste Constituent Reactions in Soils, Orlando FL, 2004

Environmentally Benign Manufacturing, Organizer with B. Bras and J. Isaacs, NSF Workshop, Birmingham, AL, Jan 9-11, 2003.

Biosolids Utilization on Land, Session and Organizing Committee, Land Treatment of Industrial Biosolids, Columbia, SC, 1997

Waste Minimization Conference on Beneficial Uses for Tile Scrap - Organizer, Pollution Prevention Research Center, Raleigh, NC, August 30, 1991.

Symposium on Environmentally Conscious Materials Processing - Organizer with Dr. J. Sekutowski and Dr. S. Weissman, Materials Research Society, Anaheim, CA April 30 - May 1, 1991.

Waste Minimization Research Needs - Organizer with Dr. A. Jefcoat, EPA/ AIChE Workshop, Washington, D.C. December 4-5, 1989.

Environmental Research in the Sunbelt - 1989, Raleigh, NC, organizer, November 14-15, 1989.

Engineering Foundation - Conference on Engineering for Waste Reduction II, Santa Barbara, CA, Organizing Committee, October 9-14, 1988.

Financial Incentives for Waste Reduction, Session Organizer, Symposium on Waste Reduction

- Pollution Prevention, Raleigh, NC. March 1988.

International Work Group on Government and Industrial Waste Reduction, Organizing Committee. 1987-1989.

Future of Industrial Waste Reductions, Washington, D. C., Organizer. November 20, 1987.

Engineering Foundation - Conference on Engineering to Minimize the Generation of Hazardous Waste, Henniker, NH, Organizing Committee. July 26-31, 1987.

Conference on Conservation Tillage - Environmental Impact on Surface and Groundwater, Chicago, IL., Organizing Committee. 1986.

International Symposium on Industrial and Hazardous Waste, Alexandria, Egypt, Organizing Committee. 1985.

National Workshop on Effects of Sewage Sludge Quality and Soil Properties on Plant Uptake of Sludge-Applied Trace Constituents - Trace Organics Subcommittee, Las Vegas, November. 1985.

Training Course for State Regulatory Officials, Land Treatment of Industrial and Municipal Wastes: 1979 - Alabama (2); Tennessee (3); Virginia (2); North Carolina, Wisconsin, 1980 - Minnesota; 1981 - Pennsylvania; 1982, 1983 - Puerto Rico, Delaware (2) 1988, Idaho, 2003, Missouri, 2004 .

United Nations Food and Agriculture Organization Project on Agricultural By-Products and Wastes, 1976, 1978, 1981.

#### American Society of Agricultural Engineers

T-9      Environmental Quality Coordinating Committee, 1973-1979 Subcommittee for Programs, 1973, 1977-1979  
            Subcommittee for Standards, 1973, 1975  
            Secretary, 1974

SW-263   Land Disposal of Wastes Committee  
            organization of committee, 1973-1974  
            member, 1975-83

S-89      Southern Regional Research Project on Animal Wastes, co-representative of  
NCSU      Experiment Station, 1973  
            Representative of NCSU Experiment Station, 1974-1977

A-411 International Relations, 1975-1982

Session Chairman

- 1976 Nonpoint Sources of Pollution
- 1977 Evaluation and Control of Agricultural Nonpoint  
Source Pollution - NCSU Research

American Institute of Chemical Engineers

Session Chairman

- 1976 Fundamental Research and Water Pollution Control
- 1977 Land Application of Industrial Wastes, I & II
- 1978 Land Treatment of Petroleum Wastes
- 1979 Pretreatment Processes and Land Application of Industrial Waste
- 1979 Utilization of Food Wastes
- 1979 Land Application Technology for Industrial Waste, I & II
- 1981 Hazardous Waste Management: Is Landfilling right for Chemical Wastes?
- 1981 Hazardous Waste Management: Waste Management Options Under RCRA
- 1981 Land Treatment of Hazardous and Non-Hazardous Industrial Sludge Handling and  
Disposal
- 1982 Hazardous Waste Disposal Options
- 1983 Management of Hazardous Wastes - from Source Control to Perpetual Storage
- 1983 Chemical Engineering Fundamentals Applied to the Environment
- 1987 In-plant Modification for Waste Stream Reduction
- 1987 Decontamination of Soils and Solid Materials
- 1989 Waste Minimization Design Methodologies and Material Substitution
- 1991 Waste Reduction in the Manufacturing Industries
- 1997 ISO 14000 - Assessing the Performance of Your Environmental Program
- 1999 Life Cycle Assessment/Analysis and Chemical Engineering
- 2000 Advances in solvent Selection and Substitution for Extraction
- 2002 Application of Life Cycle Assessment, I
- 2003 Applications of Life Cycle Assessment to Sustainable Design

Committees

- Environmental Division (1972 – present)
- Research and New Technology Committee (1996 – present)

Third International Livestock Waste Conference

Program Committee, 1973-1975

Session Chairman, 1975

Fourth International Livestock Waste Conference

Program Committee, 1979

Biosolids Utilization on Land,

Session and Organizing Committee, Land Treatment of Industrial Biosolids, 1997

Program Committee (begun 2002), International Conference on Waste Constituent Reactions in Soils, Orlando FL, 2004

**THE UNIVERSITY OF NORTH CAROLINA SYSTEM COMMITTEES**

Solid Waste Management Advisory Committee, 1990-1991

Vice Chairman and Acting Chairman, 1990

**UNIVERSITY COMMITTEES**

Agricultural Chemicals, 1973-1979

Animal Waste Management, 1974-1979

School of Agriculture and Life Sciences Speakers Bureau, 1974-1975

School of Agriculture and Life Sciences Minority Recruitment, 1979-1980

Water Resources Research Institute of University of North Carolina

Advisory Group on Land Application of Wastewater, 1976

Workshop Organization and Presentation - Land Application of Agricultural, Industrial and Municipal Wastes, 1977 (2 workshops)

Workshop Organization and Presentation - Methodologies for Measuring Nonpoint Sources, 1977 (3 workshops)

Workshop Organization and Presentation, Monitoring of Nonpoint Discharge, 1977

Advisory Task Force on Proposed North Carolina Water Quality Standards, 1977

Technical Advisory Committee, 1977-1984

Workshop Organization and Presentation, Land Application of Industrial Wastes, 1978

Graduate Minor in Water Resources, Engineering representative

Center for Humanities and Technology, Engineering representative

Faculty Mediation Panel (1989 - 1991)

Sci-Link Steering Committee, 1991

Hazardous Materials Committee, 1991-present

Park Scholars Interview Panel, 1998

### **COLLEGE OF ENGINEERING**

Course and Curriculum Committee, 1981-1982

Mathematics Evaluation Subcommittee, 1981

Biotechnology Coordinator, 1982-1983

Associate Dean for Research Search Committee, 1983

Associate Dean for Graduate and Research Programs Search Committee, 1988

Space and Facilities Committee, 1989 - 1990

Task Force on Environmental Research, Training, Policy, and Extension, 1991

ETF Task Force, 2000

### **BIOLOGICAL AND AGRICULTURAL ENGINEERING DEPARTMENT**

Open House, Chairman 1978

Search Committee for Department Head, 1991

Biological and Agricultural Engineering Open House, Chairman 1978

### **CHEMICAL ENGINEERING DEPARTMENT**

Undergraduate Administrator, 1981 - 1984

Developed Graduate Student Recruiting Program, 1983 - 1987

Chemical Engineering Department Open House, Chairman 1981-1982

Development and Implementation of 1995/96 ChE 330 Budget and preparation of 1996/97 proposal for the Unit Operations Laboratory- with Steve Peretti

Preparation of the successful nomination of Dr. N. Clontz for Distinguished Alumni Award, 1995

Prepared Chemical Engineering Option Program entitled Pollution Prevention (with Dr. Grant)

Prepared Chemical Engineering Summary of new initiatives for Undergraduate and Graduate Enhancement Programs, 1996

Prepared for University approval the BS in ChE/MS in Management program (with Dr. Winston and Dr. Allen), 1996

Developed five year plan for ChE undergraduate laboratory teaching, including new experiments, expanded computing, and Engineering Technology Fee (ETF) financial support package, 1996 - 2001

Undergraduate Laboratory Development Committee, 1997- present

Centennial Campus Relocation for College of Engineering, Chair, Chemical Engineering Department, 1998 - present

Committee for Evaluation of Improvements for Student/Faculty Ratio in Chemical Engineering Department, 1998 - 1999

Developed three year plans (including 2000 - 2008) for ChE undergraduate laboratory teaching, including new experiments, expanded computing, and Engineering Technology Fee (ETF) financial support package (1996 – present)

Distinguished Alumni Award - successful package for Mike Killian, 2000

Centennial Campus Relocation for College of Engineering, Chair, Chemical Engineering Department, 1998 - present

Committee for Evaluation of Improvements for Student/Faculty Ratio in Chemical Engineering Department, 1998 - present

ABET Coordinator, 2001 – 2005

Centennial Campus Relocation for College of Engineering, Chair, Chemical Engineering Department, 1998 - present

## **PROFESSIONAL AND COMMUNITY ACCOMPLISHMENTS**

U. S. Delegate to International Conference on Water Pollution in Developing Countries, Bangkok, Thailand, 1978.

U. S. Delegate to International Conference on Solid Wastes, Sludges and Residual Materials, Rome, Italy, June 1981.

Guest Lecturer - Global Impacts of Applied Microbiology, Bangkok, Thailand.

Organized Zambia - U. S. exchange program for technical journal and scientific equipment with

University of Zambia, Department of Chemistry.

Concept draft for use of low-cost innovative pollution control technology, Bangkok, Thailand.

Center for Study of Democratic Institutions, Santa Barbara, CA, contributing member (1973 - 1983).

University Basketball Team, University of New South Wales.

NCSU Speakers Bureau for High Schools.

Glenwood Community Action Committee, Chairman.

American Institute of Chemical Engineering, Environmental Division Judge for Student Paper Award, 1983.

Judge for 1983 Governor's Award of Excellence in Waste Management.

Participant in The Conservation Foundation of North Carolina Education Project on Toxic Waste Management, 1984.

Two environmental essays for National Academy of Sciences Committee on Chemical Engineering Frontiers: Research Needs and Opportunities, November 1985.

Environmental Protection Section Review for New Technology Committee of AIChE, 1986.

Paper Review Committee, Second International Conference on New Frontiers for Hazardous Waste Management, National Science Foundation and American Academy of Environmental Engineers, 1986.

Technical Consultant to Edgecombe County Commissioners for development of comprehensive facility for hazardous waste treatment, low-level radioactive storage, and municipal refuse treatment, 1988.

Technical Consultant to World Health Organization on Nightsoil Treatment in People's Republic of China, September - October 1988 (5 cities in China).

Member, J. F. K. Library Foundation, Boston, MA., 1988.

Technical Resource, Scientists Institute for Public Information, Subjects pollution prevention, industrial organics in plant/soil systems, land treatment, 1989 - present.

North Carolina Town Meeting - Video conference for Earth Day, Solid Waste Management -

the University Perspective, Raleigh, April 1990.

Advisory Conference Participant, Prague Czechoslovakia - Challenges and Opportunities for Clean Production, September 1991.

Development Team of U.S. Agency for International Development, Project on Environmental Pollution Prevention in Developing Countries, August-December 1991

Scientists for Media Information, assisted writer for Fairfield, IA newspaper with issues of lead in soil, 1994.

Overview Presentation to visiting delegation from Korean Ministry of Environment and Hyundai Motors, National Center for Environmental Assessment, U.S. EPA, Research Triangle Park, August 30, 1995.

Technical Input on Polyurethane Foam Plant Emissions, Environmental Legal Alliance Worldwide, Sri Lanka, August 14, 1996.

Selection Committee for the Governor and Mr. Dan K. Moore Fellow to Keep North Carolina Clean and Beautiful, April, 1997.

Technical discussions with Hungarian Ministry of Environment official, A. Csoknyai, regarding Research and Development for Pollution Prevention, Triangle International Association.

Promotion Review for U.S. EPA, National Risk Management Research Laboratory, J. Bare

Research and Teaching Discussions with EPSRC Panel, Sept. 8, 1998

International Visitors Council, briefing and tour for scientist concerned with waste management and pollution prevention from Cochabamba, Bolivia, Feb. 26, 1999.

Briefing on Atmospheric Emissions and Pollution Prevention, Christian Science Monitor, Dec. 7, 1999

Review Team, Optimizing Inherent Safety, Pollution Prevention, and Green Chemistry, Center for Waste Reduction Technologies, Atlanta, GA, March 7, 2000

Science Interview, Dioxin and Medical Wastes, Times News, Burlington, NC April, 18, 2001.

Science Advisory – Liquid Gas Terminal Safety Assessment, City Council (John Nelson), Morehead City, NC, 2001.

Assistance in developing the Information Gallery (featuring a life cycle approach to green



building design) at the new U.S. EPA Laboratory, Research Triangle, NC, 2000-2001.

Science Interview, Impeller Magazine, global trends in industrial effluent management.

Review of Search Committee candidate, Prof. Bhamidimarri, Chemical Engineering Department, Hong Kong University of Science and Technology, 2001.

Team for Organic Waste Management – future Opportunities, Florida Dept. of Environmental Protection, Dec. 19, 2002, Gainesville, FL.

Pearl River Nursery, Mississippi, Engineering recommendations on reducing odor from water storage, 9/5/03.

\* Joint Committee on Sustainable Carpet, NSF International, Ann Arbor, MI. July, 2006 – present

### **BOOKS**

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7. North Carolina Board of Water and Air Resources, "Land Disposal of Municipal Wastes," 1973.
8. North Carolina District Extension Conference, "Poultry Waste Management Systems," October 1973.
9. North Carolina Irrigation Society, "Poultry Field Research on Waste Management," November 1973.
10. Poultry Housing Environmental Conference, "Flush Systems-Overland Flow," October 1973.
11. North Carolina Conservation Districts, "Grassed Buffer Strips in Pollution Control," 1974.
12. Poultryman's Short Course, "Poultry Environmental Research," March 1974.
13. North Carolina Water Resources Research Institute Workshop, "Overland Flow of Poultry Manure System," June 1975.
14. North Carolina Poultry Association, "Demonstration of Hatchery Waste Management," 1975.
15. Reddy, K. R., R. Khaleel, M. R. Overcash and P. W. Westerman. Evaluation of nitrogen and phosphorus transformations in the soil-manure system in relation to nonpoint source pollution. Agron. Abstracts, 1977.
16. Overcash, M. R. and S. M. Barnett. Utilization of food wastes: Results of an international survey, Fifth Int'l. Conf. on Global Impacts of Applied Microbiology, Bangkok, Thailand, November 1977.
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18. North Carolina 208 Project (Land of the Sky), "Land Application of Wastes," 1978.
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21. North Carolina Young Farmers Forum, "Methane Production," 1978.
22. Reddy, K. R., R. Khaleel, M. R. Overcash and P. W. Westerman. Nonpoint source model for land areas receiving animal wastes: nitrogen and phosphorus. Agron. Abstracts, 1979.
23. Pal, D. and M. R. Overcash. Fate of Polychlorinated Biphenyls in Soil Environment. Agron. Abstracts, 1979.
24. North Carolina Water Resources Research Institute Workshop, "Land Application of Certain Industrial Wastes," 1979.
25. North Carolina Department of Environmental Management - 7 workshops, "Land Treatment of Industrial Wastes," 1979.
26. Weber, J. B., D. Pal and M. R. Overcash. Plant Uptake and Biomagnification of Polychlorinated Biphenyls. Agron. Abstracts, 1979.
27. North Carolina Agricultural Extension Service Workshop, "Nonpoint Source Pollution and the 208 Plan," 1979.
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36. Overcash, M. R. Hazardous Waste Management: Is landfilling right for chemical wastes, AIChE Meeting, New Orleans, LA, November 1981.
37. Overcash, M. R., R. L. Kendall, and B. Cantor. Land treatment of metal finishing and coating wastewaters, AIChE Meeting, Cleveland, OH, August 1982.
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41. Overcash, M. R. Examples of land application systems, Water Resources Institute Conference on Guidelines for Land Application Systems, May 1983.
42. Overcash, M. R. Land treatment - technology for hazardous waste management, 17th Amer. Chem. Soc. Great Lakes Regional Meeting, June 1983.
43. Overcash, M. R. Program for Waste Elimination: the technical side of PPP, Governor's Waste Management Board, August 1983.
44. Overcash, M. R. Landfarm Closure, Hazardous Waste Land Treatment Review Conference, U.S. EPA, Ada, OK, August 1983.

45. Overcash, M. R. Waste reduction technology, Hazardous Waste Conference of American Society for Public Administration, November 1983.
46. Overcash, M. R. Integrated Hazardous Waste Management, Eastern Carolina Section of AIChE, December 1983.
47. Overcash, M. R. Incineration in waste management, Safe Management of Toxic and Hazardous Substances Conference, Spruce Pines, NC, December 19, 1983.
48. Overcash, M. R. Hazardous waste management, source control to perpetual storage, North Carolina Bar Association Environmental Law Meeting, December 1983.
49. Overcash, M. R. Innovative interaction between industry and university, AIChE Meeting, Atlanta, GA, March 1984.
50. Nutter, W., R. Kendall and M. R. Overcash. Municipal effluent rapid infiltration systems in the Southeast, Amer. Soc. of Civil Engrs. Meeting, Atlanta, GA, March 1984.
51. Overcash, M. R., R. Sims, C. Sparacino, and T. Hughes. Loss of mutagenic characteristics of polycyclic and heterocyclic aromatics in soils: A treatment technology for wastes. Symp. on short-term genetic bioassays in the evaluation of complex environmental mixtures, U.S. EPA, Chapel Hill, NC, March 1984.
52. Overcash, M. R. Technical, Economic, and Institutional Phase in Hazardous Waste Reduction, National Research Council, Wyewoods, MD, April 30, 1984.
53. Overcash, M. R. Integrated Hazardous Waste Management, American Chemical Society, Northeast Region, Fairfield, CN, June 13, 1984.
54. Overcash, M. R. Short Course on National Practices of Pollution Prevention, North Carolina Legislative Hazardous Waste Commission, Raleigh and Asheville, NC, June 1984.
55. Overcash, M. R. and J. B. Weber. Effect of Sludge on Organic Compound Behavior in Terrestrial Systems, Forest Land Application symposium, Seattle, WA, June 25-28, 1985.
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57. Petke, H., M. R. Overcash, and T. Joyce. Land treatment of bleach plant effluent, Technical Association of the Pulp and Paper Industry, Virginia-Carolina Section, Asheville, NC, November 1985.

58. Overcash, M. R. Hazardous Waste and Land Treatment Technologies, Systems Planning and Research Seminar Series, Southern California Edison, Los Angeles, CA, May 6, 1986.
59. Overcash, M. R. Waste minimization research and large organizations, Environics Divisions, Air Force Engineering & Services Center, Tyndall Air Force Base, Tyndall, FL, April 1986.
60. Overcash, M. R., R. Kendall, and W. Nutter. Land Application Concepts and Design, Georgia Irrigation Society, Atlanta, GA, July 17, 1986.
61. Overcash, M. R. Dioxin Behavior in Soils, Environmental Engineering Seminar, Southern California Edison, Los Angeles, CA, May 6, 1986.
62. Overcash, M. R. Pollution prevention pays in the air toxics programs, Carolinas Air Pollution Control Association, Raleigh, NC, April, 1986.
63. Overcash, M. R. Contaminant Behavior in the Unsaturated Zone, Groundwater Pollution and Risk Assessment, Raleigh, NC, December 3-5, 1986.
64. Overcash, M. R. Photochemical treatment of dioxin-contaminated soils, U.S. EPA Workshop on Nonbiological Processes Affecting the Behavior of Dioxins and Related Pollutants on Environmental Surfaces, Washington, D.C., November 6-7, 1986.
65. Overcash, M. R. Pollution Prevention research and development at North Carolina State University, North Carolina Governor's Waste Management Board, Raleigh, NC, November 20, 1986.
66. Overcash, M. R. Land Treatment of Hazardous Waste. Argonne National Laboratory, Energy and Environmental Systems Division, Argonne, IL, January 1987.
67. Overcash, M. R. Behavior of Organic Chemicals in the Terrestrial System. Procter & Gamble Company, Environmental Safety Department, Cincinnati, OH, February 10, 1987.
68. Overcash, M. R. and F. Guo. National Training Course on Solid Waste Management. National Health Institute, Beijing, China, eight lecture days, March 17-25, 1987.
69. Overcash, M. R. Training Workshop on Nightsoil Management, Patriotic Health Campaign Committee, Nanning, China, March 30, 1987.
70. Overcash, M. R. School of Engineering Role in Rural and Small Town Revitalization,

North Carolina State University Centennial Series, May 6, 1987.

71. Overcash, M. R. Fate of organic compounds when applied to the soil. Sludge Utilization and Disposal Symposium, Portland, ME, August 1987.
72. Overcash, M. R. Overview and importance of organic chemicals in the terrestrial environment, Symposium on Reactions and Transport of Organic Chemicals in Soils, Amer. Soc. of Agronomy, Atlanta, GA, November 1987.
73. Overcash, M. R. Measuring waste minimization progress. Waste Minimization Policy Workshop, Berkeley Springs, WV, July 1987.
74. Overcash, M. R. Significance of Chlorolignin in Pulp and Paper Mill Sludge Land Treatment, Department of Environmental Protection, Augusta, ME., September 28, 1987.
75. Overcash, M. R. Overview of land treatment for food processing industry wastes, Food Processing Waste Conference, Atlanta, GA, September 1987.
76. Nutter, W. L., M. Overcash, R. Kendall, J. Wallace. Field and laboratory evaluation of petroleum land treatment system closure, Amer. Inst. of Hydrology, Atlanta, GA, September 1987.
77. Overcash, M. R. Dioxin in the Environment - The Chemical Equivalent of AIDS, AIChE Columbia Pacific Meeting, Portland, OR, October 1987.
78. Overcash, M. R. Pollution Prevention. A Positive Legacy to the Future, AIChE Oregon Meeting, Salem, OR, October 1987.
79. Overcash, M. R. Dioxin Decontamination, AIChE Columbia Valley Meeting, Richland, WA, October 1987.
80. Overcash, M. R. Pollution Prevention Pays, AIChE Puget Sound Meeting, Seattle, WA, October 1987.
81. Overcash, M. R. and R. M. Dunkins. Behavior of specific organics with in-situ treatment systems, Amer. Inst. of Chem. Engrs., NY, November 1987.
82. Overcash, M. R. Dioxin and soil decontamination by U. V. and gamma radiation. Amer. Inst. of Chem. Engrs., NY, November 1987.
83. Overcash, M. R. Views on Mass Balance Feasibility, Mass Balance Workshop, Washington, D.C., March 1988.

84. Overcash, M. R. Research to minimize waste production in the next century, Waste Reduction - Pollution Prevention Symposium, Raleigh, NC, March 1988.
85. Overcash, M. R. Measuring Waste Reduction. Waste Reduction -Pollution Prevention Symposium, Raleigh, NC, March 1988.
86. Daley, P., F. Lindsey, M. R. Overcash, and C. Schafer. Hazardous waste technology: an assessment of the state-of-the-art in 1993., Hazardous Materials Management Conference, Chicago, IL, March 1988.
87. Overcash, M. R. Land Application of Bleach Mill Sludge. Weyerhaeuser Environmental Workshop, Charleston, SC, April 1988.
88. Overcash, M. R. Waste Reduction Research - The Academic Perspective, 14th Annual Research Symposium, U.S. EPA Hazardous Waste Engineering Research Laboratory, Cincinnati, OH, May 9, 1988.
89. Overcash, M. R. Improved Manufacturing Productivity Through Waste Reduction, AIChE Coastal Carolina Section, Wilmington, NC, June 13, 1988.
90. Overcash, M. R. and G. T. Rauman. Solvent Recovery Innovation in Polyurethane Foam, AIChE Annual Meeting, Washington, D.C., November 29, 1988.
91. Freeman, H. and M. R. Overcash. The Role of Research in Waste Minimization, AIChE Meeting, Denver, CO, August 23, 1988.
92. Overcash, M. R. Pollution Prevention in Industry. AIChE, Cincinnati Section, Cincinnati, OH, December 13, 1988.
93. Overcash, M. R. Terrestrial Perspective of Societal Organic Compounds, First Symposium on Use of Plants for Toxicity Assessment, Atlanta, GA, April, 1989.
94. Overcash, M. R. The EPA Research Center for Waste Minimization, AIChE Meeting, Philadelphia, PA August 23, 1989.
95. Overcash, M. R. Center for Waste Minimization and Management, Chemical Industry Council of North Carolina, Science and Technology Committee, Raleigh, NC, January 1990.
96. Overcash, M. R. The future of recycling in North Carolina, NC Recycling Association Raleigh, NC, January 1990.
97. Overcash, M. R. Chemical waste minimization and management, NC Wesleyan

Symposium, Rocky Mount, NC, February 1990.

98. Overcash, M. R. Hazardous Substances Research Centers - update, NJ Water Pollution Control Association, Atlantic City, NJ, May 1990.
99. Overcash, M. R. Process Improvement and Pollution Prevention Tutorial, Industrial Energy Technology Conference, Houston, TX, June 1990.
100. Overcash, M. R. Process Research and Opportunities in Waste Reduction, Monsanto, Alvin, TX, June 1990.
101. Overcash, M. R. Environmental Protection Agency Research Center for Waste Minimization and Management - Overview. International Conference on Pollution Prevention: Clean Technologies and Clean Products, Washington, D.C., June 1990.
102. Overcash, M. R. Pollution Prevention and the Process Industry, Mexican Institute of Chemical Engineers, First Forum on the Environment, Monterrey, Mexico, September 1990.
103. Overcash, M. R., Pollution Prevention - A Critical Environmental Problem in Environmental Compliance, Union Carbide Industrial Gases - Technology Exploration Series, Tarrytown, NY, September 1990.
104. Overcash, M. R. Land Treatment Technology for Residues from Old Town Manufactured Gas Sites, Site Restoration Workshop. Southern California Edison, Irwindale, CA, October 1990.
105. Dougherty, E., A. McPeters, and M. Overcash. TCDD Transport in Soil Containing Organic Solvents, Site Restoration Workshop, Southern California Edison, Irwindale, CA, October 1990.
106. Overcash, M. R. Waste Minimization, Tri States Chapter of AIChE, Charleston, WV, October 1990.
107. Overcash, M. R. North Carolina State University Perspective on Pollution Prevention Research, Industrial Executives Meeting, Washington, D.C., October 1990.
108. Overcash, M., J. Koerwer, Y. Li. Consumer Ingredient Chemicals -Plant Uptake and Yield Response, 11th Annual Meeting of Society of Environmental Toxicology and Chemistry, Washington, D.C., November 1990.
109. Overcash, M., J. Koerwer, Y. Li. Surfactant Studies for Terrestrial Safety, 11th Annual Meeting of Society of Environmental Toxicology and Chemistry, Washington, D.C.,

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110. Overcash, M. R. University Research Areas of Center for Waste Reduction Technologies, AIChE Annual Meeting, Chicago, IL, November 1990.
111. Overcash, M. R. Pollution Prevention Research Center, Wilmington, NC Coastal Carolinas Chapter of AIChE, December 1990.
112. Overcash, M. R. Pollution Prevention - A Positive Legacy for the Future, Central Carolinas Chapter of AIChE, Charlotte, NC, January 1991.
113. Overcash, M. R., Pollution Prevention Overview. General Electric Corporation Environet Series, Durham, NC, February 1991.
114. Overcash, M. R., Industrial Consortium and Pollution Prevention, Tennessee Eastman Corporation, Kingsport, TN, February 1991.
115. Overcash, M. R. Pollution Prevention and Industrial Competiveness, National Research Council Workshop on Compatibility of Environmental and Industrial Goals, Washington, D.C., March 12, 1991.
116. Overcash, M. R. The Technological Limits to Pollution Prevention, Emerging Environmental Policies and Business Workshop, NCSU, Raleigh, NC, April 1991.
117. Overcash, M., G. Rutledge, D. Houck, and E. Hubal. Multi-Industry Pollution Prevention and Energy Evaluations, Global Pollution Prevention Conference, Washington, D.C., April 1991.
118. Overcash, M. R. Assessment of Chemical Engineering Role in Environmental Research, National Research Council Workshop on Environmental Chemistry, Washington, D.C., May 5-6, 1991.
119. Cleveland, W., L. Morris, M. Overcash, and C. Hoffman, Jr. Boron nutrition in pine under land application of wastewater, 13th Biennial Southern Forest Tree Nutrition Workshop, Athens, GA, May 7, 1991.
120. E. J. Dougherty, A. L. McPeters, and M. R. Overcash, Kinetics of photodegradation of 2,3,7,8-tetrachlorodibenzo-p-dioxin: theoretical maximum rate of soil decontamination, Trace Substances in Environmental Health, Columbia, MO, May 21-23, 1991 (poster presented by Erika J. Dougherty).
121. Arnold L. McPeters and M. R. Overcash, "Photodegradation by Sunlight of Dioxin on

Spiked Soils After Solvent Addition," Trace Substances in Environmental Health, Columbia, MO, May 21-23, 1991 (poster presented by A. L. McPeters).

122. Overcash, M. R. Pollution prevention: a national effort, Monsanto Environmental Seminar Series, St. Louis, MO, July 18, 1991.
123. Overcash, M. R. Pollution Prevention Research - Regions 4 & 6, EPA/State Region 6 Pollution Prevention Conference, Arlington, TX, July 23-25, 1991.
124. Overcash, M. R. Pollution Prevention Research Center: Overview, AT&T, Princeton, NJ, August 7, 1991.
125. Overcash, M. R. The waste reduction process: research role, American Institute of Chemical Engineers, Pittsburgh, PA, August 19, 1991.
126. Perka, A., C. S. Grant, M. Overcash, and G. Roberts. Waste minimization in batch vessel cleaning, American Institute of Chemical Engineers, Pittsburgh, PA, August 20, 1991.
127. Overcash, M. R. How industries profitably reduce waste output, Biocycle Southeast Conference. 91, Raleigh, NC, November 20, 1991.
128. Overcash, M. R. Pollution prevention - future horizons, Duke Power Company, Charlotte, NC, December 12, 1991.
129. Overcash, M. R. New educational and career opportunities in chemical engineering - the environment, Eastern NC Section AIChE, Raleigh, NC, March 11, 1992.
130. Lim, P. K., and M. R. Overcash. Pollution Prevention Research Center: program on fugitive emissions from valves, Exxon Research and Engineering, Florham Park, NJ, March 11, 1992.
131. Overcash, M. R. Research and the philosophy of waste management, Sci Link, Science Teacher Day, Raleigh, NC, March 13, 1992.
132. Grant, C., and M. Overcash. Process research for pollution prevention, Eco World Conference, Washington, D.C., June 14-17, 1992.
133. Overcash, M. Pollution prevention role in risk reduction, Wake County SARA Workshop, Wake County Emergency Management, Nov. 19, 1993
134. Overcash, M. and Y. Li, Plant response to specific organics in compost-amended soils,



4<sup>th</sup> Annual Composting Conference, Washington, D.C., Nov. 18, 1993.

135. Overcash, M. Pollution Prevention Role in Risk Reduction, an Up-date, Wake County SARA Workshop, Wake County Emergency Management, Raleigh, NC, Nov. 18, 1994

136. Overcash, M. Manufacturing and Pollution Prevention: NCSU Bilateral Research Initiatives, 1994 Pfizer Innovation Conference, Pfizer Corporation, Wakefield, MA, October 25, 1994

137. Overcash, M. Risk Assessment, PCB Compost Investigation Meeting, Minnesota Pollution Control Agency, St. Paul, MN, May 13, 1994

138. Overcash, M. Environmentally conscious Manufacturing in Flat Panel Displays, N.C. Focus on Fundamental Materials, Processes, and Devices with Applications in Flat Panel Displays Workshop, N. C. Dept. of Commerce, Research Triangle Park, N.C., Nov. 21, 1994

139. Overcash, M. Plant uptake and risk assessment, PCB Releases and Potential Impacts from Landspreading of Sludges and Sediments: Science and Program Implications, USEPA Region 4, Chicago, Oct. 20, 1994

140. Overcash, M. Current Research for Pollution Prevention, Plant Level Environmental Compliance Management, Air & Waste Management Association, Williamsburg, VA, March 9, 1995

141. Overcash, M. Moving in Circles or Moving Ahead: Use of Life Cycle Analysis in Environmental Decision-making, East Tennessee Section of Amer. Inst. of Chem. Engrs, Kingsport, TN, March 30, 1995

142. Overcash, M. Beneficial Reuse Technologies, Industrial Waste Residuals Management Conference Water Environment Federation, Miami, FL, Oct. 21-25, 1995

143. Overcash, M. Achieving Pollution Prevention in Large Manufacturing Businesses, Developing an Industry and Academic Pollution Prevention Coalition, Northeast Waste Management Officials' Association, New York, Jan. 17, 1995

144. Overcash, M. Life Cycle Technology and Textiles, Patagonia Co., Ventura, CA, July 13, 1996

145. Overcash, M. Life Cycle Evaluation of Zero Discharge Systems, TAPPI, Richmond, VA., September 13, 1996

146. Overcash, M. Life Cycle and Full Cost Accounting, Industrial Consortium Meeting, Chapel Hill, NC, January 28, 1997
147. Overcash, M. Pollution Prevention and Life Cycle in Chemical Engineering, XIV Symposium of Chemical Engineering, Monterrey, Mexico, March 6, 1997
148. Overcash, M. Exceptional Quality Industrial Biosolids, Water Environment Association - South Carolina, Myrtle Beach, SC, March 19, 1997
149. Overcash, M. Environmental Impact Assessments, Johnson & Johnson, Inc., North American Environmental and Safety Conference, New Brunswick, NJ, April 30, 1997
150. Overcash, M. Life Cycle, Pollution Prevention, and Design, General Electric Research, Schenectady, NY, April, 18, 1997
151. Overcash, M. Cleaner Production: Future Tool for Chilean Industry, INTEC, Concepcion, Chile, May 12, 1997.
152. Overcash, M. and M. Torres, Industrial Opportunities in Pollution Prevention, INTEC, Santiago, Chile, May 15, 1997
153. Overcash, M. W. Nutter, and W. Cleveland, Reducing Risk with a Generator/Contractor Agreement for Beneficial Reuse Conference on The Forest Alternative: Principles and Practice of Residuals Use, Seattle, WA, July 14, 1997
154. Overcash, M. Life Cycle and Unit Process Design, SmithKline Beecham, King of Prussia, PA, July 25, 1997
155. Overcash, M. Life Cycle Analysis, EPA Garment and Textile Care Program, Raleigh, NC, September 2, 1997
156. Overcash, M. Engineering Life Cycle Analysis, Center for Waste Reduction Technology, Sustainability Metrics Workshop, Washington, DC, September, 17, 1997.
157. Overcash, M. and D. Olds, Full Life Cycle Benefit of Biosolids Utilization Anheuser-Busch, St. Louis, MO, October 7, 1997
158. Overcash, M., Solvents and Green Analysis, SmithKline Beecham, King of Prussia, PA, October 29, 1997
159. Overcash, M. Unit Process Improvement in Pharmaceutical Processing

SmithKline Beecham, King of Prussia, PA, January 27, 1998

160. Overcash, M. and C. Maillefer, Life Cycle in Garment Care Technologies  
Textile Comparisons in Garment Care, Advisory Meeting, Raleigh, NC , March 11, 1998
161. Overcash, M. and R. Sanwald. Concepts for Recycling with the Computer Parts  
IBM, Endicott, NY, March 12, 1998
162. Overcash, M. Organics Behavior in Land Application Systems  
Georgia Department of Natural Resources, Atlanta, GA, March 17, 1998
163. Overcash, M. and C. Maillefer, Comparisons of Fabric Care Technologies, EPA Design  
for the Environment Conference for Garment and Textile Care Partnership  
Washington, DC, March 31, 1998
164. Overcash, M. and C. Maillefer, Life Cycle and Full Cost Accounting for Improvement of  
Textile and Garment Care, Annual Meeting of the Kenan Center for the Utilization  
of CO<sub>2</sub> in Manufacturing, Raleigh, NC, April 27, 1998
165. Overcash, M. Chemical Life Cycle Review, SmithKline Beecham, Worthing, UK, May  
4, 1998
166. Overcash, M. and C. Jimenez, Evaluation of Chiral Drug Life Cycle, Pfizer Corp.,  
Groton, CN, Nov. 18, 1999.
167. Overcash, M., Garment Care Life Cycle Study, The Johnson Group, Rugby, UK, Dec. 8,  
1999.
168. Overcash, M. Beneficial Reuse of Tex-N Residuals, Hanes Dye and Finishing, Co.,  
Easley, SC, Sept. 8, 1998.
169. Overcash, M. and S. Kim, Technology Comparisons for Garment Care Alternatives,  
College of Textiles, Aug. 27, 1998.
170. Overcash, M., Review of Life Cycle Applied to Pharmaceuticals, SmithKline Beecham,  
King of Prussia, PA, April, 14, 1999.
171. Overcash, M., United States Cleaner Technology Research, John Wiley & Sons,  
Chichester, UK, May 6, 1999.
172. Overcash, M., Green Products and Reuse, P2CP Co., Washington, DC, May 19, 1999.

173. Overcash, M. Life Cycle Assessment of Garment Dry Cleaning Processes, Recovery, Recycle, and Re-integration'99, Geneva, CH, Feb. 4, 1999.
174. Overcash, M. Pollution Prevention Development and Utilization - A History to 2000, Second NATO/CCMS Conference on Clean Products and Processes, Belfast, UK, March 21-25, 1999
175. Jimenez-Gonzalez, C. and M. Overcash, Overview of Life Cycle Developments for the Pharmaceutical Industry, Pfizer, New York, Nov. 1999.
176. Overcash, M. Cradle-to-Gate Life Cycle Database, Glaxo SmithKline, May 18, 2000, Worthing England.
177. Overcash, M. Land treatment technology: design and practice, Solutia Corp., July 18, 2000.
178. Overcash, M., Life cycle and sustainability, AIChE Chapter, Charlotte, NC., Nov. 9, 2000.
179. Overcash, M., Chemical life cycle inventory methodology, Database Project Advisory Committee Workshop, July, 2001.
180. Dunn, R., H. Wenzel, M. Overcash, G. Parthasarathy, Process integration design methods for water conservation and wastewater reduction for streams containing multiple components, AIChE Annual Meeting, Reno, NV, Nov. 6, 2001.
181. Overcash, M., Life cycle perspective for product labeling, International Design Center for the Environment Board Meeting, Durham, NC Nov. 16, 2001.
182. Overcash, M., Streamlining Life Cycle Analysis, The Triple Bottom Line, IDCE, Research Triangle Park, NC, April 2, 2002.
183. Overcash, M., NCSU Effort in Environmental Improvement of Products and Systems, Dept. of Defense, Washington, DC. Sept. 4, 2002.
184. Manufacture of Adipic and Acetic Acids, Swiss Federal Research Laboratory for Material Testing and Research – Duebendorf, Switzerland, Oct. 29, 2002.
185. Life cycle critique trichloromethane, PTFE, and fiberglass, ESU, Uster, Switzerland, Oct. 30, 2002.
186. Fertilizer and pesticide manufacturing assessment, Swiss Federal Research Station for

Agroecology and Agriculture (FAL), Zurich, Switzerland, Oct. 30, 2002.

187. Overcash, M., Life cycle Analysis and Life Cycle Costs, Working Group of U.S./Swedish Agreement for Cooperation on Environmental Protection in Defense Matters, Arlington, VA, Oct. 23, 2003.

188. Overcash, M., Life Cycle – The Swedish/U.S. Study, Dept of Defense, Arlington, VA, March 18, 2003.

189. Overcash, M., Chemicals and life cycle decisions for manufacturing, National Institute of Environmental Health Sciences, Research Triangle Park, NC, Apr. 11, 2005.

190. Overcash M. and M. Realff, Audiences for life cycle information, Shaw Marketing, Dalton, GA., Apr. 19, 2005.

#### UNIVERSITY INVITED PRESENTATIONS

"Blood, Its Treatment for Support of Life", Biological and Agricultural Engineering, N.C.S.U., April 1972"

"Blood Gas Transfer Augmentation by Red Blood Cell Rotation", Chemical Engineering, N.C.S.U., 1972"

"Land Application of Hazardous Wastes", Duke University Series, April 1981.

"In-Plant Source Control of Hazardous Wastes", Duke University Series, May 1981.

"Hazardous Waste Management", Chemical Engineering Department, University of Virginia, April 1983.

"Integrated Hazardous Waste Management", Chemical Engineering Department, Auburn University, October 1983.

"Hazardous Waste Management in the United States", University of Bologna, Italy, October 1984.

"Hazardous Waste Practices in the U.S.", Chemical Engineering Department, University of Cambridge, England, November 1984.

"Dioxin and Soil Decontamination by U.V. and Gamma Radiation", ESCAT and Chemical Engineering Department, University of California, Los Angeles, May 1986.

"Ultraviolet Radiation in Decontamination of Dioxin from Soils", Department of Soils and Environmental Sciences, University of California, Riverside, May 1986.

"Clean Technologies" - Methods and Examples, Technological Institute, Tastrup Denmark, September 1986.

"In-Situ Soil Decontamination of 2,3,7,8 Dioxin by U.V. Radiation", Soil Science Seminar Series, North Carolina State University, October 1986.

"Waste Elimination Techniques" Hazardous Waste Management Seminar North Carolina State University, November 1986.

"The Use of Land for Decontamination of Organic Wastes", Agronomy Department, Ohio State University, February 1987.

"Dioxin-Challenges for Decontamination" Department of Chemical Engineering, Louisiana State University, April 1987.

"Waste Reduction Technology as a Hazardous Waste Management Alternative", Department of Agronomy and Horticulture, New Mexico State University, June 1987.

"Dioxin-Challenges for Studies in Soils", Department of Agronomy and Horticulture, New Mexico State University, June 1987.

"Terrestrial Behavior of Specific Organic Compounds", Department of Agronomy and Horticulture, New Mexico State University, June 1987.

"Hazardous Waste Minimization", University of California, Los Angeles, July 1987.

"Improved Industrial Productivity by Waste Reduction", Washington State University, October 1987.

"Hazardous Waste Disposal", Department of Toxicology, N. C. State University, 1988.

"Manufacturing Research and Waste Minimization" Environmental Speaker Series, Duke University, October 1989.

"Waste Minimization and the Environment", Department of Environmental Science and Engineering, UNC - Chapel Hill, October 1990

"Pollution Prevention Research and Development" Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico, September 1990.

"Pollution Prevention Research Center: A Chemical Engineering Perspective", Chemical Engineering Seminar Series, Tufts University, February 1992.

"Chemical Engineering Challenges in Pollution Prevention", Chemical Engineering Seminar Series, Johns Hopkins University, April, 1992.

"Pollution Prevention Research", M.W. Davis Lecture Series, Univ. of South Carolina, April, 25, 1994.

"Pollution Prevention/Cleaner Production", Plenary Lecture, International Workshop on International Chemical Engineering, Department of Chemical Engineering, University of Sydney, Sydney, Australia, Dec. 3-6, 1995

"Chemical Engineering and Cleaner Production", Chemical Engineering Department, University of Melbourne, Melbourne, Australia, June 21, 1995

"Cleaner Production Technologies", Graduate School of Engineering, Royal Melbourne Institute of Technology, Melbourne, Australia, July 31, 1995

"Life Cycle Analysis in Pollution Prevention Strategies", Korean Institute of Technology, Nov. 29, 1995

"Cleaner Technology for Global Manufacturing Environment", Plenary Speech, The National Assembly Forum on Global Environmental Policy, Nov. 30, 1995

"Cleaner Production - Impacts in U.S.A. and Research Opportunities", Department of Chemical Engineering, Monash University, Melbourne, Australia, Dec. 7, 1995

"Environmental Management for the Future", Plenary Address, The Royal Society, London, July 29, 1996

"Pollution Prevention Research Center", Danish Technical University, Lyngby, Denmark, November 1, 1996

"Cleaner Technology", Plenary Address, Third European Roundtable on Cleaner Production, Kalundborg, Denmark, November 2, 1996

"Life Cycle Research", Chemical Engineering Department, Instituto Tecnológico y de Estudios Superiores de Monterrey, Monterrey, Mexico, March 7, 1997

"Cleaner Production Research", University of Concepcion, Concepcion, Chile, May 12, 1997.

“Life Cycle and the Chemical Industry”, University of Surrey, Guildford, UK, Dec. 12, 1998.

“Pollution Prevention and Life Cycle Approaches”, New Jersey Institute of Technology, Feb. 2, 2000.

“Tools for Energy and Environmental Analysis”, College of Management, N.C. State University, April 28, 2000.

“Databases for Life Cycle Inventory”, Danish Technical University, Lyngby, Denmark, May 9, 2000.

“Life Cycle for Product Management”, New Jersey Institute of Technology, May 13, 2000.

“Life Cycle Inventory and Chemical Processes”, ETF – Zurich, May 2, 2001

“Chemical Process Design and Life Cycle”, Univ. of Oviedo, Spain, May 8, 2001.

“ Life Cycle and Chemical Engineering Design”, University of New South Wales, Oct. 2, 2001.

“ Life Cycle Inventory for Utility Systems”, Monash University, Sept. 21, 2001.

“ Life Cycle Influences on Green Chemistry and Chemical Engineering”, Sigel Lecture Series, Michigan Technological University, April 19, 2002.

“Argon and methylene chloride life cycle inventories”, Swiss Federal Institute of Technology (ETH), Zurich, Switzerland, Oct. 28, 2002

“Issues of life cycle and corporate decision-making”, Chalmers University, Dec. 12, 2002.

“Technical analysis and life cycle comparisons for swine waste management alternatives”, Water Resources Research Institute, NCSU, Raleigh, NC Jan 28, 2003.

“Remanufacturing and life cycle tools”, Rochester Institute of Technology, Rochester, NY, Feb. 10, 2003.

“Life cycle and urban industrial ecology”, Univ. of Southern California, Los Angeles, CA, Feb. 12, 2003.

“Life cycle and semiconductor research, Univ. of Arizona, Tucson, AZ, April 23, 2003

“ Future research – environmentally benign design and manufacturing”, Univ. of Southern



California, Nov. 6, 2003

“Life cycle inventory procedures and interpretations”, Ecole Polytechnique Federale de Lausanne, Dec.8, 2003

“Life cycle and health care”, University of California, Davis, Nov. 22, 2004

”Life cycle research and approaches for textiles”, Donghua University, Sept. 11, 2005

”Life cycle research and health care textiles”, Univ. of California, Davis, Jan. 23, 2006.

“Life cycle research and hospital garment protection for nosocomial infections”, March 5, 2007

“Sustainability and Life Cycle Research, Rochester Institute of Technology, May 10, 2007.

“Sustainability and Life Cycle Research, Wichita State University, May 15, 2007

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