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Gail Montgomery Brion, PhD.

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OVERVIEW

I have been an Assistant/Associate professor at the University of Kentucky with a Primary Appointment in the Civil Engineering Department of the College of Engineering since receiving my doctorate in August of 1995. During this time I have set up my own specialized environmental virology research laboratory from bare walls, established world-class, shared-use environmental research facilities used by researchers across the state, been an integral part of building a new, soon to be accredited, College of Public Health, and impacted my chosen field of study through research and service. I have mentored young people through education and research and sent them on to professional positions in consulting firms, local and national government, academia, and even the World Health Organization. I have reached a point in my career where I am valued for my expert opinion on grants, journals, and other professional matters. I continue to be challenged and excited in my position as an academic, and I am confident that infrastructural base and momentum I have developed will carry me through to the end of my career. I am looking forward to expanding my capabilities as an administrator and program builder and see this as a natural progression for my academic career. While a review of my vitae will show you my professional accomplishments, missing from this summary is the motivation for my career choices. Since my motivations are an important factor in my commitment to academic work and professional development plans, I have discussed these briefly below.

I have spent my adult life preparing to work inter-disciplinarily between the fields of engineering and environmental science for the sole purpose of improving and protecting the health of the public from impacts caused by poor water quality. This decision sprang from incidents during my formative years in California that sparked a keen awareness of the direct relationship between water quality and public health. There was the occasion of finding an unregulated straight pipe dumping untreated hospital wastes directly upstream of a favorite wading spot on a city park creek, after a few of my friends became hospitalized with inexplicable illnesses. Another time I watched a migrant family wash down their lunch with untreated irrigation water flowing past the berry fields, even though their children had been too ill to work most of the day, because there was no other drinking water available. Then there was the time that my father threw away the catfish caught for our dinner from a river with posted mercury warnings. These experiences impressed upon me the impact that humans can have on their aquatic environment, and the results of that impact on our health and well-being. A desire to make a difference was kindled.

So, I joined the Sierra Club, started a recycling group, and set about to figure out how I could make a difference. I knew I wanted to dedicate my life to preserving and improving the aquatic environment, which would improve the lives and general health of people. I knew that I would have to be competent in chemistry, microbiology, and other earth sciences, but I was at a loss when it came time to select a specific college major. Environmental Engineering had not yet been widely established as a discipline in its own right in the early 70's in rural Pennsylvania, and the closest match was in a newly formed Environmental Science program with a special emphasis on wastewater treatment technology. Within a few months of graduation it became clear that I needed engineering skills to fully realize my goals and move out of a technician's job into ones that had decision making authority. I started taking math, chemistry, and engineering courses one at a time, while working full-time. One job led to another, and finally an opportunity came to make the leap into engineering at a newly formed graduate program for people with strong science backgrounds where I became fascinated with waterborne viral disease and the potential impacts of water recycling. This engineering training allowed me to move into a professional career in government, but I was still limited in the scope of what I could accomplish as an individual. Attaining a Ph.D. gave me the opportunity to impact the environment by training new generations of professionals, in essence building a workforce that could multiply my potential impact and make more impact upon the environmental problems I saw. As an academic, my varied background prepared me to work in either engineering or science, and to excel at their interfaces working with professionals in disparate disciplines and forming interdisciplinary teams. Although I lost visual acuity to surgical error in 1999, this has not prevented me from advancing towards my goals, merely caused a change in method. I now serve as an intellectual bridge between the existing Environmental Engineering program with the newly formed College of Public Health's Environmental Health program, fostering inter-disciplinary research, service, and training that has changed the way we seek to understand and improve our environment with the end result of improving public health for the citizens of the commonwealth and beyond.

GAIL MONTGOMERY BRION

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EDUCATION

UNIVERSITY OF COLORADO AT BOULDER **Ph.D. Civil Engineering. 8-95**
Advisor: JoAnn Silverstein
Dissertation: ***Inactivation of a Model Virus by Iodine: Disinfection of MS-2 Bacteriophage in Space Water Recycle Systems***

UNIVERSITY OF COLORADO AT BOULDER **M.S. Civil Engineering, 12-85**
Advisor: Walter Weers
Thesis: ***Detection of Poliovirus in Potable Reuse Water***

CALIFORNIA UNIVERSITY OF PENNSYLVANIA **B.S. Environmental Science, 5-78**

PROFESSIONAL EXPERIENCE

CURRENT POSITION AND PROFESSIONAL ACADEMIC EXPERIENCE

UNIVERSITY OF KENTUCKY

School of Engineering/ Dept. Civil Engineering **Associate Professor: 7-01 to present**
Assistant Professor: 8-95 to 6-01

College of Public Health/Dept Environmental Health **Joint Faculty: 5-00 to present**

Responsibilities: Establish an active research program in waterborne disease, water recycling, water treatment, and other environmental engineering, health, and science topics. Design research experiments, obtain funding, and from scientific analysis of data obtained, produce reports, proposals, and research papers. Train, mentor, and advise graduate and undergraduate engineering and graduate public health students while providing opportunities for their growth and professional development. Create and teach graduate and undergraduate curricula in environmental engineering, sanitation, microbiology, environmental health, and water treatment. Develop and establish graduate program and curriculum in Environmental Health for the newly formed College of Public Health. Direct the interdisciplinary Graduate School certificate in Environmental Systems.

UNIVERSITY OF COLORADO

School of Engineering/ Dept. CEAE Title: **Research Assistant**
Dates: 7-91 to 8-95

Advisor: **Dr. JoAnn Silverstein**

Responsibilities: Investigated virus fate in water reuse treatment processes under consideration for use in NASA space life support systems. Areas of research included virus disinfection kinetics, mechanisms of virus inactivation, and water recycle system design and operation. Tasks included experimental design, data analysis, writing of reports, proposals, and papers, and presentation of results to conferences and funding agencies. Oversight of project budget and laboratory coordination. Managed research laboratory facilities for 4 full-time environmental engineering faculty members and their graduate students.

UNIVERSITY OF NORTH CAROLINA-CHAPEL HILL

School of Public Health — Title: **Research Assistant**
Dept. Environmental Science — Dates: 1-90 to 7-91
Advisor: **Dr. Mark Sobsey**

Responsibilities: Researched virus sorption to activated and bioactivated carbon as process "credits" to satisfy surface water treatment regulations. Tasks included experimental design and data analysis as well as extraction and enumeration of human enteric viruses from potable water influent to small treatment facilities around Lake Tahoe seeking disinfection variances.

NON-ACADEMIC PROFESSIONAL EXPERIENCE

US EPA

Office of Air Quality Rulings and Standards — Title: **Environmental Engineer**
Ambient Standards Branch — Dates: 3-88 to 1-90
Durham, NC
Supervisor: **John Haines**, Section Chief

Responsibilities: Revision of the National Ambient Air Quality Standard for lead. Production of technical regulation review document for NAS. Coordination with Superfund on listed lead-contaminated cleanup sites. Coordination with Headquarters Offices of Water and Solid Waste on national regulations and pollution prevention initiatives.

US EPA

Region VIII — Title: **NESHAPS Asbestos Coordinator**
Air and Toxics Division — Dates: 12-85 to 3-88
Air Programs Branch
Denver, CO
Supervisor: **Marius Gedgaudas**, Section Chief

Responsibilities: Direct implementation and enforcement of asbestos regulations as well as state oversight and audit of delegated programs. Prepared and provided training on decontamination and safety procedures for all regional personnel. National regulation revision and regional public contact. Coordination with other EPA asbestos programs to insure regional and national consistency.

US EPA

Region VIII — Title: **Co-op Student Engineer**
Water Quality Division — Dates: 5-84 to 12-85
Denver, CO
Supervisor: **Dean Chausee**, Section Chief

Responsibilities: Oversight of operator training grants. Regional contact for the development of Synthetic Organic Chemical regulations. Direct implementation and enforcement of Safe Drinking Water Regulations as well as state oversight of delegated drinking water programs in five states. Sanitary survey of water treatment facilities. Provision of technical assistance to public and professionals on laboratory analysis, water treatment, and water quality issues.

PUBLIC SERVICE CO.

Ft. St. Vrain Nuclear Power Plant
Platteville, CO
Supervisor: **Victor Lucero**, Head Chemist

Title: **Plant Chemist**
Dates: 3-82 to 10-83

Responsibilities: Analysis of cooling, waste, and natural water systems. EPA laboratory certification testing and NPDES discharge permit analysis. Supervision of water treatment operations for ultrapure deionized core, and other cooling waters. Operation, maintenance, repair, and calibration of lab and system instrumentation. Emergency response for fire and chemical spills.

HACH COMPANY

Marketing Department
Loveland, CO
Supervisor**: Linda Rowley**, Marketing Associate

Title: **Product Specialist**
Dates: 5-81 to 3-82

Responsibilities: Customer assistance in chemical analysis and troubleshooting. Instruction of sales personnel in basic chemical principles. Development of seminars for water and wastewater plant operators in analytical methods, technique, and instrumentation calibration and repair.

CITY OF ROCK SPRINGS

Municipal Sewage Treatment Plant
Rock Springs, WY
Supervisor**: Swede Culbertson**, Plant Supervisor

Title: **Chief Lab Analyst**
Dates: 3-80 to 5-81

Responsibilities: Analysis of water and wastewater for NPDES permitting of trickling filter, package, and activated sludge WWTPs. EPA laboratory certification testing. Sludge quality analysis for process control. Operation, maintenance, repair, and calibration of lab and system instrumentation.

BRUSH RUN MUNICIPAL AUTHORITY

Municipal Sewage Treatment Plant
McKeesport, PA

Title: **Operator**
Dates:5-79 to 3-80

Responsibilities: Analysis of water and wastewater. Operation of 2 class C activated sludge WWTPs.

DUNCAN LAGNESE AND ASSOCIATES

Engineering Consultants
Pittsburgh, PA

Title: **Field Team Supervisor**
Dates:5-78 to 5-79

Responsibilities: Analysis of Water and Wastewater. Conducted inflow and infiltration studies on sewage collection systems for local municipalities. Data analysis and preparation of final reports.

PUBLICATIONS

BOOKS/REPORTS

Artificial Neural Network Applications in Water Supply Engineering. Task Committee Report. Water Supply Engineering Committee. ASCE. Editors: Lingireddy**, S. and Brion, G.** (in press)

BOOK CHAPTERS:

Lingireddy, S. and **Brion, G.M**. Chapter 1 - Artificial Neural Networks in Water Supply Engineering, *A Task Committee Report on Artificial Neural Network Applications in Water Supply Engineering*, Eds. Lingireddy and **Brion**, ASCE (in press)

Lingireddy, S. and **Brion, G.M.** Chapter 11 - Efficient Handling of Microbial Data Using Artificial Neural Networks, *A Task Committee Report on Artificial Neural Network Applications in Water Supply Engineering*, Eds. Lingireddy and **Brion**, ASCE (in press)

Brion, G.M. and Lingireddy, S. (2000) "Identification of Pollution Sources Via Neural Networks," in Artificial Neural Networks in Hydrology*,* eds. R.S. Govindaraju and A.R. Rao, *Kluwer Academic Publishers,* ISBN 0-7923-6226-8.

REFEREED JOURNAL PUBLICATIONS:

JOURNAL ARTICLES: (*= graduate student, # = advisor, ^ = post-doc)

1. **Brion, G.M,** O'Banion*, N.B., and Marchin, G.L. (accepted 11-2003) "Comparison of Bacteriophage for use in Iodine Inactivation: Batch and Continuous Flow Studies," *Journal of Water and Health*.

2. Booth*, J. A. and **Brion, G.M.** (2004) "The Utility of a Novel Bacterial Ratio for Watershed Management: a Case Study," *Water, Science, and Technology,* 50(1) 199-203.

3. **Brion, G.M.,** Lingireddy, S., Neelakantan, T.R., Wang*, M., Girones, R., Lees, D. Allard, A., and Vantarakis, A. (2004) "Probing Norwalk-like Virus Presence in Shellfish with Artificial Neural Networks", *Water, Science, and Technology*, 50(1) 125-129..

4. Neiman*, J. and **Brion, G.M.** (2003) "Novel Bacterial Ratio for Predicting Fecal Age," *Water, Science, and Technology*, Vol. 47, No. 3, 45-49.

5. **Brion, G.M.** and Lingireddy, S. (2003) "Artificial Neural Network Modeling: a Summary of Successful Applications Relative to Microbial Water Quality," *Water, Science, and Technology*, Vol. 47, No. 3, 235-240.

6. **Brion, G.M**., Neelakantan^, T.R., and Lingireddy, S. (2002) "A Neural Network Based Classification Scheme for Sorting Sources and Ages of Fecal Contamination in Water", *Water Research*, Vol. 36, No. 15, 3765-3774.

7. **Brion, G.M.,** Meschke*, J.S., and Sobsey, M.D. (2002) "Male-specific Coliphage: Prevalence, Types, and Survival in Natural Waters," *Water Research*, Vol. 36, No. 9, 2419-2425.

8. Neelakantan^, T., Lingireddy, S., and **Brion, G.M.**, (2002) "Effectiveness of Different ANN Training Algorithms in Predicting Protozoa Concentration in Surface Waters," *ASCE Journal of Environmental Engineering*, Vol. 128, No. 6, 533-542.

9. **Brion, G.M.**, and Silverstein#, J. (2001) "Selecting a Sensitive Bacteriophage Assay for Evaluation of a Prototype Water Recycling System," *Journal of Life Support and Biosphere Science,* Vol. 8, No. 1, 9-14.

10. Neelakantan^, T., **Brion, G.M.**, and Lingireddy, S. (2001) "Neural Network Modeling of *Cryptosporidium* and *Giardia* Concentrations in the Delaware River," *Water Science and Technology,* Vol. 43, No. 12, 125-132.

11. **Brion G.M**., Neelakantan^, T.R., and Lingireddy, S. (2001) "Using Neural Networks to Predict Peak Cryptosporidium Concentrations," *Journal of the American Water Works Association*, Vol. 93, No. 1, 99-105.

12. **Brion, G.M**., Mao^, H.H., and Lingireddy, S. (2000**) "**New Approaches to Use of Total Coliform Test for Watershed Management," *Water, Science, and Technology,* Vol. 42, No. 1-2, 65-69.

13. Powell*****, T., **Brion, G.M**., and Jagtoyen, M. (2000) "Comparative Adsorption of a Model Bacteriophage by Novel Forms of Activated Carbon," *Environmental Science and Technology*, Vol. 2000, No. 34, 2779-2783.

14. Brion, G.M. and Mao^, H.H. (2000) "Use of Total Coliform Test for Watershed Monitoring with Respects to Atypicals," *ASCE Journal of Environmental Engineering*, Vol. 126, No. 2, 175-181.

15. **Brion, G.M**. and Lingireddy, S. (1999) "A Neural Network Approach to Identifying Sources of Microbial Contamination," *Water Research,* Vol. 33, No. 14, 3099- 4007.

16. **Brion, G.M**. and Silverstein#, J. (1999) "Iodine Disinfection of a Model Bacteriophage Demonstrating Apparent Rebound," *Water Research*, Vol. 33, No. 1: 169-179.

17. Marchin, G.L., **Brion, G.M**., and Silverstein# J. (1997) "Effect of Microgravity on *Escherichia coli* and MS-2 Bacteriophage Disinfection by Iodinated Resins," *Acta Astronautica*, Vol. 40, No 1: 65-68.

18. Silverstein#, J., **Brion, G.M**., Barkley, R., Dunham, A., Hurst, C., Todd, P., and Schultz, J. (1994) "Contaminant Accumulation in Space Water Recycle Systems," *Acta Astronautica*, Vol. 33, 317-338.

19. **Brion, G.M.** and Silverstein#, J. (1992) "Inactivation of a Model Coliphage Virus in Water by Iodine," *SAE Transactions,* Vol. 101, Section 1, 1310-1316.

20. Barkley, R., Hurst, C., Dunham, A., Silverstein#, J., and **Brion, G.M**. (1992) "Generation of Iodine Disinfection Byproducts (IDP's) in a Water Recycle System," *SAE Transactions*, Vol. 101, Section 1, 1317-1321.

JOURNAL ARTICLES CURRENTLY UNDER REVIEW:

1. Chandramouli^, V., Lingireddy, S., **Brion, G.** (2004, February), "A Robust Training Terminating Criterion for Neural Network Modeling of Small Datasets," submitted to *ASCE Journal of Computing in Civil Engineering,* (paper No. CP/2004/022533).

2. Chandramouli^, V., **Brion**, G., Neelakantan^, T.R., Lingireddy, S. (2004 June), "Backfilling Missing Microbial Concentrations in a Riverine Database using Artificial Neural Networks," submitted to *Water Research*, (paper number WR2638).

3. **Brion, G.**, "The AC/TC Bacterial Ratio: A Tool for Watershed Quality Management," (July 2004) submitted to *Water, Science, and Technology,* (paper number A160).

4. Black*****, L. and **Brion, G.** "Developing Superior Analytical Methods for Fecal Sterols," (July 2004) submitted to *Water, Science, and Technology* (paper number A161).

5. **Brion, G.**, Chandramouli^, V., Neelakantan , T.R., Lingireddy, S., Girones, R., Lees, D., Allard, A., Vantarakis, A. (August 2004) "Probing Virus Presence in Shellfish with Artificial Neural Networks," submitted to *Applied and Environmental Microbiology* (paper number AEM01716-04 Version 1).

JOURNAL ARTICLES CURRENTLY UNDER PREPARATION:

Brion, G., Baron, A.T., Chandramouli^, V., Lingireddy, S. (submission to *Cancer Epidemiology, Biomarkers and Prevention* planned Sept. 2004), "Applying Artificial Neural Networks to the Prediction of Epithelial Ovarian Cancer from Multiple Biomarkers".

PATENT APPLICATIONS: (Initial licensing of patent to industry partner generated $20,000 as of 9-00, but company failed to complete application process and University has not re-initiated at this time)

US Provisional Patent Application SN# 60/130.770 (5-1999)
US Patent Application SN# 09/555.347 (5-2000)
International Patent Application SN# PCT/US00/10805 (6-2000)
"Combined Magnetite and Activated Carbon Filters for Purifying a Fluid Stream," Inventors: Drs. **Gail Brion** (Dept. of Civil Engineering) and Marit Jagtoyen (LexCarb).

RESEARCH REPORTS:

Brion, G.M., Lingireddy, S., and Neelakantan, T.R., (2000) "Using Neural Networks to Identify and Quantify Significant Sources of Encysted Protozoa in Watersheds" Technical Report to KY Water Resources Research Institute

Brion, G.M. (1998) "Indicators of Mammalian Fecal Contamination in Surface Water". Technical report to N.C. Water Resources Research Institute.

OTHER PUBLICATIONS:

Brion, Gail (1998) "Septic Tank Effluent Filters: Just a Physical Barrier or a Biological Treatment Process," *Zabel Zone*, Spring '98:37

REFEREED CONFERENCE PAPERS: (* = graduate student, # = advisor)

1. **Brion, G.M.** and Lingireddy, S. (2002) "Artificial Neural Network Modeling: A Summary of Successful Applications Relative to Microbial Water Quality" *Proc., Joint CSCE/EWRI Environmental Conference, Niagara Falls, Canada,* July 2002.

2. Nieman*, J. and **Brion, G.M.** (2002) "Novel Bacterial Ratio to Predict Fecal Age" *Proc., Joint CSCE/EWRI Environmental Conference, Niagara Falls, Canada,* July 2002.

3. **Brion, G.M.,** Neelakantan, T.R, and Lingireddy, S (2001) "New Tools to Define the Impact of Stormwater on Receiving Surface Waters," *Proc. ASCE Environmental Water Resources Institute Congress in Orlando*, May 2001.

4. **Brion, G.M.** and Lingireddy, S. (1998) "Neural Networks as Source Indexing Tools," *Proc. Source Water Protection Symposium, Jointly sponsored by AWWA, IWSA, USDA, and USEPA*, San Francisco, CA, October 1998.

5. **Brion, G.M.** and McRay-Higdon*, T. (1998) "Male-specific Coliphage as Indicators of Watershed Pollution," *Proc. Source Water Protection Symposium, Jointly sponsored by AWWA, IWSA, USDA, and USEPA*, San Francisco, CA, October 1998.

6. Lingireddy, S. and **Brion, G.M.,** (1997) "A Neural Networks Approach to Identifying Sources of Microbial Contamination," *Proc., Joint CSCE/ASCE Environmental Conference, Edmonton, Alberta*, Volume 2:1321-1332.

7. McRay-Higdon*, T., Miller*, V., and **Brion, G.M**. (1997) "A Novel Microbial Approach for Indication of Pathogens in a Drinking Water Reservoir," *Proc. AWWA Annual Conf. and Exposition*, Atlanta, GA, June 1997.

8. Powell*, T. and **Brion, G.M.** (1997) "Comparative Adsorption of a Model Bacteriophage by a Unique Activated Carbon," *Proc. AWWA Annual Conf. and Exposition*, Atlanta, GA, June 1997.

9. Jagtoyen, M., Lafferty, G., **Brion, G.,** Kimber, G. and Derbyshire, F. (1996) "Novel Activated Carbon Materials for Water Treatment," *Proc. European Carbon Conference,* Newcastle upon Tyne, England, July 1996.

10. **Brion, G.M.,** Gerba, C.P., and Silverstein#, J. (1994) "Pathogenic Viruses in Space: Indicators and Risks in Closed Space Environments," *24th International Conf. On Environmental Systems and 5th European Symposium on Space Environmental Control, Friedrichshafen, Germany, June 1994*, SAE Technical paper 941387, Warrendale, PA.

11. Silverstein#, J., **Brion, G.M.**, Dunham, A., Hurst, C., Todd, P., and Schultz, J. (1993) "Contaminant Accumulation in Space Water Recycle Systems," *Proc: IAA 10th Man in Space Symposium,* Tokyo, Japan, April 1993, (peer reviewed and revised version later published in *Acta Astronautica*).

12. Silverstein#, J., Schultz, J., Barkley, R., **Brion, G.M**., Hurst, C. (1992) "Contaminant Distribution and Accumulation in Water Recycle Systems," *22nd International Conference on Environmental Systems, Seattle, WA July 1992,* SAE Tech Paper No. 921360, Warrendale, PA, (per review panel selected for publication in *SAE Transactions*).

13. **Brion, G.M.** and Silverstein#, J. (1992) "Inactivation of a Model Coliphage Virus Water by Iodine," *22nd International Conf. On Environmental Systems, Seattle, WA, July 1992*, SAE Tech paper 921361, Warrendale, PA, (peer review panel selected for publication in *SAE Transactions*).

14. **Brion, G.M.** and Dee, S.W. (1985) "Spike Recovery of Poliovirus from the Denver Water Department Potable Reuse Demonstration Plant," *Proc: AWWA Technology Conference, WQTC-13,* Houston, TX, December 1985.

CONFERENCE ABSTRACTS (*= graduate student)

1. **Brion, G.**, "The AC/TC Bacterial Ratio: A Tool for Watershed Quality Management," *Proc. IWA 8th International Conference on Diffuse Pollution*, Kyoto, Japan, October 2004.

2. Black*, L. and **Brion, G.** "Developing Superior Analytical Methods for Fecal Sterols," *Proc. IWA 8th International Conference on Diffuse Pollution*, Kyoto, Japan, October 2004.

3. Baron, A.T., King, M.S., Dickerson, K., Durbin, E., Williams, J., Redmond, J., Hopenhayn, C.,Kelly, K., Lynn, B., Brion, G.M., Lingireddy, S., Chandramouli^, V., Shelton, B., and Cibull, M. "Cancer Biomarkers and their Relationship to Bioinformatics," *Proc. University of Kentucky Markey Cancer Center Symposium on The Relationship of Tobacco and HPV with Lung, Head & Neck, and Cervical Cancer*, Lexington, KY, USA, May 2004.

4. Reed*, T.M., Fryar, A.E., **Brion, G.M**., Fogle, A., and Taraba, J.L. "Role of Suspended Sediment in Facilitating Pathogen Transport in Inner Bluegrass Karst Aquifers," *Proc. 2003 Annual Geological Society of America,* Seattle, WA, USA, November 2003.

5. Booth*, J. A. and **Brion, G.M.** "The Utility of a Novel Bacterial Ratio for Watershed Management: a Case Study," *Proc. IWA Symposium on Health-Related Water Microbiology,* Capetown-South Africa, September 2003.

6. **Brion, G.M.,** Lingireddy, S., Neelakantan, T.R., Wang, M., Girones, R., Lees, D. Allard, A., and Vantarakis, A. "Probing Norwalk-like Virus Presence in Shellfish with Artificial Neural Networks", *Proc. IWA Symposium on Health-Related Water Microbiology,* Capetown-South Africa, September 2003.

7. **Brion, G.M.,** and Lingireddy, S. "Artificial Neural Network Modeling: a Summary of Successful Applications Relative to Microbial Water Quality," *Proc. 3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

8. Neiman*, J. and **Brion, G.M.**. "Novel Bacterial Ratio for Predicting Fecal Age," *Proc. 3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

9. Suttigarn*, A. and **Brion, G.M.**. "Magnetite: Potential as a Reusable Contact Coagulant for the Removal of Dissolved Organics from Water," *Proc. 3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

10. **Brion, G.M.,** Meschke, J.S., and Sobsey, M.D. (2000) "Male-specific Coliphage: Prevalence, Types, and Survival in Natural Waters," *Proc. 1st World Congress of the International Water Association, Health-Related Water Microbiology Symposium*, Paris, France, July 2000.

11. O'Banion*, B. and **Brion, G.M**. (2000) "Comparison of Bacteriophages for Use in Iodine Inactivation Studies," *Proc. 1st World Congress of the International Water Association, Health-Related Water Microbiology Symposium*, Paris, France, July 2000.

12. Neelakantan, T., **Brion, G.M.,** and Lingireddy, S. (2000) "Neural Network Modeling of *Cryptosporidium* and *Giardia* Concentrations in the Delaware River," *Proc. 1st World Congress of the International Water Association, Health-Related Water Microbiology Symposium*, Paris, France, July 2000.

13. Brion, G.M. (1998) "Development of a Single-filter Collection and Assay Method for Simultaneous Concentration of Cryptosporidium and MS-2 Phage from Water", *Proc. Kentucky Water Resources Annual Symposium,* Lexington, KY, February.

PRESENTATIONS

INVITED

1. "Air Pollution and Health", *Community Transportation Academy Professional Development Session,* Lexington, KY, October 2002.

2. "Coal Slurry: Human Health Impacts of Coal Slurry Contaminated Surface Water" *Committee on Coal Waste Impoundments, National Research Council,* Charleston, WV, May 2001.

3. "Using Neural Network Analysis to Classify Runoff Sources," *Soil Science Society of America 2000: Agronomy, Crop, and Soil Sciences: Stars of the 20th Century – Beacons for the 21st*. Minnesota, MN, November 2000.

4. "New Bacterial Ratio for use in Watershed Management," *Seminar to Research and Production Staff of the Louisville Water Treatment Facilities,* Louisville, KY, February 2000.

5. "Indicator Organisms for Water Quality: Trends and New Developments," Drinking Water Analysts Annual Training School, *KY Natural Resources and Environmental Protection Cabinet, Department of Environmental Protection*, Louisville, KY, April 1999

6. "New Approaches to the Use of Total Coliform Tests for Watershed Management," *UK Geological Sciences Seminar*, Lexington, KY, October 1999.

7. "Indicator Organisms and Their Relationship to Land Use" *UK Soil Science Seminar*, Lexington, KY, February 1998.

8. "Preliminary Results Describing the Impacts of Different Land Use Practices on Microbial Indicators in a Surface Water Supply" *Kentucky Water Resource Research Institute First Wednesday Luncheon Seminar,* Lexington, KY, October 1996

CONFERENCE PRESENTATIONS: (ɣ= presenter, *= graduate student, # = advisor)

1. Black*ɣ, L. and **Brion, G.** "Developing Superior Analytical Methods for Fecal Sterols," *Proc. IWA 8th International Conference on Diffuse Pollution*, Kyoto, Japan, October 2004.

2. Reed*ɣ, T.M., Fryar, A.E., **Brion, G.M**., Fogle, A., and Taraba, J.L. "Role of Suspended Sediment in Facilitating Pathogen Transport in Inner Bluegrass Karst Aquifers," *Proc. 2003 Annual Geological Society of America, Seattle*, WA, USA, November 2003.

3. Baronɣ, A.T., King, M.S., Dickerson, K., Durbin, E., Williams, J., Redmond, J., Hopenhayn, C.,Kelly, K., Lynn, B., Brion, G.M., Lingireddy, S., Chandramouli^, V., Shelton, B., and Cibull, M. "Cancer Biomarkers and their Relationship to Bioinformatics," *Proc. University of Kentucky Markey Cancer Center Symposium on The Relationship of Tobacco and HPV with Lung, Head & Neck, and Cervical Cancer*, Lexington, KY, USA, May 2004.

4. **Brionɣ, G.M.** and Lingireddy, S. (2002) "Artificial Neural Network Modeling: A Summary of Successful Applications Relative to Microbial Water Quality" *In Proc., Joint CSCE/EWRI Environmental Conference, Niagara Falls, Canada,* July 2002.

5. Nieman*, J. and **Brionɣ, G.M.** (2002) "Novel Bacterial Ratio to Predict Fecal Age" *In Proc., Joint CSCE/EWRI Environmental Conference, Niagara Falls, Canada,* July 2002.

6. **Brionɣ, G.M.,** and Lingireddy, S. "Artificial Neural Network Modeling: a Summary of Successful Applications Relative to Microbial Water Quality," *3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

7. **Brion, G.M.,** Neelakantan, T.R., and Lingireddyɣ, S (2001) "New Tools to Define the Impact of Stormwater on Receiving Surface Waters," *ASCE Environmental Water Resources Institute Congress,* Orlando, Florida, USA, May 2001.

8. Neelakantan, T.R., **Brionɣ, G.M.,** and Lingireddy, S. "Neural Network Modeling of *Cryptosporidium* and *Giardia* Concentrations in the Delaware River," *1st World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Paris, France, July 2000 (1 of 42 papers selected for presentation from 186 submitted).

9. **Brionɣ, G.M.**, Mao, H.H., and Lingireddy, S. "New Approach to Use of the Total Coliform Test for Watershed Management," *7th International Conference of the Israel Society for Ecology and Environmental Quality Sciences, cosponsored by IAWQ,* Jerusalem, Israel, June 1999.

10. Lingireddy, S. and **Brion[ɣ], G.M.**, (1997) "A Neural Networks Approach to Identifying Sources of Microbial Contamination," *Joint CSCE/ASCE Environmental Engineering Conference,* Edmonton, Alberta, July 1997.

11. **Brion[ɣ], G.M.** "Development of a Single-filter Collection and Assay Method for Simultaneous Concentration of Cryptosporidium and MS-2 Phage from Water," *Kentucky Water Resources Annual Symposium,* Lexington, KY, February 1997.

12. **Brion[ɣ], G.M.** "Single-filter Collection of Cryptosporidium and MS-2 Phage from Water," *Annual Meeting of the Kentucky Academy of Science,* Morehead, KY, November 1997.

13. Jagtoyen[ɣ], M., Lafferty, G., **Brion, G.,** Kimber, G. and Derbyshire, "Novel Activated Carbon Materials for Water Treatment," *Carbon Materials for the Environment, Am. Carbon Society,* Charleston, SC, June 1996.

14. **Brion[ɣ], G.M.** and Silverstein#, J. "Inactivation of a Model Coliphage Virus Water by Iodine," *22nd International Conf. On Environmental Systems,* Seattle, WA, July 1992.

15. **Brion[ɣ], G.M.** "Detection of Poliovirus in Potable Reuse Water," *AWWA Annual Rocky Mountain Section Meeting,* Vail, CO, 1986

CONFERENCE POSTERS: (ɣ= presenter, *= graduate student, # = advisor)

1. Dastidar*[ɣ], A., Aldrich, T., Ravdal, H., and **Brion, G.M.** "Life Expectancy Analysis for United States, Kentucky, and the Purchase Area Development District, 1950-2001", (submitted 9-15-2004) *Proc. CPH 2004 Research Symposium,* Lexington, KY, USA, November 2004.

2. **Brion[ɣ], G.M.**, "The AC/TC Bacterial Ratio: A Tool for Watershed Quality Management," *Proc. IWA 8th International Conference on Diffuse Pollution*, Kyoto, Japan, October 2004.

3. Freitas*[ɣ], S. **and Brion, G.M**. "Predictive Input Parameters for Enteric Virus Presence at the Inlet of a Potable Water Supply," *KY-TN AWWA & WEA Joint Section Meeting,* Nashville, TN, July 2004. (**Award winning poster**).

4. Kowsuvon*[ɣ], N. **and Brion, G.M**. "Comparison of Bacteriophage PRD1 and Male-specific as Signals for Presence of Human Enteric Viruses in Water," *KY-TN AWWA & WEA Joint Section Meeting,* Nashville, TN, July 2004.

5. Black*[ɣ], L. and **Brion, G.M**. "Sterols (Coprostanol and Epicoprostanol) as Tracers for Human Fecal Contamination in Kentucky Watersheds", National Science Foundation, *Experimental Program to Stimulate Competitive Research 2003 Annual Meeting: EPSCoR 2005 2010: New Directions,* Las Vegas, NV, USA, September 2003

6. Booth*[ɣ], J. A. and **Brion, G.M.**. "The Utility of a Novel Bacterial Ratio for Watershed Management: a Case Study," KY-TN AWWA Section Meeting, Bowling Green, KY, October 2003.

7. Booth*, J. A. and **Brion[ɣ], G.M.**. "The Utility of a Novel Bacterial Ratio for Watershed Management: a Case Study," *IWA Symposium on Health-Related Water Microbiology,* Capetown-South Africa, September 2003.

8. **Brion[ɣ], G.M.,** Lingireddy, S., Neelakantan, T.R., Wang, M., Girones, R., Lees, D. Allard, A., and Vantarakis, A. "Probing Norwalk-like Virus Presence in Shellfish with Artificial Neural Networks", *IWA Symposium on Health-Related Water Microbiology,* Capetown-South Africa, September 2003**.**
(Awarded 2nd place of 106 entries for "Most Forward Thinking Research").

9. Clarke*ɣ, N. **and Brion, G.M**. "Methods for Monitoring Fecal Streptococci in Surface Waters," *KY-TN AWWA Section Meeting,* Chattanooga, TN, October 2002.
(**Award winning poster**).

10. Neiman*ɣ, J. **and Brion, G.M**. "Novel Bacterial Ratio for Predicting Fecal Age," *KY-TN AWWA Section Meeting,* Chattanooga, TN, October 2002.

11. Neiman*, J. and **Brionɣ, G.M.**. "Novel Bacterial Ratio for Predicting Fecal Age," *3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

12. Suttigarn*, A. and **Brionɣ, G.M.**. "Magnetite: Potential as a Reusable Contact Coagulant for the Removal of Dissolved Organics from Water," *3rd World Congress of the International Water Association, Health-Related Water Microbiology Symposium,* Melbourne, Australia, April 2002.

13. Suttigarn*ɣ, A. **and Brion, G.M**. "Removal of Dissolved Humic Acid from Water by Magnetite," *KY-TN AWWA Section Meeting,* Nashville, TN, October 2000.
(**Award winning poster**).

14. Wang*ɣ, M. **and Brion, G.M**. "Recovery of Cryptosporidium oocysts by 'Touchless' Eluent Washing of Flat Membrane Filters," *KY-TN AWWA Section Meeting,* Nashville, TN, October 2000.
(**Award winning poster**).

15. **Brionɣ, G.M**, Meschke, J.S., and Sobsey, M.D. "Male-specific Coliphage: Prevalence, Types, and Survival in Natural Waters," *IWA Paris 2000: Health Related Water Microbiology,* Paris, France, July 2000.

16. O'Banion*ɣ, B. and **Brion, G.M.** "Comparison of Bacteriophages for Use in Iodine Inactivation Studies," *IWA Paris 2000: Health Related Water Microbiology,* Paris, France, July 2000.

17. **Brionɣ, G.M.** and Lingireddy, S. "Neural Networks as Source Indexing Tools," *Source Water Protection Symposium, Jointly sponsored by AWWA, IWSA, USDA, and USEPA* San Francisco, CA, October 1998.

18. **Brionɣ, G.M.** and McRay-Higdon, T.* "Male-specific Coliphage as Indicators of Watershed Pollution," *Source Water Protection Symposium, Jointly sponsored by AWWA, IWSA, USDA, and USEPA,* San Francisco, CA, October 1998.

19. Miller*ɣ, V. and **Brion, G.M**. "The Microbial Impacts of Different Land Use Practices in a Drinking Water Reservoir," *Water Environment Association 52nd Annual Meeting,* Memphis, TN, May 1998.

20. **Brionɣ, G.M.** "Single-filter Collection of Cryptosporidium and MS-2 Phage from Water," *AWWA Water Quality Technology Conference, WQTC 25,* Denver, CO, November 1997.

21. Mc Ray-Higdon*ɣ, T.**, Brion, G.M**., and Lingireddy, S. "Defining Inter-relationships Between Microbial Indicators in Surface Waters," *KY-TN AWWA Section Meeting*, Drawbridge Estate, KY, Sept. 1997.
(**Award winning poster**)

22. Herriford*ɣ, J., **Brion G.M**., and Serrano, S. "Predicting Water Treatment Plant Intake Turbidities Using Rainfall Events," *KY-TN AWWA Section Meeting,* Drawbridge Estate, KY, Sept. 1997

23. Powell*ɣ, T. and **Brion, G.M.** "Enhanced Persistence and Comparative Adsorption of a Model Bacteriophage by Activated Carbons," *KY-TN AWWA Section Meeting,* Memphis, TN, Sept. 1996.
(**Award winning poster**)

24. Miller*ɣ, V. and **Brion, G.M**. "The Microbial Impacts of Different Land Use Practices on a Drinking Water Reservoir," *KY-TN AWWA Section Meeting,* Memphis, TN, Sept. 1996.
(**Award winning poster**)

25. McRay-Higdon*ɣ, T. and **Brion, G.M**. "Preliminary Study of a Novel Microbial System's Relation to Cryptosporidium and Giardia in a Drinking Water Reservoir," *KY-TN AWWA Section Meeting,* Memphis, TN, Sept. 1996

26. **Brionɣ, G.M.** and Dee, S.W. "Spike Recovery of Poliovirus from the Denver Water Department Potable Reuse Demonstration Plant," *AWWA Technology Conference, WQTC-13,* Houston, TX, December 1985.

RESEARCH

RESEARCH STATEMENT

One fact drives my research efforts is that an estimated 3-5 million people each year die from an adequate, consistent, and safe source of drinking water, most of them children under the age of 5. Advanced water treatment techniques are beyond the means of the majority of these people, as often is simple disinfection. 1.3 billion people lack access to a safe, adequate, reliable drinking water supply. This is not a problem found only in developing nations as the conditions in rural, poverty-stricken Kentucky are below acceptable national sanitation levels and often rely upon individual water supplies that are contaminated with fecal material. I have focused my research on looking at simple and inexpensive ways to improve the quality of source water, or indicate hazards therein, as a way to attack this problem. My research efforts towards this goal have fallen into a few well defined areas that are listed below with examples related to past and ongoing research efforts:

- Developing microbial quality indicators or treatment test surrogates.
    - Defining a new bacterial ratio (AC/TC) for water quality.
    - Defining viral surrogates for iodine disinfection studies.
    - Investigating the prevalence and survival of potential bacteriophage indicators.
- Applying advanced modeling techniques to indicate potential risk.
    - Sorting water quality impacts by Artificial Neural Networks (ANN).
    - Predicting potential pathogens in water and shellfish.
    - Predicting ovarian cancer.
- Evaluating water treatment processes.
    - Investigating new forms of carbon for microbial removal.
    - Investigating the potential uses of magnetite for organic and microbial removal.
    - Iodine inactivation.

To date, the independent development of the AC/TC ratio is what I view as my most significant individual contribution to my profession relative to my stated motivation, as it allows for economical control strategies to be developed that can reduce the potential for disease transmission by surface water. I have had several students obtain their graduate degrees studying the ratio of atypical colonies to total coliform colonies developed independently in my labs since 1996 resulting in numerous publications and national/international presentations. The AC/TC ratio is a different approach than others currently under development in that it does not rely upon a single, well-characterized organism or chemical compound to draw inferences about the quality status of surface waters, but relies upon broad observations of microbial communities obtained through simple, inexpensive test methodology that is familiar, inexpensive, and widely available. The AC/TC ratio works by relating nutrient-enriched, indigenous bacterial concentrations to those of fecally-associated, introduced bacteria. I have established that there is a baseline of indigenous microbes that will grow on m-Endo broth against which fluctuations of fecally associated microbes can be evaluated. The AC/TC ratio allows engineers and other sanitarians an easy way to evaluate watershed quality and for targeting areas/sources for remediation, as well as a means for evaluating the success of remediation. The ratio starts out low for human sewage or fresh animal waste and increases with time as fecally associated organisms die-off and indigenous organisms respond to nutrient inputs. The AC/TC ratio has been shown to be indicative of human sewage and general fecal age in several case studies where other indicators have failed to provide significant information. This ratio has been used by fellow researchers in New Zealand to identify hot-spots in an urban watershed and has raised interest worldwide. Locally, the ratio has been used by researchers in Geology, Agriculture, and Engineering as well as volunteer groups and special state projects to quantify and indicate microbial water quality. Unpublished research from a multi-year study ongoing in my labs shows that the AC/TC ratio is the most significant input parameter into a logistic regression model for the 93.3% accurate prediction of enteric virus presence in river water. Without this ratio, the presence of fecal coliforms and male-specific bacteriophage fails to accurately predict viral presence. Advanced ANN modeling to predict fecal source and age of runoff-impacted surface waters is entirely reliant upon the AC/TC ratio. We are now investigating distinctive signatures for this ratio in the subsurface environment and septage systems. I look forward to seeing the AC/TC ratios utility confirmed at other spots around the world and to its successful application in watershed and waste management for the reduction

of pathogen burden of surface waters. I hope there will be a day when this ratio is applied as frequently as the old FC/FS ratio developed by Dr. Geldrich.

Second in my evaluation of the most important of research efforts stems from a wonderful collaboration utilizing advanced modeling techniques on environmental data, which began in 1997 with my departmental colleague and friend, Dr. Srinivasa Lingireddy. Through this balanced collaboration, we have shown the utility of Artificial Neural Networks (ANN) for modeling problems in water resources, public health microbiology, food safety, and most recently cancer prediction (unpublished). The blending of Dr. Lingireddy's computational skills with my understanding of risk prediction and public health microbiology has resulted in not only numerous grants, publications, and international presentations, but the mentoring of other academic professionals in the field worldwide, and the development of a user friendly program for environmental data analysis. We have successfully applied our ANN program to the prediction of: fecal sources, fecal age, protozoan concentrations, enteric virus presence in shellfish, ovarian cancer, and for estimating missing data observations in multivariate datasets. We have shown ANN models to be superior to logistic regression analysis of environmental data with respects to prediction and developed improvements in the application of ANNs. Our collaboration has resulted in many more gains than we could have originally anticipated and I think represents the true power of equal collaborative effort. Researchers nationally and internationally have been influenced by this collaboration and have begun their own investigations into the application of ANN models for risk or water quality prediction, an effort I am keenly aware of since I have become one of the oft requested primary reviewers for this line of research in multiple journals. De-mystifying the black-box of ANN modeling and showing how many of our engineering and policy decisions could be served by this tool if we rephrase our questions slightly has been a major professional accomplishment. Ongoing investigations into expanding this approach into epidemiology and cancer risk prediction are underway and I foresee a time when these tools are applied to environmental data as often, but with much greater success, as basic multiple linear regression has been.

Lastly, there is the research I am involved with that deals with developing and evaluating new water treatment processes and materials. My Masters research engaged me in advanced potable treatment processes and from this I learned that these processes are generally out of the economic reach of the general public. The bulk of our protection against waterborne viruses rests primarily upon the process of disinfection; not a comforting thought to one that has been trained in the multiple fail-safe approaches used by the nuclear industry and has worked as a water treatment operator who knows how fast a system can get out of balance and how wily microbes can be. The distance between the sewage effluent pipe and the human gut has shrunk as population increases, enhancing the risk of failure and disease. There is much about the process of disinfection with respects to viruses that we still do not know and the surrogate viruses we use to test our systems may not behave as we expect. Research on disinfection kinetics has led to unexpected findings about these surrogate bacterial viruses often used to model treatment processes and indicate the quality of the environment with respects to enteric viruses. My NSF-funded research on appropriate bacteriophage surrogates for iodine inactivation has been carried forward to the group that is setting the standard for evaluation of small potable treatment units. The most commonly used F+ssRNA bacteriophage MS-2, the one I used for my dissertation, is no longer considered an appropriate surrogate to evaluate iodine inactivation due to extreme sensitivity. My work has shown that the hardier F+ssRNA bacteriophage MS-2 and the lipid-containing, sewage derived PRD1 are more appropriate to model iodine inactivation of enteric viruses, and this work has led to insights about the relative survival of candidate indicator bacteriophage in the environment. This research will serve as a platform from which to investigate the mechanisms of viral inactivation by iodine. All of these water based studies have led to ongoing and as of yet unpublished research by my first PhD student in the development of bacteriophage surrogates for bioaerosol systems and the testing and improvement of bioaerosol treatment systems such as disinfectant impregnated cloth. In addition to investigating disinfection processes, I have been actively investigating the utility of magnetite in combination with other adsorbents for the removal and immobilization of viruses in fluid streams. The patents relevant to modified fibrous carbon composite materials resulting from collaborative research activity that started my first year of service have already generated revenue for the University, and even though they are now in an indeterminate state, this research has shown that combinations of activated carbon and magnetite are more effective at removal than carbon alone. The patenting process has had a delaying effect on publications from this line of research, as this process required that the research findings not be widely disseminated before filing. However, the first two years of results have been released for publication in a top-tier journal (*Environmental Science and Technology*). The insights into viral immobilization by magnetite in concert with other sorbents has led

to new investigations that are the basis of another PhD student's work on potential, inexpensive water treatment systems for in-home use and best management practices for retarding pathogen movement in shallow subsurface flow.

In addition to conducting research in these areas which resulted in significant amounts of grant funding, I have been actively building the research infrastructure at UK to support advanced environmental studies. When I came to UK in 1995, I was given a bare-walls lab, a minimal start-up package, and access to a unique situation with respects to potential collaborators. UK is one of the few campuses that I am aware of that has Colleges of Engineering, Arts & Sciences, Public Health, and Agriculture within walking distance of each other. By building collaborations with other environmental researchers based upon the use of shared laboratory facilities obtained through an NSF grant that stretch across this campus, and now across the state, I have been able to coalesce critical mass for environmental studies and increase research productivity overall. The infrastructure improvements of the Environmental Research and Training Labs (ERTL) are allowing me, and others to reach our full potential as researchers. In addition to basic facilities and support staff needed for analysis of metals, xenobiotics, and microbes, we now have the only fully staffed Ratio-Isotope Mass Spec lab in the state of Kentucky (http://www.engr.uky.edu/~ertl/). This new ability ot track individual isotopes of carbon, nitrogen, sulfur, hydrogen, and oxygen is expanding the base of research for many faculty. The ERTL facilities are supporting the broadening of my research into organic biomarkers of pollution, real-time PCR for identification and quantification of pathogens/indicators, and bioaerosols. The annual percent increase in research funding from the two departments (Civil Engineering and Geology) involved in the establishment of the ERTL facility has been much greater than for the university as a whole and greater than other departments that have had significant NSF infrastructure investments during the same time period. Over $6 million in grants have been associated with the ERTL facility in the first two years of operation. I have been Director of ERTL and will continue to be for the foreseeable future.

I have been effective in not only establishing physical infrastructure, but intellectual infrastructure for environmental research. I have found that I really enjoy program building and encouraging interdisciplinary teams of researchers to consider ways in which environmental research in the state of KY can grow and intermingle. Program building was a hidden talent that I was not able to explore until after the demands of primary tenure and promotion had been satisfied, and one talent that was actually spurred by an unexpected loss of visual acuity. After losing visual acuity to botched LASIK surgery, I find that I am driven to listen to people more and think about their needs rather than focusing on my own narrow field of research that relies so intensely upon acute vision. Since my last promotion, I have established the Kentucky Environmental Research and Education Consortium, a collaborative group that includes UK and three regional universities, and have pending NSF research infrastructure grants with consortia members that will expand environmental research, education, and outreach into underserved regions of eastern and western Kentucky. In a state with scarce resources, and a political system that interprets environmental science to mean anti-growth environmentalists, establishing a consortium to develop a united framework with which to synchronize and harmonize environmental research efforts is a logical way to grow. It remains to be seen if these budding efforts bear fruit in the long run, but it is my goal to continue to build inter-university collaborations that strengthen the ability of the state as a whole to respond to our historical and emerging environmental concerns. The state of Kentucky is fortunate in its small population to land mass ratio in that we have time to build the framework upon which the decisions for sustainable growth can be made for the good of the Commonwealth. It is exciting to be part of a growing movement for change in the way Kentuckians view and use their environment. It is also very rewarding to have reached a point in my career where my professional vision and insights are sought out and valued by my colleagues.

FUNDED RESEARCH ACTIVITY

GRANTS AWARDED: OVER $5,000,000 IN GRANTS AWARDED WITH $4,834,138 DIRECTLY MANAGED BY DR. BRION.

EXTRAMURAL:

US-EPA-2001-STAR-V1
Using Neural Networks to Create New Indices and Classification Schemes
7-02 to 6-05
Gail Brion (PI), Dr. Srinivasa Lingireddy
$567,258

NSF-EPS
Kentucky EPSCoR
2-02 to 1-05
John Connolly assembled all six initiatives submitted in one single proposal. **Gail Brion (PI)**, Alan Fryar, and Frank Ettensohn were responsible for Initiative #5-Environmental Research and Training Laboratories.
$14,912,806 ($9,000,000 NSF + $5,912,806 matching from state, UK, and UL funds)
Initiative #5 funds $2,368,000

NIOSH
7/15/03 to 6/30/04
Health Effects of Occupational Exposures in PGDP Workers
David Tollerud (PI), University of Louisville; Gail Brion (formerly Douglas Scutchfield), University of Kentucky; Richard Hornung, University of Cincinnati
$994,783 (22% to UK)

US EPA-Region 4
Diagnostic Watershed Model for Pathogen Speciation and Mitigation
9-01 to 8-03
Lindell Ormsbee (PI), Srinivasa Lingireddy, **Gail Brion**
$151,434

Kentucky Transportation Center
1-02 to 12-03
Evaluation of Methods to Protect Water Quality in Karst Areas: Phase I
Ted Hopwood (PI), Sadhir Palle, **Gail Brion**, Srinivasa Lingireddy
$135,000

NSF Supplemental to POWRE '98
Grant for Modifications to Epifluorescent Microscope
10-00 to 3-01
Gail Brion (PI)
$13,325

NSF POWRE '98
Investigating Viral Disinfection Kinetics
10-98 to 3-01
Gail Brion (PI)
$75,000

USGS KWRRI Kentucky '01
Bacterial Ratios and Neural Network Modeling of KY River Water Quality
Gail Brion (PI), Srinivasa Lingireddy, UK Dept. Civil Engineering
3-01 to 2-02
$27,869

USGS/KWRRI Kentucky '98
Using Neural Networks to Identify and Quantify Significant Sources of Encysted Protozoa in Watersheds
Gail Brion (PI), Dr. Srinivasa Lingireddy, UK Dept. Civil Engineering
8-98 to 12-00
$219,000

USGS/WRRI-North Carolina State University '96
Microbial Impacts of Animal Wastes on Water Resources
Mark Sobsey (PI), University of North Carolina at Chapel Hill and **Gail Brion** UK Dept. of Civil Engineering
9-1-96 to 8-31-97
$184,800

UNIVERSITY OF KENTUCKY:

Senate Bill 271, Water Research Proposals-Special Grants '04
Role of Adsorption and Desorption on the Movement and Tracking of Fecal Indicator Microbes through Soil and Karst Environments
Alan Fryar (PI), Mark Coyne, **Dr. Gail Brion**
7-04 to 6-05
$38,247

Senate Bill 271, Water Research Proposals-Special Grants '04
Reducing the Impact of Milk house Wastewater by On-site Treatment
Jose Bicudo (PI), **Gail Brion**, Ron Fleming
7-04 to 6-05
$51,802

Senate Bill 271, Water Research Proposals-Special Grants '01
Role of Suspended Sediment in Facilitating Pathogen Transport in Inner Bluegrass Karst Aquifers
Alan Fryar (PI), Mark Coyne, Joeseph Taraba, **Gail Brion**
7-02 to 6-04
$70,884

University of Kentucky Major Research Equipment '99
Multi-use Total Carbon Analyzer
$37,838

Senate Bill 271, Water Research Proposals-Special Grants '99
Training and Testing of Neural Network Models for Identifying Non Point Source Pollution by Animal Wastes
Mark Coyne (PI), Dwayne Edwards, **Gail Brion**, Srinivasa Lingireddy
4-99 to 3-00
$30,000

UK Center for Applied Energy Research
Investigating Virus Fate During Water Treatment with Magnetite
Gail Brion (PI)
FY 2001
$12,000

UK Center for Applied Energy Research
Investigating Virus Fate During Water Treatment with Magnetite
Gail Brion (PI)
FY 2000
$8,000

UK Center for Applied Energy Research
Microbial Adsorption from Aerosols onto Novel Forms of Activated Carbon
Gail Brion (PI) and Mark Hernandez (CU-Boulder Dept CEAE)
FY 1998
$5,000 (60% to Dr. Brion and 40% for consulting and use of aerosol chamber at CU-Boulder)

UK Center for Applied Energy Research
Investigating Virus and Bacterial Removal from Fluid Streams by Novel Forms of Activated Carbon with and without Magnetite to support Patent Application
Gail Brion (PI)
FY 1997
$10,000 (8K student stipend and 2K lab supplies)

UK Center for Applied Energy Research
Investigating Viral Adsorption onto Novel Forms of Activated Carbon
Gail Brion (PI)
FY 1996
$10,000 (student stipend)

Kentucky Water Resource Research Institute
Development of a Single-filter Collection and Assay Method for Simultaneous Concentration of Cryptosporidium and MS-2 Bacteriophage from Water
Gail Brion (PI)
FY 1998
$12,000

Kentucky Water Resources Research Institute
Relating Turbidity and Microbial Spikes to Rainfall and Plant Operations
Gail Brion (PI) & Sergio Serrano, UK Dept. Civil Engineering
FY 1996 & 1997
$6,000 (student salary support)

UK Research Foundation
Investigating Protozoan Recovery from Local Watershed
Gail Brion (PI)
FY 1999
$4,500 (for supplies)

UK College of Engineering
Doctoral Stipend for Research
Gail Brion (PI)
FY 1999
$30,000 (for recruitment of postdoctoral researcher)

STATE / INDUSTRY:

Thoroughbred Resource Conservation and Development Council
Equine Waste BMP Demonstration Project
2-99 to 2-01
$3,300 (analytical subcontract to Kentucky Geological Survey)

Zabel Technologies
Louisville, KY
Performance of Septic-tank Biofilter Units
Gail Brion (PI)
5-97 to 12-97
$9,000 ($6K student stipend and $3K supplies and equipment)

Kentucky American Water Company
Lexington, KY
Microbial Impacts of Animal Wastes on Reservoir #4
Gail Brion (PI)
5-96 to 9-97
$8,000 ($2K student stipend + $6K in kind match)

STUDENT RESEARCH SUPERVISION

I have been successful at recruiting and retaining graduate students, and have encouraged students to produce publications and presentations through active mentoring. Several of my students have received awards for their research presentations. Part of my success with disseminating students' results stems from active promotion of their research at regional, national, and international conferences, and effective pairing of graduate students with undergraduate researchers and/or non-thesis track graduate students in support of their research projects. Another part of my success in recruiting and retaining good graduate students is due to the trans-disciplinary nature of my research that blends science with engineering. In essence, I can draw from a larger potential student pool during these good economic times when engineering students are often lured away from graduate school by good salaries. Indeed, I led a revision of our department's graduate entrance requirements that provides a logical and consistent course of remedial study to facilitate the admission of students from other hard science disciplines such as chemistry, microbiology, mathematics, and computer programming. This change has enhanced recruitment into the Environmental Engineering graduate program and attracted two, female PhD candidates from the sciences into engineering where they are thriving. One of these students joined me in Fall of 1999, has completed her remedial engineering work, passed her comprehensive exams, and will be graduating within the year. The other has just started on her research, but is already presenting the results of her method development at international conferences. To put my graduate student productivity into perspective, consider the following statistics. The department of Civil Engineering at UK has 18 full-time faculty members, has awarded 5 doctoral degrees from 1998 through 2003, averages about 15 Masters students per year, and has the highest ratio of ABET accredited, undergraduate degrees awarded per graduate school faculty (4.75) relative to fifteen of our benchmark institutions. Efforts are underway to increase the doctoral student enrollment and graduation rate to help UK achieve its goal to become one of the top 20 research institutions, but the Civil Engineering program is not designated as one of the top tier programs for research infrastructure investments in the College of Engineering and as such is not first in line for resources required to expand their doctoral program. The new program in Environmental Health has offered more opportunities for graduate student recruitment and supervision that I am exploiting as they become available.

POSTDOCTORAL: Harold Mao, 8-98 to 8-99

SERVED AS COMMITTEE CHAIR

Samantha Freitas*	DrPH	Capstone Project	expected 5-05
Min Wang*@	PhD	Dissertation	expected 5-05
Lauren Black	PhD	Dissertation	expected 12-05
Prince Kowsuvon	PhD	Dissertation	expected 5-06
Aniruddha Dastidar	MSCE	Capstone Project	expected 5-05
Jason Booth	MSCE	Research Project	expected 12-04
John Herriford	MSCE	Research Project	ABD
Brennan O'Banion	MPH	Capstone Project	ABD
Nicole Clark*^	MPH	Capstone Project	5-03
Jennifer Webster	MSCE	Research project	12-02
Jonathon Neiman	MSCE	Thesis	8-02
Arthon Suttigarn*	MSCE	Thesis	12-00
Sarah Houghland	MSCE	Thesis	5-00
Tonya McRay-Higdon*	MSCE	Thesis	5-98
Valerie Miller*	MSCE	Research Project	5-98
Traci Powell*	MSCE	Research Project	5-97
Brian Belcher	MSCE	Research Project	5-97

***= student won award for conference poster of research work.**
^ "Most Promising Researcher" award from College of Public Health.
@ PhD Candidate passed preliminary exams.

SERVED AS COMMITTEE MEMBER

Ashley Wren	PhDChemistry	Dissertation	expected 5-06
Taimur Azmat Shaihh	PhDChemistry	Dissertation	expected 5-05
Tien Mun Yee@	PhD	Dissertation	expected 5-05
Danita LaSage	PhDGeology	Dissertation	9-04
Tom Reed	MSGeology	Thesis	expected 12-04
Meg Steinman	MPH	Capstone Project	5-04
Jan Hamon	MPH	Capstone Project	5-03
Peggy Ellis	MPH	Capstone Project	12-03
Caroline Shaw	MPH	Capstone Project	5-02
Bridget Hittepoole	MPH	Capstone Project	5-02
Tien Mun Yee	MSCE	Thesis	5-02
Joe Pavoni	MSCE	Research Project	5-00
Jennifer Miller-Arnold	MSCE	Research Project	5-98
Mike Adams	MSCE	Research Project	5-98
Padhir Sudhar	MSCE	Research Project	12-97
Sashi Bawa	MSCE	Research Project	5-96
Evans Chirwa	MSCE	Thesis	12-96

UNDERGRADUATE RESEARCH ASSISTANTS SPONSORED AND THEIR CURRENT PLACEMENTS

For Course Credit:

Sharon Ray	Sp00	BIO 395 (3 credits)	BS-Biology Graduate, UK
Topic: Bacteriophage Disinfection Kinetics			
Tony Justice	F97	CE 395 (3 credits)	Engineer for Quest Inc.
Topic: Septic Tank Post-filters as Bioprocesses			
Dawn Jones	Sp96	CE 395 (3 credits)	Engineer with KY State Government
Topic: Design and Construction of a Water Treatment Train for Education.			

Without Course Credit:

Tam Nhu Ho	2004	Pre-Med, Biology undergrad, UK, KY
Robbie Gillespie	2004	Paul Dunbar HS Senior
Mike Asalon	2003	BSCE Graduate '03, UK, KY
Heather Hancock	2003-2004	Pre-Vet, Biology undergrad, UK, KY.
William Sympson	2001	BS-Ag Eng Graduate. UK 2002
Meredith Himmler	1999	Medical School, BSCE UK 2000
Shanaka Ewing	1998-2003	BSCE Graduate '03, UK, KY
Brennan O'Banion	1997	MPH Candidate, UK, KY
Trey Flowers	1996	Ph.D. Eng. Candidate, Berkley, CA

TEACHING

TEACHING STATEMENT

I have a strong commitment to teaching as well as research, for only through teaching can the fire of discovery be lit in the next generation, and that fire must be lit for me to accomplish my goal of multiplying a positive impact on the environment through the next generation. Although I had never taught before becoming an academic, I always had a great respect for my teachers; especially the ones that inspired me to reach beyond my perceived limits and those that helped illuminate the linkages between physics, chemistry, and biology. However, the respect I felt did not automatically translate into my quality as a teacher. I had to study other teachers and learn from students to improve my skills. In the past few years, I have come into my own as a teacher and developed a style that is appreciated by my students. This style blends my extensive life and work experiences into the material being presented and allows students to understand how knowledge can be applied in their careers and across disciplinary boundaries. It is a concrete approach to learning that builds upon visualization of the concepts being introduced and prepares students for lifelong learning and critical thinking. I have been able to integrate across disciplines allowing the students to see the underlying relationships between knowledge in disparate fields and many have been inspired to blend disciplines in their own curriculum. The following quote has been my guide for teaching in the past few years, and I believe its influence on my teaching style has been reflected in the change in my teaching style and the increase in my teaching evaluations.

> "It is not enough to teach a man a specialty. Through it he may become a kind of useful machine, but not a harmoniously developed personality. It is essential that the student acquire an understanding of, and a lively feeling for, values. He must acquire a vivid sense of the beautiful and of the morally good. Otherwise he -with his specialized knowledge- more closely resembles a trained dog than a harmoniously developed person. He must learn to understand the motives of human beings, their illusions, and their sufferings in order to acquire a proper relationship to individual fellow men and to the community.
>
> These precious things are conveyed to the younger generation through personal contact with those who teach, not -or at least not in the main- through textbooks. It is this that primarily constitutes and preserves culture. This is what I have in mind when I recommend the "humanities" as important, not just dry specialized knowledge in the fields of history and philosophy.
>
> Overemphasis on the competitive spirit and premature specialization on the ground of immediate usefulness kill the spirit on which all cultural life depends, specialized knowledge included."
>
> Albert Einstein, 10-5-52, NY Times

It has been a great privilege to be part of the mentoring of the next generation of professionals in both the College of Engineering and The College of Public Health. I look forward to expanding this role as I take on the duties of directing the Graduate School Certificate Program in Environmental Systems that reaches across all colleges. I am, and will continue to be, successful in sustaining and expanding this program due to the very broad background and professional experiences I bring into the university.

COURSES TAUGHT:

The normal teaching load for tenure faculty in the Department of Civil Engineering is 4 courses a year, generally two per semester unless a significant level of salary release is achieved. All 500 and above level courses are considered to be graduate courses at UK. However, the majority of enrollment in 500 level courses comes from undergraduate students seeking to fill technical electives. Courses at the 600 level are graduate enrollment only and 900 level courses are for professional program students such as the DrPH program in the College of Public Health.
A brief description of the courses that I have been 100% responsible for teaching at the University of Kentucky follows.

CE 451 Water Quality: A senior level undergraduate class that provides competency in the key water and wastewater treatment processes used for sanitation. Phased out in 1996 as required course for all CE majors and replaced by CE 351.

CE 351 Introduction to Environmental Engineering: A required junior level undergraduate course that replaced CE 451 as of 1996 that provides a broad, problem solving approach to understanding environmental engineering.

CE 555 Microbial Aspects of Environmental Engineering: An undergraduate engineering elective or multidisciplinary graduate selective. A basic introduction to prokaryote focused environmental microbiology and engineering applications for non-biology majors.

CE 651 Fundamentals of Water Quality Control I: Physical-Chemical Water Treatment Processes: An engineering graduate selective that covers the theory and practices of potable water treatment with emphasis on physical-chemical processes for municipal and industrial waters.

CE 655 (became CE 655) **Special Topics in Engineering: Water, Sanitation, and Health:** A unique interdisciplinary graduate course geared towards educating individuals that are interested in, or will be working on, the growing problem of providing water and sanitation to the 1.3 billion people worldwide that currently lack these services. Waterborne and water-related pathogens and appropriate engineering solutions and watershed control strategies are presented.

CPH 920/PM770 First Professional Seminar in Environmental Health: A required DRPH course designed to provide comprehensive coverage of the principles upon which the Environmental Health field relies.

CPH 921 Second Professional Seminar in Environmental Health: An advanced DrPH course designed to link academic work in environmental health with applications in public health practice.

CURRICULUM DEVELOPMENT

Reflecting my interest in water recycling, treatment, and the prevention of waterborne and related diseases, as well as my commitment to establishing interdisciplinary education between engineering and the other sciences, I have created the following courses during my time at the University of Kentucky. These course s were developed for the growing environmental programs in Civil Engineering and in Environmental Health. Two of the courses were developed to serve students in both disciplines and seek to reconnect the natural linkages between engineering and public health. I have been 100% responsible for the initiation, creation, and development of these courses.

- **CE 351 Introduction to Environmental Engineering:** This course is a required undergraduate engineering course created to expose all civil engineering students, and other science students that have had chemistry and college level algebra, to key environmental concepts. This course is the core course for the Environmental Engineering Certificate Program for all engineering disciplines. This course was created without numerous prerequisites, and with an emphasis on utilizing pre-derived formulae and models, so science students outside engineering could successfully complete the course, but it currently serves primarily Civil Engineering undergraduates. This course uses Gilbert Masters' *Introduction to Environmental Engineering and Science* for a text. To improve the analytical skills of the students and tie together concepts presented in this course, a significant written project detailing a select pollutant or environmental disaster is assigned. For this project, a set of questions is posed which require extensive research and synthesis. The final project is completed by either small groups, or individually depending upon class size and departmental resources.

- **CE 555 Microbial Aspects of Environmental Engineering:** This course is intended to introduce environmental microbiology to senior level undergraduate and beginning graduate students of engineering, science, and public health. The course is focused entirely on the prokaryote; its structure, function, energy production, and role in biogeochemical cycling. Since engineering students normally do not possess a strong background in the biological sciences or organic chemistry, the course will cover fundamentals of microbiology, biochemistry and microbial ecology as they apply to and are utilized in engineering applications. The textbook for this course is *The Biology of Microorganisms 8th Edition* by T. Brock, M. Madigan, J. Matinko and J. Parker. The text is augmented by examples of how engineers are utilizing prokaryote metabolism for production, waste minimization, and treatment processes. The course is accepted as one of the required courses for the undergraduate Environmental Certificate program as well as a recommended course for Masters students in the Environmental Health concentration of the College of Public Health.

- **CE 655 Water Sanitation and Health:** This course introduces students to the water related areas of Environmental Health Engineering while examining applicable solutions to the problems presented. Waterborne, water-scarce, and water-related diseases, and the engineering practices and principles that affect public health are covered. Special emphasis is placed on sustainable, low-tech, engineering methods and public health practices for water supply and sanitation with designs applicable to small systems and rural areas of developing nations. Slow sand filtration is covered in depth along with selection of water supply, spring protection, well development, and VIP latrine construction with locally available materials. Students learn the use of surrogate indicator organisms for the evaluation and regulation of water quality and treatment processes. Both engineering and public health graduate students can use this graduate course to satisfy recommended graduate coursework. Two texts are required: Medical Microbiology, 22nd edition, authors: Jawetz, Brooks, Melnick, Butel, Adelberg, Ornston McGraw Hill publisher, ISBN 0 838 56298 1 and Environmental Health Engineering in the Tropics, 2nd edition, authors: Cairncross and Feachem, Wiley Publishers, ISBN 0 471 93885 8. These texts are augmented with selected journal readings that together form the basis for class instruction and discussion. A term paper covering an in-depth study of malaria, the deadliest vector-borne, water-related disease is assigned.

- **SPH 920 Advanced Environmental Health:** This course was developed for the College of Public Health to satisfy the Environmental Health requirement as one of the 5 required core courses for the DrPH professional students and is limited to doctoral candidates only. Doctoral students in all 5 areas of Public Health (Health Behavior, Health Management, Biostatistics, Epidemiology, and Environmental Health) must complete this course and it is the basis for part of the preliminary exam required for all doctoral candidates. It is designed to support competency in the field of Environmental Health and provide opportunities to develop leadership qualities for the returning health professionals (note: acceptance into the DrPH program is contingent upon demonstration of 3 years of professional experience beyond the Masters). The course covers assessment tools, places, media, pathways, control strategies, and environmental regulation for environmental exposures. Students gain in-depth awareness of the top 20 CERCLA listed environmental pollutants through independent study and research. Policy implications of environmental philosophy and regulation are covered in depth as is the process of predicting cancer risk assessment from toxicological animal studies and modeling. The text for this course is Environmental Health, author Dade Moeller, publisher Harvard University Press, ISBN 0 674 25859 2. The text is augmented by current articles and case study reports on environmental pollutants and topics of interest. Learning outcomes from this course that relate to CEPH accreditation requirements have been developed.

- **SPH 921 Professional Seminar in Environmental Health:** This course is one of 5 advanced seminar courses developed in support of the professional DrPH program in the College of Public Health. All DrPH candidates must take advanced seminar courses in 3 of the 5 designated areas. These courses are designed to provide depth of understanding in the selected areas and promote leadership and critical thinking skills. This course exposes professionals to cutting edge research in the environmental health and science area, develops their ability to critically review published materials, and builds a knowledge and skill base from which they can develop and interpret case studies, environmental policy, and regulations for effective implementation of health interventions. The course consists of a series of seminars and readings from outside speakers on their current research findings interspersed with seminars developed by the professional students on assigned topics relative to the outside speakers' research. In addition, the students jointly design and carry out an investigation of a local environmental health problem with the help of the ERTL laboratory facilities. An example project was a study of dust lead levels in married student housing complexes adjacent to a battery plant for the purpose of determining if an environmental hazard existed and what remediation strategies would be employed. The students must define the problem, create a study design, carry out sampling and analysis with appropriate QA/QC, and provide a written report of their findings with recommended actions. There is no text for this class, but extensive independent study of journals and other documentation is required.

TEACHING EVALUATIONS SUMMARY

	Course	Overall Value of Course		Overall Quality of Teaching	
		Brion	Department	**Brion**	Department
F 95	CE 451	**2.8**	3.0	**2.6**	3.0
S 96	CE 351	**2.8**	3.1	**2.4**	3.2
F 96	CE 351	**3.1**	3.1	**3.3**	3.1
S 97	CE 351	**3.2**	3.2	**3.4**	3.2
S 97	CE 651	**3.7**	3.2	**3.5**	3.2
F 97	CE 655	**3.5**	3.0	**3.5**	3.1
S 98	CE 351	**2.8**	3.0	**3.0**	3.1
F 98	CE 655	**3.6**	3.0	**3.8**	3.1
S 99	CE 351-01	**3.0**	3.0	**3.2**	3.0
S 99	CE 351-02	**2.5**	3.0	**2.9**	3.0
S 00	CE 655	**3.8**	3.2	**4.0**	3.2
S 00	CE 351-01	**3.0**	3.2	**3.0**	3.2
F 00	CE 555	**3.4**	3.1	**3.7**	3.1
S 01	CE 655	**3.4**	3.1	**3.6**	3.1
S 01	CE 351	**3.2**	3.1	**3.6**	3.1
F01	CE555	**3.8**	3.1	**4.0**	3.2
S02	CE655	**3.6**	3.0	**4.0**	3.0
F02	CE555	**NA**	3.1	**NA**	3.2
F02	CPH921	**3.8**	3.1	**3.8**	3.2
S03	CE655	**3.7**	3.2	**3.3**	3.2
F03	PM770/CPH920	**3.8**	3.1	**3.7**	3.2
S03	CPH921	**3.5**	3.2	**3.0**	3.2

NA=not available due to lost submission

ADVISING

I formally advise undergraduate and graduate students in engineering and graduate students only in public health on course curriculum. In the College of Engineering, we currently graduate about 100 ABET accredited Civil Engineers, 15 CE Masters students, and less than 1 CE PhD per year. The College of Public health has yet to graduate a DrPH student, but has graduated 35 Masters students last year, with the number growing every year since its inception. All students are monitored for their success and progress in completion of the requirements for graduation. Each student during the advisement process is consulted about their goals upon graduation, the department degree requirements, and possible career options. Presented in the following table is a summary of the numbers of students whom I was formally responsible for advising.

Semester	undergraduate	masters	doctoral
F '95	20	5	
S '96	19	5	
F '96	13	5	
S '97	13	5	
F '97	18	4	
S '98	19	5	
F '98	17	4	
S '99	10	4	
F '99	17	4	1
S '00	20	4	1
F '00	26	6	1
S '01	27	6	1
F '01	20	7	1
S '02	25	6	2
F '02	19	4	4
S '03	25	4	3
F '03	30	4	3
S '04	29	5	4

SERVICE

SERVICE STATEMENT

The University of Kentucky (UK) is a land grant institution and prides itself on service to our community and constituents as well as to the world at large. As the flagship Research University in the state, the faculty members at UK serve as a valuable nexus for technology transfer to the surrounding professional community. As important as our service is to the broader academic community, so is service that directly impacts the overall quality of life for citizens of Kentucky. It has been a great pleasure to serve as a technological resource for our local industries, governments, and organizations. I have been active on all service fronts, nationally, within the university, and within our state and community. I am valued for my leadership and vision as well as my thorough reviews of proposals and journal articles, and professional opinions. Due to my unique position as the first tenure-track, female faculty member hired by the department of Civil Engineering, many of my service efforts have naturally concentrated on recruitment, retention, and promotion of young women into the College of Engineering, the Department of Civil Engineering, and other departments on campus. Due to my status as one of the founding members of the Environmental Health Department of the College of Public Health, I have been instrumental in selecting the young faculty that will build this program and expand our research expertise in areas currently underserved. As a result of my program bridging activities, I have developed a keen interest in mentoring young faculty from many disparate disciplines through the promotion and tenure process and would like to have more input as a Full Professor on the system used by UK and other institutions. I look forward to continuing these activities and providing service, vision, and guidance to my profession and the Commonwealth of Kentucky as a full member of the University of Kentucky faculty.

PROFESSIONAL SERVICE

PROPOSAL REVIEWS

- The Cooperative Institute for Coastal and Estuarine Environmental Technology, 2004.
- NSF Review- Decision and Risk Management, 2003.
- NSF Panel Review - Career, 2002, 2003, 2004.
- EPSCORE Research Enhancement Grant Program, 2002, 2003.
- NSF Panel Review - New Technologies for the Environment, 2000.
- USGS-KWRRI Research Yearly Competitive Grant Program 1999-2004.
- USGS North Central Regional Competitive Grant Program 1997.

JOURNAL REVIEWS

Appointed to the Editorial Board of the Journal of Water and Health (6-2004)

- *Water Research*, International Water Association.
- *Journal of Water and Health,* International Water Association
- *Journal of Water Supply: Research and Technology Aqua*, International Water Association
- *Journal of the American Water Works Association,* American Water Works Association
- *ASCE Journal of Environmental Engineering*, American Society of Civil Engineers.
- *ASCE Journal of Hydrology*, American Society of Civil Engineers.
- *Journal of Virological Methods,* Elsevier
- *Journal of Microbiological Methods*, Elsevier Science.
- *Journal of Environmental Management*, Elsevier Science
- *Journal of Environmental Engineering and Science,* National Research Council Canada
- *Journal of Environmental Management,* Academic Press
- *Journal of Environmental Quality,* American Society of Agronomy.
- *Environmental & Engineering Geoscience,* Geological Society of America
- *SAE Transactions.* Society of Automotive Engineers.

PROFESSIONAL SOCIETY, NATIONAL, AND REGIONAL COMMITTEE ACTIVITY

- American Society of Civil Engineers: Environmental Water Resources Institute; Environmental Health and Water Quality Committee, **currently Chair** (1996-2002 member, 2002-Vice Chair, 2003-Chair).
- Association of Environmental Engineering and Science Professors Ad hoc Mission Committee, 2004.
- Association of Environmental Engineering and Science Professors Diversity Committee, 1999, 2000.
- Kentucky Water Resources Research Advisory Committee, 1999-2005.

PROFESSIONAL SOCIETY MEMBERSHIPS

- International Association of Water. 1995-current
- American Association for the Advancement of Science. 1999-current
- Association of Environmental Engineering and Science Professors. 1995-current
- Environmental Water Resources Institute. 2002-current
- American Water Works Association. 1995-2003
- Society of Women Engineers. 1995-2003
- American Association of University Women. 1996-2002
- Chi Epsilon, Faculty Honor Member. current

UNIVERSITY SERVICE

DEPARTMENTAL:

- CPH Academic Affairs Committee, 2004-current.
- CE Research Team, 1999-current.
- CPH Appointment, Promotion, and Tenure Committee, 2003-2004.
- CPH Student Affairs Committee, 2000-2004.
- CE Pre-Tenure Review Committee, 2003.
- CPH Search Committee for faculty hire 2003.
- CE Search Committee for faculty hire 2003.
- CE Search Committee for faculty hire 2001.
- CE Search Committee for faculty hire 1997.
- CE Search Committee for faculty hire 1998.
- CE Seminar Committee, 1997, 1998.
- CE Social Committee, 1995, 1996.
- CE Faculty Performance Review Committee, 1995, 1996.
- CE Judge Laurence Bischof Public Speaking Contest, 1998, 1999.
- CE Guest Lecturer for CE 120 Intro. to Civil Engineering, 1995, 1996, 2000.

COLLEGE:

- Space Committee, 2003-current.
- Member Environmental Certificate Committee, 1995-current.
- Judge for Oswald Research and Creativity Program 1995, 1996, 1997.
- Evaluation of College of Engineering Scholarship applicants, 1997.
- Participant in NSF-Young Scholars Program, 1997.
- Women in Engineering Career Day Lab Demonstrations, 1995, 1996, 1999.
- Women in Engineering Welcome to New Freshmen, 1995-current
- Initiator of Co-op agreement negotiations with USEPA 1996.

CAMPUS:

- Director of the Environmental Research and Training Laboratories, 2002-current.
- Director of the Environmental Systems Graduate Certificate Program, 2004-current.
- Associate Director of the Tracy Farmer Center for the Environment, 2002-current.
- Research Advertisement for "Unsung Heros" campaign, 1996.
- Interview with UK Dan Adkins for CommuniK, 1996.
- Laboratory tour and seminar for the National Merit Scholars Overnight, 1995.
- Guest Lecturer for ES 600, Environmental Systems Graduate Seminar, 1997.
- Guest Lecturer for GEO 750, Contaminant Hydrology Graduate Seminar, 1999.

SYSTEM WIDE:

- New Faculty Assessment of the Academic Environment Retreat 1996.
- Participant in Undergraduate Research Opportunity Placement, Freshmen Summer Program of UK-Excel, 1997.

SERVICE FOR THE COMMONWEALTH OF KENTUCKY

- Mayors Water Authority Task Force, 2004 to current.
- Mentor and Research Advisor for Paul Dunbar Gifted Highschool Students Access to Research Program, Lexington, KY, 1996 to current.
- Consulting resource for Zabel Technologies of Louisville, KY on post-septic tank filters.
- Consulting resource for Commonwealth Technologies of Lexington, KY on retention pond and surface runoff sampling.
- Consulting resource for Omni Engineers, of Louisville, KY on distinguishing sources of fecal pollution and statistical analysis.
- Consulting resource for Metalform Incorporated on waste fluids.
- Teacher for Kentucky Society of Professional Engineers EIT/FE exam preparation, 1995, 1996, 1997.
- SWE Exciting Engineering and Science Experiments Interactive Demonstrations, Lexington Children's Museum, 1999.
- SWE Career Day Booth at State Girl Scouts Convention 1996.
- Training for Staff of the Louisville Water Treatment Facilities, 2000.
- Training for Drinking Water Analysts at annual school, 1999.
- Project Advisor for local science fair participants, 1999, 2000.
- Builder of Habitat for Humanity Homes sponsored by Lexington, KY church groups, 2000.