

RESUME

William Frederick Ritter

ADDRESS:

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EDUCATION:

| <u>Years</u> | <u>Degree</u> | <u>University</u> | <u>Major</u> |
|--------------|---------------|---|--|
| 1961-1965 | B.S.A. | University of Guelph | Agricultural Engineering |
| 1965-1966 | B.S.A. | University of Toronto Toronto, Ontario, Canada | Civil Engineering |
| 1966-1968 | M.S. | Iowa State University Ames, Iowa 50010 U.S.A. | Water Resources |
| 1968-1971 | Ph.D. | Iowa State University Ames, Iowa 50010 U.S.A. | Sanitary Engineering and Agricultural Engineering |

EXPERIENCE:

- Nov. 1971 – present
 - University of Delaware, Newark, DE. Professor of Bioresources and Civil Engineering and Environmental Engineering (retired December 2014), senior policy fellow in Center for Energy and Environmental Policy, and member of the core faculty for the interdisciplinary graduate program in Environmental and Energy Policy. 2003-2013 and 1993 - 1998 - professor and chair of the Bioresources Engineering Department, 1992-93 - professor and acting chair of the Bioresources Engineering Department, 1982 -92 - professor, 1977-82 - associate professor, 1971-77 - assistant professor.
- Jan. 1992 - Jun. 1992
 - Project Manager, Wik Associates, Inc., New Castle, DE. Environmental consulting in hazardous waste management and sediment and storm water management.

- Jul. 1966 - Nov. 1971 - Research Associate, Iowa State University, Ames, Iowa. Work involved research in soil and water conservation and nonpoint source pollution while completing M.S. and Ph.D. requirements.
- May 1966 - Jul. 1966 - R. V. Anderson and Associates, 194 Wilson Avenue, Toronto, Ontario, Canada. Work involved surveying in different areas of municipal engineering
- May 1965 - Sept. 1965 - R. V. Anderson and Associates, 194 Wilson Avenue, Toronto, Ontario, Canada. Same type of work as in 1966.
- May 1964 - Sept. 1964 - Ontario Department of Agriculture, Newmarket, Ontario, Canada. Summer Assistant Engineer in Extension. Worked in farm drainage, ponds, and farm buildings.
- May 1963 - Sept. 1963 - Ontario Department of Agriculture, Newmarket, Ontario, Canada. Summer Assistant Engineer in Extension. Worked in farm drainage.
- Jun. 1962 - Sept. 1962 - Arnolds Dairy Farm, Moorefield, Ontario, Canada. Served as dairy herdsman.
- Prior to May 1963 - Shady Rest Farms. Raised and worked on a 150 acre beef and hog farm. I was active in 4-H for 8 years.

TEACHING:

I have taught the following undergraduate and graduate courses at the University of Delaware:

- AGE 303- Soil and Water Conservation Engineering, undergraduate, 1972-1984, 13 times
- AGE 428- Irrigation and Drainage Engineering, undergraduate, 1976-1989, 6 times
- AGE 467- Managing Global Environmental Problems, undergraduate, 1988, 1 time
- AGE 603- Soil Physics, graduate, 1975-1988, 7 times
- AGE 667- Groundwater Pollution, graduate, 1989, 1 time
- BREG 103- Land and Water Management, undergraduate, 1972-present, 34 times (Has also been offered online since 2001)
- EGTE 113- Land Surveying, undergraduate, 1986, 1 time
- BREG 311- Fundamentals of Soil Mechanics, 2009, 1 time
- BREG 328- Wastewater Treatment Systems, undergraduate, 1972-present, 24 times (Also offered online since 1998)
- BREG 424- Water Supply and Treatment Systems, undergraduate, 2010-present, 2 times
- BREG 621- Soil and Water Management Systems, graduate, 1993, 1 time
- BREG 628- Natural Wastewater Treatment Systems, graduate, 1988-present, 11 times
- BREG 667- Agricultural Air Pollution, graduate, 2010, 1 time (offered online since 2010)
- CIEG 441- Hydrology, undergraduate, 1998, 1 time
- CIEG 436- Solid Waste Management, undergraduate, 1999-present, 15 times
- CIEG 331- Introduction to Environmental Engineering, undergraduate, 2000-2002, 2 times
- ENEP 324- Water Resources Management, undergraduate, 2013-present, 1 time
- ENEP 624- Water Resources Management, graduate, 2014-present, 1 time

AGE 428, AGE 467, AGE 603, AGE 667, BREG 328, BREG 424, BREG 667, CIEG 436, ENEP 324 and ENEP 624 were new courses developed by me. I have also taught a course in water treatment to water treatment plant operators and served as faculty advisor to undergraduate and graduate students for independent study. I have been faculty advisor for four first-place winners and three second-place winners in the ASAE North Atlantic Region and NABEC student paper competitions and a second and third place winner in the ASAE national student paper competition and a first and third place winners in NABEC student design competition.

Graduate Student Committees

| | |
|-----------------|------|
| Ph.D Advisor | - 9 |
| M.S. Advisor | - 17 |
| Ph,D Committees | - 32 |
| M.S. Committees | - 20 |

RESEARCH:

My research interests are in groundwater pollution, lake eutrophication, animal waste management, treatment and disposal of municipal and industrial wastes, water quality modeling, surface water contamination and irrigation water management. My research has had an impact on setting public policy in Delaware. Over a hundred students who were either graduate students under my supervision or undergraduate students who have worked on my research grants for pay have gone on the careers in water resources or the environmental science and engineering.

EXTENSION:

Served as coordinator of the Cooperative Extension program in solid waste management for 1990-91. From 1992 I have had I had a 5 to 20% extension appointment.

ADMINISTRATION:

From July of 1992 to June 1993 I served as interim chair of the Agricultural Engineering Department. From July 1993 to July, 1998, I served as chair and again I served as chair from July 1, 2003 to January 31, 2012. The Department during my first term as chair, had 8 to 8.5 faculty, 1 extension engineer, 3 to 4 research associates, 1 or 2 staff and 5 or 6 adjunct faculty who teach courses in our Engineering Technology program. Since 2002, the department has 10 teaching, research and extension faculty, 2 research and extension professionals and 4 adjunct teaching faculty. The Department has an ABET accredited program in Engineering Technology. Enrollment has varied from 60 to 80 students in the program. The Department also offers an M.S. and Ph.D. in Operations Research and an M.S. in Bioresources Engineering. During my term as chair the Department changed its name to Bioresources Engineering, has made major revisions to the Engineering and Technology program, joined the interdisciplinary Ph.D. program in Operations Research, and started a minor in Engineering Technology and M.S. in Bioresources Engineering.

CONSULTING:

Over the years I have served as a consultant to industry and government on land application of sludges and wastewater, livestock waste management, on-site wastewater systems, wastewater treatment, groundwater contamination and hydrology. Clients include:

1. E. I. DuPont de Nemours Company, Seaford, DE
2. American Original Company, Bridgeville, DE
3. Nottingham Canning Company, Oxford, PA
4. Conrad Pyle Company, West Grove, PA
5. Showell Farms, Cambridge, MD
6. South Summit Civic Association, St. Georges, DE
7. CABE Associates, Dover, DE
8. Mobile Dredging and Pump Company, Exton, PA
9. McCann Associates, Dagsboro, DE
10. Shallcross Lake Fishing Club, Wilmington, DE
11. Delaware Department of Natural Resources & Environmental Control, Dover, DE
12. Crop Genetics International Hanover, MD
13. U.S. Department of Agriculture, Soil Conservation Service, Washington, DC
14. Townsend Inc., Millsboro, DE
15. Valasic Foods, Bridgeville, DE
16. Perdue Inc., Salisbury, MD
17. James C. Andersen Associates, Mount Laurel, NJ
18. Pennsylvania Department of Environmental Control, Harrisburg, PA
19. Peter E. Lowenstein & Associates, Frankford, DE
20. KCI Technologies Inc., Newark, DE
21. Heinz Pet Products, Bloomsburg, PA
22. Gen Farms, Kennedyville, MD
23. Wik Associates Inc., New Castle, DE
25. Environmental Consultants International, Rehoboth Beach, DE
25. P. H. Glatfelter Company, Spring Grove, PA
26. U. S. Department of Justice, Washington, DC
27. Terris, Pravlik & Millian, Washington, DC
28. Philpower, Nashville, TN
29. State of California, Sacramento, CA
30. Lafarge, Tarrytown, NY
31. Sierra Club, San Francisco, CA
32. T&M Associates, Moorestown, NJ
33. LB Builders, Lewis, DE.
34. U.S. Human Society, Washington, DC..
35. Town of Middletown, DE
36. Saylor Foundation, Washington, DC.

PROFESSIONALENGINEERING REGISTRATION:

I have been a registered P.E. in Civil Engineering since 1970. Presently registered in Delaware and Pennsylvania. I am also a diplomat of the American Academy of

Environmental Engineers and certified in water and wastewater and American Academy of Water Resources Engineers and certified in water resources.

PROFESSIONAL SOCIETIES, HONOR SOCIETIES MEMBERSHIP:

American Society of Civil Engineers, Fellow
American Society of Agricultural Engineers, Fellow
American Water Works Association, Life Member
Canadian Society of Agricultural Engineers
Water Environment Federation, Life Member
American Academy of Environmental Engineers
Delaware Association of Professional Engineers
Tau Beta Pi
Gamma Sigma Delta
Sigma Xi
Alpha Epsilon

SERVICE TO PROFESSIONAL SOCIETIES

North Atlantic Region Membership Committee, 1979.
Chairman of ASAE North Atlantic Region Career Guidance Committee, 1974-78.
Co-Program Chairman ASAE JERDEL Section (spring meeting), 1980.
Chairman of ASAE JERDEL Section Awards Committee, 1981-82.
NAR-ASAE Executive Committee, 1981-86. Second vice chairman, first vice-chairman, chairman-elect, chairman, and past chairman.
ASAE A-124 Allis Chalmers National Student Design Competition Committee.(1978-1988).-Have served as secretary, vice-chairman, and chairman.
ASAE SE-412 - Agricultural Sanitation and Waste Management Committee (1982-1995. Have served as secretary, vice-chairman and chairman.
ASABE FPE-707-Food Processing and Waste Management 1980-1995 and 2008-present Have served as secretary, vice-chairman, and chairman three times.
ASAE SW-06 - Paper Awards Committee, 1985-87.
ASAE SW-26 - Countryside Engineering Group. Vice chairman (1985-87), chairman (1987-89).
ASAE SW-08 - Water Resources Law Committee, 1985-87.
ASAE T-9 - Environment Quality Coordinating Committee (1984-1994). Have served as vice-chairman and chairman
ASAE SW-265 - Rural Landscape Committee, 1987-90.
ASAE District 1 Director-Elect (1989-90), Director (1990-92).
ASAE 1991 6th International Agricultural and Food Processing Program Committee, member
ASAE SW-231 - Drainage Research, 1995-2001
ASABE SW-23 – Drainage Group, 2010-present.
ASABE Membership Council, 2004-2012
ASAE E-07 - Issues Management and Social Action, 1996-99.
ASAE 1992 Land Reclamation Advances in Research and Technology Conference Program, chairman
ASAE 1993 NABEC Meeting Local Arrangements Committee, chairman
ASABE-NABEC - Planning Committee, 1997 - 2003. Served as secretary and

second vice-chair, 1st vice-chair, chair-elect, chair and past chair.
 ASABE-NABEC – Historian, 2004-present
 ASABE-NABEC – Planning Committee, 2013-14 chair elect and 2014-15 chair
 Have prepared and revised several ASAE standards
 ASCE Irrigation and Drainage Division Water Quality Committee. Have served as secretary, chairman elect and chairman, twice.
 ASCE Irrigation and Drainage Division Executive Committee. Have served as secretary-elect, secretary, vice chairman, and chairman (1987-92).
 Member of ASCE Task Committee on Water Quality Problems Resulting from Increasing Irrigation Efficiency for ASCE, 1981-84.
 Chairman of ASCE Task Committee on Effect of Irrigation Groundwater Quality in the Humid Region, 1984-86.
 Chairman of 1989 ASCE National Water Conference and Life Symposium.
 ASCE Irrigation and Drainage Division Sessions Program Committee. Have served as secretary, vice chairman and chairman.
 Program Chairman for ASCE Water Quality Committee for 1982 Irrigation and Drainage Specialty Conference Chairman and Proceedings Editor of 1991 ASCE National Irrigation and Drainage Conference.
 Chairman of ASCE Task Committee on Effect on Agricultural Drainage on Water Quality in the Humid Region, 1992-94.
 Chairman of ASCE Irrigation and Drainage Division Awards Committee, 1992.
 Chairman, ASCE Delaware Section Audit Committee, 1982-83.
 Member of ASCE Task Committee to Reorganize the Hydraulics and Irrigation and Drainage Engineering Divisions, 1992-93.
 Program Chairman, ASCE for Joint 1994 ASCE Irrigation and Drainage Division - ASAE Annual Meeting
 ASCE Water Resource Engineering Division News Correspondent, 1995-99.
 Chairman, ASCE Task Committee on Conflict Between Drainage Design and Water Resources Engineering Construction, 1995-98.
 Chairman, ASCE Task Committee on Guidelines for Management and Use of Wastewater, 1997-2000.
 Member, ASCE Watershed Management 2000 Conference Program, 1998 - 2000.
 ASCE EWRI Communications Council Control Member, 1999-present.
 Member ASCE EWRI Irrigation and Drainage Council, 1999-present
 Chair of the ASCE EWRI Journals State-of-the-Art Task Committee, 2001-2002
 Chair of ASCE Irrigation and Drainage Publications Committee, 2001-present
 Member of ASCE-EWRI Journals and Periodicals Council, 2001 - present.
 Editor ASCE Journal of Irrigation and Drainage Engineering, 2001- present
 ASCE EWRI Environmental Permitting Committee, 2007-2009-Chair
 ASCE EWRI Air Quality Committee, 2004-2007, Chair 2006-07
 Member of the Dairy Program Committee for National Livestock Poultry and Aquaculture Waste Management Workshop, 1991.
 Newsletter Editor ASCE Delaware Section, 1983-84.
 ASCE Delaware Section, Executive Committee. Treasurer, vice president, president and past president, 1984-88.
 ASCE District 5 Council, Chairman 1986-87.
 Delaware Engineers Week Committee. 1984-85.

OTHER PROFESSIONAL ACTIVITIES:

Member State 208 Technical Advisory Committee, 1979-81.
Delaware Association of Conservation Districts Ad Hoc Committee for Organic Waste Disposal and Water Quality, 1983.
Member of Delaware Department of Natural Resources Solid Waste Advisory Committee, 1984.
Chesapeake Bay Best Management Practice Publication Committee, 1983-84.
Northeast Center for Rural Development Ad Hoc Groundwater Advisory Committee, 1984.
Soil Conservation Service Inland Bays Committee, 1987.
New Castle County Water Supply Plan Project Management Public Advisory Committee, 1990-present.
Inland Bays Science and Technical Advisory Water Quality Subcommittee, 1992-present.
Pennsylvania Food Processing Residual Management Manual Technical Advisory Committee. 1992 - 93.
Lewis Publishing Company Agricultural Advisory Board. 1992-1996.
Iowa State University CARD Center Technical Review Committee for Livestock Environment Project - 1993-1996.
University of Maryland Agricultural Experiment Station Promotion and Tenure Committee, 1993.
Delaware Manure Management Committee - 1994-1996.
Delaware Nonpoint Source Advisory Committee - 1995-1998, 2002 - present.
Delaware Nutrient Management Committee - 1996-1997.
Delaware Environmental Indicators Committee - 1998-99.
New Castle County Subsurface Extraction Technical Advisory Committee – 1998-2004.
Northeast Natural Resources, Agriculture and Engineering Services Committee, 1997 - 2011, Chair 2001 - 2002.

HONORS AND AWARDS:

1979 EPA Superior Achievement Award.
ASAE North Atlantic Young Engineer of the Year, 1981.
1984 New Castle County Water Resources Award.
University of Delaware Fellow to Salzburg Seminar, 1987.
ASAE Gunlogson Countryside Engineering Award, 1988.
College of Agricultural Sciences, F.D. Chester Outstanding Research Award, 1990.
ASCE Irrigation and Drainage Division Outstanding Service Award, 1993.
Elected a Fellow of ASAE, 1994.
ASAE - NABEC Distinguished Lecturer, 1994-95.
ASCE Water Resources Engineering Division Service Award, 1995.
ASCE Fellow, 1997.
ASCE Outstanding News Correspondence Award, 1997.
AWWA Life Member, 1998
ASCE Delaware Section Member of the Year Award, 1999.
ASAE-NABEC Distinguished Service Award, 2003.
ASCE Royce J. Tipton Award, 2004

ASCE Richard Torrence Award, 2010
WEF Life Member, 2012
ASCE-EWRI Fellow, 2013
American Academy of Water Resources Engineers elected a diplomat by eminent stature in field, 2013

SOCIAL AND CIVIC ACTIVITIES:

Member Greater Newark Toastmaster Club, 1972-85. Have served in all club offices and as district officer.
Member Newark Kiwanis Club, 1974-75. President, 1974.
Advisor to Conservation Districts Water Resources Committee, 1979.
Member White Clay Creek Stormwater Management Project Citizens' Advisory Committee, 1980-1981.
Member Newark Lions Club, 1981-present. Board of Directors, 1983-84, 2nd vice-president, 1984-85, 1st vice president, 1985-87, president 1987-88, treasurer 1990-present.
Board of Directors of Newark Day Nursery. Vice president, 1981-84, president, 1984-86.
Have presented Toastmaster youth leader programs and communication workshops to youth and civic organizations and judged public speaking contests.
Newark Parks and Recreation Little League Baseball Coach, 1987-90.
New Castle County YMCA Soccer Coach, 1987.

ACADEMIC REVIEWS, GRANT REVIEW PANELS AND EDITORIAL BOARDS:

USDA/CSRS Review of Agricultural and Biological Engineering Department, Rutgers University, New Brunswick, NJ. September, 1984.
USDA/CSRS Review of Agricultural Engineering Department, University of Maine, Orono, ME. June, 1988.
USGS 105 Program Engineering Division Grant Review Panel, 1991.
USDA Nitrogen Testing Grants Review Panel, 1992
USAID Research Grants Panel Review, 1993, 2013
EPA, Environmental Engineering Grants Review Panel, 1997, 1998.
USDA-NRI Water Resources Grants Review Panel, 2001
EPA, Small Business Waste Management Grants Review Panel, 2006
Editorial Board of Advances in Environmental Research Journal, 1996-2002.
Editor ASCE Journal of Irrigation and Drainage Engineering, 2001-present

MANUSCRIPT, RESEARCH PROPOSAL AND BOOK REVIEWS:

American Society of Agricultural Engineers Transactions
Journal of Environmental Quality
Environmental Engineering Journal
Irrigation and Drainage Engineering Journal
Environmental Pollution
Applied Engineering in Agriculture
Agriculture, Ecosystems & Environment
U.S. Department of Agriculture
Maine Agricultural Experiment Station
Journal of Agricultural Engineering Research

U.S. Geological Survey
Canadian National Research Council
University of Maryland Sea Grant Program
Maryland Department of Environment
Iowa State University
Maryland Department of Agriculture
NOAA Sea Grant Program
Academic Press
John Wiley & Sons, Inc.
Virginia Tech Water Resources Research Center
Virginia Department of Agriculture
Water Environment Research Journal
Biotechnology and Bioengineering
Idaho Board of Education
Bioresource Technology
Hong Kong Research Council
Oregon Cooperative Extension Service
University of Georgia

UNIVERSITY SERVICE:

University Committees

COPE Committee to Evaluate Chemical Engineering Department, 1977.
Research Committee, 1976-78.
Undergraduate Studies Committee, 1979-81.
Ad Hoc Committee on Independent Study, 1979-80, chairman.
Faculty Senator, 1980-82.
Instructional Resources Committee, 1981-83.
Committee on Committees, 1982-84.
Faculty Representative to Board of Trustees Agricultural Committee,
1983-84.
Committee to Evaluate Dean of College of Agricultural Sciences,
1984,1989.
Undergraduate Admissions and Standing Committee, 1984-86. Chairman,
1984-86.
Coordinating Committee on Education, 1984-86.
University Honors Form Committee, 1989.
University Environmental Concerns Committee, 1991-1999.
College of Agricultural Science Dean's Search Committee, 1991.
Central University Safety Committee, 1991-1998
Personal Protective Equipment Committee, 1992.
Environmental Certification Advisory Committee, 1993-1997.
Environmental Science Graduate Program Committee, 1994-96.
Environmental and Energy Policy Graduate Program Steering Committee, 1996.
Environmental and Energy Policy Program Director Search Committee, 1998.
Environmental and Energy Policy Graduate Program Admissions Committee
1998-2001.

College Committees

United Fund Committee, 1972.
Career Days Committee, 1972.
Winterim Session Committee, 1972-74.
Promotion and Tenure Committee. Have served 8 terms and chairman twice.
Honors Day Committee, 1977-78.
Grievance Committee, 1977-78.
Cooperative Extension Service 208 Advisory Committee, 1978.
Pesticide Committee, 1979.
Safety Committee, chairman 1982-present.
Sludge Guidelines Fact Sheet Committee, 1984.
Search Committee for Assistant Dean of Instruction, 1985-86.
Education and Research Center Field Day Committee, 1986, 1987, chairman, 1989.
Dean's Advisory Committee, 1987-88.
Cooperative Extension Service - Futures Planning Committee, 1990.
College Wall of Fame Committee - 1992
Conversion From Fiscal to Academic Year Policy Committee, 1995-96, chairman

Department Committees

Agricultural Engineering Club Faculty Advisor, 1972-80.
Representative to University Honors Program, 1977-79.
Promotion and Tenure Committee. Have served as chairman 9 times.
Faculty and Research Associate Search Committees. Have served as chairman several times.
United Way Solicitor, 1985.
Graduate Program Planning Committee, 1985-87.
Geography Department Promotion and Tenure Committee, 1988.
Animal Science Department Faculty Evaluation Committee, 1991.

PUBLICATIONS AND PAPERS

Author of over 300 publications and papers, and have presented over 200 papers at international, national and regional meetings.

1. Ritter, W. F. and C. E. Beer. 1968. Yield reduction by controlled flooding of corn. American Society of Agricultural Engineers, St. Joseph, MI. 68-2390.
2. DeBoer, D. W. and W. F. Ritter. 1969. Flood damage to crops in depression areas of North - Central Iowa, American Society of Agricultural Engineers, St. Joseph, MI. MC 69-401.
3. Ritter, W. F. and C. E. Beer. 1969. Yield reduction from controlled flooding of corn. Iowa Farm Science, 24. October.

- *4. Ritter, W. F. and C. E. Beer. 1969. Yield reduction of controlled flooding of corn. Transactions of the American Society of Agricultural Engineers 12:46-48.
- *5. DeBoer, D. W. and W. F. Ritter. 1970. Flood damage to crops in depression areas of North - Central Iowa. Transactions of the American Society of Agricultural Engineers 13:547-549.
- *6. Ritter, W. F., H. P. Johnson, and W. G. Lovely. 1973. Diffusion of atrazine propachlor, and diazinon in a silt loam soil. Weed Science of America Journal 21:381-384.
- 7. Ritter, W. F. and T. H. Williams. 1973. Soil moisture and soil temperature measurements in corn and soybeans. University of Delaware Cooperative Extension Bul. 107.
- *8. Ritter, W. F., H. P. Johnson, W. G. Lovely, and Myron Molnau. 1974. Pesticide residues on small agricultural watersheds. Journal of Environmental Science and Technology 8:38-42.
- *9. Ali, Syed Hyder, P. P. Burbutis, W. F. Ritter, and R. W. Lake. 1974. Black Fly (*Simulium Vittatum Zetterstedt*) densities and water quality conditions in Red Clay Creek, PA-DE. Environmental Entomology 3:879-881.
- 10. Ritter, W. F. 1974. Leaching of metals from sludge. Project Completion Report submitted to E. I. DuPont de Nemours Company.
- 11. Ritter, W. F. and R. P. Eastburn. 1975. Energy sources for biological nitrification-denitrification of livestock wastes. American Society of Agricultural Engineers, St. Joseph, MI. 75-4041.
- 12. Ritter, W. F. and R. P. Eastburn. 1975. Leaching of heavy metals from sludge. American Society of Agricultural Engineers, St. Joseph, MI. NAR 75-101.
- 13. Ritter, W. F. and R. P. Eastburn. 1975. Treatment of livestock wastes by a barriered landscaped water renovation system. Proceedings of 3rd International Livestock Waste Symposium, April 21-24, Urbana, IL. American Society of Agricultural Engineers PROC-275. pp 572-575.
- 14. Ritter, W. F., N. E. Collins, and R. P. Eastburn. 1975. Chemical treatment of liquid dairy manure to reduce maladors. Proceedings of 3rd International Livestock Waste Symposium, April 21-24, Urbana, IL. American Society of Agricultural Engineers PROC-275. pp 381-384.
- 15. Hesseltine, W. R. and W. F. Ritter. 1975. The content and value of farm manure. University of Delaware Cooperative Extension Dairy Fact Sheet.
- 16. Ritter, W. F. and W. C. Liebhardt. 1976. Livestock solid waste management: Pretreatment and land disposal. Hercules Inc. Environment Grant Completion Report.

17. Ritter, W. F., R. P. Eastburn, and J. R. Harris. 1976. Renovation of liquid dairy and milking parlor wastes. American Society of Agricultural Engineers, St. Joseph, MI. 76-4031.
18. Ritter, W. F. 1976. Uptake of heavy metals by crops grown on sludge amended soils. Paper presented at Chesapeake Water Pollution Control Association Annual Meeting, June 9-11, Ocean City, MD.
19. Ritter, W. F. and R. P. Eastburn. 1976. Treatment of dairy cattle wastes by a barriered landscape wastewater renovation system in the Mid-Atlantic states. American Society of Agricultural Engineers, St. Joseph, MI. NAR 76-118.
20. Ritter, W. F. 1977. Tertiary treatment and reuse of animal wastes. Final report submitted to U. S. Department of Interior for Project No. A-030-DEL, Report No. W77-00158.
21. Neisser, M. P. and W. F. Ritter. 1977. Land disposal of industrial wastes. Final report submitted to E. I. DuPont de Nemours Company, Newark, DE.
22. Ritter, W. F. and G. Scheffler. 1977. Monitoring nonpoint source pollution in Coastal Sussex County. EPA 208 Coastal Sussex County Task 2332 Report.
23. Ritter, W. F. 1977. Modeling nonpoint source pollution in Coastal Sussex County. EPA 208 Coastal Sussex County Task 2351 Final Report.
24. Jensen, P. A., W. F. Ritter, and J. M. Tyrowski. 1977. Coliform bacterial loading and dynamics. Final Report to Coastal Sussex County EPA 208 Program, Contract No. P-003102-01-0.
25. Ritter, W. F. and T. H. Williams. 1977. Corn water requirements. Delaware Cooperative Extension Service Fact Sheet.
26. Ritter, W. F. and E. W. Walpole. 1977. Runoff and odor control. Northeast Region Agricultural Engineering Service Dairy Waste Management Fact Sheet, NDPC27.8.
27. Ritter, W. F. 1978. Control of odors in livestock wastes by polyphosphates. Project Completion Report, Allied Chemical Company, Philadelphia, PA.
28. Ritter, W. F., T. H. Williams, and R. P. Eastburn. 1978. Estimating evapotranspiration rates for corn in Delaware. American Society of Agricultural Engineers, St. Joseph, MI. 78-2029.
29. Ritter, W. F., R. P. Eastburn, and J. P. Jones. 1978. Nonpoint source pollution from coastal plain soils in Delaware. American Society of Agricultural Engineers, St. Joseph, MI. 78-2046.
30. Ritter, W. F. 1978. Water quality management in 208 Coastal Sussex County. American Society of Agricultural Engineers, St. Joseph, MI. NAR 78-205.

31. Ritter, W. F. 1978. What does law 208 mean to farmers? Delaware Dairy Digest. 19(3).
32. Ritter, W. F. 1978. Odor prevention is the essence of control. Dairy Herd Management. 15(4):58-62.
- *33. Ritter, W. F. and R. P. Eastburn. 1978. Treatment of livestock wastes by a barriered landscape wastewater renovation system. Journal of Water Pollution Control Federation. 50:144-150.
- *34. Ritter, W. F. and R. P. Eastburn. 1978. Uptake of heavy metals from sewage sludge through coastal plain soils. Communications in Soil Science and Plant Analysis. 9(9):785-798.
- *35. Ritter, W. F. and R. P. Eastburn. 1978. Uptake of heavy metals from sewage sludge applied to land by corn and soybeans. Communications in Soil Science and Plant Analysis. 9(9):799-811.
36. Ritter, W. F. 1978. An overview of land disposal of industrial wastes. Proceedings of 10th Mid-Atlantic Industrial Waste Conference. June 19-20, 1978, Newark, DE. pp 39-45.
37. Ritter, W. F. and P. A. Jensen. 1979. Water quality modeling in the Delaware coastal plain. In: Best Management Practices for Agriculture and Silviculture. R. C. Loehr, ed. Ann Arbor Science Publishers, Inc., Ann Arbor, MI. pp 507-524.
38. Malone, G. W., G. W. Chaloupka, and W. F. Ritter. 1979. Recycled paper products as broiler litter. Proceedings of 1979 National Broiler Housing Seminar, October 3, University of Delaware, Georgetown, DE. pp 70-75.
39. Walpole, E. W., R. E. Fowler, and W. F. Ritter. 1979. Delaware's total confinement hog facility. American Society of Agricultural Engineers, St. Joseph, MI. 79-4064.
40. Ritter, W. F., R. P. Eastburn, and M. P. Neisser. 1979. Potential for land disposal of nonbiodegradable wastes. American Society of Agricultural Engineers, St. Joseph, MI. NAR 79-201.
41. Ritter, W. F. and R. P. Eastburn. 1979. Control of odors in livestock wastes by polyphosphates. American Society of Agricultural Engineers, St. Joseph, MI, NAR 79-205.
- *42. Ritter, W. F., R. P. Eastburn, and P. J. Jones. 1979. Nonpoint source pollution from Coastal Plain soils in Delaware. Transactions of the American Society of Agricultural Engineers 22:1044-1049.
43. Ritter, W. F. 1979. The nose knows - odor control products vary in effectiveness. Dairy Herd Management 16(5):54-62.

44. Ritter, W. F. 1979. How to control odors from animal production. Delaware Diary Digest 20(3).
45. Ritter, W. F. 1980. Meeting the requirements of water pollution control legislation. Delaware College of Agricultural Sciences 1979 Annual Report.
46. Ritter, W. F. 1980. Biological and chemical treatment of poultry processing sludge. Technical Report submitted to Perdue Inc. , Salisbury, MD.
47. Ritter, W. F. and R. P. Eastburn. 1980. Chemical and biological treatment of poultry processing sludge. American Society of Agricultural Engineers, St. Joseph, MI. 80-6251.
48. Ritter, W. F. 1980. Chemical control of livestock wastes. American Society of Agricultural Engineers, St. Joseph, MI. 80-4036.
49. Ritter, W. F., J. R. Harris, and C. E. Palo. 1980. Phosphorus and water quality relationships in Delaware lakes. American Society of Agricultural Engineers, St. Joseph, MI. NAR 80-216.
50. Ritter, W. F. 1980. Research related to water quality and 208 planning. Presented at National Association of Conservation Districts Northeast Regional Meeting, August 12-15, Wilmington, DE.
- *51. Ritter, W. F. and R. P. Eastburn. 1980. Odor control in liquid dairy and swine manure with commercial products. Canadian Agricultural Engineering Journal 22:117-118.
- *52. Ritter, W. F., R. P. Eastburn, and M. P. Neisser. 1981. Potential for land disposal of two nonbiodegradable wastes. Transactions of the American Society of Agricultural Engineers 24:945-950.
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338. Chitikela S.R., J.L. Simerl and W.F.Ritter. 2012. Municipal wastewater treatment operations- the environment and energy requirements. In Proceedings of EWRI/ASCE World Water and Environmental Congress, May20-24, 2012,Albuquerque, NM. CD-ROM.
339. Ritter, W.F. 2013. Potential for Nutrient Trading in the Chesapeake Bay Watershed to Meet TMDL Nutrient Load Reductions. In Proceedings of USCID 7th International Conference on Irrigation and Drainage, April 16-19, 2013, Phoenix, AZ. CD-ROM.
340. Ritter, W.F. 2013. The Role of Agriculture in Atmospheric Nitrogen Deposition in the Chesapeake Bay Watershed. In Proceedings of USCID 7th International Conference on Irrigation and Drainage, April 16-19, 2013, Phoenix, AZ. CD-ROM.
341. Ritter, W.F. and S.R. Chitikela. 2014. Greenhouse Gas Emissions From Wastewater Treatment Plants By-Product Operations: A Comprehensive Review. In Proceedings of EWRI/ASCE World Water and Environmental Congress, June 1-5, 2014, Portland, OR. CD-ROM.
342. Ritter, W.F. and C. Drouza. 2013. An Analysis of the Environmental and Social Impacts of Solid Waste Management in India. In Proceedings of EWRI/ASCE World Water and Environmental Congress, June 1-5, 2014, Portland, OR. CD-ROM.
343. Ritter, W.F. and J de Monde. 2013. Groundwater Use in Agriculture; Approaches to Sustainable Management in the U.S. Case Studies. In Proceedings of EWRI/ASCE World Water and Environmental Congress, June 1-5, 2014, Portland, OR. CD-ROM.

RESEARCH PROJECTS AT THE UNIVERSITY OF DELAWARE:

1. July 1, 1972 - June 30, 1976 - Hercules Inc. - Solid Waste Management Pre-Treatment and Disposal. (\$87,500)
2. July 1, 1974 - June 30, 1975 - University of Delaware Research Foundation - Energy Sources For Biological Nitrification - Denitrification of Animal Wastes. (\$2,900)
3. July 1, 1974 - June 30, 1975 - DuPont Company - Fate of Heavy Metals From Land Disposal of Sludge. (\$1,000)
4. July 1, 1974 - June 30, 1976 - U. S. Department of Interior - Tertiary Treatment and Reuse of Animal Wastes. (\$17,600)
5. July 1, 1975 - June 30, 1976 - Delaware Institute of Medical Education and Research - Effects of Metals in Sewage Sludge When Applied to Land. (\$2,360)
6. April 1, 1976 - December 31, 1977 - U. S. Environmental Protection Agency 208 Program - Hydrodynamic, Water Quality and Nonpoint Source Monitoring and Modeling in Coastal Sussex County, Delaware. (\$84,649)
7. July 1, 1976 - June 30, 1977 - DuPont Company - Land Disposal of Industrial Wastes. (\$5,000)
8. July 1, 1977 - June 30, 1978 - Allied Chemical Company - Control of Odors in Livestock Wastes by Polyphosphates. (\$3,450)
9. July 1, 1977 - September 30, 1981 - Delaware Agricultural Experiment Station Hatch Project. Irrigation of Corn on Coastal Plain Soils.
10. January 1, 1978 - September 30, 1981 - Delaware Agricultural Experiment Station Hatch Project. Swine Waste Management in Delaware.
11. October 1, 1978 - September 30, 1980 - U. S. Department of Interior - Modeling Nonpoint Source Pollution on Coastal Plain Soils. (\$21,000)
12. November 1, 1978 - June 30, 1979 - Delaware Reclamation Center - Use of Processed Newspaper and Cardboard for Broiler Litter. (\$1,400)
13. March 1, 1979 - August 31, 1980 - Delaware Department of Natural Resources - Eutrophication of Delaware's Public Lakes. (\$50,338)
14. April 1, 1979 - June 30, 1981 - Perdue Inc. - Treatment of Poultry Processing Wastewater Suspended Solids From Dissolved Air Flotation. (\$8,140)
15. January 1, 1980 - December 31, 1982 - New Castle County Water Resources Agency - Methodologies for Assessing the Impact of Best Management Practices on Water Quality. (\$16,499)

16. March 1, 1980 - August 31, 1981 - Delaware Department of Natural Resources - Groundwater Pollution/Lake Eutrophication Program for Kent/Sussex Counties. (\$109,059)
17. October 1, 1980 - November 1, 1981 - Delaware Department of Natural Resources - Blairs, Griffith and Haven Lakes. Feasibility Study - Phase II. (\$19,477)
18. May 1, 1981 - September 30, 1984 - Delaware Agricultural Experiment Station Hatch Project. Soybean Irrigation Management.
19. October 1, 1981 - September 30, 1982 - U. S. Department of Interior - Influence of Agricultural Drainage on Water Quality. (\$12,500)
20. October 1, 1981 - September 30, 1987 - Delaware Agricultural Experiment Station Hatch Project. Influence of Agricultural Waste Management and Irrigation on Groundwater Quality.
21. November 1, 1982 - December 31, 1986 - New Castle County Water Resources Agency - Rural Clean Water Program Water Quality Monitoring and Evaluation. (\$54,789)
22. January 1, 1983 - September 30, 1985 - Soil Conservation Service, U. S. Department of Agriculture - Influence of Agricultural Drainage on Water Quality. (\$30,800)
23. July 1, 1983 - June 30, 1984 - U. S. Department of Interior - Influence of Irrigation on Groundwater Quality. (\$9,000)
24. January 1, 1984 - June 30, 1986 - New Castle County Water Resources Agency - Impact of Best Management Practices on Groundwater Quality in the Appoquinimink Watershed. (\$18,251)
25. April 1, 1984 - September 30, 1989 - U. S. Department of Agriculture - Quantification of Pesticide Losses by Leaching and Runoff in Tilled and Untilled Fields in the Chesapeake Bay Watershed. (\$575,000) Co-investigator with U. of Maryland, Penn State and Cornell University.
26. July 1, 1984 - June 30, 1987 - U. S. Department of Interior - Influence of Nitrogen Management and Irrigation on Groundwater Quality. (\$32,000)
27. March 1, 1985 - September 30, 1990 - Delaware Agricultural Experiment Station Hatch Project. Irrigation Management of Field and Vegetable Crops.
28. February 1, 1985 - January 31, 1987 - National Oceanic and Atmospheric Administration Sea Grant Program. Influence of Alternative On-Site Wastewater Treatment Systems on Groundwater Quality. (\$30,350)
29. March 1, 1985 - February 28, 1986 - State of Delaware. Nutrient Budgets for the Inland Bays. (\$5,873)

30. July 1, 1986 - March 31, 1989 - State of Delaware. Subsurface Effects of Alternative On-Site Wastewater Systems and Denitrification in the Inland Bays. (\$98,870)
31. August 1, 1986 - February 28, 1988 - State of Delaware. Automated Weather Station for the Inland Bays. (\$6,138)
32. March 1, 1987 - May 31, 1990 - State of Delaware. Evaluation of Groundwater Quality Around Stored Poultry Manure. (\$20,000)
33. March 1, 1987 - May 31, 1990 - State of Delaware. Dead Bird Disposal. (\$25,000)
34. January 15, 1987 - June 30, 1989 - State of Delaware. Effect of Lime Stabilized Septage on Groundwater and Soil Properties. (\$24,861)
35. April 1, 1987 - March 31, 1988 - Delaware Potato Board. Irrigation Water Use for Potatoes. (\$1,100)
36. May 1, 1987 - April 30, 1988 - Delaware Soybean Board. Irrigation of Double-Cropped Soybeans. (\$2,300)
37. March 1, 1987 - February 28, 1988 - State of Delaware. Demonstration of the Usefulness of a Nonpoint Model for Watersheds in the Delaware Inland Bays. (\$7,500)
38. July 1, 1988 - June 30, 1990 - State of Delaware. Operation of Inland Bays Weather Station. (\$3,100)
39. July 1, 1988 - June 30, 1990 - U. S. Department of Agriculture. Role of Cover Crops in Nitrogen Management in the Chesapeake Bay Watershed. (\$155,000) Co-Investigation with U. of Maryland, Penn State and Rodale Institute.
40. October 1, 1988 to September 30, 1990 - State of Delaware. Implementation and Evaluation of a Comprehensive Poultry Manure Management Program for the State of Delaware. (\$213,198). Co-investigator.
41. November 1, 1988 - August 31, 1989. P. H. Glatfelter Company. Evaluation of Waste Products as a Soil Amendment. (\$19,315)
42. June 1, 1989 - May 31, 1992. U. S. Department of Interior. Leaching of Alachlor in a Coastal Plain Soil. (\$36,000)
43. October 1, 1990 - September 30, 1993. U. S. Department of Interior. Preventing Pesticide Contamination of Aquifers by Best Management Practices. (120,000). Co-Investigator with Cornell University.
44. February 1, 1991 - December 31, 1991. Delaware Department of Agriculture. Wastewater Treatment in the Aquaculture Industry. (\$2,000).
45. June 1, 1992 - May 31, 1995. U. S. Department of Interior Cropping Systems to Reduce Nitrate Contamination of Ground Water. (\$39,000).

46. February 1, 1992 - September 30, 1993. State of Delaware. Development of Environmental Soil Tests and Field Rating Systems for Phosphorus in the Inland Bay Watershed of Delaware. (\$44,540). Co-Investigator.
47. April 1, 1992 - September 30, 1994. U. S. Department of Agriculture. Pesticide Movement in Controlled Drainage Systems. (\$24,472).
48. UNIDEL Foundation. 1992. Equipment Grant for Environmental Research and Teaching in College of Agricultural Sciences. Co-Investigator (\$235,000).
49. February 1, 1993 to January 31, 1995. U. S. Department of Agriculture. Integrated Kenaf, Broiler Manure and Beef Production System. Co-Investigator. (\$81,500).
50. May 15, 1992 to September 30, 1992. State of Delaware. Nutrient Budgets for the Appoquinimink Watershed. (\$22,670).
51. May 1, 1992 to October 31, 1992. National Geographic Society. Bioremediation: A State-of-the-Art Assessment. (\$21,575).
52. October 1, 1993 to September 30, 1998. State of Delaware. Nanticoke Watershed Project. (\$190,000).
53. July 1, 1993 to June 30, 1994. University of Delaware Research Foundation. An In-Situ Real Time Field Technique for Nitrogen Management. Co-Investigator. (\$21,000).
54. October 1, 1993 to September 30, 1994. State of Delaware. Phosphorus Management in the Appoquinimink Watershed. Co-Investigator (\$20,000).
55. June 1, 1994 to May 30, 1995. Chesapeake Bay Research Consortium. An Evaluation of Animal Waste Management Systems and Nutrient Management Strategies for the Chesapeake Bay. (\$30,405).
56. July 1, 1995 to June 30, 1998. New Castle County. Crop Management and Monitoring at the M-O-T Spray Irrigation Facility. (\$121,500).
57. October 1, 1995 to September 30, 2000. Delaware Agricultural Experiment Station Hatch Project. Modeling of Pollutants in Surface Water and Ground Water.
58. October 1, 1996 to September 30, 2001. Delaware Agricultural Experiment Station Hatch Project. Developing Remediation Processes for Pesticide Contaminated Mix-Load Sites.
59. January 1, 1998 to June 30, 1998. State of Delaware. Coastal Management Stormwater Program. (\$8,000).
60. January 1, 1998 to December 31, 1998. Center for the Inland Bays. Evaluation of BMPs for the Inland Bays. (\$13,800).

61. July 1, 1998 to June 30, 2000. Delaware Transportation Center. Evaluation of a Weedwiper for Roadside Weed Control. (\$65,000).
62. July 1, 1998 to June 30, 2004. New Castle County. Crop Management and Monitoring at the M-O-T Spray Irrigation Facility. (\$235,000).
63. October 1, 1999 to September, 2000, CABA Associates. Treatability Studies for an Industrial Wastewater. (\$4,600).
59. July 1, 2000 to June 30, 2003. U. S. Department of Interior. Environmental Policies for a Sustainable Poultry Industry in Sussex County. (\$48,000).
60. July 1, 2000 to February 28, 2001. U. S. Department Interior. Nutrient Management Undergraduate Student Research Internships. (\$10,000).
61. August 1, 2001 to July 31, 2002. EPA Chesapeake Bay Program. Identification of Improved Nonpoint Source Best Management Practices for Consideration in Revised Tributary Strategies. (\$72,500).
62. July 1, 2001 to June 30, 2002. New Castle County. Optimization Study of M-O-T Wastewater Treatment Plant and Spray Irrigation. (\$14,800).
63. October 1, 2001 to March 31, 2002. CABA Associates. Wastewater Biodegradability Studies for Nitrogen. (\$4,143).
64. January 15, 2002 to January 14, 2003. Sussex County Conservation District. Evaluation of Vegetative Control with the Weed Wiper. (\$5,000).
65. June 1, 2002 to December 31, 2002. DuPont Company. Composting of Biomax Material. (\$25,474).
66. August 15, 2002 to August 14, 2003. State of Delaware. Odessa National NPS Monitoring. (\$13,000) Co-investigator.
67. March 1, 2003 to February 28, 2004. Blue Moon Foundation. Health, Ecological, Energy and Economic Impacts of the 4 in 1 System and Institutional Strategies for its Successful Application in Rural China. (\$50,000). Co-investigator.
68. March 1, 2003 to February 28, 2005. Sussex Country Conservation District. Evaluation of Vegetative Control with the Weed Wiper. (\$13,500).
69. October 1, 2003 to September 30, 2006. U.S. Environmental Protection Agency. Hydrology and Water Quality of Freshwater Wetlands. (\$198,000) Co-investigator.

70. July 1, 2004 to June 30, 2009. New Castle County. Crop Management and Monitoring at the M-O-T Spray Irrigation Facility. (\$125,000).
71. October 1, 2004 to September 30, 2007. Wicomico County. Environmental Effect of Long Piers on Tidal Wetlands. (\$179,220). Co-investigator.
77. July 1, 2004 to June 30, 2009. New Castle County. Crop Management and Monitoring at the M-O-T Spray Irrigation Facility. (\$150,000).
78. October 1, 2006 to September 30, 2009. State of Delaware. Evaluation of Rapid Infiltration Systems Phase I and II. (\$216,264). Co-investigator.
79. January 1, 2008 to June 30, 2012. U.S. Department of Agriculture NRI Program. Characterization of PM2.5 and PM10 Particulate Emissions and Their Relationship to Activity in Typical Poultry Houses. (\$532,347).
80. July 1, 2009 to June 30, 2011. New Castle County. Crop Management and Monitoring at the M-O-T Spray Irrigation Facility. (\$107,000).
81. January 1, 2010 to August 31, 2011. Town of Middletown. Engineered Rapid Infiltration Systems for Enhanced Removal of Secondary Effluent at Middletown Wastewater Treatment Plant. (\$66,333).
82. April 1, 2010 to March 31, 2014. NIFA-USDA. Mid-Atlantic Agrability Project. (\$720,000). Co-PI.
83. March 1, 2010 to April 30, 2011. State of Delaware. Identifying Potential Sites in Delaware for Slow Rate Land Application of Wastewater. (\$78,806).
84. July 1, 2012 to February 28, 2015. Town of Middletown. Engineered Rapid Infiltration Systems for Enhanced Removal of Secondary Effluent at Middletown Wastewater Treatment Plant: Phase II. (\$172,618).