
State Water Resources Control Board

TO: Gordon Innes
Waste Discharge Requirement Unit II Chief
Groundwater Quality Branch
Division of Water Quality

FROM: 
Gerald W. Bowes, Ph.D., Manager
Cal/EPA Scientific Peer Review Program
OFFICE OF RESEARCH, PLANNING AND PERFORMANCE

DATE: June 25, 2012

SUBJECT: REVIEWERS APPROVED FOR A DRAFT AMENDMENT TO THE RECYCLED WATER POLICY

I am pleased to response to your request for scientific peer-reviewers for the subject noted above, the University of California, with whom Cal/EPA has an Interagency Agreement to identify reviewer candidates, contacted scientists it considered qualified to perform the assignment.

Each candidate who was both interested and available for the review period was asked to complete a Conflict of Interest Disclosure form and send it to me for review. In follow-up communications with selected candidates, I asked them to affirm there is nothing in their background: a) that might be reasonably construed by others as affecting their judgment, and b) which might constitute an actual or potential source of bias. They also were asked to affirm they would be able to perform an objective and independent review.

Reviewers Approved:

- a) Michael D. Collins, Ph.D.
Professor, Department of Environmental Health Sciences and IDP in Molecular Toxicology
School of Public Health
University of California, Los Angeles
71-297 CHS, MC 177220
Los Angeles, California 90095

Telephone: (310) 206-6730
Fax: (310) 206-9903
Email: mdc@ucla.edu

- b) Imma Ferrer, Ph.D.
Research Associate, Center for Environmental Mass Spectrometry
Department of Civil, Environmental and Architectural Engineering
University of Colorado
ECOT 441, UCB 428
Boulder, Colorado 80309

Telephone: (303) 735-4147
Fax: (303) 492-1149
Email: imma.ferrer@colorado.edu
- c) Richard M. Gersberg, Ph.D.
Professor and Head, Division of Environmental Health
Graduate School of Public Health
San Diego State University
Hardy Tower 119, 5500 Campanile Drive
San Diego, California 92182-4162

Telephone: (619) 594-2905
Email: rgersber@mail.sdsu.edu
- d) Stanley B. Grant, Ph.D.
Professor, Civil & Environmental Engineering
The Henry Samueli School of Engineering, ET 644C
University of California, Irvine
Irvine, California 92697-2575

Telephone: (949) 824-8277
Fax: (949) 824-2541
Email: sbgrant@uci.edu
- e) Karl G. Linden, Ph.D.
Professor, Department of Environmental Engineering
University of Colorado
ECOT 542
Boulder, Colorado 80309-0428

Telephone: (303) 492-4798
Email: karl.linden@colorado.edu
- f) Michael J. Plewa, Ph.D.
Professor of Genetics and University Scholar
College of Agricultural, Consume & Environmental Sciences
University of Illinois, Urbana-Champaign
1101 West Peabody Drive
Urbana, Illinois 61801

Telephone: (217) 333-3614
Email: mplewa@illinois.edu

Curriculum Vitae are attached.

Contacting Reviewers. Contact the reviewers immediately. Tell them you have just learned of their identity, and when to expect review material. Keep them informed of delays, and ensure new dates are acceptable. Include me as a “cc” on communications indicating delays.

Initiating the Review. Send the reviewers a cover letter with the following:

- a) Original letter of request for reviewers and attachments, which was sent to them by the University during the solicitation process;
- b) Key Document(s) for Review;
- c) Key Supporting Documents.

An example of a cover letter initiating the review is attached. Please send me a copy of the cover letter to one of your reviewers.

Essential Directions. Tell your reviewers in the cover letter:

- a) **Follow the review guidance provided in the initial letter of request for reviewers, Attachment 2.**
- b) **Address all topics listed in Attachment 2, as expertise allows, in the order given.**

Revisions. If you have revised any part of the initial request, stamp “Revised” on each page where a change has been made, and date of the change. Clearly describe the revision in the cover letter. Reviewers must be made aware of changes.

Mode of Transmission. Review material frequently is sent electronically. Hard copy is recommended for lengthy documents. Confirm electronic and hard copies have been received by reviewers.

Confidentiality of the Review Process. Approved reviewers were sent the attached January 7, 2009 Supplement to the Cal/EPA Peer Review Guidelines. Please read it carefully. In part it provides guidance to ensure confidentiality through the peer review process. Reviewers must keep their identities confidential, and I ask that you do also to avoid compromising the external review.

Communication Restrictions. Communications between reviewers and requesting organizations are restricted to questions of clarification. Both enquiries and responses must be in writing. (Email is fine). If you prefer, all communications can be routed through me.

Contacts by Outside Parties. After reviews have been submitted, the Supplement notes reviewers are under no obligation to discuss their comments with third parties, and we recommend they do not.

All outside parties are provided opportunities to address a proposed regulatory action through a well-defined rulemaking process. Ask your reviewers to direct third parties to you, or a designated staff person, with comments or suggestions in writing.

Completed Reviews. These are to be sent directly to the person signing the letter initiating

the review, unless directed otherwise.

If I can provide additional help, contact me at any time during the review process.

cc: Melenee Emanuel
Groundwater Quality Branch
Division of Water Quality

Attachments (8)

- 1) Curriculum Vitae – Michael D. Collins, Ph.D.
- 2) Curriculum Vitae – Imma Ferrer, Ph.D.
- 3) Curriculum Vitae – Richard M. Gersberg, Ph.D.
- 4) Curriculum Vitae – Stanley B. Grant, Ph.D.
- 5) Curriculum Vitae – Karl G. Linden, Ph.D.
- 6) Curriculum Vitae – Michael J. Plewa, Ph.D.
- 7) Example of Letter Initiating Review
- 8) Supplement to Cal/EPA External Scientific Peer Review Guidelines

Curriculum Vitae

MICHAEL D. COLLINS

Email: mdc@ucla.edu

Education:

Children's Hospital Research Foundation, Cincinnati, OH	Postdoctoral Fellowship in Teratology	1984-1987
Harvard University	Interdisciplinary Programs in Health Fellow, School of Public Health	1982-1984
University of Missouri-Columbia	Ph.D. in Civil Engineering	1982
University of Missouri-Columbia	M.S.P.H.	1981
University of Illinois-Urbana	M.S. in Environmental Engineering	1977
University of Illinois-Urbana	Law School (No degree)	1971-1972
University of Illinois-Urbana	B.S. in Aeronautical and Astronomical Engineering	1971

Academic Appointments:

Associate Scientist, California Institute of Technology (2008-present)
Professor, Department of Environmental Health Sciences, Interdepartmental Program in Molecular Toxicology, Jonsson Cancer Center and Interdepartmental Program in Environmental Science and Engineering, School of Public Health, University of California at Los Angeles (2002-present).
Faculty, Center for Occupational and Environmental Health, University of California at Los Angeles (1993-present)
Associate Director of Student Affairs, Interdepartmental Program in Molecular Toxicology, University of California at Los Angeles (2000-present).
Associate Professor, Department of Environmental Health Sciences, School of Public Health, University of California at Los Angeles (1995-2002).
Assistant Professor, Department of Environmental Health Sciences, School of Public Health, University of California at Los Angeles (1993-1995).
Faculty, Environmental Science and Engineering Interdepartmental Program, University of California at Los Angeles (1994-present)
Visiting Scientist, Institute for Toxicology and Embryonalpharmacology, Free University of Berlin, Berlin, Germany (1989-1990).
Research Assistant Professor of Pediatrics, Department of Pediatrics, College of Medicine, University of Cincinnati (1988-1993).
Research Instructor of Pediatrics, Department of Pediatrics, College of Medicine, University of Cincinnati (1986-1988).
Research Fellow, Children's Hospital Research Foundation, Cincinnati, Ohio in Teratology (1984-1987).
IPH Fellow, Harvard School of Public Health; laboratory associations with the Embryology-Teratology Unit of Massachusetts General Hospital, the Department of Nutrition and Food

Sciences at the Massachusetts Institute of Technology and with the Department of Population Sciences, HSPH (1982-1984).

Research Associate, Department of Civil Engineering, University of Missouri-Columbia (1979-1982).

Research Associate, Cancer Research Center, Ellis Fischel State Cancer Hospital, Columbia, Missouri (1979-1982).

Research Assistant, Environmental Health Surveillance Center, Department of Family and Community Medicine, University of Missouri-Columbia (1979-1982).

Doctoral Students Mentored:

Hovland, Jr., David N. (1999); Scientist, Allergan, Irvine, California

Mao, Gloria E. (1999); Senior Scientist, Nutrilite, Los Angeles, CA

Machado, Antonio (Tony) F. (2002); Associate Professor, Department of Environmental and Occupational Health, California State University at Northridge, CA.

Lee, Grace Sangeun (2005); Pharmacology Toxicology Reviewer. United States Food and Drug Administration, Washington, D.C.

Martin, Lisa J. (2007); Postdoctoral fellow in the laboratory of Dr. Aldons J. Lulis, Department of Medicine, University of California at Los Angeles, Los Angeles, CA.

Elsaid, Ahmed (2007); Lecturer, Zagazig University, Egypt.

Liao, Xiaoyan (2007); Postdoctoral Fellow, University of California at San Diego, San Diego, CA

Postdoctoral Fellows Mentored:

Chen, Haiyan (2002-2005) Ph.D. Nanjing Medical University, Nanjing, China. Instructor, University of Alabama at Birmingham, AL.

Khaled Korieam (2007-2008) Assistant Professor, Medical Physiology Department, National Research Center, Giza, Egypt

Academic Awards:

James G. Wilson Publication Award, Teratology Society (2008)

Best paper in reproductive and developmental toxicology in *Toxicological Sciences*, Society of Toxicology (2008)

Visiting Professor, Nanjing Medical University, Nanjing, China (2004)

Delta Omega Society, Iota chapter (Public Health Honors Society)(2004)

Visiting Scientist, Institute for Toxicology and Embryopharmacology, Free University of Berlin, Berlin, Germany (1989-1990).

NIEHS Traineeship in Teratology through Children's Hospital Research Foundation, Cincinnati, Ohio (1984-1987)

IPH Fellowship Award through Harvard University (1982-1984)

Ninth Annual Area of Microbiology Student Research Award through the University of Missouri (1981)

EPA Traineeship through the University of Illinois (1974)

Professional Organizations:

Teratology Society
Southern California Chapter of the Society of Toxicology

Service Experience:

Invited lectures/presentations:

- University of Missouri-Columbia, 4th Annual Summer Institute in Hazardous Waste Management, "Overview of testing methodologies for carcinogenesis, mutagenesis and teratogenesis," August, 1985.
- University of Texas School of Public Health, San Antonio, TX, "Teratogenicity of carboxylic acids: Possible relationship to embryonic intracellular pH," 1986.
- National Institute of Occupational Safety and Health, Cincinnati, OH, "Hypothesized role of embryonic intracellular pH in the teratogenic mechanism of action of selected compounds," 1987.
- Retinoids and Teratogenesis: Molecular Mechanisms and Approaches, sponsored by Hoffmann-La Roche, Inc., Rye, NY, "Characterization of the teratogenic response to all-*trans* retinoic acid in SWV and C57BL/6 mice at specific gestational times," April 30-May 3, 1989.
- European Teratology Society Meeting, Budapest, Hungary, "DMO distribution for determination of pH of embryonic and extraembryonic compartments," September 4-7, 1989.
- Department of Toxicology, University of Uppsala, Uppsala, Sweden, "The hypothesized role of intracellular pH in developmental toxicology," and "The differential response of two mouse strains to the teratogenic effects of all-*trans* retinoic acid: Teratology, maternal versus embryonic factors and pharmacokinetics," August, 1990.
- Institute for Toxicology and Embryonalpharmacology, Free University of Berlin, Berlin, Germany, "Phenotypic interaction of the *legless* mutation with all-*trans* retinoic acid administered during organogenesis," March, 1992.
- Department of Environmental Health Sciences, Tulane University School of Public Health, New Orleans, LA, "Aspects of retinoid-induced normal and abnormal development," December, 1992.
- Department of Food Science and Technology, University of Georgia, Athens, GA, "Aspects of retinoid-induced normal and abnormal development," December, 1992.
- University of Minnesota School of Public Health, Minneapolis, MN, "Aspects of retinoid function in normal and abnormal development," July, 1993.
- University of California at Los Angeles School of Public Health, Los Angeles, CA, "Developmental toxicology of retinoids," September 1993.
- Department of Pediatrics, University of Cincinnati School of Medicine, Cincinnati, OH, "Diabetic embryopathy," March 1994.
- Genetic and Environmental Toxicology Association, Fall Meeting, Oakland, CA, "Retinoid teratology," November 1994.

Department of Environmental Health Sciences, School of Public Health, University of California at Los Angeles, CA, "Perturbations of the retinoid pathway as a mechanism of teratogenesis," December 1994.

Allergan Pharmaceutical Corporation, Irvine, CA, "Aspects of retinoid teratology: morphogenesis, pharmacokinetics, and molecular pathways," January 1995.

Department of Community and Environmental Medicine, University of California at Irvine, CA, "Teratogenesis of retinoids," October 1995.

Department of Pathology (Grand Rounds), University of California at Los Angeles, CA, "Perturbations of developmental processes by retinoids," January 1996.

University of Southern California, Los Angeles, CA, "Aspects of retinoid teratology," October 1996.

UCLA-Sociedad Mexicana de Medicina del Trabajo: Collaborative Conference on Occupational Medicine, "Toxicology: Reproductive effects," September 1997.

Toxicology Program, University of California at Riverside, "Aspects of retinoid teratogenesis," May 1998.

Institute for Toxicology and Embryonalpharmacology, Free University of Berlin, Berlin, Germany, "Isolation of genetic loci associated with a murine strain difference in cadmium-induced forelimb ectrodactyly," September 2000.

Department of Obstetrics and Gynecology, Università "G. d'Annunzio, Chieti, Italy "A whole genome scanning approach to identify chromosomal loci responsible for a murine strain difference in cadmium-induced limb defects," September 2000.

Public forum in Glendale, California sponsored by Congressman Adam Schiff, NIEHS and NIH. "Aspects of chromium toxicity", January 2002.

Developmental Biology Program, Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson University, Philadelphia, Pennsylvania. "Probing a murine strain difference in limb teratogenesis", June 2002.

International Congress: Environmental Influences on Reproduction and Development. Università "G. d'Annunzio", Chieti, Italy. "Gene-environment interactions in teratogenesis: Combining various insults with a Pax3 mutation in the splotch mouse model", October 2002.

Environmental Toxicology Program, University of California at Irvine, "Analyses of a murine strain difference in chemically-induced teratogenesis", December 2002.

National Institute of Environmental Health Sciences, Research Triangle Park, North Carolina, "Utilizing a proteomics approach to delineate murine strain differences in teratogenesis" May 2004.

Department of Molecular, Cellular and Craniofacial Biology, School of Dentistry, University of Louisville, Kentucky, "Approaches for explaining murine strain differences in teratogenesis", December 2004.

Department of Environmental and Occupational Health, School of Public Health, University of Washington, Seattle, WA, "" May 2006

FASEB Retinoids Conference, Indian Wells, CA, "Differential mouse strain sensitivity to retinoid-induced limb teratogenesis" June 2006.

Teratology Society Annual Meeting Education Course, Tucson, AZ, "Skeletal development (including limb)" June 2006.

Teratology Society Annual Meeting, Wiley-Blackwell Symposium, Rio Grande, Puerto Rico, “Chemical perturbations of developmental gene regulatory networks: sea urchin model.” June 2009.

Current Trends in Developmental and Reproductive Toxicology, Kalamazoo, MI, “Utilization of gene regulatory networks in the sea urchin to detect mechanisms of mammalian teratogenesis” August 2011

Reviewer:

Reviewer of manuscripts for *Teratogenesis, Carcinogenesis and Mutagenesis, Molecular Toxicology, Teratology, Environmental Health Perspectives, Toxicology and Applied Pharmacology, Life Sciences, Drug Metabolism and Disposition, Neurotoxicology and Teratology, Journal of Cellular Biochemistry, Pharmacological Research, FASEB Journal, Pharmacogenomics, Toxicological Sciences, Diabetologia, Birth Defects Research, Reproductive Toxicology, Chemical Research in Toxicology, Fertility and Sterility, Physiological Genomics, Biochimica et Biophysica Acta Molecular Cell Research, Journal of Biological Chemistry, Expert Opinion on Drug Metabolism and Toxicology. British Journal of Nutrition*

Reviewer of grants for the British Columbia Health Research Foundation.

Reviewer of U.S. EPA Grants for Research Program entitled “Human Health Risk Assessment,” (1995).

Reviewer of U.S. EPA STAR Fellowships (1997).

Reviewer of graduate student research proposals for the Center for Environmental Risk Reduction (1997).

Reviewer of proposals for the NIEHS-funded Southern California Environmental Health Science Center directed by Dr. John Peters (2004).

Reviewer of proposals for the Israel Science Foundation (2004)

Reviewer of proposals for the Maryland Sea Grant Proposals (2004)

Reviewer of a textbook for Jones and Bartlett (2005)

Reviewer of the Reproductive and Developmental Toxicology Division/Laboratory of the United States Environmental Protection Agency, Research Triangle Park, NC (2006)

Reviewer on the Superfund Basic Research and Training Program Special Emphasis Panel, NIEHS, Research Triangle Park, North Carolina (2007)

Reviewer (ad hoc) Environmental Health Sciences Review Committee, NIEHS, Research Triangle Park, North Carolina (2007)

Reviewer (ad hoc) of the Developmental and Reproductive Toxicology of Cadmium for the National Toxicology Program, NIEHS, Research Triangle Park, North Carolina (2007)

Reviewer (ad hoc) for Developmental Biology Study Section of NIH, San Francisco, CA (2008)

Reviewer (ad hoc) for R13 Meeting Grants for NIH (2008)

Reviewer (ad hoc) for R15 Grants for NIH (2009)

Editorial Activities:

Section editor for the molecular development and genetics section of *Teratology* (2000-2002).

Patents:

US Patent No. 7,585,894: 4-[(E)-2-(5,6,7,8-TETRAHYDRO-5,5,8,8-TETRAMETHYL-2-NAPHTHALENYL)-1-PROPENYL]BENZOIC ACID ANALOGS AND METHOD OF MANUFACTURE AND USE THEREOF, Clagett-Dame et al., P05114US

Session Chairperson:

Chaired session entitled "Mechanisms of developmental toxicity" at the 31st Annual Meeting of the Teratology Society in Boca Raton, Florida in 1991.

Co-Chaired session entitled "Retinoids" at the 37th Annual Meeting of the Teratology Society in Palm Beach, Florida in 1997.

Co-Chaired and organized a March of Dimes-Sponsored Symposium entitled "Genetic susceptibility to teratogenesis" in Palm Beach, Florida in 2000.

Co-Chaired session entitled "Mechanisms of abnormal development" at the 42nd Annual Meeting of the Teratology Society in Scottsdale, Arizona in 2002.

Co-Chaired and organized Wiley-Liss Symposium entitled "Molecular clocks in embryonic development" at the 47th Annual Meeting of the Teratology Society in Pittsburgh, Pennsylvania in 2007.

Co-Chaired and organized March of Dimes-Sponsored Symposium entitled "Embryonic and fetal hypoxia" at the 48th Annual Meeting of the Teratology Society in Monterey, California in 2008.

Committee Work:

Department of Environmental Health Sciences Admissions Committee (1993-1995, 2000-2004, 2009-)

Department of Environmental Health Sciences MPH Examination Committee (1995-1997, 1999)

Department of Environmental Health Sciences Space Committee (1995-2000)

Department of Environmental Health Sciences Academic Policy and Procedures Committee (1997-2000).

Department of Environmental Health Sciences Recruitment and Alumni Committee (Chair, 1999- 2004; member, 2004-2008)

Department of Environmental Health Sciences Curriculum Committee (2009- 2012)

Secretary of the School of Public Health Faculty Executive Committee (1994).

School of Public Health Faculty Executive Committee, Department of Environmental Health Sciences representative (1998-2008).

School of Public Health Equipment and Laboratory Committee (1994-1998; Chair 1995-1996)

School of Public Health Student Affairs Committee (2009-2011)

School of Public Health Educational Policy and Curriculum Committee (2011-2012)

UCLA Committee to establish an Interdepartmental Program in Molecular Toxicology (1997-2000).

Teratology Society, Education Committee (1997-2000).

Teratology Society, Student Affairs Committee (2000-2001; 2002-2008; Chair in 2005).

Teratology Society, Ad hoc Committee on Bioinformatics in Teratology (2004-2009)

Teratology Society, Publications Committee (2005-present; Chair 2006-2007)

State of California: State Board 1764 Advisory Board (1995-1996).
School of Public Health Outreach Committee (1997-1999).

Teaching Experience:

Teratology, Nanjing Medical University, Nanjing, China: 2004
Introduction to Environmental Health Sciences (Masters of Public Health for Health Professionals), University of California at Los Angeles: 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011.
Microbiology module of Fundamentals of Environmental Health Sciences, UCLA: 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2008, 2010.
Techniques in murine whole embryo culture, National Polytechnic Institute, Mexico City, Mexico: 2000
Toxicology module of Fundamentals of Environmental Health Sciences, UCLA: 1998
Ecotoxicology, UCLA: 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2004, 2010.
Teratology, CINVESTAV, Mexico City, Mexico: 1997
Basic Embryology and Birth Defects, Medical School, UCLA: 1997, 1998, 1999
Embryology and Teratology, School of Public Health, UCLA: 1996, 1998, 2002
Toxicodynamics, University of California at Los Angeles: 1995, 1997, 2001, 2002, 2003, 2004, 2012.
Fundamentals of Toxicology, UCLA: 1994, 1995, 1996, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2009, 2010, 2011.
Fundamentals of Biology, University of Cincinnati: 1992, 1993
Lectured in Developmental Biology, University of Cincinnati: 1992
Lectured in Fundamentals of Environmental Toxicology, University of Cincinnati: 1991
Lectured in Teratology Course, University of Cincinnati: 1988, 1992, 1994
Health Aspects of the Environmental, Family and Community Medicine 415, Univ. of Missouri: 1982
Environmental Health Engineering, Civil Engineering 301/401, Univ. of Missouri: 1980, 1982

Consulting Experience:

State of California: Senate Bill 1764 Leaking Underground Fuel Tank Advisory Committee (1995-1996)
Member of the UCLA Independent Belmont Commission to the Los Angeles Unified School District (Principle investigator: Dr. Philip Harber) for the purpose of evaluating issues of toxicology and risk assessment for the Belmont Learning Complex (1999).
Peer Reviewer for the U.S. Environmental Protection Agency's Draft External Review Document "Perchlorate Environmental Contamination: Toxicological Review and Risk Characterization" (2002).
Peer Reviewer for Office of Environmental Health Hazard Assessment of the State of California of Document "Draft Public Health Goal for Toxaphene in Drinking Water" (2003).
Peer Reviewer for the U.S. Environmental Protection Agency's Reproductive Toxicology Division, Research Triangle Park, North Carolina (2006)

Internal Evaluator, Teratology Society Strategic Planning Session, San Diego, CA (2007)

Grants:

NIH R23-ES04402, "Neural tube defects induced by anions via increased intracellular pH"

Principal Investigator: M.D. Collins

Percent effort: 95%

Total Direct Costs: \$342,275

Project Period: 7/1/87-6/30/93

Institutional Biomedical Research Support Grant (BRSG), "Maternal versus embryonic factors in the teratogenic response of inbred strains to all-trans retinoic acid"

Principal Investigator: M.D. Collins

Percent effort: 5%

Total Direct Costs: \$15,000

Project Period: 4/1/88-3/31/89

Mitre Corporation Project, "Antioxidant protection from hydroxyurea-induced embryotoxicity in whole embryo culture"

Principal Investigator: M.D. Collins

Percent effort: 5%

Total Direct Costs: \$8,000

Project Period: 7/1/91-6/30/92

Perinatal Research Institute, Program Project Grant IV on Diabetes in Pregnancy Mini-Grant

Proposals, "Development of a murine model for diabetic embryopathy"

Principal Investigators: M.D. Collins and E.F. Zimmerman

Percent effort: 5%

Total Direct Costs: \$5,000

Project Period: 10/1/92-10/1/93

Institutional Biomedical Research Support Grant (BRSG), "Retinoid nuclear receptors during normal and abnormal murine neural tube closure"

Principal Investigator: M.D. Collins

Percent effort: 5%

Total Direct Costs: \$15,000

Project Period: 1/1/93-9/30/93

NIH T32 ES07051, "Training grant in teratology"

Principal Investigator: W.J. Scott, Jr.

Percent effort: 5%

Total Direct Costs: \$693,324

Project Period: 7/1/92-6/30/97 (however, Collins departed at the end of 1993)

UCLA Academic Senate, "Development of a murine model for diabetic embryopathy"

Principle Investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$3591.90
Project Period: 1/1/94-6/30/94

California EPA, "Non-carcinogenic toxicologic endpoints for seven chemicals: A literature review"
Principal Investigator: J. Froines
Percent effort: 10%
Total Direct Costs: \$78,137
Project Period: 4/30/94-10/30/94

California EPA, "Literature search for hot spot chemicals from the Office of Environmental Health Hazard Assessment (OEHHA), Air Toxicology and Epidemiology Section"
Principle Investigator: M. Collins
Percent effort: 10% for 9 months and 26% for 3 months
Total Direct Costs: \$136,487
Project Period: 11/1/94-9/30/95

Nestle Westreco, "Micronutrients and cancer prevention"
Principle Investigator: M. Swendseid
Percent effort: 5%
Total Direct Costs: \$14,000
Project Period: 3/1/94-2/28/95

UCLA Academic Senate, "An animal model for the induction of neural tube defects by folate deficiency"
Principle Investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$3850
Project Period: 7/1/95

UCLA Center for Environmental Risk Reduction, "Reducing arsenic-induced embryopathy: A mechanistic approach"
Principle investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$37,500
Project Period: 9/1/96-8/31/99

Juvenile Diabetes Foundation International, "Neural tube defects from diabetes in Pax-3 mouse mutant"
Principle investigator: M. Collins
Percent effort: 10%
Total Direct Costs: \$90,910
Project Period: 9/1/96-2/1/99

Fogarty International Center/NIH, "UCLA-Mexico collaborative training and research program"
Principle investigator: J. Froines
Percent effort: 0%
Total Direct Costs: \$566,800
Project Period: 9/30/95-9/29/00

Southern California Environmental Health Sciences Center/NIEHS, "Identification of genetic loci associated with murine strain differences in susceptibility to Cd-induced limb malformations"
Principle Investigator: M. Collins
Percent effort: 0 %
Total Direct Costs: \$15,052
Project Period: 10/1/96-3/31/97

Univ. of California Toxic Substances Research and Teaching Program (TSR&TP), "An Evaluation of the peer-reviewed research literature on human health, including asthma and environmental effects, of MTBE"
Principle Investigator: J. Froines
Percent effort: 8.3%
Total Direct Costs: \$114,000
Project Period: 1/1/98-10/31/98

U.S. Environmental Protection Agency, Science to Achieve Results (STAR) Fellowship, "The role of retinoic acid receptors RAR-beta and RAR-gamma during normal and abnormal neural tube closure"
Principle Investigator: G. Mao
Percent effort: 0%
Total Direct Costs: \$53,004
Project Period: 9/1/98-8/30/00

Southern California Environmental Health Science Center/NIEHS, "Fine mapping the murine *cdm* gene via a C57BL/6 and DBA/2 strain intercross"
Principle Investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$15,703
Project Period: 5/1/99-4/30/00

UCLA Academic Senate, "Fine mapping of a gene determining susceptibility to cadmium toxicity"
Principle Investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$3000
Project Period: 7/1/99-6/30/00

Univ. of California Toxic Substances Research & Teaching Program (TSR&TP), "Identification of chromosomal loci associated with murine strain differences in cadmium-induced congenital malformations"

Principle Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$50,000

Project Period: 7/1/99-9/30/01

State of California, Office of Environmental Health Hazard Assessment (OEHHA), "Focused literature search for 13 chemicals to include: acrolein, chlorine, acetaldehyde, carbon tetrachloride, methanol, vinyl chloride, methyl chloroform, phosphine, 1,4-dichlorobenzene, methyl ethyl ketone, propylene oxide, n-hexane, and carbon disulfide"

Principle Investigator: M. Collins

Percent effort: 10%

Total Direct Costs: \$32,800

Project Period: 4/1/00-12/31/00

University of California Toxic Substances Research and Teaching Program (TSR&TP), "UCLA/UC Riverside/Los Alamos consortium in research and training in mechanisms of toxicity"

Principle Investigator: O. Hankinson

Percent effort: 0%

Total Direct Costs: \$882,000

Project Period: 7/1/00-6/30/08.

National Institute of Environmental Health Sciences (NIH), "Murine strain sensitivity to cadmium teratogenesis"

Principle Investigator: M. Collins

Percent effort: 30% effort for 9 months, 67% effort for 3 months

Total Direct Costs: \$1,000,000

Project Period: 4/1/01-3/30/07

Center for Inherited Disease Research (CIDR)/NIH, "Identification of genetic loci associated with differential sensitivity of two inbred murine strains to all-trans-retinoic acid-induced congenital malformations"

Principle Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: 0 (Genotyping provided by the agency)

Project Period: 4/1/02-2/1/03

University of California Toxic Substances Research & Teaching Program, "Interactions between cadmium and arsenite in the production of birth defects"

Principle Investigator: J. Fukuto

Percent effort: 0%

Total Direct Costs: \$150,000

Project Period: 7/01/02-6/30/04

National Institute of Environmental Health Sciences (NIH), "Cadmium teratogenesis in murine strains: Proteomics"

Principle Investigator: M. Collins

Percent effort: 10% for 9 months, 33% for 3 months

Total Direct Costs: \$275,000

Project Period: 9/1/02-8/31/04

Southern California Particle Center and Supersite (funded by the US EPA with John Froines as the PI) "Developmental toxicity of components of air contamination"

Principle Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$29,263

Project period: 9/01/03-8/31/04

National Institute of Environmental Health Sciences (NIH), "2005 Teratology Society Meeting"

Principal Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$5000

Project period: June 2005

Jonsson Comprehensive Cancer Center Ann Fitzpatrick Alper Program (UCLA), "Epithelial to mesenchymal transition as a mechanistic component of cadmium-induced carcinogenesis"

Principle Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$20,000

Project period: 04/01/05-3/31/06

National Institute of Environmental Health Sciences (NIH), "2006 Teratology Society Meeting"

Principal Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$15,000

Project period: June 2006

UCLA Academic Senate, "Antagonism of all-trans-retinoic acid-induced teratogenesis by up-regulation of the Ha-ras oncogene in a murine model"

Principle Investigator: M. Collins

Percent effort: 0%

Total Direct Costs: \$6000

Project period: 7/01/05-6/30/07

UCLA Academic Senate, "Determining the mechanism by which sodium valproate induces radialization during early sea urchin (*S. purpuratus*) development"

Principle Investigator: M. Collins

Percent effort: 0%
Total Direct Costs: \$10,000
Project period: 7/01/09-6/30/10

Southern California Environmental Health Science Center (NIEHS), “Detecting perturbations of sea urchin development gene regulatory networks by chemicals to determine mechanisms of teratogenesis”

Principle Investigator: M. Collins
Percent effort: 0%
Total Direct Costs: \$34,800
Project period: 4/01/10-3/31/11

Peer Reviewed Articles:

- (1) Collins, M. Algal toxins. *Microbiological Reviews* 42:725-746, 1978.
- (2) Marienfeld, C.J., M. Collins, H. Wright, R. Reddy, G. Shoop, K. Roberts and P. Rust. Cancer mortality and public drinking water in St. Louis City and County. *J. Amer. Water Works Assoc.* 72:649-654, 1980.
- (3) Marienfeld, C.J., M. Collins, H. Wright, R. Reddy, G. Shoop and P. Rust. Cancer mortality and the method of chlorination of public drinking water: St. Louis City and St. Louis County, Missouri. *J. Environ. Pathol. Toxicol. Oncol.* 7:141-158, 1986.
- (4) Naruse, I., M.D. Collins, and W.J. Scott. Strain differences in the teratogenicity induced by sodium valproate in cultured mouse embryos. *Teratology* 38:87-96, 1988.
- (5) Collins, M.D., C.A. Duggan, C.M. Schreiner, and W.J. Scott. Decreasing pH of rat embryos and fluids estimated by transplacental distribution of DMO. *Am. J. Physiol.* 257:R542-R549, 1989.
- (6) Zimmerman, E.F. and M.D. Collins. Chloride transport in embryonic cells: Effect of ethanol and GABA. *Teratology* 40:593-601, 1989.
- (7) Collins, M.D., R. Fradkin, and W.J. Scott. Induction of postaxial forelimb ectrodactyly with anticonvulsant agents in A/J mice. *Teratology* 41:61-70, 1990.
- (8) Zimmerman, E.F., W.J. Scott, and M.D. Collins. Ethanol-induced limb defects in mice: effect of strain and Ro 15-4513. *Teratology* 41:453-462, 1990.
- (9) Scott, W.J., C.A. Duggan, C.M. Schreiner, and M.D. Collins. Reduction of embryonic intracellular pH: a potential mechanism of acetazolamide-induced limb malformations. *Toxicol. Appl. Pharmacol.* 103:238-254, 1990.
- (10) Srivastava, M., M. Collins, W.J. Scott, and H. Nau. Transplacental distribution of weak

- acids in mice: Accumulation in compartments of high pH. *Teratology* 43:325-329, 1991.
- (11) Eckhoff, Ch., M.D. Collins, and H. Nau. Human plasma all-*trans*, 13-*cis*, and 13-*cis*-4-oxoretinoic acid profiles during subchronic vitamin A supplementation: comparison to retinol and retinyl ester plasma levels. *J. Nutrition* 121:1016-1025, 1991.
 - (12) Collins, M.D., Walling, K.M., Resnick, E. and Scott, W.J. The effect of administration time of malformations induced by three anticonvulsant agents in C57BL/6J mice with emphasis on forelimb ectrodactyly. *Teratology* 44:617-627, 1991.
 - (13) Eckhoff, C., J.R. Bailey, M.D. Collins, W. Slikker, Jr., and H. Nau. Influence of dose and pharmaceutical preparation of vitamin A on retinol metabolism and systemic generation of retinoic acid compounds in the cynomolgus monkey. *Toxicol. Appl. Pharmacol.* 111:116-127, 1991.
 - (14) Collins, M.D., W.J. Scott, S.J. Miller, D.A. Evans, and H. Nau. Murine teratology and pharmacokinetics of the enantiomers of sodium 2-ethylhexanoate. *Toxicol. Appl. Pharmacol.* 112:257-265, 1992.
 - (15) Collins, M.D., Ch. Eckhoff, W. Slikker, J.R. Bailey and H. Nau. Quantitative plasma disposition of retinol and retinyl esters after high dose oral vitamin A administration in the cynomolgus monkey. *Fund. Appl. Toxicol.* 19:109-116, 1992.
 - (16) Collins, M.D., Ch. Eckhoff, I. Chahoud, G. Bochert and H. Nau. 4-Methylpyrazole partially ameliorated the teratogenicity of retinol and reduced the metabolic formation of all-*trans*- retinoic acid in the mouse. *Arch. Toxicol.* 66:652-659, 1992.
 - (17) Klug, S., M. Collins, T. Nagao, H.-J. Merker and D. Neubert. Effect of lithium on rat embryos in culture: growth, development, compartmental distribution and lack of a protective effect of inositol. *Arch. Toxicol.* 66:719-728, 1992.
 - (18) Tzimas, G., H. Bürgin, M.D. Collins, H. Hummler and H. Nau. The high sensitivity of the rabbit to the teratogenic effects of 13-*cis*-retinoic acid (isotretinoin) is a consequence of prolonged exposure of the embryo to 13-*cis*-retinoic acid and 13-*cis*-4-oxo-retinoic acid, and not of isomerization to all-*trans*-retinoic acid. *Arch. Toxicol.* 68:119-128, 1994.
 - (19) Brown, T.L., W.C. Fischer, M.D. Collins, B.K. De and W.J. Scott, Jr. Identification of a 100-kDa phosphoprotein in developing murine embryos as elongation factor 2. *Arch. Biochem. Biophys.* 309:105-110, 1994.
 - (20) Fisher, J.E., R.B. Potturi, M. Collins, E. Resnick and E.F. Zimmerman. Cocaine-induced embryonic cardiovascular disruption in mice. *Teratology* 49:182-191, 1994.
 - (21) Collins, M.D., G. Tzimas, H. Hummler, H. Burgin and H. Nau. Comparative teratology and transplacental pharmacokinetics of all-trans-retinoic acid, 13-cis-retinoic acid, and

- retinyl palmitate following daily administrations in rats. *Toxicol. Appl. Pharmacol.* 127:132-144, 1994.
- (22) Scott, W.J., M.D. Collins, A.N. Ernst, D.M. Supp and S.S. Potter. Enhanced expression of limb malformations in legless mutants by transplacental exposure to retinoic acid. *Dev. Biol.* 164:277-289, 1994.
- (23) Scott, W.J. Jr., M.D. Collins and H.Nau. Pharmacokinetic determinants of embryotoxicity in rats associated with organic acids. *Environ. Health Perspect.* 102 (Suppl. 11): 97-101, 1994.
- (24) Scott, W.J., Jr., R. Walter, G. Tzimas, J.O. Sass, H. Nau and M.D. Collins. Endogenous status of retinoids and their cytosolic binding proteins in limb buds of chick versus mouse embryos. *Dev. Biol.* 165: 397-409, 1994.
- (25) Collins, M. D., G. Tzimas, H. Burgin, H. Hummler and H. Nau. Single versus multiple dose administration of all-trans-retinoic acid during organogenesis: Differential metabolism and transplacental kinetics in rat and rabbit. *Toxicol. Appl. Pharmacol.* 130: 9-18, 1995.
- (26) Tzimas, G., M. Collins, and H. Nau. Developmental stage associated differences in the transplacental distribution of 13-cis- and all-trans-retinoic acid as well as their glucuronides in rats and mice. *Toxicol. Appl. Pharmacol.* 133: 91-101, 1995.
- (27)...Schreiner, C. M., M. D. Collins, W. J. Scott, C. Vorhees, J. Colvin, and D. McCandless. Intracellular pH and cellular proliferation in normal mouse forelimb development and following exposure to acetazolamide. *Teratology* 52: 160-168, 1995.
- (28) Collins, M.D., W.J. Scott Jr., A.G. Hendrickx, P.E. Peterson and H. Nau. Estimating intracellular pH of monkey embryos at various stages of organogenesis by dimethadione distribution. *Reprod. Fertil. Dev.* 8: 911-920, 1996.
- (29) Tzimas, G., M.D. Collins, and H. Nau. Identification of 14-hydroxy-4,14-*retro*-retinol as an *in vivo* metabolite of vitamin A. *Biochim. Biophys. Acta* 1301: 1-6, 1996.
- (30) Tzimas, G., M.D. Collins, H. Burgin, H. Hummler, and H. Nau. Embryonic doses of vitamin A to rabbits result in low plasma but high embryonic concentrations of all-*trans*-retinoic acid: Risk of vitamin A exposure in humans. *J. Nutr.* 126: 2159-2171, 1996.
- (31) Collins, M.D. and G.E. Mao. Teratology of retinoids. *Annu. Rev. Pharmacol. Toxicol.* 39: 399-430, 1999.
- (32) Hovland Jr., D.N., A.F. Machado, W.J. Scott Jr., and M.D. Collins. Differential sensitivity of the SWV and C57BL/6 mouse strains to the teratogenic action of single administrations of

- cadmium given throughout the period of anterior neuropore closure. *Teratology* 60: 13-21, 1999.
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- (34) Mao, G.E., M.D. Collins, and F. Derguini. Teratogenicity, tissue distribution, and metabolism of the *retro*-retinoids, 14-hydroxy-4,14-*retro*-retinol and anhydroretinol, in the C57BL/6J mouse. *Toxicol. Appl. Pharmacol.* 163: 38-49, 2000.
- (35) Hovland Jr., D.N., R.M. Cantor, G.S. Lee, A.F. Machado, and M.D. Collins. Identification of a murine locus conveying susceptibility to cadmium-induced forelimb malformations. *Genomics* 63: 193-201, 2000.
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- (41) Santos-Guzmán, J., T. Arnhold, H. Nau, C. Wagner, S.H. Fahr, G.E. Mao, M.A. Caudill, J.C. Wang, S.M. Henning, M.E. Swendseid and M.D. Collins. Antagonism of hypervitaminosis A-Induced anterior neural tube closure defects with a methyl-donor deficiency in murine whole-embryo culture. *J. Nutr.* 133: 3561-3570, 2003.
- (42) Lee, G.S., D.M. Kochhar and M.D. Collins. Retinoid-induced limb malformations. *Current Pharmaceutical Design* 10: 2657-2699, 2004.

- (43) Lee, G.S., R.M. Cantor, A. Abnoosian, E. Park, M.L. Yamamoto, D.N. Hovland Jr., and M.D. Collins. A gene(s) for all-*trans*-retinoic acid-induced forelimb defects mapped and confirmed to murine chromosome 11. *Genetics*: 170: 345-353, 2005.
- (44) Xia, Y., S. Cheng, Q. Bian, L. Xu, M.D. Collins, H.C. Chang, L. Song, J. Liu, S. Wang and X. Wang. Genotoxic effects on spermatozoa of carbaryl-exposed workers. *Tox. Sci.* 85: 615-623, 2005.
- (45) Lee, G.S., X. Liao, R.M. Cantor, and M.D. Collins. Interactive effects of cadmium and all-*trans*-retinoic acid on the induction of forelimb ectrodactyly in C57BL/6 mice. *Birth Defects Research, Part A: Clin Mol Teratol* 76(1): 19-28, 2006.
- (46) Collins, M.D., Ch. Eckhoff, R. Weiss, E. Resnick, H. Nau, W.J. Scott, Jr. Differential teratogenesis of all-*trans*-retinoic acid in SWV and C57BL/6N mice administered at gestational day 9.5: emphasis on limb dysmorphology. *Birth Defects Research, Part A: Clin Mol Teratol* 76(2): 96-106, 2006.
- (47) Shimizu, H., G.S. Lee, S. R. Beedanagari, M.D. Collins. Altered localization of gene expression in both ectoderm and mesoderm are associated with a murine strain difference in retinoic acid-induced forelimb ectrodactyly. *Birth Defects Research, Part A: Clin Mol Teratol* 79(6): 465-482, 2007.
- (48) Fukuto, J.M. and M.D. Collins. Interactive endogenous small molecule (gaseous) signaling: implications for teratogenesis. *Curr Pharmaceutical Design* 13(29): 2952-2978, 2007.
- (49) Elsaid, A.F., E.C. Délot, M.D. Collins. Differential perturbation of the Fgf/Erk1/2 and Shh pathways in the C57BL/6N and SWV embryonic limb buds after mid-gestational cadmium chloride administration. *Mol Genet Metab* 92(3): 258-270, 2007.
- (50) Liao, X., G.S. Lee, H. Shimizu, M.D. Collins. Comparative molecular pathology of cadmium- and all-*trans*-retinoic acid-induced postaxial forelimb ectrodactyly. *Toxicol Appl. Pharmacol* 225(1): 47-60, 2007.
- (51) Martin, L., H. Chen, X. Liao, H. Allayee, D. Shih, G. Lee, D. Hovland, W. Robbins, K. Carnes, R. Hess, A. Lusic, M. Collins. FK506, a calcineurin inhibitor, prevents cadmium-induced testicular toxicity in mice. *Tox Sci* 100(2): 474-485, 2007.
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- (53) Liao, X. and M.D. Collins. All-*trans* retinoic acid-induced ectopic limb and caudal structures:

murine strain sensitivities and pathogenesis. *Developmental Dynamics* 237(6): 1553-1564, 2008.

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- (55) Lee GS, Liao X, Shimizu H, Collins MD. Genetic and pathologic aspects of retinoic acid-induced limb malformations in the mouse. *Birth Defects Res A Clin Mol Teratol.* 88(10): 863-882, 2010.
- (56) Anding AL, Nieves NJ, Abzianidze VV, Collins MD, Curley RW Jr, Clagett-Dame M. 4-Hydroxybenzyl modification of the highly teratogenic retinoid, 4-[(1E)-2-(5,5,8,8-tetramethyl-5,6,7,8-tetrahydro-2-naphthalenyl)-1-propen-1-yl]benzoic acid (TTNPB), yields a compound that induces apoptosis in breast cancer cells and shows reduced teratogenicity. *Chem Res Toxicol* 24(11): 1853-61, 2011.

Chapters and Invited Papers:

Collins, M. Possible link between water supply and high birth defect rate. *American Water Works Association 1978 Annual Conference Proceedings* (June 25-30, 1978; Atlantic City, N.J.) Paper No. 24-5.

Collins, M.D., C. Gowans, F. Garro, D. Estervig and T. Swanson. Temporal association between an algal bloom and mutagenicity in a water reservoir. In: *The Water Environment: Algal Toxins and Health* (W.W. Carmichael, ed.), Plenum Press, N.Y., 1981.

Marienfild, C.J. and M. Collins. The ebb and flow of manganese: a possible pathogenic factor in birth defects, cancer and heart disease. In: *Trace Substances in Environmental Health-XV*. (D.D. Hemphill, ed.), Univ. of Missouri Press, Columbia, pp. 3-20, 1982.

Collins, M.D. Evidence for an association between a public water supply and the community's congenital malformation rate. In: *1982 National Conference on Environmental Engineering*. (W.K. Johnson and D.R. Martenson, eds.), Amer. Soc. of Civil Engineers, N.Y., pp. 281-288, 1982.

Scott, W.J., C.A. Duggan, C.M. Schreiner, M.D. Collins and H. Nau. Intracellular pH of rodent embryos and its association with teratogenic response. In: *Approaches to Elucidate Mechanisms in Teratogenesis*. (F. Welsch, ed.), Hemisphere Publ. Corp., Washington, pp. 99-107, 1987.

- Collins, M. and M. Schenker. The alteration of susceptibility to neoplasia induced by cigarette smoke exposure. In: Variation in Susceptibility to Inhaled Pollutants--Identification, Mechanisms and Policy Implications. (B. Beck, J. Brain, R. Shaikh and J. Warren, eds.), Johns Hopkins Univ. Press, Baltimore, pp. 269-294, 1988.
- Schreiner, C.M., W.J. Scott, M.D. Collins, J. Colvin and D. McCandless. Estimation of intracellular pH by computer assisted imaging in the developing mouse forelimb bud exposed to acetazolamide. In: Limb Development and Regeneration. (J.F. Fallon, P.F. Goetinck, R.O. Kelley and D.L. Stocum, eds.), Wiley-Liss, New York, Part A, pp. 403-408, 1993.
- Scott, W.J., M.D. Collins, A.N. Ernst, D.M. Supp and S.S. Potter. Exacerbation of limb malformations in *legless (lgl)* homozygotes by retinoic acid (RA). In: Limb Development and Regeneration. (J.F. Fallon, P.F. Goetinck, R.O. Kelley and D.L. Stocum, eds.), Wiley-Liss, New York, Part B, pp. 735-738, 1993.
- Tzimas, G., J.O. Sass, R. Ruhl, M. Foerster, S. Klug, M.D. Collins, and H. Nau. Proximate retinoid teratogens. In: Retinoids: From Basic Science to Clinical Applications. (M. Livrea and G. Vidali, eds.) Birkhauser, Basel, pp. 179-195, 1994.
- Machado, A.F., W.J. Scott, and M.D. Collins. Reactive oxygen and nitrogen species in the production of congenital malformations by known teratogenic agents and maternal conditions. In: Signal Transduction by Reactive Oxygen and Nitrogen Species: Pathways and Chemical Principles. (H. J. Forman, J. Fukuto, and M. Torres, eds.) Kluwer Academic Publ., Dordrecht, pp. 379-406, 2003.

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Curriculum Vitae

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Education

- **Ph.D. Thesis**, Institut d'Investigacions Químiques i Ambientals del Consell Superior d'Investigacions Científiques (IIQAB-CSIC), University of Barcelona (UB), Barcelona, Spain, December 1999.
- **Master Thesis**, Analytical Chemistry, Faculty of Chemistry, University of Barcelona (UB), Barcelona, Spain, December 1996.
- **B.S. in Chemistry**, Faculty of Chemistry, University of Barcelona (UB), Barcelona, Spain, July 1994.

Research Experience

March 2008-present: Professional Research Associate at the **University of Colorado**, Boulder, CO, USA. Chief Analyst of the **Center for Environmental Mass Spectrometry** at the University of Colorado.

April 2003-March 2008: Associate Professor Researcher at the **University of Almería** in Almería, Spain.

January 2000-January 2003: Post-doctoral research fellow at the **National Water Quality Laboratory** of the **U.S. Geological Survey** in Denver, Colorado, USA and at **Colorado School of Mines** (Golden, Colorado, USA). Sponsors: Dr. Edward T. Furlong and Prof. Kent J. Voorhees. Performed research into the development of LC/MS/MS methodologies for organic contaminants in the environment.

July 1995-December 1999: Ph. D. student at the **Environmental Chemistry Department of the IIQAB-CSIC** in Barcelona, Spain. Advisor: Prof. Damià Barceló. "Development of methodologies involving solid-phase extraction and liquid chromatography for the monitoring of pesticides and metabolites in natural waters".

March-May 1997: visiting research scientist (as part of the Ph. D.) at the **Organic Geochemistry Laboratory** of the **U.S. Geological Survey** in Lawrence, Kansas (USA) carrying out analysis of herbicides by high-performance-liquid-chromatography (HPLC).

July 1994-July 1995: Master thesis at the **Environmental Chemistry Department of the IIQAB-CSIC** in Barcelona, Spain (advisor: Prof. Damià Barceló). “Determination of pesticides in water by immunochemical and chromatographic techniques”.

May 1994: one month of training in the Analytical Chemistry Department at the **University of Barcelona (UB)** carrying out analysis of polycyclic hydrocarbons by gas chromatography (GC).

List of Publications (Hirsch factor=35)

1. Thurman, E.M.; Ferrer, I.; Zweigenbaum, J.A., **2012**, Analysis of Pharmaceuticals in Environmental samples with Ultrahigh-Definition LC-QTOF-MS and Accurate Mass, *Current Trends in Mass Spectrometry*, in press.
2. Ferrer, I.; Thurman, E.M., **2012**, Analysis of 100 pharmaceuticals and their degradates in water samples by liquid chromatography/quadrupole time-of-flight mass spectrometry, *Journal of Chromatography A*, in press.
3. Thurman, E.M.; Ferrer, I., **2012**, Liquid Chromatography/Quadrupole Time-of-flight Mass Spectrometry with Metabolic Profiling of Human Urine as a Tool for Environmental Analysis of Dextromethorphan, *Journal of Chromatography A*, in press.
4. Padilla-Sánchez, J.A.; Thurman, E.M.; Plaza-Bolaños, P.; Ferrer, I., **2012**, Identification of pesticide transformation products in agricultural soils using liquid chromatography/quadrupole-time-of-flight mass spectrometry, *Rapid Communications in Mass Spectrometry*, 26, 1091-1099.
5. Writer, J.H.; Keefe, S.K.; Ryan, J.N.; Ferrer, I.; Thurman, E.M.; Barber, L.B., **2011**, Methods for Evaluating in-stream attenuation of trace organic compounds, *Applied Geochemistry*, v. 26, S344-S345.
6. Ferrer, I., Thurman, E.M., **2010**, Identification of a New Antidepressant and its Glucuronide Metabolite in Water Samples Using Liquid Chromatography/Quadrupole Time-of-Flight Mass Spectrometry, *Analytical Chemistry*, 82, 8161-8168.
7. Ferrer, I., Zweigenbaum, J.A., Thurman, E.M., **2010**, Analysis of 70 Environmental Protection Agency Priority Pharmaceuticals in Water by EPA Method 1694, *Journal of Chromatography A*, 1217, 5674-5686.
8. Ferrer, I., Thurman, E.M., **2010**, Analysis of sucralose and other sweeteners in water and beverage samples by liquid chromatography/time-of-flight-mass spectrometry, *Journal of Chromatography A*, v. 1217, 4127-4134.
9. Thurman, E.M., Ferrer, I., **2010**, The isotopic mass defect: a tool for limiting molecular formula by accurate mass, *Analytical and Bioanalytical Chemistry*, v. 397, 2807-2816.
10. Ferrer, I., Thurman, E.M., **2010**, Environmental Application of a UHPLC System: the Evolution of Chromatography, *American Laboratory*, v. 42, 22-27.
11. Ferrer, I.; Barber, L.B.; Thurman, E.M., **2009**, Gas chromatographic-mass spectrometric fragmentation study of phytoestrogens as their trimethylsilyl derivatives: Identification in soy milk and wastewater samples, *Journal of Chromatography A*, v. 1216, 6024-6032.
12. Lambropoulou, D.A.; Hernando, M.D.; Konstantinou, I.K.; Thurman, E.M.; Ferrer, I.; Albanis, T.A.; Fernandez-Alba, A.R., **2008**, Identification of photocatalytic degradation products of bezafibrate in

- TiO₂ aqueous suspensions by liquid and gas chromatography, *Journal of Chromatography A*, v. 1183, 38-48.
13. Ferrer, C.; Fernández-Alba, A.R.; Ferrer, I., **2007**, Analysis of Illegal Dyes in Food by LC/TOF-MS, *International Journal of Environmental Analytical Chemistry*, v. 87, 999-1012.
 14. Thurman, E.M.; Ferrer, I.; Pozo, O.J.; Sancho, J.V.; Hernández, F., **2007**, The even-electron rule in electrospray mass spectra of pesticides, *Rapid Communications in Mass Spectrometry*, v. 21, 3855-3868.
 15. Ferrer, I.; Thurman, E.M.; Zweigenbaum, J.A., **2007**, Screening and Confirmation of 100 pesticides in Food Samples by LC/MS-MS, *Rapid Communications in Mass Spectrometry*, v. 21, 3869-3882.
 16. Ferrer, I.; Thurman, E.M., **2007**, Multi-residue Method for the Analysis of 101 pesticides and their degradates in food and water samples by liquid chromatography/time-of-flight mass spectrometry, *Journal of Chromatography A*, v. 1175, 24-37.
 17. Ferrer I.; Thurman E.M., **2007**, Importance of the Electron Mass in the Calculations of Exact Mass by Time-of-Flight Mass Spectrometry, *Rapid Communications in Mass Spectrometry*, v. 21, 2538-2539.
 18. Gómez, M.J.; Malato, O.; Ferrer, I.; Agüera, A.; Fernández-Alba, A.R., **2007**, Solid-phase extraction followed by liquid chromatography–time-of-flight–mass spectrometry to evaluate pharmaceuticals in effluents. A pilot monitoring study, *Journal of Environmental Monitoring*, v. 9, 718-729.
 19. Ferrer, I.; Fernández-Alba, A.R.; Zweigenbaum, J.A.; Thurman, E.M., **2006**, Exact-mass library for Pesticides using a molecular-feature database, *Rapid Communications in Mass Spectrometry*, v. 20, 3659-3668.
 20. Thurman, E.M.; Ferrer, I.; Zweigenbaum, J.A., **2006**, High Resolution and Accurate Mass Analysis of Xenobiotics in Food, *Analytical Chemistry*, v. 78, 6702-6708.
 21. Thurman, E.M., Ferrer, I.; Malato, O.; Fernández-Alba, A.R., **2006**, Feasibility of LC/TOFMS and elemental database searching as a spectral library for pesticides in food, *Food Additives and Contaminants*, v. 23, 1169-1178.
 22. Mezcuca, M.; Ferrer, I.; Hernando, M.D.; Fernández-Alba, A.R., **2006**, Photolysis and photocatalysis of Bisphenol A: identification of degradation products by liquid chromatography with electrospray ionization/time-of-flight/mass spectrometry (LC/ESI/ToF/MS), *Food Additives and Contaminants*, v. 23, 1242-1251.
 23. García-Reyes, J.F.; Ferrer, C.; M.; Thurman, E.M.; Fernández-Alba A.R.; Ferrer, I, **2006**, Analysis of Herbicides in Olive Oil by Liquid Chromatography Time-of-Flight Mass Spectrometry, *Journal of Agricultural and Food Chemistry*, v. 54, 6493-6500.
 24. Thurman, E.M.; Ferrer, I.; Fernández-Alba, A.R., **2005**, Matching unknown empirical formulas to chemical structure using LC/MS TOF accurate mass and database searching: examples of unknown pesticides on tomato skins, *Journal of Chromatography A*, v. 1067, 127-134.
 25. Ferrer, C.; Gómez, M.J.; García-Reyes, J.F.; Ferrer, I.; Thurman, E.M.; Fernández-Alba, A.R., **2005**, Determination of Pesticide Residues in Olives and Olive Oil by Matrix Solid-phase Dispersion Followed by Gas Chromatography/Mass Spectrometry and Liquid Chromatography/Tandem Mass Spectrometry, *Journal of Chromatography A*, v. 1069, 183-194.
 26. Ferrer, I.; Thurman, E.M.; Fernández-Alba, A.R., **2005**, Quantitation and Accurate Mass Analysis of Pesticides in Vegetables by LC/TOF-MS, *Analytical Chemistry*, v. 77, 2818-2825.

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 61. M. A. González-Martínez, R. Puchades, A. Maquieiria, I. Ferrer, M-P. Marco, D. Barceló, **1999**, Reversible Immunosensor for the Automatic Determination of Atrazine. Selection and Performance of three Polyclonal Antisera, *Analytica Chimica Acta*, v. 386, 201-210.
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Edited Books

- Ferrer, I. and Thurman, E.M., Edited book on “Liquid Chromatography/Time-of-Flight Mass Spectrometry: Principles, Tools and Applications for Accurate Mass Analysis, Hoboken, NJ, Wiley, 2009, p.261.
- Ferrer, I. and Thurman E. M., Edited book on “Liquid Chromatography/Mass Spectrometry, MS/MS and Time-of-Flight MS: Analysis of Emerging Contaminants”, ACS Symposium Series 850; American Chemical Society: Washington, D.C., 2003, p 415. (2 chapters as first author and 5 as second author).

Chapters in Books

- Ferrer, I.; Thurman, E.M.; Zweigenbaum, J.A., “LC/TOF-MS Analysis of Pesticides in Fruits and Vegetables: the Emerging Role of Accurate Mass in the Unambiguous Identification of Pesticides in Food” in J.A. Zweigenbaum (Editor), Mass Spectrometry in Food Safety: Methods and Protocols, Humana Press, Springer Protocols, New York, USA, **2011**, p. 193.

- Ferrer, I. and Thurman, E.M., Edited book on “Liquid Chromatography/Time-of-Flight Mass Spectrometry: Principles, Tools and Applications for Accurate Mass Analysis, Hoboken, NJ, Wiley, **2009**, p.261. (2 chapters as first author and 2 as second author).
- Thurman, E.M., Ferrer, I., “Identification of Unknown Environmental Contaminants Using Multidimensional LC-MS Strategies Involving TOF-MS, Ion Trap MSn and Q-TOF MS-MS”, Encyclopedia of Mass Spectrometry, W. Niessen (Editor), Volume 8, Elsevier, Amsterdam, **2006**, pp. 567-572.
- Ferrer, I.; Abián, J.; Fernández-Alba, “LC-MS II: Applications for Pesticide Food Analysis” in: A.R. Fernández-Alba (Editor), Chromatographic-Mass Spectrometric Food Analysis for Trace Determination of Pesticide Residues, Elsevier, Amsterdam, The Netherlands, **2005**, p. 403.
- Thurman, E.M.; Ferrer, I.; Fernández-Alba, “LC-MS I: Basic Principles and Technical Aspects of LC-MS for Pesticide Análisis” in: A.R. Fernández-Alba (Editor), Chromatographic-Mass Spectrometric Food Analysis for Trace Determination of Pesticide Residues, Elsevier, Amsterdam, The Netherlands, **2005**, p. 369.
- Hernando, M.D., Ferrer, I and Fernández-Alba, A.R. on “The Handbook of Environmental Chemistry”, Springer-Verlag Heidelberg, **2004**, volume 50. (Evaluation of Pesticides in Wastewaters. A Combined (Chemical and Biological) Analytical Approach).
- Ferrer, I. and Thurman E. M., Edited book on “Liquid Chromatography/Mass Spectrometry, MS/MS and Time-of-Flight MS: Analysis of Emerging Contaminants”, ACS Symposium Series 850; American Chemical Society: Washington, D.C., 2003, p 415. (2 chapters as first author and 5 as second author).
- Ferrer, I; Schroeder, H. Fr. and Furlong E.T., “Analyses of Cationic Surfactants: Methods and Applications”, in: T.P. Knepper, D. Barceló and P. de Voogt (Editors), Analysis and Fate of Surfactants in the Aquatic Environment, Elsevier, Amsterdam, The Netherlands, **2003**, p. 353.

Keynote Lectures at Conferences

- Keynote lecture at the “12th Symposium on Sample Handling for Environmental and Biological Analysis”, Zaragoza, Spain, October 2006
- Keynote lecture at the “2nd International Symposium on Recent Advances in Food Analysis”, Prague, Czech Republic, November 2005.

Invited Talks at Conferences

- Pittcon 2012 (63rd Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2012.
- Pittcon 2011 (62nd Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Atlanta, GA, USA, February 2011.
- Agilent Technologies, 2010 (7th Simposium de Instrumentación Analítica, Biociencias y Análisis Químicos), Mexico City, Mexico, July 2010.
- Pittcon 2010 (61th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, February 2010.
- IV Reunión Sociedad Española de Espectrometría de Masas-SEEM, Castellón de la Plana, Spain, October 2009.
- Agilent Technical Forum on Mass Spectrometry at the 57th Conference on Mass Spectrometry and Allied Topics (ASMS), Philadelphia, PA, USA, May 2009.
- Pittcon 2009 (60th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy),

- Chicago, IL, USA, March 2009.
- 45th Annual Florida Pesticide Residue Workshop (FPRW), St. Pete Beach, FL, USA, July 2008.
- Agilent Technical Forum on Mass Spectrometry at the 55th Conference on Mass Spectrometry and Allied Topics (ASMS), Indianapolis, IN, USA, June 2007.
- Pittcon 2007 (58th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Chicago, IL, USA, March 2007.
- 6th European Pesticide Residue Workshop, Corfu, Greece, June 2006.
- Pittcon 2006 (57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2006.
- Pittcon 2005 (56th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, February 2005.
- 5th European Pesticide Residues Workshop: Pesticides in Food and Drink, Stockholm, Sweden, June 2004.
- Pittcon 2004 (55th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Chicago, IL, USA, March 2004.
- SACH Conference, Zurich, Switzerland, September 2003.
- Pittcon 2003 (54th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2003.
- 223rd ACS National Meeting, Orlando, Florida, USA, April 2002 (two lectures in different sessions).
- Pittcon 2002 (53th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), New Orleans, LO, USA, March 2002.
- 21st Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC)", Nashville, Tennessee, USA, November 2000.
- 7th Symposium on the Chemistry and Fate of Modern Pesticides, Lawrence, Kansas, USA, September 1999.
- Immunochemistry Summit VII & Third Workshop on Biosensors and Biological Techniques in Environmental Analysis, Las Vegas, Nevada, USA, December 1998.

Other Talks at Conferences

- 58th Conference on Mass Spectrometry and Allied Topics (ASMS), Salt Lake City, UT, USA, May 2010.
- 2nd International Conference on Occurrence, Fate, Effects, and Analysis of Emerging Contaminants in the Environment (EmCon), Fort Collins, CO, USA, August 2009.
- American Water Works Association (AWWA) Research Symposium: Emerging Organic Contaminants, Austin, TX, USA, February 2009.
- 56th Conference on Mass Spectrometry and Allied Topics (ASMS), Denver, CO, USA, June 2008.
- Pittcon 2008 (59th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), New Orleans, LA, USA, March 2008.
- 17th International Mass Spectrometry Conference, Prague, Czech Republic, August 2006.
- II Reunión Sociedad Española de Espectrometría de Masas-SEEM, Barcelona, Spain, November 2004.
- 3rd Scientific Meeting of the Spanish Society of Chromatography and Related Techniques, Almería, Spain, November 2003.
- Chemical Analysis and Risk Assessment of Emerging Contaminants in Sediments and Dredged material". Barcelona, Spain, November 2002.

- 43nd Rocky Mountain Conference on Analytical Chemistry, Denver, Colorado, USA, July 2001.
- 42nd Rocky Mountain Conference on Analytical Chemistry, Broomfield, Colorado, USA, July 2000.
- Fourth Workshop on Biosensors and Biological Techniques in Environmental Analysis, Maó, Menorca, Spain, December 1999.
- The 9th Symposium on Handling of Environmental and Biological Samples in Chromatography, Oporto, Portugal, October 1999.
- 2nd Euroconference on Environmental Analytical Chemistry. Environmental Analytical Chemistry for the Protection of Sensitive Ecosystems, Córdoba, Spain, October 1998.
- 6th Symposium on Chemistry and Fate of Modern Pesticides, Amsterdam, The Netherlands, June 1997.

Poster Presentations at Conferences

- 57th Conference on Mass Spectrometry and Allied Topics (ASMS), Philadelphia, PA, May-June 2009.
- 3rd International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, November 2007.
- 12th Symposium on Sample Handling for Environmental and Biological Analysis, Zaragoza, Spain, October 2006.
- 17th International Mass Spectrometry Conference, Prague, Czech Republic, August 2006.
- 6th European Pesticide Residue Workshop, Corfu, Greece, June 2006.
- Pittcon 2006 (57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2006.
- 2nd International Symposium on Recent Advances in Food Analysis, Prague, Czech Republic, November 2005.
- Pittcon 2005 (56th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, February 2005.
- 21st Symposium on Liquid Chromatography Mass Spectrometry (LC/MS; SFC/MS; CE/MS; MS/MS), Montreux, Switzerland, November 2004.
- 51th Conference on Mass Spectrometry and Allied Topics (ASMS), Montreal, Canada, June 2003.
- 50th Conference on Mass Spectrometry and Allied Topics (ASMS), Orlando, Florida, USA, June 2002.
- 22nd Annual Meeting of the Society of Environmental Toxicology and Chemistry (SETAC), Baltimore, Maryland, USA, November 2001.
- 49th Conference on Mass Spectrometry and Allied Topics (ASMS), Chicago, Illinois, USA, May 2001.
- 10th Symposium on Handling of Environmental and Biological Samples in Chromatography, Mainz, Germany, April 2001.
- 17th Symposium on Liquid Chromatography Mass Spectrometry (LC/MS; SFC/MS; CE/MS; MS/MS), Montreux, Switzerland, November 2000.
- 48th Conference on Mass Spectrometry and Allied Topics (ASMS), Long Beach, California, USA, June 2000.
- 9^{as} Jornadas de Análisis Instrumental (JAI), Expoquimía, Barcelona, Spain, November 1999.
- 15th Symposium on Liquid Chromatography Mass Spectrometry (LC/MS; SFC/MS; CE/MS; MS/MS), Montreux, Switzerland, November 1998.
- V International Symposium on Analytical Methodology in the Environmental Field, La Coruña,

- Spain, April 1998.
- European Workshop on Environmental Technologies 1997: Waste Water Treatment and Monitoring, Abatement of Emissions to the Atmosphere, Cleaner Technologies, Cranfield, Bedford, UK, December 1997.
 - 8th Symposium on Handling of Environmental and Biological Samples in Chromatography, Almería, Spain, October 1997.
 - 4th European Workshop on Biosensors for Environmental Monitoring, Barcelona, Spain, February 1996.
 - 13th Symposium on Liquid Chromatography Mass Spectrometry (LC/MS; SFC/MS; CE/MS; MS/MS), Montreux, Switzerland, November 1996.
 - 8^{as} Jornadas de Análisis Instrumental (JAI), Expoquímica, Barcelona, Spain, October 1996.
 - 26th International Symposium on Environmental Analytical Chemistry, Vienna, Austria, April 1996.

Invited Seminars

- Weisser Analitica Group, Santiago de Chile, Chile, August 20th 2009.
- Department of Pharmaceutical Science, University of Salerno, Italy, May 14th 2007.
- Department of Analytical Chemistry, University “La Sapienza”, Roma, Italy, May 11th 2007.
- Department of Chemistry, Universidad de Jaén, Spain, July 12th 2005.
- Agilent Technologies Santa Clara Site, Santa Clara, California, USA, February 7th 2005.
- Analytical Chemistry Department, University of Almería, Almería, Spain, September 29th 2003.
- Department of Chemistry, Colorado School of Mines, Golden, Colorado, USA, February 15th 2000.
- EAWAG, Dübendorf, Switzerland, August 5th 1999.
- NWQL of the US Geological Survey, Federal Center, Denver, Colorado, USA, June 7th 1999.
- Organic Geochemistry Group, U.S. Geological Survey, Lawrence, Kansas, USA, May 22nd 1997.

Teaching of Courses

- Pittcon Conference, Orlando, Florida, USA, March 17th 2006
“Interpretation of Electrospray Mass Spectra of Small Molecules”
- Agilent Technologies World Tour 2006, València, Spain, June 2006.
“Aplicación de técnicas de LC-MS para el análisis de microcontaminantes en alimentos y aguas”
- Pittcon Conference, Orlando, Florida, USA, February 28th 2005.
“Interpretation of Electrospray Mass Spectra of Small Molecules”
- ANECOOP site in Valencia, Spain, November 4th 2004.
“Aplicación de LC/TOF/MS como método multi-residuos”
- Pittcon Conference, Chicago, Illinois, USA, March 11th 2004.
“Interpretation of Electrospray Mass Spectra of Small Molecules”
- Waters User’s Meeting at the 51th Conference on Mass Spectrometry and Allied Topics (ASMS), Montreal, Canada, June 2003.
- University of Oviedo, Spain, May 11-15th 1998.
“Control analítico de la contaminación ambiental: instrumentos necesarios y su implantación en el sistema de calidad”
- University of Almeria, Spain, October 23-25th 1997.
“Short Course on Handling of Environmental Samples”

Organization of Symposia and International Conferences

- Pittcon 2009 (60th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Chicago, IL, USA, March 2009. “Achievements and Challenges in Mass Spectrometry III”.
- Pittcon 2008 (59th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), New Orleans, LA, USA, March 2008. “Achievements and Challenges in Mass Spectrometry II”.
- Pittcon 2007 (58th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Chicago, IL, USA, March 2007. “Achievements and Challenges in Mass Spectrometry I”.
- 4th European Conference on Pesticides and Related Organic Micropollutants in the Environment and 10th Symposium on Chemistry and Fate of Modern Pesticides, Almería, Spain, November 26-29th 2006.
- Pittcon 2006 (57th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2006. “Liquid Chromatography/Time-of-Flight Mass Spectrometry and Other New LC-MS Methods for the Analysis of Pesticides and Pharmaceuticals in Food and Water”
- Pittcon 2005 (56th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, February 2005. “Liquid Chromatography/Time-of-Flight Mass Spectrometry for Accurate Mass Analysis of Pesticides and Pharmaceuticals in Food and Water”
- Pittcon 2004 (55th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Chicago, IL, USA, March 2004. “Accurate Mass Analysis of Pharmaceuticals and Hormones in Environmental Samples by Liquid Chromatography/Mass Spectrometry (Time-of-Flight and Quadrupole-Time-of-Flight, LC/MS TOF and Q-TOF)”
- 3rd Scientific Meeting of the Spanish Society of Chromatography and Related Techniques and 3rd Waste Water Cluster European Workshop, Almería, Spain, November 19-21st 2003.
- Pittcon 2003 (54th Pittsburgh Conference on Analytical Chemistry and Applied Spectroscopy), Orlando, FL, USA, March 2003. “Identification and Discovery of Emerging Contaminants by Liquid Chromatography Mass Spectrometry/Mass Spectrometry (LC/MS/MS)”.
- 223rd American Chemical Society National Meeting (ACS), Orlando, Florida, USA, April 7-11th 2002. Session on “Analysis of Emerging Contaminants Using LC/MS/MS”.
- Fourth Workshop on Biosensors and Biological Techniques in Environmental Analysis, Maó, Menorca, Spain, December 1-3rd 1999.

Professional Activities

- Member of the Spanish Society for Mass Spectrometry (SEEM).
- Member of the American Society for Mass Spectrometry (ASMS).
- Frequent referee of journal papers for Analytical Chemistry, Environmental Science & Technology, Rapid Communications in Mass Spectrometry, Journal of Mass Spectrometry, Journal of Chromatography A, Analytical & Bioanalytical Chemistry...
- Peer reviewer of research proposals to the Spanish Ministry of Education (MEC) through the ANEP (Agencia Nacional de Evaluación y prospective).
- Ph. D. committee member of Maria Ibáñez, Universitat Jaume I, Castellón, Spain, February 15th 2006.
- Ph. D. committee member of Núria Fontanals, Universitat Rovira y Virgili, Tarragona, Spain, February 18th 2005.

Awards and Honors

- José Castillejo Travel Fellowship for Visiting Scientist, November 2007.
- Ramón y Cajal Post-doctoral Fellowship, declined 2003.
- Fullbright Visiting Scientist Program between Spain and USA (years 1999 and 2001).
- Best poster award at the “9^{as} Jornadas de Análisis Instrumental (JAI), Expoquímica”, Barcelona, Spain, November 1999.
- Accelerated paper in Analytical Chemistry, November 1997, v. 69, p. 4508-4514.

Patents

- Determination of chemical empirical formulas of unknown compounds using accurate ion mass measurement of all isotopes, 2007, *US 20070114373*.

Hands-on Experience on Analytical Instruments

Solid Phase Extraction (SPE):

- Automated on-line solid-phase extraction system, Prospekt (Spark Holland, the Netherlands).
- Automated on-line solid-phase extraction system, OSP-2 (Merck, Germany).
- Automated off-line solid-phase extraction system, Millilab Workstation (Waters, Milford, MA).
- Automated off-line solid-phase extraction system, ASPEC XL (Gilson, Villiviers-le-Bel, France).

LC/MS Single Quadrupole systems:

- Quadrupole Mass Spectrometer, VG Platform (Micromass, Manchester, UK).
- Quadrupole Mass Spectrometer, MSD 1100 (Agilent Technologies, Palo Alto, CA).

LC/TOF/MS systems:

- Quadrupole Time-of-Flight Mass Spectrometer, Leco Jaguar (Leco, St. Joseph, MI).
- Quadrupole Time-of-Flight Mass Spectrometer, LCT (Micromass, Manchester, UK).
- Quadrupole Time-of-Flight Mass Spectrometer, Mariner (Applied Biosystems, Foster City, CA, USA).
- Time-of-Flight Mass Spectrometer Agilent, 6420 (Agilent Technologies, Santa Clara, CA, USA).
- Quadrupole Time-of-Flight Mass Spectrometer Agilent, 6510 (Agilent Technologies, Santa Clara, CA, USA).

LC/MS/MS systems:

- Quadrupole Ion Trap Mass Spectrometer, Bruker Esquire (Bruker Daltonics, Bellerica, MA).
- Triple Quadrupole Mass Spectrometer, Quattro Ultima (Micromass, Manchester, UK).
- Quadrupole Ion Trap Mass Spectrometer, XCT (Agilent Technologies, Palo Alto, CA).
- Triple Quadrupole Mass Spectrometer, 6460 (Agilent Technologies, Palo Alto, CA).

MALDI/TOF/MS systems:

- MALDI/TOF/MS (Applied Biosystems, Foster City, CA, USA).

GC/MS Instruments:

- Quadrupole Mass Spectrometer, *MSD* (Agilent Technologies, Palo Alto, CA).
- Triple Quadrupole Mass Spectrometer, 7000A, (Agilent Technologies, Palo Alto, CA).
- Ion Trap Mass Spectrometer, GCQ/Polaris (ThermoFinnigan, Austin, TX).

Curriculum Vitae

RICHARD GERSBERG, Ph.D., M.S.

Present Position:

Professor and Head
Division of Occupational & Environmental Health
Graduate School of Public Health
College of Health & Human Services
San Diego State University
San Diego, California 92182
(619) 594-2905

Education:

1977 Ph.D., Microbiology, University of California, Davis
1968 M.S., Biology, University of Houston
1966 B.S., Biology, City College of the City University of New York

Employment Record:

1997 - present Head, Division of Occupational and Environmental Health
Graduate School of Public Health, San Diego State University
1993 - present Professor of Environmental Health,
Graduate School of Public Health
San Diego State University
2000-2008 Director, Coastal and Marine Institute, San Diego State University, and the
new Coastal Waters Laboratory on San Diego Bay
1990 - 1993 Associate Professor of Environmental Health, Graduate School of Public
Health, San Diego State University.
1986 - 1990 Assistant Professor of Environmental Health, Graduate School of Public
Health, San Diego State University.
1984 - 1988 Director of Research, San Diego Region Water Reclamation Agency,
Santee, California.

Employment Record: (continued)

- 1980 - 1984 Project Manager, Ecological Research Associates. U.S. EPA Artificial Wetlands Project at Santee, California.
- 1979 - 1980 Environmental Consultant, Ecological Research Associates. Task coordinator for Bioassay Program of the Lake Mead Water Quality Standards Study.
- 1977 - 1979 Assistant Research Microbiologist, Division of Environmental Studies, University of California, Davis. Castle Lake Research Program.
- 1974 - 1977 Research Assistant, Institute of Ecology, University of California, Davis. Castle Lake Limnological Research Group.
- 1976 Teaching Fellow, Division of Environmental Studies, University of California, Davis. Instructor for one quarter of a Limnology field course.
- 1973 Research Assistant, Bodega Bay Marine Laboratory, University of California, Davis. Lobster Aquaculture Project.
- 1969 - 1970 U.S. Navy, Lieutenant (j.g.), Naval Security Group, Washington, D.C.
- 1970 - 1972 Instructor, Faculty of the U.S. Naval Academy, Annapolis, MD. Taught one year of General Chemistry and one year of General Biology.
- 1968 - 1969 Research Fellow, Department of Biophysical Sciences, University of Houston. Investigations of biophysical and biochemical characteristics of polymorphic hemoglobins of marine fish.
- 1966 - 1968 Teaching Fellow, Department of Biology, University of Houston. Laboratory instructor for one semester of Histology and General Biology and two semesters of Comparative Anatomy.

Professional Memberships:

American Association for the Advancement of Science

Water Pollution Control Federation

American Public Health Association

IAWPRC Specialist Group on the Use of Macrophytes in Water Pollution Control

Professional Activities and Achievements:

2005- 2008	Member, The CALFED Bay-Delta Authority (CBDA) Science Program, in cooperation with California Sea Grant.
2005-2006	Member, Technical Panel on the SETAC (Society of Environmental Toxicology and Chemistry) third-party scientific and technical review of the Capital Regional District's (Victoria, Canada) Liquid Waste Management Plan (LWMP).
2005	Member, Salton Sea Science Panel for State of California Department of Water Resources
2005	Member, Independent Advisory Panel, City of San Diego Water Reuse Study.
2003	Guest Professor, University of Venice, Italy, Modeling Bacterial Quality of the Venice Lagoon
1994 - 1999	Member, California Sea Grant Committee
1994 - 1995	Member, Ecological Risk Assessment Workshop Steering Committee, California EPA
1995 -present	Guest Professor, Department of Water Management , Univ. of Applied Sciences, Magdeburg, Germany
1990 -1994	Member of State of California, Department of Health Task Force on Wastewater Reclamation Criteria.

Grants and Contracts

2010-1012	Principal Investigator, Award from the Unified Port District of San Diego, San Diego Bay Terrain Modeling. \$96, 528.
2010-2012	Principal Investigator, Ambient Water Quality of San Diego Watersheds, San Diego Coastkeeper/ State Water Resources Control Board, \$60,000.
2009- 2011	Principal Investigator, Award from the San Diego Foundation, Sea-Level Rise in San Diego: Wetland Habitats at Risk and a Sea Level Rise Adaptation Strategy for the San Diego Region. \$59, 539.

2008-2009 Principal Investigator, Blasker Award from the San Diego Foundation, Global Climate Change: Sea-Level Rise, Critical Coastal Habitats, and Coastal Water Quality in the San Diego Region. \$72,797.

2008-2010 Principal Investigator, Networking for Community Health: Risk Assessment for Consuming Fish and Ocean Recreation in Imperial Beach, CA., Imperial Beach Health Center and the TIDES Foundation. \$47,219.

2006-2007 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$2,499,861.

2006-2007 Principal Investigator, Viral Pathogens in the New River and an Evaluation of Human Health Risk Reduction by the Brawley Constructed Wetlands Demonstration Project, Southwest Consortium for Environmental Research and Policy, \$59,500.

2006-2007 Principal Investigator, Statewide Integration of Immunization Registries, California Department of Health Services and First Five Commission, \$900,000

2005-2006 Principal Investigator, Bioterrorism Preparedness Grant to the California Distance Learning Health Network (CDLHN), California Department of Health Services Immunization Branch, \$899,999.

2005-2006 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$2,489,945

2004-2005 Principal Investigator, Bioterrorism Preparedness Grant to the California Distance Learning Health Network (CDLHN), California Department of Health Services, \$700,460.

2004-2005 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$2,306,480

2004-2005 Principal Investigator, Real-Time PCR for Validation of Fecal Coliform and Enterococci as Indicators of Human Health Risk, Southwest Consortium for Environmental Research and Policy, \$62,000.

2003-2004 Principal Investigator, Bioterrorism Preparedness Grant to the California Distance Learning Health Network (CDLHN), California Department of Health Services, \$1,403,618

2003-2004 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$3,469,396

2003-2004 Principal Investigator, Health for the Flu Awareness Campaign, County of San Diego, Health and Human Services Agency, \$100,000

2002-2003 Principal Investigator, Wet and Dry Season Water Quality Monitoring of the Tijuana River, California State Water Resources Control Board, \$48,500

2002-2003 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$5,353,695

2002-2003 Principal Investigator, A human health risk assessment for enteroviruses and Hepatitis A virus (HAV) in runoff from the Tijuana River and in bathing waters of nearby Imperial Beach. US EPA and the Southwest Center for Environmental Policy Research. \$66,000.

2001-2002 Co-Principal Investigator, San Diego County-Baja California Water Quality Prediction and Monitoring Program. California State Water Resources Control Board. \$190,000.

2001-2002 Principal Investigator, Determining Contaminant Levels in Plant and Animal Tissues of the Salton Sea, California. U.S. Geological Survey. \$30,015

2001-2002 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$1,581,813

2001-2002 Principal Investigator, BASINS Modeling of the Loading of Fecal Coliforms and Pathogens from Land-Based Sources into the Bight of the Californias, US EPA and the Southwest Center for Environmental Policy Research. \$69,450.

1999-2000 Principal Investigator, Public Health Projects (California Distance Learning Health Network), Immunization Branch of California Department of Health Services. \$1,100,000.

- 1999-2000 Co Principal Investigator, Transboundary Watershed Research Project, US EPA and the Southwest Center for Environmental Policy Research. \$162,283
- 1997-1998 Principal Investigator, Predictive Modeling of the Interactions between Land Use and Storm Water Quality in the Tijuana River watershed, US EPA and the Southwest Center for Environmental Policy Research
- 1996-1997 Principal Investigator, Monitoring and Modeling of Water Quality in the Tijuana River Watershed, US EPA and the Southwest Center for Environmental Policy Research
- 1995 - 1996 Co-Investigator, Lead Poisoning Case Management Program for San Diego County (State of California)
- 1992 - 1994 Co-Principal Investigator, Study of Water Quality of San Elijo Lagoon (U.S. EPA and California State Water Quality Control Board)
- 1990 - 1991 Co-Principal Investigator, Using Wastewater Wetlands to Protect Tijuana Estuary from Sewage Pollution (National Oceanic and Atmospheric Administration)
- 1989 - 1991 Co-Principal Investigator, Wastewater Wetlands: Pulsed Discharges to Protect Coastal Water Bodies (California Sea Grant Program)
- 1988 - 1991 Principal Investigator, In-Situ Microbial Degradation of Gasoline Using Denitrification (Electric Power Research Institute)

Published Articles:

Jinadasa, K.B.S.N., Wijewardena, S.K.I., Zhang, D.Q., Gersberg, R.M., Tan, S.K., Wang, J.Y., Ng, W.J., 2012. Socio-environmental impact of water pollution on the Mid-canal (*Meda Ela*), Sri Lanka. J. of Water Resource and Protection. In Press

Zhang, D.Q., Gersberg, R.M., Zhu, J.F., Hua, T., Nguyen, A.T., Tan, S.K., 2012. Batch versus continuous feeding strategies for pharmaceutical removal by subsurface flow constructed wetlands. Environmental Pollution. In press

Zhang, D.Q., Tan, S.K., Gersberg, R.M., 2012. Centralized versus decentralized stormwater management: case studies of Singapore and Berlin, Germany. Journal of Environmental Management. In press

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Zhang, D.Q., Gersberg, R.M., Hua, T., Zhu, J.F., Jinadasa, K.B.S.N., Tan, S. K., 2012. Pharmaceutical removal in tropical subsurface flow constructed wetlands at varying hydraulic loading rate. Chemosphere 87, 273-277.

Zhang, D.Q., Tan, S.K., Gersberg, R.M., Zhu, J.F., Hua, T., Nguyen, A.T., 2012. Effect of feeding strategies on pharmaceutical removal by subsurface flow constructed wetlands. Journal of Environmental Quality. In press.

Weragoda, S.K., Jinadasa, K.B.S.N., Zhang, D., Gersberg, R.M., Tan, S.K., Tanaka, N. and W.J. Ng. Tropical application of floating treatment wetlands. Wetlands. In Press.

Zhang, D.Q., Tan, S.K., Gersberg, R.M., Zhu, J., Sadreddini, S. and Y. Li. Nutrient removal in tropical subsurface flow constructed wetlands under batch and continuous flow conditions. In Press. J. Environ. Management

Lüderitz, V, Speiert, T., Langheinrich, U., Völkl, W., and R.M. Gersberg. Restoration of rivers Upper Main and Rodach – the success and its measurement. 2011.Ecological Engineering 37: 2044-2055.

Slaughter, T.E., Gersberg, R., Watanabe, K., Rudolph, J., Stransky, C. and T.E. Novotny. 2011. Toxicity of cigarette butts, and their chemical components to marine and freshwater fish. Tobacco Control 20, Suppl.1:23-27.

Zhang, D.Q., Tan, S.K., Gersberg, R.M., Sadreddini, S., Zhu, J. and A.T. Nguyen. 2011. Removal of Pharmaceutical Compounds in Tropical Constructed Wetlands. Ecological Engineering 37: 460-464.

Zhang, D.Q., Tan S.K. and R. M. Gersberg. 2010. Municipal solid waste management in China: status, problems and challenges. J. Environ. Management 91: 1623-1633.

Zhang, D.Q., Tan S.K. and R. M. Gersberg. 2010. A comparison of municipal solid waste management in Berlin and Singapore. Waste Management 30:921-933.

Zhang, D.Q., Gersberg, R.M., and S.K. Tan. 2009. Constructed Wetlands in China. Ecological Engineering 35:1367-1378.

Zhang, D.Q., Gersberg, R.M. and C. Wilhelm. 2009. Decentralized Water Management - Rainwater Harvesting and Greywater Reuse in an Urban Area of Beijing, China. Urban Water Journal 6 (5): 375 – 385.

Published Articles: (continued)

Johnson, P.I., Gersberg, R.M, Rigby, M. and S. Roy. 2009. The fate of selenium in the Imperial and Brawley constructed wetlands in Imperial Valley, California. Ecological Engineering 35: 908-913.

Watanabe, K., Franz, K. and R.M. Gersberg. Levels of the organophosphorus pesticide diazinon in the Chollas Creek watershed, San Diego, Ca, since its phase-out in 2004. 2008. Bulletin of the Southern California Academy of Science 107 (1): 33-40.

Gersberg, R.M. Tiedge, J. Gottstein, D., Altmann, S., Watanabe, K. and V. Luederitz. 2008. Effect of the South Bay Ocean Outfall (SBOO) on ocean beach water quality near the USA-Mexico border. International Journal of Environ. Health Res. 18 (2):149-158.

Moreau, M. F., J. Surico-Bennett, M. Vicario-Fisher, R. Gerards, R. M. Gersberg and S. H. Hurlbert, 2007. Selenium, arsenic, DDT and other contaminants in four fish species in the Salton Sea, California, their temporal trends, and their potential impact on human consumers and wildlife. Lake and Reservoir Management 23:536-569.

Moreau, M. F., J. Surico-Bennett, M. Vicario-Fisher, D. Crane, R. Gerards, R. M. Gersberg and S. H. Hurlbert. 2007. Contaminants in tilapia (*Oreochromis mossambicus*) from the Salton Sea, California, in relation to human health, piscivorous birds and fish meal production. Hydrobiologia 576:127-165.

Gersberg, R.M., Rose, M. Robles, R. and A.K. Dhar. 2006. Quantitative detection of Hepatitis A virus and enteroviruses near the United States-Mexico border and correlation with levels of fecal indicator bacteria. Appl. Environ. Microbiol. 72: 7438-7444.

Gersberg, R.M. 2006. Selenium in the Salton Sea, California: A case study of the non-sustainability of intensive irrigated agriculture in the Western U.S. In *Sustainable Approaches in Water Management, Urban Planning, and Effective and Renewable Energy Uses* (R. Jüpner and P. Fox, eds.). Proceedings, Sept 16-17, 2005, Indianapolis, IN. Shaker Verlag, Aachen Germany.

Rose, M., Dhar, A.K., Brooks, H.A., Zecchini, F. and R.M. Gersberg. 2006. Quantitation of Hepatitis A virus and enterovirus levels in the lagoon canals and Lido beach of Venice, Italy, using real-time RT PCR. Water Res. 40: 2249-2462.

Brooks, H.A., Gersberg, R.M. and A.K. Dhar. 2005. Quantification of hepatitis A virus in seawater via real-time RT-PCR. J.Virol. Methods 127 (2) : 109-118.

Luederitz, V., Gerlach, F., Juepner, R., Calleros, J., Pitt, P. and R.M. Gersberg. 2005. Biological assessment of Tecate Creek (U.S.-Mexico) with special regard to self-purification. Bulletin of the Southern California Academy of Sciences. 104: 1-13.

Published Articles: (continued)

Coates-Hedberg, K. and R.M. Gersberg. Association of gastrointestinal illnesses and environmental factors in a Kumiai Indian community in Baja California, Mexico. 2004. In *The U.S.-Mexican Border Environment: Tribal Environmental Issues of the Border Region* (M. Wilken-Robertson, ed.). SCERP Monograph Series No. 9. San Diego State University Press pp. 171-195.

Gersberg, R.M. Daft, D. and D. Yorkey. 2004. Temporal pattern of toxicity in runoff from the Tijuana River watershed. Water Res. 38: 559-568.

Langheinrich, U., Tischew, S., Gersberg, R.M., and V. Luederitz. 2004. Ditches and canals in management of fens: opportunity or risk? A case study in the Droemling Natural Park, Germany Wetlands Ecology and Management 12:429-445.

Gersberg, R.M., Pitt, J. Weis, D. and D. Yorkey. 2002. Characterizing In-Stream Metal Loading in the Tijuana River Watershed. Proceedings of the Water Environment Federation Specialty Conference on National TMDL Science and Policy, Phoenix, AZ. November 13-16, 2002.

Luederitz, V., Eckert, E., Lange-Weber, M. Lange, A. and R.M. Gersberg. 2001. Nutrient removal efficiency and resource economics of vertical flow and horizontal flow constructed wetlands. Ecol. Eng. 18/2, 157-172.

Weis, D.A., Gersberg, R.M. and J. Calloway. 2001. Vertical accretion rates and heavy metal chronologies in wetland sediments of the Tijuana Estuary. Estuaries 24 (6), 840-850.

Gersberg, R.M., Pitt, J., King, A., Johnson, H. and R. Wright. 2000. Use of the BASINS Model to estimate the loading of heavy metals from the binational Tijuana River watershed. Watershed 2000 Specialty Conference, Water Environment Federation, 9-12 July, 2000, Vancouver, Canada.

Gersberg, R.M., Brown, C., Zambrano, V., Worthington, K. and D. Weis. 2000. Quality of urban runoff in the Tijuana River watershed. SCERP Monograph Series (no.2) on Water Issues Along the United States and Mexico Border (P. Westerhoff, Ed.) Southwest Center for Environmental Research and Policy, pp. 31-45.

Englert, P., Brown, C, Placchi, C. and R.M. Gersberg. 1999. Geographic information system (GIS) characterization of metal loading in the binational Tijuana River watershed. J. Borderlands Studies. 14:2, 81-91.

Riveles, K. and R.M. Gersberg. 1999. Toxicity identification evaluation of runoff from the Tijuana River. Bull. Environ. Contam. Toxicol. 63, 625-632.

Published Articles: (continued)

Brown, C., Placchi, C., and R.M. Gersberg. 1998. Modeling the impacts of surface water hydrology and land use on water quality in the Tijuana River watershed. In Proceedings of the WEF Specialty Conference on Watershed Management, pp. 477-484, May 3-6, 1998. Denver, Co.

Meyer, S.F. and R.M. Gersberg. 1997. Heavy metals and acid-volatile sulfides in sediments of the Tijuana Estuary. Bull. Environ. Contam. Toxicol. 59, 113-119.

Gersberg, R. M., Gaynor, K., Tenczar, D., Bartzen, M., Ginsberg, M., Gresham, L. S. and C. Molgaard. 1997. Quantitative modeling of lead exposure from glazed ceramic pottery in childhood lead poisoning cases. Int. J. Environ. Hlth. 7, 193-202.

Gersberg, R.M., Matkovits, M., Dodge, D., McPherson, T., and J.M. Boland. 1995. Experimental opening of a coastal California lagoon: Effect on bacteriological quality of recreational ocean waters. J. Environ. Hlth. 58, 24-29.

Gersberg, R.M., Korth, K., Bogardt, A.H., Rice, L., Randall, J.D., Bradley, M.D., Dawsey, W.J., and B.B. Hemmingsen. 1995. Chemical and microbiological evaluation of in situ bioremediation of hydrocarbons in anoxic groundwater enriched with nutrients and nitrate. World Journal of Microbiology and Biotechnology 11(5), 549-558.

Gersberg, R.M., Carroquino, M.J., Fischer, D.E., and W.J. Dawsey. 1995. Biomonitoring of toxicity reduction during in-situ bioremediation of monoaromatic hydrocarbons in groundwater. Water Res. 29, 545-550.

Gersberg, R.M., Dodge, D., Parsons, L. and J.B. Zedler. 1994. Microbiological water quality of the Tijuana Estuary. J. Border Health 10(3), 16-27.

de Peyster, A. and R.M. Gersberg. 1994. Use of aquatic species toxicity testing in public health. Chem. Health and Safety 1(3), 38-43.

Zedler, J.B., Busnardo, M., Sinicrope, T., Langis, R., Gersberg, R. and S. Baczkowski. 1994. Pulsed discharge wastewater wetlands: Potential for solving multiple problems by varying hydroperiod. In Global Wetlands, (W.J. Mitsch, Ed.), pp. 363-368. Elsevier Science Publishers, Amsterdam, The Netherlands.

Gersberg, R.M., Dawsey, W.J. and M.D. Bradley. 1993. Nitrate enhancement of in-situ bioremediation of monoaromatic compounds in groundwater. Remediation 3, 233-245.

Sinicrope, T.L., Langis, R., Gersberg, R.M., Busnardo, M.J. and J.B. Zedler. 1992. Metal removal by wetland mesocosms subjected to different hydroperiods. Ecol. Eng. 1, 309-322.

Published Articles: (continued)

Carroquino, M., Gersberg, R.M., Dawsey, W.J., and M.D. Bradley. 1992. Toxicity reduction associated with the biodegradation of monoaromatic hydrocarbons in gasoline-contaminated groundwaters. Bull. Environ. Contam. Toxicol. 49, 224-231.

Gersberg, R.M., Dawsey, W.J. and M.D. Bradley. 1991. Biodegradation of monoaromatic hydrocarbons in groundwater under denitrifying conditions. Bull. Environ. Contam. Toxicol. 47, 8-15.

Busnardo, M.J., Gersberg, R.M., Langis, R., Sinicrope, T.L., and J.B. Zedler. 1992. Nitrogen and phosphorus removal by wetland mesocosms subjected to different hydroperiods. Ecol. Eng. 1, 287-307

Gersberg, R.M. and D.A. Silvaggio. 1992. Fate of coliphage during wastewater treatment by water hyacinth (Eichhornia crassipes). Ecol. Eng. 1, 355-363.

Gersberg, R.M., Trindade, F and C. Nordby. 1989. Heavy metals in sediments and fish of the Tijuana Estuary. J. Border Health. 5, 5-15.

Gersberg, R., Gearheart, R.A., and M. Ives. 1989. Pathogen removal in constructed wetlands. In Constructed Wetlands for Wastewater Treatment, Chapter 35, pp.431-445. Lewis Publishers, Inc., Chelsea, Michigan.

Gersberg, R.M., Dawsey, W.J. and H.F. Ridgway. 1989. Biodegradation of dissolved aromatic hydrocarbons in gasoline-contaminated groundwaters using denitrification. In Petroleum Contaminated Soils, Vol. II, Chapter 18, pp.211-217. Lewis Publishers, Inc., Chelsea, Michigan.

Gersberg, R.M., Lyon, S.R., Brenner, R. and B.V. Elkins. 1989. Integrated wastewater treatment by artificial wetlands: A gravel marsh case study. In Constructed Wetlands for Wastewater Treatment, Chapter 10, pp.145-152. Lewis Publishers, Inc., Chelsea, Michigan.

Gersberg, R.M., Lyon, S.R., Brenner, R. and B.V. Elkins. 1988. Performance of a clay-alum flocculation (CCBA) process for virus removal from municipal wastewater. Water Res. 22, 1449-1454.

Sheehan, P.J., Schneiter, R.W., Mohr, T.K.G. and R.M. Gersberg. 1988. Progress in bioreclamation of contaminated groundwater without oxygen addition. HAZMACON 88, April 5 - 8, 1988, Anaheim, California, pp.711-721.

Sheehan, P.J., Schneiter, R.W. and R.M. Gersberg. 1988. Bioreclamation of gasoline-contaminated ground water without oxygen additions. Proceedings of the Second National Outdoor Action

Published Articles: (continued)

Conference on Aquifer Restoration, Ground Water Monitoring and Geophysical Methods. May 23-26, 1988. Las Vegas, Nevada, pp.183-199.

Gersberg, R.M., Brenner, R., Lyon, S.R. and B.V. Elkins. 1987. Virus removal by a clay-alum (CCBA) coagulation process for wastewater reclamation. Proceedings of Water Reuse Symposium IV. AWWA Research Foundation. August 3-7, Denver Colorado, pp.1173-1182.

Gersberg, R.M., Lyon, S.R., Brenner, R., and B.V. Elkins. 1987. Fate of viruses in artificial wetlands. Appl. Environ. Microbiol. 83, 731-736.

Gersberg, R.M., Brenner, R., Lyon, S.R. and B.V. Elkins. 1987. Survival of bacteria and viruses in municipal wastewaters applied to artificial wetlands. In Aquatic Plants For Water Treatment and Resource Recovery. (K.R. Reddy and W.H. Smith, Eds.), pp.237-245. Magnolia Publishing, Orlando, Florida.

Gersberg, R.M., Brenner, R., and B.V. Elkins. 1986. Selenium removal using aerobic bacteria. Proceedings of a Symposium on Selenium in the Environment, California Agricultural Technology Institute, California State University, Fresno, June 10-12, 1985, pp. 161-164.

Elkins, B.V., Wilson, G.E., and R.M. Gersberg. 1985. Complete reclamation of wastewater and sludge. Water Sci. Tech. 17, 1453-1454.

Gersberg, R.M., Elkins, B.V., and C.R. Goldman. 1986. Role of aquatic plants in wastewater treatment by artificial wetlands. Water Res. 20, 363-368.

Gersberg, R.M., Lyon, S.R., Elkins, B.V., and C.R. Goldman. 1985. The removal of heavy metals by artificial wetlands. Proceedings of Water Reuse Symposium III. AWWA Research Foundation, San Diego, California, August 26-31, 1984, 639-648.

Gersberg, R.M. and D.W. Allen. 1985. Phosphorus uptake by Klebsiella pneumoniae and Acinetobacter calcoaceticus. Water Sci. Tech. 17, 113-118.

Gersberg, R.M., Elkins, B.V., and C.R. Goldman. 1985. Wastewater treatment by artificial wetlands. Water Sci. Technol. 17, 443-450.

Gersberg, R.M., Elkins, B.V., and C.R. Goldman. 1984. The use of artificial wetlands to remove nitrogen from wastewater. J. Water Pollut. Control Fed. 56, 152-156.

Gersberg, R.M., Elkins, B.V., and C.R. Goldman. 1983. Nitrogen removal in artificial wetlands. Water Res. 17, 1009-1014.

Published Articles: (continued)

Axler, R.P., Gersberg, R.M., and C.R. Goldman. 1982. Inorganic nitrogen assimilation in a subalpine lake. Limnol. Oceanogr. 27, 53-65.

Axler, R.P. and R.M. Gersberg. 1981. Vertical patterns of inorganic carbon and nitrogen uptake in a subalpine lake. Verh. Internat. Verein Limnol. 21, 326-332.

Axler, R.P., Gersberg, R.M., and C.R. Goldman. 1980. Stimulation of nitrate uptake and photosynthesis by molybdenum in Castle Lake, California. Can. J. Fish. Aquat. Sci. 37, 707-712.

Gersberg, R.M., Axler, R.P., and C.R. Goldman. 1980. Isotope studies of nitrogen transformations in Castle Lake, California. Proceedings of the FAO/IAEA Advisory Group on Agrochemical Residue-Biota Interactions in soil and water. International Atomic Energy Agency, Vienna, Austria, 75-85.

Axler, R.P., Gersberg, R.M., and L.J. Paulson. 1978. The primary productivity of Big Soda Lake, Nevada. Great Basin Naturalist 38 (2), 187-192.

Kimmel, B.L., Gersberg, R.M., Paulson, L.J., Axler, R.P., and C.R. Goldman. 1978. Recent changes in the meromictic status of Big Soda Lake, Nevada, Limnol. Oceanogr. 23 (5), 1021-1025.

Gersberg, R.M., Axler, R.P., Krohn, K., and N. Peek. 1977. Nitrate uptake by phytoplankton: Measurements utilizing the radioisotope ¹³N. Verh. Internat. Verein Limnol. 20, 392-399.

Gersberg, R.M., Krohn, K., Peek, N., and C.R. Goldman. 1976. Denitrification studies with ¹³N-labeled nitrate. Science 192, 1229-1231.

Articles Submitted or In Preparation

Zhang, D.Q., Gersberg, R.M., Nguyen, A.T., Hua, T., Valencia, E., Loh, B.W.T., Tan, P.Y., Tan, S.K., 2010. Pollutant removal by bioretention systems at varying hydraulic loading rates. Submitted to Water, Air & Soil Pollution.

Zhang, D.Q., Hua, T., Gersberg, R.M., Zhu, J.F., Ng, W.J., Tan, S. K., 2012. Uptake of diclofenac by *Scirpus validus* cultivated under hydroponic conditions. Submitted to Science of Total Environment.

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Education

PhD, California Institute of Technology, 1992.
Environmental Engineering & Science
Minor: Applied Biology
Dissertation Title: Detection and Partitioning of Bacteriophage in Natural Aquatic Environments
Advisor: Lidstrom, M. E., List, E. J.

MS, California Institute of Technology, 1990.
Major: Environmental Engineering & Science
Advisor: Lidstrom, M. E.

BS, With Distinction, Stanford University, 1985.
Major: Geology

Professional Positions

Department Chairperson, Dept. of Chemical Engineering and Materials Science, (September 2002 - June 2009).
Professor, Civil and Environmental Engineering, UC Irvine (2009-2010).
Professor, Chemical Engineering and Materials Science, UC Irvine (2001-2010).
Associate Professor, Chemical Engineering and Materials Science, UC Irvine (1999-2001).
Associate Professor, Civil and Environmental Engineering, UC Irvine (1997-1999).
Assistant Professor, Civil and Environmental Engineering, UC Irvine (1991-1997).
Chair Professor of Hydrology and Water Resources, University of Melbourne. (June 15, 2010 - Present).
Visiting appointment in the Department of Civil and Environmental Engineering, during the UCI academic summers of 2010, 2011, and 2012.
Seismic Analyst, Unocal Corporation. (January 1985 - August 1987).

Research Interests

Coastal Water Quality, Environmental Dispersion of Pathogens, Fate and Transport Modeling;
Environmental Microbiology

Awards and Honors

Croucher Lecture, University of Hong Kong. (May 11, 2010).
Appreciation Award, Graduate Student Association, Chemical Eng. and Materials Science. (2009).
Science Advisory Board, U.S. Environmental Protection Agency (Drinking Water Panel). (2002 - 2009).
Croucher Lecture, University of Hong Kong Advanced Study Institute on Nearshore Coastal Water Quality Research. (December 14, 2009).

Chancellor's International Lecture, University of Melbourne. (September 3, 2009).
Grand Rounds Lecture, UCI Medical School. (October 24, 2007).
Finalist, Dean of Engineering, College of Engineering, University of Hawaii (Manoa Campus). (2006).
Conservator of the Year, Bolsa Chica Conservancy (with commendations from City of Huntington Beach, County of Orange, California Legislature, California Senate, and US Congress). (2002).
Commencement Speaker for Schools of Engineering and Social Ecology, UC Irvine. (2001).
Honorary Member, Golden Key International Honor Society. (2001).
W.M. Keck Fellow Award, Chapman University. (2000).
National Science Foundation Early Career Award. (July 1995 - June 2000).
Distinguished Assistant Professor Award for Teaching, UCI Academic Senate. (1998).
Outstanding Assistant Professor Award, School of Engineering. (1994).
Most Outstanding Professor, School of Engineering Senior Undergraduates. (1993).
Faculty Research Fellowship, UC Irvine. (1992).
National Research Service Award Fellowship, National Institutes of Health. (1989 - 1991).
Caltech Institute Fellowship. (1987 - 1988).
Honorable Mention, NSF Graduate Fellowship Competition, National Science Foundation. (1987).

RESEARCH

Publications

Instructor's Manuals

1. Grant, S. B., Duong, M. (1995). Laboratory Manual for Environmental Microbiology.

Journal Articles, Peer-Reviewed

54. Grant et al. Taking the 'waste' out of 'wastewater' to meet water needs. *Science*. (Invited Review Article).
53. Grant, S. B., Stewardson, M. J., Marusic, I. (2012). Effective Diffusivity and Mass Flux across the Sediment-Water Interface in Turbulent Streams. *Water Resources Research*, 48(W05548).
52. Bailey, M. M. Natural Attenuation of Sewage Contaminated Shallow Groundwater and Implications for Coastal Water Quality. *Environmental Science and Technology*.
51. Bailey, M. M., Cooper, W. J., Grant, S. B. (2011). In situ disinfection of sewage contaminated shallow groundwater: A feasibility study. *Water Research*, 45, 5641-5653.
50. Grant, S. B., Marusic, I. (2011). Crossing Turbulent Boundaries: Interfacial Flux in Environmental Flows. *Environmental Science and Technology*, 45, 7107-7113. (Feature Article).
49. Grant, S. B., Litton, R. M., Ahn, J. H. (2011). Measuring and modeling the flux of fecal bacteria across the sediment-water interface in a turbulent stream. *Water Resources Research*, 47, W05517.
48. Ho, L. C., Litton, R. M., Grant, S. B. (2011). Anthropogenic Currents and Shoreline Water Quality in Avalon Bay, California. *Environmental Science and Technology*, 45, 2079-2085.

47. Grant, S. B., Sanders, B. F. (2010). The beach boundary layer: A framework for addressing recreational water quality impairment at enclosed beaches. *Environmental Science and Technology*, 44, 8804-8813.
46. Litton, R. M., Ahn, J. H., Sercu, B., Holden, P. A., Sedlak, D. L., Grant, S. B. (2010). Evaluation of chemical, molecular, and traditional markers of fecal contamination in an effluent dominated urban stream. *Environmental Science and Technology*, 44, 7369-7375. (featured in Chemical and Engineering News).
45. Surbeck, C. Q., Jiang, S. C., Grant, S. B. (2010). Ecological control of fecal indicator bacteria in an urban stream. *Environmental Science and Technology*, 44, 631-637.
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43. Clark, C. D., Litz, L. P., Grant, S. B. (2008). Salt marshes as a source of chromophoric dissolved organic matter (CDOM) to Southern California coastal waters. *Limnology and Oceanography*, 53, 1923-1933.
42. Jeong, Y., Sanders, B. F., McLaughlin, K., Grant, S. B. (2008). Treatment of dry weather urban runoff in tidal marshes: A longitudinal study of the Talbert Marsh, southern California. *Environmental Science and Technology*, 42, 3609-3614.
41. McLaughlin, K., Ahn, J. H., Litton, R. M., Grant, S. B. (2007). Use of Salinity Mixing Models to Estimate the Contribution of Creek Water Fecal Indicator Bacteria to an Estuarine Environment. *Water Research*, 41, 3595-3604. (special issue on Microbial Source Tracking).
40. Ahn, J. H., Grant, S. B. (2007). Size distribution, sources, and seasonality of suspended particles in southern California marine bathing waters. *Environmental Science and Technology*, 41, 695-702.
39. Grant et al. (2006). Response to comment on "Coastal water quality impact of storm runoff from an urban watershed in southern California". *Environmental Science and Technology*, 40, 3441-3442.
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36. Pednekar, A. M., Grant, S. B., Jeong, Y., Poon, Y., Oancea, C. (2005). Influence of climate change, tidal mixing, and watershed urbanization on historical water quality in Newport Bay, a saltwater wetland and tidal embayment in southern California. *Environmental Science and Technology*, 39, 9071-9082.
35. Jeong, Y., Grant, S. B., Ritter, S., Pednekar, A., Candelaria, L., Winant, C. (2005). Identifying pollutant sources in tidally mixed systems: case study of fecal indicator bacteria from marinas in Newport Bay, southern California. *Environmental Science and Technology*, 39, 9083-9093.

34. Ahn, J., Grant, S. B., Surbeck, C., DiGiacomo, P., Nezlin, N. (2005). Coastal water quality impact of storm runoff from an urban watershed in southern California. *Environmental Science and Technology*, 39, 5490-5953.
33. Grant, S. B., Kim, J. H., Jones, B. H., Jenkins, S. A., Wasyl, J., Cudaback, C. (2005). Surf zone entrainment, alongshore transport, and human health implications of pollution from tidal outlets. *Journal Geophysical Research-Oceans*, 110:C10025.
32. Kim, J. H., Grant, S. B., Sanders, B. F., McGee, C. D., Largier, J. L. (2004). Locating sources of surf zone pollution: a mass budget analysis of fecal indicator bacteria at Huntington State Beach, California. *Environmental Science and Technology*, 38, 2626-2636.
31. Reeves, R. L., Grant, S. B., Mrse, R. D., Oancea, C., Sanders, B. F., Boehm, A. (2004). Scaling and management of fecal indicator bacteria in runoff from a coastal urban watershed in southern California. *Environmental Science and Technology*, 38, 2637-2648.
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29. Boehm, A., Fuhrman, J., Mrse, R. D., Grant, S. B. (2003). A tiered approach for identification of a human fecal pollution source at a recreational beach: Case study at Avalon Bay, Catalina Island, California. *Environmental Science and Technology*, 37, 673-680.
28. Boehm, A. B., Grant, S. B., Kim, J. H., Mowbray, S. L., McGee, C. D., Clark, C. D., Foley, D. M., Wellman, D. E. (2002). Decadal and shorter period variability of surf zone water quality at Huntington Beach, California. *Environmental Science and Technology*, 36, 3885-3892. (featured on cover).
27. Redman, J. A., Grant, S. B., Estes, M. K. (2001). Resolving microscale and macroscale heterogeneity in pathogen filtration. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 191, 57-70.
26. Boehm, A. B., Grant, S. B. (2001). A steady-state model of particulate organic carbon flux below the mixed-layer and application to the joint global ocean flux study. *Journal Geophysical Research-Oceans*, 106(31), 31227-31237.
25. Grant, S. B., Poor, C., Kim, J. H. (2001). Kinetic theories for the coagulation and sedimentation of particles. *Journal of Colloid and Interface Science*, 238, 238-250.
24. Sanders, B. F., Green, C. L., Chu, A., Grant, S. B. (2001). Case study: modeling tidal transport of urban runoff in channels using the finite volume method. *ASCE Journal of Hydraulic Engineering*, 127(10), 795-804.
23. Grant, S. B., Sanders, B. F., Redman, J. A., Kim, J. H., Mrse, R., McGee, C. D., Gardiner, N., Jones, B. H., Sveikovskiy, J., Leipzig, V., Brown, A. (2001). Generation of enterococci bacteria in a coastal salt water marsh and its impact on surf zone water quality. *Environmental Science and Technology*, 35, 2407-2415.
22. Redman, J. A., Grant, S. B., Olson, T. M., Estes, M. K. (2001). Pathogen filtration,

- heterogeneity, and the potable reuse of wastewater. *Environmental Science and Technology*, 35, 1798-1805.
21. Chin, C. J., Yiacoumi, S., Tsouris, C., Relle, S., Grant, S. B. (2000). Secondary-minimum aggregation of superparamagnetic colloidal particles. *Langmuir*, 16, 3641-3650.
 20. Relle, S., Grant, S. B., Tsouris, C. (1999). Diffusional coagulation of superparamagnetic particles in the presence of an external magnetic field. *Physica A: Statistical Mechanics and its Applications*, 270, 427-443.
 19. Boehm, A. B., Poor, C., Grant, S. B. (1999). Particle coagulation and the memory of initial conditions. *Journal Physics A: Mathematical and General*, 31, 9241-9254.
 18. Redman, J. A., Grant, S. B., Olson, T. M., Adkins, J. M., Jackson, J. L., Castillo, M. S., Yanko, W. A. (1999). Physicochemical mechanisms responsible for the filtration and mobilization of a filamentous bacteriophage in quartz sand. *Water Research*, 33, 43-52.
 17. Boehm, A. B., Grant, S. B. (1998). The influence of coagulation, sedimentation, and grazing by zooplankton on phytoplankton aggregate distributions in aquatic systems. *Journal of Geophysical Research: Oceans*, 103(C8), 15601-15612.
 16. Relle, S., Grant, S. B. (1998). A one-step process for particle separation by magnetic seeding. *Langmuir*, 14(9), 2316-2328.
 15. Walker, H. W., Grant, S. B. (1998). Influence of surface charge and particle size on the stabilization of colloidal particles by model polyelectrolytes. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 135, 123-133.
 14. Redman, J. A., Grant, S. B., Olson, T. M., Hardy, M. E., Estes, M. K. (1997). Filtration of recombinant Norwalk virus particles and bacteriophage MS2 in quartz sand: importance of electrostatic interactions. *Environmental Science and Technology*, 31(12), 3378-3383.
 13. Duong, M. H., Penrod, S. P., Grant, S. B. (1997). Kinetics of p-Nitrophenol degradation by *Pseudomonas* sp. ATCC29354: an experiment illustrating bioremediation. *Journal of Chemical Education*, 74, 1451-1454.
 12. Penrod, S. P., Olson, T. M., Grant, S. B. (1996). The deposition kinetics of two viruses in packed beds of quartz granular media. *Langmuir*, 12(23), 5576-5587.
 11. Walker, H. W., Grant, S. B. (1996). Factors influencing the flocculation of colloidal particles by a model anionic polyelectrolyte. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 119(2-3), 229-239.
 10. Grant, S. B., Pendroy, C. P., Mayer, C. L., Bellin, J. K., Palmer, C. J. (1996). Prevalence of Enterohemorrhagic *Escherichia coli* in raw and treated municipal sewage. *Applied and Environmental Microbiology*, 62(9), 3466-3469.
 9. Walker, H. W., Grant, S. B. (1996). Role of polymer flexibility in the stabilization of colloidal particles by model anionic polyelectrolytes. *Journal of Colloid and Interface Science*, 179, 552-560.
 8. Walker, H. W., Grant, S. B. (1996). The coagulation and stabilization of colloidal particles by adsorbed DNA block copolymers: the role of polymer conformation. *Langmuir*, 12(13), 3151-3156. (featured on cover).

7. Grant, S. B., Poor, C., Relle, S. (1996). Scaling theory and solutions for the steady-state coagulation and settling of fractal aggregates in aquatic systems. *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 107, 155-174.
6. Walker, H. W., Grant, S. B. (1995). The conformation of DNA block copolymer molecules adsorbed on latex particles as revealed by hydroxyl radical footprinting. *Langmuir*, 11(10), 3772-3777.
5. Penrod, S. L., Olson, T. M., Grant, S. B. (1995). Whole particle microelectrophoresis for small viruses and colloids. *Journal of Colloid and Interface Science*, 173, 521-523.
4. Grant, S. B. (1995). Inactivation kinetics of viral aggregates. *ASCE Journal of Environmental Engineering*, 121(4), 311-319.
3. Duong, M. H., Grant, S. B., Lidstrom, M. E. (1994). Transfer solvent chemistry affects mixed-phase hybridization. *Analytical Biochemistry*, 220, 431-433.
2. Grant, S. B. (1994). Virus coagulation in aqueous environments. *Environmental Science and Technology*, 28, 928-933.
1. Grant, S. B., List, E. J., Lidstrom, M. E. (1993). Kinetic analysis of virus adsorption and inactivation in batch experiments. *Water Resources Research*, 29, 2067-2085.

Newspaper Articles

2. Grant, S. B. (2002). Runoff is Far Greater Threat To Coast than Sewage Plume. *Los Angeles Times*. (Op/Ed Piece in Sunday LA Times).
1. Grant, S. B., Grant, L. (1999). An All Points Bulletin: Coast Must Be Cleared. *Los Angeles Times*. (Op/Ed Piece in Sunday LA Times).

Research Reports

8. Grant et al. (2010). *Avalon Bay Water Quality Improvement Project, Catalina Island, California*. State of California Water Quality Control Board. 100..
7. Grant, S. B., Jiang, C., Sanders, B. F., McLaughlin, K., Ahn, J. H., Litton, R. M., Ho, L., Moore, D. (2009). *Newport Bay Fecal Indicator Bacteria Source Identification Project*. UC Irvine, Chemical Engineering and Materials Science. 333..
6. Grant, S. B., Mrse, R., Jensen-Mullin, C., Bachman, M., Boehm, A., Fuhrman, J., Jones, B. (2006). *Sources and mitigation of water quality impairment in Avalon Bay, Catalina Island*. City of Avalon and the State Water Resources Control Board.. (includes appendix).
5. Grant, S. B., Rekhi, N., Pise, N. R., Reeves, R. L., Matsumoto, M., Wistrom, A., Moussa, L., Bay, S., Kayhanian, M. (2003). *A review of the contaminants and toxicity associated with particles in stormwater runoff*.. (includes appendix).
4. Grant, S. B., Sanders, B., Boehm, A., Arega, G., Ensari, S., Mrse, R., Kang, H., Reeves, R., Kim, J. H., Redman, J., Jiang, S., Chu, W., Choi, S., Clark, C., Litz, L., Sutula, M., Noblet, J., Sobsey, M., McGee, C. (2002). *Coastal Runoff Impact Study (UCI-CRIS), Phase II: Sources and dynamics of fecal indicator bacteria in the Lower Santa Ana River Watershed*. National Water Research Institute.. (Technical Completion Report).

3. Grant, S. B., Webb, C., Sanders, B., Jones, B., Boehm, A., Kim, J., Redman, J., Chu, A., Mrse, R., Gardiner, N., Brown, A. (2000). *Huntington Beach Water Quality INvestigation Phase II: An Analysis of Ocean, Surf Zone, Watershed, Sediment, and Groundwater Data Collected from June 1998 through September 2000*. National Water Research Institute..
2. Grant, S. B., Sanders, B. (2000). *Tidal Transport of Bacteria Between The Talbert Watershed and the Ocean*. National Water Research Institute.. (Technical Completion Report).
1. Grant, S. B. (1994). *Microorganism Detection by Multiple Non-Specific Oligonucleotide Probes, or "Gene Probe Spectroscopy"*. UC Water Resources Center.. (Technical Completion Report).

Technical Reports

2. Grant, S. B. (2008). *2008 Academic Plan: UCI Chemical Engineering and Materials Science*. UC Irvine..
1. Grant, S. B. (2005). *Achieving Excellence at the Intersection of Chemical Engineering and materials Science*. UC Irvine.. (Academic Plan for the Department of Chemical Engineering and Materials Science).

Presentations Given

Grant, S. B., Osher Lifelong Learning Institute, "The Beach Boundary Layer and Recreational Water Quality at Enclosed Beaches," UCI Extension, UC Irvine, CA. (September 30, 2010).

Grant, S. B., "The Beach Boundary Layer and Recreational Water Quality at Enclosed Beaches," Department of Civil and Environmental Engineering, University of Melbourne, Victoria (Australia). (September 9, 2010).

Grant, S. B., "The Beach Boundary Layer and Recreational Water Quality at Enclosed Beaches," Department of Civil and Environmental Engineering, Monash University, Victoria (Australia). (July 20, 2010).

Grant, S. B., Croucher Lecture, "Measuring and Modeling the Flux of Bacteria Across the Sediment-Water Interface in a Turbulent Stream," Department of Civil and Environmental Engineering, University of Hong Kong, Hong Kong (China). (May 11, 2010).

Grant, S. B., Croucher Lecture, "The Beach Boundary Layer and Recreational Water Quality at Enclosed Beaches," Department of Civil and Environmental Engineering, University of Hong Kong, Hong Kong (China). (May 10, 2010).

Grant, S. B., State of California Beach Water Quality Work Group, "Newport Bay Fecal Indicator Bacteria Source Identification Project," State Water Board, Southern California Coastal Water Research Project, Costa Mesa, CA. (February 3, 2010).

Grant, S. B. (Author), Litton, R. (Presenter), 2010 Ocean Sciences Meeting, "nhancing the predictive capabilities of a water quality model that assesses the fecal impairment of recreational waters by incorporating stratified random sampling design into the model development," American Geophysical Union, Portland, OR. (February 2, 2010).

- Grant, S. B., Croucher ASI on Nearshore Coastal Water Quality, "Beach Water Quality Forecasting: Challenges and Opportunities," University of Hong Kong, Hong Kong (China). (December 16, 2009).
- Grant, S. B. (Plenary Lecturer), "Cleaning Up Urban Rivers and Streams: Case Studies from California and Australia," Chancellor's International Lecture, University of Melbourne, Victoria (Australia). (September 3, 2009).
- Grant, S. B., National Beaches Conference, "Tidal Saltwater Wetlands and Coastal Water Quality," U.S. Environmental Protection Agency, Huntington Beach, CA. (April 21, 2009).
- Grant, S. B., "Tidal Saltwater Wetlands and Coastal Water Quality," Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, CA. (October 23, 2008).
- Grant, S. B., "Sources and Nearshore Transport of Coastal Pollution," U.S. National Science Foundation, Office of Cyberinfrastructure, Washington D.C.. (October 10, 2008).
- Grant, S. B., "Tidal Saltwater Wetlands and Coastal Water Quality," Scripps Institution of Oceanography, UC San Diego, La Jolla, CA. (October 1, 2008).
- Grant, S. B., "Tidal Saltwater Wetlands and Coastal Water Quality," School of Engineering, University of Melbourne, Victoria (Australia). (August 8, 2008).
- Grant, S. B., "Fecal Bacteria Source Tracking in the Middle Santa Ana River," Riverside Middle Santa Ana River Source Tracking Committee, Riverside, CA. (June 5, 2008).
- Grant, S. B., "Tidal Saltwater Wetlands and Coastal Water Quality," Department of Biology, California State University, Los Angeles, CA. (May 6, 2008).
- Grant, S. B., "Tidal Saltwater Wetlands and Coastal Water Quality," Department of Civil and Environmental Engineering, University of Connecticut, Storrs, CT. (May 1, 2008).
- Grant, S. B., "Sources and Transport Pathways of Urban Coastal Pollution," Department of Chemical and Environmental Engineering, UC Riverside, Riverside, CA. (November 30, 2007).
- Grant, S. B. (Plenary Lecturer), Grand Rounds, UCI Medical School, "Exposure patterns and health effects associated with swimming and surfing in polluted marine waters," UC Irvine, CA. (October 24, 2007).
- Grant, S. B., "Sources and Transport Pathways of Urban Coastal Pollution," Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, MD. (June 6, 2007).
- Grant, S. B. (Keynote Speaker), American Geophysical Union Annual Meeting, "Exposure patterns and health effects associated with surfing and swimming in polluted marine waters," Acapulco (Mexico). (May 22, 2007 - May 24, 2007).
- Grant, S. B., Workshop on Pathogen Transport in the Environment, "Pathogen transport in coastal systems," Michigan State University, Lansing, MI. (April 20, 2007).
- Grant, S. B., Newport Bay Fecal Coliform TMDL Technical Advisory Committee, "Sources of Fecal Indicator Bacteria Pollution in Newport Bay," Newport Beach, CA. (April 13, 2007).

- Grant, S. B. (Author), Pednekar, A. (Presenter), Annual Conference, "California sustainable watershed/wetland information manager," California Stormwater Quality Association, Sacramento, CA. (September 25, 2006).
- Grant, S. B., Avalon City Council, "Causes and remediation of fecal indicator bacteria impairment in Avalon Bay, Catalina Island," Avalon, Catalina Island, CA. (August 17, 2006).
- Grant, S. B., Hydrology and Hydraulics Technical Group, "CalSWIM: California Sustainable Watershed/Wetland Information Manager," American Society of Civil Engineers, Irvine, CA. (April 29, 2006).
- Grant, S. B., National Water Research Institute Research Advisory Board, "Continuing Project Review: Dynamics of point and non-point source fecal pollution from an urban watershed in southern California," Reno, NV. (April 29, 2006).
- Grant, S. B., Ocean Science Meeting, "Concentration fingerprinting fecal indicator bacteria sources in a coastal wetland," American Society of Limnology and Oceanography, Honolulu, HI. (February 22, 2006).
- Grant, S. B., Legislator Briefings on Science and Policy, "Public mis-notification of coastal water quality," COMPASS and Sea Web, Panel: Protecting California's Ocean and Coast, State Capital Building, Sacramento, CA. (February 2, 2006).
- Grant, S. B. (Keynote Speaker), Western Regional Meeting, "Integrating molecular biology, physical oceanography, and remote sensing technology to illuminate the sources and pathways of urban coastal pollution," American Chemical Society, Anaheim, CA. (January 23, 2006).
- Grant, S. B., "Future of engineering in today's society," School of Engineering, University of Hawaii, Honolulu, HI. (January 7, 2006).
- Grant, S. B., Wetlands Advisory Board, "Dynamics of point and non-point source fecal pollution in an urban watershed in southern California," City of San Diego, San Diego, CA. (November 15, 2005).
- Grant, S. B., Research Advisory Board Meeting, "Continuing Project Review: Dynamics of point and non-point source fecal pollution from an urban watershed in southern California," National Water Research Institute, Costa Mesa, CA. (October 15, 2005).
- Grant, S. B., California Clean Beaches Initiative, "Mixing and swash zone water quality in tidal embayments: contrasting case studies at Avalon Bay and Newport Beach," State of California Water Board, Dana Point Ocean Institute, Dana Point, CA. (August 16, 2005).
- Grant, S. B., Annual Meeting, "Impact of stormwater runoff on coastal water quality," American Chemical Society, Panel: Environmental Colloids Session, San Diego, CA. (April 25, 2005).
- Grant, S. B. (Author), Pednekar, A. (Presenter), World Water and Environmental Research Congress, "Water quality in a tidal saltwater wetland: influence of climate change, tidal mixing, and watershed urbanization," American Society of Civil Engineers, Anchorage, AK. (March 18, 2005).
- Grant, S. B. (Author), Jeong, Y. (Presenter), Ocean Science Meeting, "Fisher information and analysis of complex environmental signals in coastal water quality monitored at Newport Bay, California," American Society of Limnology and Oceanography, Salt Lake City, UT. (February 25, 2005).

- Grant, S. B., Borchardt Conference on Advancements in Water and Wastewater Treatment, "Water Quality Impact of Storm Water Runoff from the Santa Ana River, southern California," College of Engineering, University of Michigan, Ann Arbor, MI. (February 23, 2005).
- Grant, S. B., Annual Meeting, "Now-casting coastal water quality," National Council on Water Quality Monitoring, San Jose, CA. (December 7, 2004).
- Grant, S. B., California Beach Water Quality Work Group, "Impacts of Storm Water Runoff on Coastal Water Quality," Southern California Coastal Water Research Project, Westminster, CA. (November 16, 2004).
- Grant, S. B., Research Advisory Board Meeting, "Continuing Project Review: Dynamics of point and non-point source fecal pollution from an urban watershed in southern California," National Water Research Institute, Chicago, IL. (October 15, 2004).
- Grant, S. B., National Beaches Conference, "Public mis-notification of coastal water quality," U.S. Environmental Protection Agency, San Diego, CA. (October 13, 2004).
- Grant, S. B., Water Quality Stakeholders Group, "Research update: stormwater runoff from the Santa Ana River," County of San Bernadino, San Bernadino, CA. (October 5, 2004).
- Grant, S. B., Urban Runoff Roundtable, "Urban runoff: a landside perspective," National Water Research Institute, Irvine, CA. (August 4, 2004).
- Grant, S. B., CallT2 Hydrology Workshop, "Combining molecular biology, physical oceanography, and remote sensing technology to illuminate the sources and pathways of urban coastal pollution," CallT2, San Diego, CA. (May 17, 2004).
- Grant, S. B., Newkirk Lecture, "Surf zone pollution: science, sources, and public notices," Newkirk Center for Science and Society, UC Irvine, Irvine, CA. (May 6, 2004).
- Grant, S. B., Orange County Younger Members Forum, "Troubled Waters: Our Ocean Our Beaches," American Society of Civil Engineers, Irvine, CA. (April 27, 2004).
- Grant, S. B., Research Advisory Board Meeting, "Continuing Project Review: Dynamics of point and non-point source fecal pollution from an urban watershed in southern California," National Water Research Institute, Costa Mesa, CA. (April 24, 2004).
- Grant, S. B., "Combining molecular biology, physical oceanography, and remote sensing technology to illuminate the sources and pathways of urban coastal pollution," Department of Environmental Engineering Science, Caltech, Pasadena, CA. (April 7, 2004).
- Grant, S. B., Ocean Science Meeting, "Public mis-notification of coastal water quality," American Society of Limnology and Oceanography, Honolulu, HI. (February 16, 2004).
- Grant, S. B., "Combining molecular biology, physical oceanography, and remote sensing technology to illuminate the sources and pathways of urban coastal pollution," Department of Civil and Environmental Engineering, UC Davis, Davis, CA. (February 5, 2004).
- Grant, S. B., "Combining molecular biology, physical oceanography, and remote sensing technology to illuminate the sources and pathways of urban coastal pollution," Department of Chemical Engineering, UCLA, Los Angeles, CA. (January 30, 2004).

- Grant, S. B., Research Advisory Board Meeting, "Progress Report: UCI Urban watershed runoff studies (Phase III)," National Water Research Institute, Airlie Conference Center, Warrenton, VA. (October 17, 2003).
- Grant, S. B., "Locating and Quantifying Sources of Surf Zone Pollution," Donald Bren School of Environmental Management, UC Santa Barbara, CA. (January 27, 2003).
- Grant, S. B., "Locating and Quantifying Sources of Surf Zone Pollution," Department of Civil and Environmental Engineering, UC Davis, Davis, CA. (January 21, 2003).
- Grant, S. B., "Ocean monitoring and surf zone water quality," Southern California Association of Governments, Panel: Water Policy Task Force, Los Angeles, CA. (December 12, 2002).
- Grant, S. B., "Ocean Water Quality in Surf City: A Scientific Perspective," Water Advisory Committee of Orange County, Fountain Valley, CA. (November 1, 2002).
- Grant, S. B., Water Quality of Lakes, Rivers, and Coastal Zones, "Decadal and shorter period variability of fecal pollution at Huntington Beach, California," American Society of Limnology and Oceanography, UC Irvine, CA. (June 14, 2002).
- Grant, S. B., Workshop on Particles and Polymers Near Interfaces: Fundamentals and Applications, "Role of Interfacial Forces in the Transmission of Pathogens in the Environment," Oud Poelgeest, The Netherlands. (March 23, 2002 - March 26, 2002).
- Grant, S. B. (Author), Clark, C. (Presenter), Ocean Sciences Meeting, "Diurnal photochemical and biological processes of CDOM in southern California coastal waters," American Geophysical Union, Honolulu, HI. (February 11, 2002 - February 15, 2002).
- Grant, S. B. (Author), Boehm, A. (Presenter), Ocean Sciences Meeting, "Long and short term variability in ocean water quality at Huntington Beach, CA," American Geophysical Union, Honolulu, HI. (February 11, 2002 - February 15, 2002).
- Grant, S. B. (Author), Clark, C. (Presenter & Author), Ocean Sciences Meeting, "Variability of hydrogen peroxide, a CDOM photochemical product, in the surf zone," American Geophysical Union, Honolulu, HI. (February 11, 2002 - February 15, 2002).
- Grant, S. B. (Author), Redman, J. (Presenter), Annual Meeting, "Influence of Heterogeneity on Virus Filtration in Porous Media," American Geophysical Union, Panel: Pathogen Transport, San Francisco, CA. (December 10, 2001 - December 15, 2001).
- Grant, S. B., Urban Watershed Conference, "Urban Watershed Impacts on Coastal Beaches," National Water Research Institute, Costa Mesa, CA. (October 17, 2001 - October 19, 2001).
- Grant, S. B., UCI CEO Roundtable Retreat, "The Policy and Perception of Beach Water Quality," UCI Advancement. (June 7, 2001).
- Grant, S. B., UCI Chancellor's Club Lecture Series, "Pollution in the Surf: the Science and Perception of Beach Water Quality," UC Irvine, CA. (May 16, 2001).
- Grant, S. B., Charge Inversion Workshop, "DNA as a model polymer for coagulation studies," Theoretical Physics Institute, University of Minnesota, Minneapolis, MN. (May 11, 2001 - May 13, 2001).
- Grant, S. B., "The Policy and Perception of Beach Water Quality," Department of Civil and Environmental Engineering, UCLA, Los Angeles, CA. (January 16, 2001).

- Grant, S. B., W.M. Keck Lecture Series, "The Policy and Science of Clean Beaches: Lessons from Huntington Beach," Chapman University, Chapman, CA. (November 28, 2000).
- Grant, S. B., "The Sun, The Moon, and Bacterial Pollution at Huntington Beach," Department of Chemical and Environmental Engineering, UC Riverside, Riverside, CA. (June 6, 2000).
- Grant, S. B., City Council, "Ocean Water Quality: Problems and Progress," City of Laguna Beach, Laguna Beach, CA. (March 9, 2000).
- Grant, S. B., USC Sea Grant Blue Ribbon Peer Review Panel, "Tidal Transport of Bacteria Between the Talbert Watershed and the Ocean," National Water Research Institute, Orange County, CA. (March 1, 2000).
- Grant, S. B., Annual Meeting, "Experimental evidence for the universality of particle flocculation," American Chemical Society, Anaheim, CA. poster. (March 21, 1999).
- Grant, S. B. (Author), Boehm, A. (Presenter), Annual Meeting, "Influence of coagulation, sedimentation, and grazing by zooplankton on phytoplankton aggregate distribution below the mixed layer," American Chemical Society, Anaheim, CA. (March 21, 1999).
- Grant, S. B., Annual Meeting, "Particle coagulation and the memory of initial conditions," American Chemical Society, Anaheim, CA. poster. (March 21, 1999).
- Grant, S. B., Annual Meeting, "The effects of biofilms on the filtration of recombinant Norwalk virus particles in capillary columns," American Chemical Society, Anaheim, CA. (March 21, 1999).
- Grant, S. B., Annual Meeting, "The filtration of a filamentous bacteriophage in quartz sand," American Chemical Society, Anaheim, CA. Poster. (March 21, 1999).
- Grant, S. B., "Virus Filtration and Water Reuse: From Microscale Phenomena to Field-Scale Observations," Department of Civil and Environmental Engineering, UC Berkeley, Berkeley, CA. (October 30, 1998).
- Grant, S. B., "Drinking Water Pollution and Your Health," St. Mark Presbyterian Church, Newport Beach, CA. (September 13, 1998).
- Grant, S. B., National Research Council/Water Science and Technology Board, "Virus Filtration and Water Reclamation," National Academy of Sciences, Beckman Academy of Sciences, Irvine, CA.. (February 2, 1998).
- Grant, S. B. (Author), Redman, J. (Presenter), Fall Meeting, "Physicochemical mechanisms governing virus filtration," American Geophysical Union, San Francisco, CA. (December 9, 1997).
- Grant, S. B., CEE Affiliates Quarterly Meeting, "Future of Water Reuse in Orange County," Department of Civil and Environmental Engineering, UC Irvine, CA. (November 4, 1997).
- Grant, S. B., Workshop on Coastal Pollution, "Biological indications of coastal pollution," National Science Foundation, Milwaukee, WI. (October 17, 1997).
- Grant, S. B. (Author), Relle, S. (Presenter), 47th Canadian Chemical Engineering Conference, "A theoretical model for particle separation by magnetic seeding," Canadian Chemical Engineering Society, Edmonton, Alberta (Canada). (October 8, 1997).

- Grant, S. B., 47th Canadian Chemical Engineering Conference, "The removal of fluidborne particles by coagulation: physical insights based on mathematical solutions," Canadian Chemical Engineering Society, Edmonton, Alberta (Canada). (October 8, 1997).
- Grant, S. B., Colloid and Surface Science Symposium, "Factors influencing the stabilization of particles by a model polyelectrolyte," American Chemical Society, Panel: Environmental Phenomena Program, University of Delaware, Newark, DE. (July 2, 1997).
- Grant, S. B., Colloid and Surface Science Symposium, "The importance of pore water pH in the transmission of Norwalk Virus through porous media studied using recombinant Norwalk Virus Particles," American Chemical Society, Panel: Environmental Phenomena Program, University of Delaware, Newark, DE. (July 2, 1997).
- Grant, S. B. (Author), Redman, J. (Presenter), UC Water Reuse Research Conference, "An Electrostatic Mechanism for the Filtration of a Filamentous Bacteriophage in Quartz Sand," UC Water Research Foundation, Monterey, CA. (June 6, 1997).
- Grant, S. B., UC Water Reuse Research Conference, "Recombinant virus particles and water reuse in the 21st century," UC Water Research Foundation, Monterey, CA. (June 6, 1997).
- Grant, S. B., "Virus Filtration and Water Reuse in the 21st Century," Department of Civil and Environmental Engineering, UCLA, Los Angeles, CA. (April 29, 1997).
- Grant, S. B., "Recombinant virus particles and water reuse in the 21st century," Department of Environmental Engineering Science, Caltech, Pasadena, CA. (January 16, 1997).
- Grant, S. B., 70th Colloid and Surface Science Symposium, "Scaling theory and solutions for the steady-state coagulation and settling of fractal aggregates in aqueous environments," American Chemical Society, Panel: Environmental Phenomena Program, Clarkson University, Potsdam, NY. (July 11, 1996 - July 16, 1996).
- Grant, S. B., 70th Colloid and Surface Science Symposium, "The coagulation and stabilization of colloidal particles by model anionic polyelectrolytes," American Chemical Society, Panel: Environmental Phenomena Program, Clarkson University, Potsdam, NY. (July 11, 1996 - July 16, 1996).
- Grant, S. B., 70th Colloid and Surface Science Symposium, "The deposition kinetics of two viruses in packed beds of quartz granular media," American Chemical Society, Panel: Environmental Phenomena Program, Clarkson University, Potsdam, NY. (June 11, 1996 - June 16, 1996).
- Grant, S. B., Symposium on Virus in Groundwater, "Norwalk Recombinant Virus-Like-Particles (rVLPs) for Studying Natural Groundwater Disinfection," National Water Research Institute/US Environmental Protection Agency, Washington D.C.. (March 10, 1996).
- Grant, S. B., The 1995 Water Seminar, "Gene Probe Spectroscopy: A New Approach for Detecting Microorganisms in Water Samples," National Water Research Institute/UC Water Resources Center, National Academies of Sciences, Irvine, CA.. (September 13, 1995).
- Grant, S. B., Annual Meeting, "Deposition mechanisms of Bacteriophage MS-2 and Lambda on ultra-pure crushed quartz," American Chemical Society, Panel: Division of Environmental Chemistry, Anaheim, CA. poster. (August 20, 1995 - August 25, 1995).

- Grant, S. B., Annual Meeting, "Effect of polyelectrolyte chain length on the stabilization of colloidal particles," American Chemical Society, Panel: Division of Environmental Chemistry, Anaheim, CA. poster. (August 20, 1995 - August 25, 1995).
- Grant, S. B., Annual Meeting, "Flocculation and stabilization of colloidal particles by adsorbed block copolymers: role of polymer conformation," American Chemical Society, Panel: Division of Environmental Chemistry, Anaheim, CA. poster. (August 20, 1995 - August 25, 1995).
- Grant, S. B., Annual Meeting, "Scaling theory and solutions for the steady-state coagulation and settling of fractal aggregates," American Chemical Society, Panel: Division of Environmental Chemistry, Anaheim, CA. poster. (August 20, 1995 - August 25, 1995).
- Grant, S. B., 69th Colloid Science Symposium, "DNA as a model polymer for adsorption studies," American Chemical Society, Panel: Biopolymers at Interfaces, University of Utah, Salt Lake City, UT. (June 11, 1995 - June 14, 1995).
- Grant, S. B., Municipal Water Quality Investigations, "DNA Diagnostics for Tracking Microbial Contaminants in the Environment," State of California Department of Water Resources, State Capital Building, Sacramento, CA. (September 1994).
- Grant, S. B., "Train-Loop-Tail Structure of Adsorbed Polymers as Revealed by Hydroxyl Radical Footprinting (HRF)," Department of Environmental Engineering Science, Caltech, Pasadena, CA. (June 1, 1994).
- Grant, S. B. (Author), Duong, M. (Presenter), Annual Meeting, "Microorganism detection by multiple non-specific oligonucleotide probes," American Society of Microbiology, Las Vegas, NV. poster. (May 26, 1994).
- Grant, S. B., Annual Meeting, "Determination of the conformation of adsorbed macromolecules by DNA footprinting," American Chemical Society, Panel: Division of Environmental Chemistry, San Diego, CA. poster. (March 13, 1994 - March 17, 1994).
- Grant, S. B., Annual Meeting, "Virus inactivation and coagulation in aqueous environments," American Chemical Society, Panel: Division of Environmental Chemistry, San Diego, CA. (March 13, 1994 - March 17, 1994).
- Grant, S. B., "Virus Adsorption at the Solid-Liquid Interface," Department of Civil and Environmental Engineering, University of Southern California, Los Angeles, CA. (February 1993).
- Grant, S. B., "Virus Adsorption at the Solid-Liquid Interface," Department of Civil and Environmental Engineering, UCLA, Los Angeles, CA. (November 1992).
- Grant, S. B. (Author), Walker, H. (Presenter), Fall Meeting, "Investigation of the effects of model polyelectrolyte coatings on colloid transport in porous media," American Geophysical Union, San Francisco, CA. poster. (October 27, 1992).
- Grant, S. B., "Detection and Partitioning of Viruses in Fluid/Solid Systems," Department of Environmental Engineering Science, Caltech, Pasadena, CA. (September 1992).
- Grant, S. B., Biotechnology Conference, "Estimating virus viability using a modified nucleic acid hybridization assay," American Society of Microbiology, New York, NY. poster. (June 27, 1991).

Grant, S. B., Biotechnology Conference, "Partitioning of bacteriophage in quartz/water systems," American Society of Microbiology, New York, NY. poster. (June 27, 1991).

Contracts, Grants and Sponsored Research

Fixed Price Contract

Grant, Stanley B. (Principal Investigator), "Contribution of marinas to fecal indicator bacteria impairment in Newport Bay, California," Santa Ana Regional Water Quality Control Board, \$126,096.00. (July 1, 2002 - September 1, 2003).

Grant, Stanley B. (Principal Investigator), "Source identification of fecal indicator pollution in Avalon Bay, California," LA Regional Water Quality Control Board, \$45,620.00. (September 1, 2001 - September 1, 2003).

Grant

Grant, Stanley B. (Co-Principal Investigator), Lopes, Crista (Principal Investigator), "SDCI Data New: Trust Management for Open Collaborative Information Repositories: The CalSWIM," NSF - National Science Foundation, \$194,801.00. (September 1, 2007 - August 31, 2011).

Grant, Stanley B. (Principal Investigator), "Avalon Bay Water Quality Improvement Study," California State Water Quality Control Board, Clean Beaches Initiative, \$506,994.00. (October 26, 2006 - July 1, 2010).

Grant, Stanley B. (Principal Investigator), Holden, Patricia (Co-Principal Investigator), Sedlak, David (Co-Principal Investigator), "Fecal Indicator Bacteria Source Tracking in the Middle Santa Ana River," National Water Research Institute, \$150,000.00. (April 1, 2007 - September 30, 2008).

Grant, Stanley B. (Principal Investigator), "Dynamics of source and non-point source pollution from an urban watershed in S. California," EPA - Environmental Protection Agency, \$26,574.00. (August 1, 2005 - July 31, 2008).

Grant, Stanley B. (Principal Investigator), "Dynamics of Point and Non-point Source Fecal Pollution from an Urban Watershed in Southern California," EPA - Environmental Protection Agency, \$99,861.00. (August 2005 - July 2007).

Grant, Stanley B. (Principal Investigator), Sanders, Brett (Co-Principal Investigator), Holden, Patricia (Co-Principal Investigator), "Dynamics of Point and Non-point Source Fecal Pollution from an Urban Watershed in Southern California," National Water Research Institute, \$375,000.00. (September 1, 2003 - April 9, 2007).

Grant, Stanley B. (Principal Investigator), Sanders, B F (Co-Principal Investigator), Jiang, S (Co-Principal Investigator), "Newport Bay Fecal Coliform Source Identification and Management Plan," State of California Water Quality Control Board, \$745,000.00. (February 15, 2005 - February 28, 2007).

Grant, Stanley B. (Principal Investigator), Sanders, Brett, Holden, Patricia, "Dynamics of point and non-point source fecal pollution from an urban watershed in Southern California," US Geological Survey National Institutes for Water Resources and the National Water Research Institute, \$534,045.00. (September 1, 2003 - February 28, 2007).

- Grant, Stanley B. (Principal Investigator), "Bacterial Sources Study in Western Region of Newport Bay," State of California, Water Resources Control Board, \$52,000.00. (June 2004 - March 2006).
- Grant, Stanley B. (Principal Investigator), "Forecasting Coastal Water Quality with Real-Time Sensor Webs," CA Regional Water Quality Control Board, \$39,000.00. (January 2005 - December 2005).
- Grant, Stanley B. (Principal Investigator), "California Sustainable Watershed/Wetland Information Manager (CalSWIM)," County of Orange, \$40,000.00. (October 2004 - October 2005).
- Grant, Stanley B. (Principal Investigator), Levin, Lisa (Co-Principal Investigator), Winant, Clinton (Co-Principal Investigator), Ambrose, Richard (Co-Principal Investigator), Sanders, Brett (Co-Principal Investigator), "Coastal water quality: The role of wetlands in mitigating the effects of urban and rural runoff," UC Marine Council Multi-Campus Competition, \$663,960.00. (July 1, 2002 - June 30, 2005).
- Grant, Stanley B. (Co-Principal Investigator), Sanders, Brett (Principal Investigator), Sobsey, Mark (Co-Principal Investigator), Horne, Alex (Co-Principal Investigator), Keller, Robin (Co-Principal Investigator), "Identification and control of non-point sources of microbial pollution," U.S. EPA-ORD-NCERQA STAR Competition, \$895,234.00. (August 2000 - January 2005).
- Grant, Stanley B. (Principal Investigator), Sanders, Brett F. (Co-Principal Investigator), "Coastal runoff impact study (UCI-CRIS), Phase III: Loading of fecal pollution from an urban watershed in Southern California," National Water Research Institute, \$50,000.00. (January 1, 2003 - December 30, 2003).
- Grant, Stanley B. (Principal Investigator), "Water Quality Impact of a Lagoon Breach," Southern California Edison, \$75,000.00. (October 1, 2002 - December 30, 2003).
- Grant, Stanley B. (Principal Investigator), Sanders, Brett (Co-Principal Investigator), "Huntington Beach Water Quality Investigation-Phase III," Orange County Sanitation District, \$100,000.00. (September 1, 2001 - August 31, 2002).
- Grant, Stanley B. (Principal Investigator), Sanders, Brett F. (Co-Principal Investigator), Jiang, Chenyang (Co-Principal Investigator), "Coastal runoff impact study (UCI-CRIS), Phase II: Sources and dynamics of pollutants in the Lower Santa Ana River Watershed," National Water Research Institute, \$447,811.00. (August 1, 2000 - May 1, 2002).
- Grant, Stanley B. (Principal Investigator), Bay, Steve (Co-Principal Investigator), Wistrom, Anders (Co-Principal Investigator), Matsumoto, Mark (Co-Principal Investigator), "Pollutants associated with stormwater runoff particle size distributions, Phase I," Caltrans, \$145,037.00. (February 1, 2001 - June 30, 2001).
- Grant, Stanley B. (Principal Investigator), "Microscale mechanisms involved in virus filtration," Arizona State University, \$50,000.00. (1999 - 2000).
- Grant, Stanley B. (Principal Investigator), Sanders, Brett F. (Co-Principal Investigator), "Coastal runoff impact study (UCI-CRIS), Phase I: Causes of surf zone pollution in Huntington Beach, California," National Water Research Institute, \$147,488.00. (November 11, 1999 - October 30, 2000).
- Grant, Stanley B. (Principal Investigator), "Coagulation and settling of particles in aquatic environments," NSF - National Science Foundation, \$350,000.00. (July 1995 - June 2000).

Grant, Stanley B. (Principal Investigator), Ogunseitan, Oladele A (Co-Principal Investigator), Estes, Mary (Co-Principal Investigator), "Norwalk Virus-Like Particles (VLPs) for studying natural groundwater disinfection," NSF - National Science Foundation, \$493,654.00. (November 1995 - October 1998).

Grant, Stanley B. (Co-Principal Investigator), Olson, Terese M (Principal Investigator), "An integrated course series in environmental chemistry and microbiology," NSF - National Science Foundation, \$30,711.00. (September 1994 - August 1996).

Grant, Stanley B. (Co-Principal Investigator), Olson, Terese M (Principal Investigator), Chrysikopoulos, Costas (Co-Principal Investigator), "Deposition mechanisms influencing virus transport in porous media," National Water Research Institute, \$137,000.00. (January 1993 - December 1994).

Grant, Stanley B. (Principal Investigator), "Investigations of polymer conformation and colloid stability using DNA as a model polyelectrolyte," NSF - National Science Foundation, \$161,421.00. (September 1992 - September 1994).

Grant, Stanley B. (Co-Principal Investigator), Olson, Terese M (Principal Investigator), "Investigations of the effects of polyelectrolyte coatings on colloid transport in porous media," DOE - Dept of Energy, \$105,358.00. (August 1992 - July 1993).

Grant, Stanley B. (Principal Investigator), "DNA-tagged latex particles as tracers for environmental contaminants," UC Faculty Research Grant, \$4,980.00. (July 1992 - June 1993).

Professional Service

Ad hoc Reviewer, Environmental Science and Technology (7 manuscripts); Sea Grant (1 proposal); Limnology and Oceanography (1 manuscript); Water Research (1 manuscript); National Science Foundation (1 proposal), Appointed, Pro Bono, International. (2010).

U.S. Environmental Protection Agency, Reviewer, Appointed, Compensated, National. (2010).

Ad hoc Reviewer, Environmental Science and Technology (3 manuscripts); Water Resources Research (1 manuscript); Limnology and Oceanography (1 manuscript); Journal of Geophysical Research-Oceans (1 manuscript); Water Resources (1 manuscript). (2009).

US EPA Science Advisory Board (Science and Technology Achievements Awards Panel), Member, Appointed, Compensated, National. (2004 - 2009).

US EPA Science Advisory Board (Drinking Water Panel), Member, Appointed, Compensated. (2003 - 2009).

NRC/NAE "Committee on Reducing Stormwater Discharge Contributions to Water Pollution", Member, Appointed, Pro Bono, National. (2006 - 2008).

NSF Proposal Review Panel for MUSES: Material Use in Science, Engineering, and Society, Member, Appointed, Pro Bono, National. (2006).

Orange County Sanitation District, Advisor, Appointed, Pro Bono, Regional. (2001 - 2002).

Water Research Environment Foundation, Board of Advisors, Appointed, Pro Bono, National. (2001 - 2002).

UC Water Resources Center, Board of Advisors, Appointed, Pro Bono, State. (2000 - 2002).

National Water Research Institute, Panelist, Appointed, Pro Bono, National. (2000).

U.S. Environmental Protection Agency (Proposal Review Panel), Panelist, Appointed, Pro Bono, National. (2000).

Water Research Environment Foundation (Proposal Review Panel), Member, Appointed, Pro Bono, National. (1999 - 2000).

National Science Foundation (proposal review panel), Member, Appointed, Pro Bono. (1996).

Consulting

Government Agency, US Environmental Protection Agency, California. (October 5, 2010 - October 7, 2010).

Government Agency, California State Water Board, California. (May 25, 2010 - June 10, 2010).

Litigation/Expert Witness, Los Angeles County, Los Angeles. (April 14, 2009 - December 3, 2009).

Government Agency, California State Water Board, California. (March 8, 2009 - October 27, 2009).

Government Agency, City of Avalon/Calif State Water Board, California. (January 1, 2008 - December 30, 2008).

Government Agency, City of Avalon/California State Water Board, California. (June 18, 2007 - December 21, 2007).

TEACHING

Teaching Interests

Professor Grant teaches chemical engineering and environmental engineering courses at the undergraduate and graduate levels.

Special Pedagogical Activities

Medical - Grand Rounds, UC Irvine, (October 24, 2007).

Postdoctoral Research Supervision

June 2006 - September 2007, Youngsul Jeong, Supervisor

Current Position: Research Engineer, Q-Rapha, Inc. (Annandale, Virginia)

July 2007, Jong Ho Ahn, Supervisor

Current Position: Korea Environment Institute (Seoul, Korea)

October 2005 - February 2007, Karen McLaughlin, Supervisor

Current Position: Environmental Scientist, Southern California Coastal Water Research Project 2003 - 2004, Joon Kim, Supervisor

Current Position: Assistant Professor, Department of Environmental Science and Engineering, Guangju Institute of Science and Technology (South Korea)

2001 - 2003, Semsu Ensari, Supervisor

Current Position: Group Leader, Sr. Bioprocess Engineer, Ambrx (San Diego, CA)
2001 - 2002, Jeremy Redman, Supervisor
Current Position: Assistant Professor, Department of Civil and Environmental Engineering,
California State University Long Beach
2000 - 2002, Alexandria Boehm, Supervisor
Current Position: Associate Professor, Department of Civil and Environmental Engineering,
Stanford University
1996, Harold Walker, Supervisor
Current Position: Associate Professor, Department of Civil and Environmental Engineering, The
Ohio State University

Doctoral Committee

2008 - Present, Morgan Bailey, Chair
2005 - Present, Lin Ho, Chair
2006 - July 2010, Rachel Litton, Chair
Current Position: Assistant Specialist (without salary), UCI
July 2007, Abhishek Pednekar, Chair
Current Position: Process Engineer, Worley Parsons Resources and Energy, Monrovia, CA
July 2007, Cristiane Surbeck, Chair
Recipient: EPA STAR Graduate Fellowship, August 2005 to July 2007. Current Position:
Assistant Professor of Civil and Environmental Engineering, University of Mississippi
July 2007, Jong Ho Ahn, Chair
Current Position: Korea Environment Institute, Seoul, Korea
June 2006, Youngsul Jeong, Chair
Recipient: UC Marine Council Graduate Fellowship for NEOCO Research
Current Position: Research Engineer, Q-Rapha, Inc., Annandale, Virginia
June 2003, Joon Kim, Chair
Recipient: National Water Research Institute Graduate Fellowship; UC Marine Council Graduate
Fellowship
Current Position: Assistant Professor of Environmental Science and Engineering, Guangju
Institute of Science and Technology (Korea)
June 2001, Jeremy Redman, Chair
Recipient UCI Regents Fellowship
Postdoctoral Fellow, Yale University
Current Position: Assistant Professor, Civil and Environmental Engineering, California State
University Long Beach
June 2000, Alexandria Boehm, Chair
Recipient UC Chancellor's Graduate Fellowship
UC Faculty Fellow (2000-2002)
Current Position: Associate Professor, Civil and Environmental Engineering, Stanford University
1998, Scarlet Relle, Chair
Recipient: UCI Graduate Opportunity Fellowship (1995-96); Visiting Student Fellowship, Institute
for Rock Magnetism, U of Minnesota (1996); Visiting Scholar, Oak Ridge National
Laboratories (1998)
Current Position: Part-time Instructor, California State Northridge
1996, Harold Walker, Chair
Recipient: Irvine Ranch Water District Fellowship (1995); Fluor Daniel Graduate Fellowship
(1996)
Current Position: Associate Professor of Civil and Environmental Engineering, The Ohio State
University

Doctoral Candidacy Committee

Jong Ahn, Chair

Lin Ho, Chair
Rachel Litton, Chair

Directed Individual/Independent Study

September 2008 - July 2010, Helen Sanchez, Advisor

Master's Thesis Committee

2007, Marc Esplugas, Chair
2005, Terrence Chen, Chair
June 2003, Ryan Reeves, Chair
1996, Samuel Penrod, Chair
1995, Christopher Pendroy, Chair

Undergraduate Research Supervision

June 2002 - July 2005, Scott Ritter, Chair

SERVICE

Department Service

Chair, Chemical Engineering Curriculum Committee. (January 1, 2011 - July 1, 2011).
Chair, Adhoc Review Committee for Tenure Case. (September 1, 2010 - March 1, 2011).
Chair, Department of Chemical Engineering and Materials Science. (2002 - 2009).
Chair, Merit and Promotion Committee. (1999 - 2001).
Chair, ABET Coordinating Committee. (1997 - 1999).
Member, Laboratory Committee. (1995 - 1999).
Member, Undergraduate Affairs Committee. (1995 - 1999).
Member, Faculty Search Committee. (1996).
Member, MSO Search Committee. (1996).
Member, Faculty Search Committee. (1994).
Member, Graduate Studies Committee. (1991 - 1994).

School/College Service

Member, Screening Committee--Assistant Dean Search. (1992 - Present).
Director, Interdisciplinary Environmental Engineering Program. (2001 - 2002).
Member, Screening Committee--Assistant Dean Search. (1993).

University Service

Member, UCI Graduate Council. (2001 - 2002).

Member, UC Water Resources Coordinating Board, Irvine Campus. (1999 - 2001).

Mentor, UC Leads Program. (2000).

Member, Committee on Undergraduate Scholarships and Financial Aid. (1997 - 1999).

Member, Environmental Engineering Curriculum Review Committee. (1995 - 1999).

Advisor, UCI Undecided/Undeclared Students. (1995 - 1999).

Mentor, Pregraduate Mentorship Program. (1993 - 1998).

Reviewer, Site Assessment Curriculum Review Committee-UCI Extension. (1992 - 1995).

Mentor, Summer Undergraduate Research Fellowship. (1992 - 1994).

School of Engineering Representative, UCI Academic Senate. (1991 - 1994).

Reviewer, UC Hazardous Material Training Manual. (1993).

Curriculum Vitae

KARL G. LINDEN

Helen and Huber Croft Professor
Dept. of Civil, Environmental, and
Architectural Engineering
University of Colorado Boulder
Boulder, CO 80309 USA

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E-mail karl.linden@colorado.edu

Education

Ph.D., Civil and Environmental Engineering, University of California, Davis. March 1997.
“UV Disinfection: Estimating Effective Germicidal Dose in Low and Medium Pressure
UV Systems”, Advisor: Jeannie L. Darby.

Master of Science, Civil and Environmental Engineering, University of California, Davis.
March 1993. Advisor: Jeannie L. Darby.

Bachelor of Science, Agricultural and Biological Engineering, Cornell University, Ithaca, NY,
May 1989. Advisor: William J. Jewell.

Areas of Specialization

Teaching

Areas of competence include water and wastewater treatment processes (physical, chemical, and biological), water reuse, UV processes in environmental systems, appropriate treatment technologies, environmental aquatic chemistry, ecological environmental engineering, water treatment process laboratory, water chemistry laboratory. Other teaching interests: bioremediation, environmental toxicology, and natural treatment processes. Experience with students diverse in age, ability, and ethnicity.

Research

Research focuses on investigation of alternative disinfectants and advanced oxidation for water and wastewater treatment. Specifically, efficacy of UV irradiation for inactivation of persistent and emerging pathogens; and advanced oxidation processes for the degradation of environmental pollutants of concern in clean and reclaimed water for reuse. Household disinfection for developing communities. Other experience in biological treatment processes, environmental toxicology, industrial wastewater treatment, greywater reuse, streambank stabilization and classification, natural treatment technologies, appropriate treatment technologies, bioremediation techniques, and anaerobic treatment processes.

Honors, Awards, and Distinctions

Helen and Huber Croft Endowed Professorship, 2011 - 2016

Distinguished Faculty Award, University of Colorado School of Engineering, 2011

Best Student Paper Award to M.S. advisee Sarah Bounty, International UV Association North American Congress, Toronto, Ontario Canada 2011

First Place Poster Award AWWA Water Quality Technology Conference, Phoenix AZ, 2011

Liebman Faculty Fellow, University of Colorado School of Engineering, 2008 – 2010

Best Paper of the Year, Journal AWWA 2010. “Demonstrating 4-log Adenovirus Inactivation in a Medium-Pressure Ultraviolet Disinfection Reactor”, *Journal AWWA* , 101 (4) 90+
Research Development Award, University of Colorado, CEAE Department, 2009
Best Student Paper Award to Ph.D. advisee Anne C. Eischeid, Water Quality Technology Conference, AWWA, Cincinnati, OH 2008.
RMIT International Fellow – Royal Melbourne Institute of Technology, Australia 2007-08
2nd Place Best Doctoral Dissertation. Award to Ph.D. advisee Erik Rosenfeldt, AWWA 2008
Klein/Stansell Family Distinguished Research Award, Pratt School of Engineering, 2004
John-Kelly C. Warren Faculty Scholar, Pratt School of Eng., Duke University 2001-2005
Switzer Environmental Foundation Leadership Fellow: 2001-2003
National Science Foundation New Century Scholar: 1998
UNC-Charlotte Junior Faculty Fellowship - 1998
Trojan Technologies UV Fellow, 1995-96
Switzer Foundation Environmental Fellowship recipient, 1993-94
Chancellors Teaching Fellowship, UC Davis, 1994
USDOE, Graduate Assistance in Areas of National Need - Civil Engineering, 1993-94
Malcolm Stacey Fellowship, UC Davis, 1993-94; 1994-95
Fellow, Professional Studies Program in India, UC Berkeley, 1991-92
National Science Foundation Research Experience for Undergraduates, 1988

Professional Experience

Academic

July 2011 - Present. Helen and Huber Croft Endowed Full Professor, Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Boulder, CO.

January 2008 – 2011. Professor, Department of Civil, Environmental and Architectural Engineering, University of Colorado Boulder, Boulder, CO.

April 2009 – Present. Associate Director of Education and Research, Mortensen Center in Engineering for Developing Communities, University of Colorado Boulder, CO.

July 2005 – December 2007. Associate Professor with Tenure, Department of Civil and Environmental Engineering, Pratt School of Engineering, Duke University, Durham, NC

August 2006 – December 2006. Visiting Professor, University of Colorado at Boulder, Boulder CO, (host: Prof. R. Scott Summers)

January 2001 – June 2005. John-Kelly C. Warren Assistant Professor, Department of Civil and Environmental Engineering, Pratt School of Engineering, Duke University, Durham, NC

July 1999 – 2001. Assistant Professor, Department of Civil and Environmental Engineering, School of Engineering, Duke University

September – December 2003. Visiting Professor, EAWAG, Swiss Federal Institute for Environmental Science and Technology, Dübendorf, Switzerland (with Dr. Urs von Gunten)

March – August 2003. Visiting Professor, Clinical Institute for Hygiene and Medical Microbiology, and the Institute for Medical Physics and Biostatistics, University of Vienna, Austria (with Prof. Regina Sommer and Dipl.-Ing. Alexander Cabaj)

February 2001 – Present. Graduate Faculty, Department of Environmental Science and Engineering, School of Public Health, University of North Carolina at Chapel Hill

August 1997 – June 1999. Assistant Professor, Department of Civil Engineering, University of North Carolina at Charlotte

January - August 1997. Lecturer, Department of Civil Engineering, University of North Carolina at Charlotte

June 1990 - June 1991, April 1992 – December 1996. Research Assistant, Department of Civil and Environmental Engineering, UC Davis

September 1992 – March 1995. Teaching Assistant, Department of Civil and Environmental Engineering, UC Davis

September 1991 – February 1992. UC Berkeley Fellow, Peoples Science Institute, Dehra Dun, India

Consulting

January 2008-2011. Remote Light Inc. Chair – UV Technology Committee

January 1998 – Present. Engineering Consultant: Black and Veatch, Montgomery Watson Harza, US EPA, Cadmus Group, Malcolm Pirnie, Hazen and Sawyer, Carollo Engineers, Colorado Department of Public Health and Environment, Dow Water, Brown and Caldwell.

February – April 1993. Project Engineer, Larry Walker and Associates, Davis, CA

April – September 1990. Project Engineer, Microgen Corporation, Ithaca, NY
Engineer-In-Training Certificate; License XE095615, California; February 1995

Professional Affiliations

American Society of Civil Engineers

American Water Works Association

Association of Environmental Engineering and Science Professors

International Water Association

International Ultraviolet Association

American Chemical Society

Academic Service

University of Colorado at Boulder

Executive Committee, Mortenson Center in Engineering for Developing Communities,
University of Colorado – Boulder, 2010 - present.

Executive Committee, Department of Civil, Environmental, and Architectural Engineering,
University of Colorado – Boulder, 2010 - present.

First Level Review Committee, Chair: College of Engineering and Applied Science, Aug
2010 – 2012

First Level Review Committee, Vice Chair: College of Engineering and Applied Science, Aug
2008 – 2010

Leader, Environmental Sustainability Initiative, CEAS, 2010 – Present

Being the Bridge, faculty liaison for Associate Director of Development Nick Lobejko

Faculty Coordinator, 2010 Rocky Mountain AWWA/WEF Student Conference, University of
Colorado Boulder May 18, 2010.

Department Research Committee: CU Boulder CEAE, 2008 – Present

Department Facilities Committee: CU Boulder CEAE, 2009 – Present

Department Personnel Committee: CU Boulder CEAE, 2009 – Present

Duke University

Tenure Review Committee

The Randolph K. Repass and Sally-Christine Rodgers University Professorship in Marine
Conservation and Technology Search Committee (Pratt and NSOEES) 2004-2006

Hudson Hall Renovations Committee: Chair of the subcommittee on Basement of Hudson /
Environmental Engineering, 2004-2006

Faculty Search Committee Member, Civil and Environmental Engineering, 2002-2007

Departmental Review Committee, Civil and Environmental Engineering, 2002-2006

Committee on Engineering Advisory Universal Resources (COEUR), Pratt School of
Engineering, 2002-2007

Space Allocation Committee, Civil and Environmental Engineering, 2001-2005

Graduate Admissions Advisory Committee, Civil and Environmental Engineering, 2001-2002

Pratt CIEMAS Building Committee, Pratt School of Engin., New Building Design, 2000-2002

Chair Search Committee Member, Civil and Environmental Engineering, 2000-01

Infrastructure Committee, Pratt School of Engineering Strategic Planning Group, 2000-2001

UNC-Charlotte

Duke Energy Endowed Professorship Search Committee, College of Engineering, 1998-99

College of Engineering, Laboratory Equipment Committee, 1997-99

Department of Civil Engineering Computer Committee, 1997-99

Department of Civil Engineering Advisory Committee, 1997-99

Environmental Science and Engineering Interdisciplinary Program Committee, 1997-99

Member, Environmental Academy 1997-99

Professional Service

Committees, Panels and Editorships

Trustee, Water Science and Research Division, American Water Works Association 2011-14

Associate Editor, ASCE: Journal of Environmental Engineering, 2005 - Present

Journal AWWA Best Paper Award selection committee, 2011-2014

Expert Advisory Panel, University of British Columbia, RES'EAU-WaterNET, 2009-2014

Chair, Association of Environmental Engineering and Science Professors (AEESP) Lecturer
Selection Committee, AWWA Liaison, Member, 2010-Present.

Member, University Student Activities Committee, AWWA, 2004-2011

Founding Member/Board Member, International Ultraviolet Association, April 1999 – present

International Vice President, International Ultraviolet Association, June 2001 – present

Executive Operating Committee, International Ultraviolet Association, 2011 – present

President Elect, International Ultraviolet Association, 2011-2012

Editorial Board, UV News, International Ultraviolet Association, 1999 - present.

Chair, Green UV Initiatives Committee, International Ultraviolet Association, 2010 - present

Chair, Committee on UV Practice, IUVA, 2001- 2005

Chair, Awards Committee, IUVA, 2001 – 2003; 2008- present

Member, Student Activities Committee, IUVA, 2001 – 2006

External Site Reviewer, Canadian NSERC Industrial Research Chair Selection, 2010

Site Visit Review Committee. Program in Civil and Environmental Engineering, Louisiana
State University (LSU), April 18-20, 2010

Technical Advisor, New York City Department of Environmental Protection, UV Disinfection

for NYC Drinking Water Supply, October, 2001 – 2006, 2010-2012

Orange County Water District Technical Review Committee for Groundwater Replenishment System, 2001 – 2004

Technical Advisor for Disinfection Research Group, New Zealand, Auckland Regional Council, Project Manukau Wastewater UV Disinfection 2002 - 2004

National Drinking Water Advisory Council (NDWAC), Research Working Group member, US EPA, November 2000 – Present (advises EPA on research priorities in drinking water)

- Futures Research Needs Subgroup, NDWAC, US EPA, 2000 - 2004
- Contaminant Mixtures Research Needs Subgroup, NDWAC, US EPA, 2000 - 2004

International Union of Pure and Applied Chemists (IUPAC) Photochemistry sub-group on UV Disinfection, 1999 – 2002

Special Consultant to the Federal Advisory Committee Act (FACA) in development of the National Regulatory Guidelines Stage 2 Disinfectants/Disinfection Byproducts Rule - US EPA, 1999-2001

US EPA UV Disinfection Technical Working Group Advisory Committee, 1999 – 2002

Steering Committee, National Center for Food Safety and Technology, Validation of Processing Technologies for Juice Conference, February 2003.

NC WEA/AWWA – Student Activities Committee Representative, 1997-2006

Statewide Coordinator, NC Water Resources/Environmental Engineering Teleconference Series, 1997 – 1999

Conferences/Workshops

Symposium Organizer, “Environmental Fate of Dispersants used in Oil Spills” 243rd ACS National Meeting in San Diego, CA 3/24/12 – 3/29/12

Symposium Organizer, “Chemistry of Hydroxyl Radicals in Natural and Engineered Aqueous Systems” 242nd ACS National Meeting in Denver, Colorado, 8/28/11 – 9/1/11

International Scientific Committee, MICROPOL 2011, International Water Association, Sydney Australia

International Scientific Committee, REUSE 2011, International Water Association, Barcelona Spain

Technical Committee Co-Chair, International Ultraviolet Association & International Ozone Association Joint North American Conference, May 3-6, 2009 Boston, MA

US EPA Water Reuse Research Needs Workshop, UNC-Chapel Hill Feb 3-4, 2010

WaterReuse Foundation Research Needs Workshop, San Diego, CA Dec 1-3, 2009

Coordinator, Water Reuse in 2030 International Workshop, Brisbane, Australia Sept. 24-25, 2009.

Coordinator, Water Reuse in 2030 North American Workshop, Denver, CO, June 11-12,

2009.

Chair, Best student paper award, AWWA Water Quality Technology Conference. Savannah, GA. Nov 17, 2010

Chair, Best student paper award, AWWA Water Quality Technology Conference. Seattle WA. Nov 18, 2009

Chair, Best student paper award, AWWA Water Quality Technology Conference. Cincinnati, OH. Nov 19, 2008

Technical Committee Chair, IUVA First World Congress, June, 2001

Technical Committee Co-Chair, IUVA First Asian Regional Congress, October, 2002

Technical Committee member, IUVA UV Karlsruhe, European Conference on UV Radiation: Effects and Technologies, September, 2004

Moderator, Session 4: UV Reactor Design and Validation, International UV Association World Congress and Exhibition, Paris, France, May 22-25, 2011

Moderator, Session 5: UV Validation and Monitoring II, International UV Association North American Regional Congress, Toronto Canada, September 19-21, 2011

Moderator Session 9: Oxidation and Other Disinfection Alternatives, 3/2, 2009. Water Environment Foundation, Disinfection 2009: Addressing the Full Spectrum of Global Disinfection Challenges 2/28-3/3, 2009, Atlanta, Georgia

Moderator Session 12: Water Reuse, 3/2, 2009. Water Environment Foundation, Disinfection 2009: Addressing the Full Spectrum of Global Disinfection Challenges 2/28-3/3, 2009, Atlanta, Georgia

Moderator, UV and Advanced Oxidation Session, AWWA WQTC, Cincinnati, OH, November 2008

Moderator, Universities Forum, AWWA Annual Conference and Exhibition, Atlanta, GA June 2008

Co-Chair, Advanced Oxidation Session, Leading Edge Technologies Conference, IWA, Zurich, Switzerland June 1-4, 2008

Special Topics Session Organizer, Emerging Contaminants, International UV Association World Congress, Los Angeles, CA August 2007

Special Topics Session Organizer, Adenoviruses and UV Disinfection, International UV Association World Congress, Los Angeles, CA August 2007

Moderator, UV Validation and Operational Flexibility Session, AWWA WQTC, Charlotte, NC, November, 2007

WaterReuse Foundation Research Needs Workshop, San Diego, CA Nov 28-30, 2006

Co-Chair, First Mid-East Conference on UV Technologies, Tel Aviv Israel, Nov 2005.

US EPA, American Water Works Association Research Foundation (AwwaRF) Drinking Water Research Needs Expert Workshop, September 1999.

Water Environment Federation, Disinfection Practices CD-ROM: UV disinfection section,
Oct 2000 – April 2002

Coordinator, UV Disinfection Workshop, American Water Works Association Annual
Conference, Nashville, TN, November 2001.

Outreach

Explore Engineering Day for Women, Environmental Engineering Laboratory Tour Leader,
College of Engineering and Applied Science, University of Colorado-Boulder, Nov. 12,
2010.

High School Honors Institute, Water treatment activity, College of Engineering and Applied
Science, University of Colorado-Boulder July 2010

Faculty Advisor, Engineers Without Borders Rwanda Team, University of Colorado-Boulder
2008-Present.

Reviewer of Promotion, Grants, Journals

Review of Tenure Case for University of California, Davis, December, 2011

Review of Tenure Case for Seattle University, September, 2011

Review of Tenure Case for Imperial College, London, February, 2011

Review of Tenure Case for Florida International University, August, 2008

US EPA UV Disinfection Guidance Manual, Co-Author, US EPA, Jan. 2001 – 2006

Review of Tenure Case for National Technological University of Singapore, August, 2007

McGraw Hill Encyclopedia: Author for water treatment and water supply revisions, 2005

Environmental Protection Agency Grants Review Panel, SBIR, July 2002

University of Colorado Seed Grant Review Panel, 2011

National Science Foundation Grants Review Committee, Division of Bioenvironmental
Engineering, March 2001

External Review of MS thesis for Civil Engineering Department at McGill University, 2001

External Review of PhD Thesis for Civil Engineering Department at RMIT University,
Melbourne, Australia 2002-03; 2005

External Review of PhD Thesis for Civil Engineering Department at University of Toronto,
Canada, 2005

External Review of PhD Thesis for Civil Engineering Department at University of Alberta,
Canada, 2006

Project Advisory Committee, AWWARF Proj # 3176, “Evaluation of Computational Fluid
Dynamics (CFD) for Modeling UV-Initiated Advanced Oxidation Processes”, Ducoste,
PI, 2005-2007

- Project Advisory Committee, AWWARF Proj # 2721, “Susceptibility of multiple strains of *Cryptosporidium* oocysts to UV light”, Clancy, PI., 2000-2002
- Project Advisory Committee AWWARF Proj # 2817, “Development of a Particle Actinometer”, Anderson, PI., 2001-2004
- Reviewer: Canadian New Opportunities Fund for Investigators, 2001
- Reviewer: University of Illinois Water Research Center Grants Program, 2001
- Reviewer: NC Water Resources Research Institute (WRRI) Grants, 2003
- Reviewer: NSERC (Canadian National Science and Engineering Research Council) Discovery Grants Program, 2000, 2001, 2003, 2004, 2009, 2010
- Reviewer: NSERC (Canadian National Science and Engineering Research Council) Malcolm Stacey Fellowship Grants Program, 2009
- Reviewer: Science Centers program, U.S. Civilian Research and Development Foundation (CRDF) Grants, 2002
- Reviewer: Collaboration in Basic Science and Engineering (COBASE) National Academies, Grants, 2002.
- Reviewer: United States - Israel Binational Agricultural Research & Development Fund, 2007
- Reviewer: Cottrell College Science Award proposal - Research Corporation, 2006, 2007
- Reviewer: United States Civilian Research & Development Foundation, 2007
- Reviewer: Canadian Water Network Expert Panel proposal review, 2007
- Reviewer: Government of Israel, German-Israeli Proposal Reviewer, 2007
- Reviewer: McGraw Hill Higher Education Texts: new graduate environmental engineering textbook, 2002
- Manuscript Reviewer – *Wat. Environ. Res., Environ. Technol., Wat. Res., ASCE J. Environ. Eng., Biotech. Prog.* (AIChE), *Ozone Sci. Eng., Chemosphere, Environ. Sci. Technol., J AWWA, Env. Eng. Sci.*

Teaching Experiences

University of Colorado at Boulder (Professor)

Fundamentals of Environmental Engineering, CVEN 3414 - Fall 2008, 2009, 2011
Required undergraduate course on science and design of Environmental Engineering processes including water and wastewater treatment, solids waste, air quality, and hazardous waste treatment.

UV Processes in Environmental Systems, CVEN 5834 – Fall 2006, Spring 2010
Elective course for advanced graduate students interested in photolysis and oxidation in water and wastewater, including disinfection and advanced oxidation processes.

Water Sanitation and Hygiene, CVEN 5834-03 – Fall 2008, 2009, 2010, 2011

Graduate course in the Engineering for Developing Communities program covering appropriate treatment technologies for applications in water, air and sanitation in rural and developing communities.

Water Reuse, CVEN 5834 – Spring 2009, 2011

Advanced graduate course focusing on the social, political, and technical aspects of implementing water reuse.

Duke University (Assistant/Associate Professor)

Introduction to Engineering, EGR 010 – Spring 2001, 2002, 2004

Introduction to environmental engineering for freshmen Pratt School of Engineering Students, Team-taught with Joe Nadeau

Environmental Engineering, CEE 124L - Fall 1999

Senior level undergraduate course on science and design of water and wastewater treatment processes, solids waste handling, air quality, and hazardous waste treatment

Chemistry and Microbiology for Environmental Engineers, CEE 120L – Fall 2000 - 2002

Required for undergrad environ. eng. majors integrating research and model lab exercises

Physical and Chemical Treatment Processes, CEE 241 – Fall 2000, 2002, 2004, Spr 2006

Core graduate level science and design course guided toward open-ended problem solving utilizing fundamentals learned in class

Advanced Water Treatment Laboratory, CEE 265.2L - Fall 2001, Fall 2007

Elective graduate laboratory course on treatment of emerging contaminants with advanced treatment technologies (membranes, GAC, UV oxidation, others)

UV Processes in Environmental Systems, CEE 265L/269 – Spring 2000, 2004, Fall 2005

Elective course for advanced graduate students interested in photolysis and oxidation

Ecological Environmental Engineering, CEE 265L – Spring 2005

Elective course for advanced graduate students interested in natural/alternative treatment systems and water sanitation issues relevant to developing countries

University of North Carolina at Charlotte (Assistant Professor)

Environmental Engineering Laboratory, CEGR 3155 - Fall 1997, 1998

Undergraduate course – labs for water and wastewater treatment operations and processes.

Systems and Design, CEGR 3201 - Fall 1997, 1998

1/3 semester module on Environmental Systems Optimization emphasizing calculus, graphical and linear programming solutions to environmental systems optimization problems.

Water/Wastewater Engineering, CEGR 4142 - Spring 1997, 1998, 1999

Upper level undergraduate elective course on science and design of water and wastewater treatment processes including physical, chemical, and biological treatment.

Design of Natural Treatment Systems, CEGR 6892 – Fall 1997

Organized and led independent study class with 4 students on wetlands based treatment systems.

Physical Hydrology and the Rosgen Method, CEGR 6892 - Spring 1998

Independent Study on hydrological processes and design of stream restoration based on the methods developed by David Rosgen.

Teaching Evaluations

Consistently ranked above the Department and College averages for all questions in all classes taught.

Research Funding

As Principal Investigator

1. Smart UV Systems for Urban Clean Water, National Collegiate Inventors and Innovators Alliance (NCIIA) (\$50,000, 3/12-8/13), Linden K.G. (PI) *Pending*
2. Demonstrating Advanced Oxidation Technologies/Biofiltration on Pharmaceutical Removal in wastewater” Water Environment Research Foundation U2R11, (\$190,000, 3/12 – 9/13) Linden, K.G. (PI)
3. “Development of Validation Factors for Possible Low-Wavelength Biases in Assessing UV Inactivation of Cryptosporidium” Water Research Foundation 4421 (\$125,000, 1/12 – 12/13) Linden K.G. (PI)
4. “Guidance Document for Testing Medium Pressure UV Inactivation of Viruses” Water Research Foundation 4376 (\$441,500, 10/11 – 9/13) Linden K.G. (PI)
5. “IRES: Toward Sustainable Water and Sanitation Infrastructure” National Science Foundation OISE - 1065050 (\$149,384, 4/11 - 3/14) Linden K.G. (PI)
6. “Advanced Oxidation and Transformation of Organic Contaminants” Water Research Foundation 4241, (\$785,994, 1/11 – 7/13) Linden K.G. (PI), von Gunten, U. (Co-PI)
7. “Investigating Underlying Mechanisms behind the Extreme Resistance of Adenoviruses to UV Disinfection” National Science Foundation *CBET-0933560* (\$397,281 9/09 – 3/12) Linden K.G. (PI), Hernandez, M. (Co-PI)
8. “Sanitation Marketing and Business Opportunities in Developing Countries” Laird Norton Family Foundation, (\$9,000, 2011) Linden K.G. (PI)
9. “Ozone Testing for Virus Inactivation at the Eastern Wastewater Treatment Plant”, Melbourne Water 1546757, Australia (\$207,658 1/10-6/11), Linden K.G. (PI)
10. “Partnerships in Sustainability: Working with Partners in Peru to Enhance Local Water Projects” Office for University Outreach, University of Colorado-Boulder (\$10,000, 2009-2011) Linden K.G. (PI)
11. “Photochemical Fate Of Oil Dispersants Used in The Gulf Oil Spill clean -up” National Science Foundation RAPID Program *CBET-1043818* (\$82,319 7/10 – 1/12) Linden K.G. (PI), Rosario, F. (Co-PI)

12. "Characterization and Disinfection of Greywater using ozone, UV and Chlorine" Carollo Engineers/San Francisco Public Utilities Commiss. (\$25,500 8/10 – 3/11) Linden K.G. (PI)
13. "Water Reuse 2030" WateReuse Foundation (\$296,954, 2/09 – 6/11) Linden K.G. (PI), Drewes, J; Khan S. (Co-PIs)
14. "Fundamental Mechanisms behind the Extreme Resistance of Adenoviruses to UV Disinfection" National Science Foundation SGER. (\$69,484 9/08 – 8/09) Linden K.G. (PI)
15. "Greywater Treatment Utilizing UV-H2O2 process" Water Legacy (\$3,000, 9/08 – 1/09) Linden K.G. (PI)
16. "UV-Based Advanced Oxidation Treatment of Pre- and Post-GAC Contacted Water" American Water Works Association Research Foundation (\$100,000, 3/08 – 8/09) Linden, K.G. (PI)
17. "Impact of UV Location and Sequence on Byproduct Formation" American Water Works Association Research Foundation (\$436,000, 10/07 – 1/10) Linden K.G. (PI), Weinberg H. (UNC), Mitch W. (Yale) (Co-PIs)
18. "Enhanced Disinfection of Adenoviruses with UV Irradiation" WateReuse Foundation Unsolicited Project (\$168,692, 2/07 – 3/09), Linden K.G. (PI), Thurston-Enriquez J. (USDA) (Co-PI)
19. "Presence, Fate, and Treatability of Estro- and Androgenic Contaminants in Wastewater and Biosolids" US EPA Office of WW Management (\$100,000, 5/06 – 5/08) Linden K.G. (PI), Kullman, S.W. (Co-PI).
20. "Innovative Technologies for Treatment of Reclaimed Water" WateReuse Foundation (\$460,000, 1/06-12/08) Linden K.G. (PI), Salveson, A., Thurston-Enriquez, J. (Co-PIs)
21. "Pulsed UV versus Low to Medium Pressure UV: Evaluation of Drinking Water Treatment Efficiency" US EPA (\$200,000, 9/04-3/08) Linden, K.G. (PI)
22. "UV Disinfection Byproduct Testing" CH2M Hill/Greater Cincinnati WaterWorks (\$16,555, 5/05 – 9/05) Linden K.G. (PI), Reckhow D. (Co-PI).
23. "Impact of UV and UV Advanced Oxidation Processes on Toxicity of Endocrine Disrupting Compounds in Water" American Water Works Association Research Foundation, (\$150,000, 2/03-7/06) Linden, K.G. (PI), Kullman, S.
24. "Impact of UV disinfection on chlorine residuals" University of Toronto (AwwaRF sub agreement) (\$30,000, 7/04-6/05), Linden, K.G. (PI)
25. "Advanced Oxidation Processes for the Treatment of Candidate Contaminant List (CCL) Chemicals" US EPA Office of Water, Cooperative Agreement, (\$300,000, 9/01 – 8/06) Linden, K.G. (PI), Sharpless, C., Suffet, I.H.
26. "Effectiveness of UV Irradiation for Pathogen Inactivation in Surface Waters" US EPA Science To Achieve Results Program, (\$525,000, 9/01 – 10/05) Linden, K.G. (PI), Sobsey, M.D.
27. "Development of an on-line Fluence Meter" KIWA Netherlands, (\$80,000, 5/03-5/04) Linden, K.G. (PI), Sharpless, C.

28. "Innovative technologies for long term compliance with microbial water quality standards", Malcolm Pirnie Inc./Cincinnati Water Works, (\$105,000 3/1/01 – 8/31/02) Linden, K.G. (PI) *Note: Received the Engineering Excellence award in the Research category from the American Council of Engineering Companies (ACEC) of Ohio.*
29. "Innovative UV Technologies to Oxidize Organic and Organoleptic Chemicals" American Water Works Association Research Foundation/US Environmental Protection Agency, (\$425,000 1/1/00-12/31/03) Linden, K.G. (PI), Andrews, S., Atasi, K., Bolton, J., Suffet, I.H.
30. "Fate and persistence of pathogens subjected to disinfection", Water Environment Research Foundation, (\$576,031 1/4/99 – 12/3/03) Linden, K.G. (PI), Sobsey, M.D., and J.D. Oliver.
31. "Disinfection efficiency and dose measurement for medium pressure and pulsed-UV disinfection systems" American Water Works Association Research Foundation, (\$224,780 11/1/98 – 3/31/02) Linden, K.G. (PI), Mofidi, A.A.
32. "UV disinfection of filtered water supplies: Water Quality Impacts on MS2 Dose-Response Curves", Camp Dresser & McKee Inc, (\$86,400, 4/01 – 3/02) Linden, K.G. (PI)
33. "UV Irradiation for Treatment of Taste and Odor Causing Compounds in Water", Camp Dresser & McKee Inc, (\$15,000, 8/01 – 3/02) Linden, K.G. (PI)
34. "Support for Research Assistant Shanshan Jin, Leach fund, Department of Civil and Environmental Engineering, Duke University, (\$6,754, 5/01-8/01) Linden, K.G. (PI)
35. "Comparison of performance and operations and maintenance costs of three of biological nutrient removal schemes at a full-scale wastewater treatment facility in Charlotte NC", North Carolina Water Resources Research Institute – Urban Water Consortium, (\$71,989, 9/1/98 – 8/31/00) Linden, K.G. (PI)
36. "Performance and testing of trickling filter and submerged fixed bed at the Frito Lay Packaging Plant in Charlotte, NC" NSW Corporation (\$31,000, 11/4/98 – 6/25/99) Linden, K.G., (PI)
37. "Optimization of the NSW biotower at the Coca-Cola Bottling Plant in Charlotte NC", NSW Corporation, (\$16,000, 6/15/98 – 12/31/98) Linden, K.G. (PI)
38. "Application of morphologic characterization to urban watersheds for developing stream restoration techniques", City of Charlotte StormWater Services, (\$63,929, 9/1/97 – 8/30/00) Linden, K.G. (PI), Bowen, J.D. and C.J. Allan
39. "Investigation of byproduct formation following high intensity UV irradiation for disinfection of water and wastewater", UNC Charlotte Junior Faculty Research Fellowship, (\$3,500, 5/15/98 – 8/15/98) Linden, K.G. (PI)
40. "Estimating germicidal UV dose from medium pressure UV disinfection systems using a chemical actinometry approach", UNC Charlotte Faculty Research Support Grant (\$5,000, 7/1/97 – 6/30/98) Linden, K.G. (PI)
41. "Support for travel funds to visit two potential industry sponsors" College of Engineering Small Grants Proposal (\$1,500, 1997). Linden, K.G. (PI)
42. "Support for travel funds to NSF Regional Grants Conference in Athens, GA" College of Engineering Small Grants Proposal (\$450, 1997). Linden, K.G. (PI)

43. “Support for travel to Edmonton Canada to present paper at annual joint ASCE/CSCE environmental engineering conference”, International Travel Grant, UNC-Charlotte (\$400, 1997) Linden, K.G. (PI)

As Co-Principal Investigator (\$ is amount to Linden unless noted)

1. “RCN-SEES: Social Ecological Effects of Political and Environmental Change in the Western Amazon” National Science Foundation (\$750,000 total, 9/12 – 8/16) Linden K.G. (Co-PI) *Pending*
2. “Graduate Assistance in Areas of National Need (GAANN) Program: Civil Engineering for Developing Communities” (\$659,643 total, 3/13 – 2/17) Linden, K.G. (Co-PI) *Pending*
3. “WSC: Integration of Water Quality into Sustainable Water Management under Extreme Climate Events”, National Science Foundation (\$1,500,000 total) Linden K.G. (Co-PI) *Pending*
4. “CNH: Monitoring and Modeling of the Human/River Systems in the Napo River Basin of Amazon Peru” National Science Foundation (\$1,500,000 total) Linden K.G. (Co-PI) *Pending*
5. “Enhanced Self Sufficiency for Water with Robust UV LED Disinfection” Office of Naval Research BAA 11-007, Subcontract from Sensor Electronic Technologies (SET) (\$125,000, 3/12 – 2/14)
6. “The Science and Technology of Dispersants as Relevant to Deep Sea Oil Releases: Research Consortia” Gulf of Mexico Research Institute (GRI) (\$11,400,000 total, \$222,000 to Linden, 1/12 – 12/14) Linden, K.G. (Co-PI), John, V. (Tulane-PI)
7. “Demonstrating Advanced Oxidation Technologies on Pharmaceutical Removal Downstream of Biological Treatment” Water Environment Research Foundation INFR 6SG09 (\$37,000, 1/10 – 5/11) Linden K.G. (Co-PI)
8. “Constructed Wetlands and UV Disinfection for Wastewater Treatment and Reuse in Small Communities” Multinational Agricultural Research and Development Program, US-Israeli Bi-National Agricultural Research and Development Fund. BARD FG-9502-09 (\$10,000 4/10 – 3/11) Linden K.G. (Co-PI)
9. “Heterogeneous Photocatalytic System for Water Remediation” Eltron Research (NIEHS 1R41ES017575-01), (\$30,000, 8/09 – 4/10) Linden (Co-PI).
10. Workshop: “Ensuring the Sustainable Reuse of Wastewater for Agricultural Irrigation in Semi-Arid Regions” U.S.-Israel Binational Science Foundation, Linden (Co-PI), Zoller (PI) (\$25,000, 2008)
11. “Fate and Effects of Hormones in Waste From Concentrated Animal Feeding Operations” (CAFOS) US EPA STAR, Linden K.G. (Co-PI), Kullman S.W. (PI), Ferrel G. (USGS) (Co-PI), Meyer M. (USGS) (Co-PI) (\$25,000, 6/07 – 5/10)
12. “Superfund Chemicals Impact on Reproduction and Development, Project 7: Microbial and Photolytic Transformations of Superfund Chemicals“, Subcontract from Superfund

- Hazardous Substances Basic Research Center, Dr. DiGiulio, Duke University, (\$1,400,000 [Shared equally with A. Schuler], 4/05 – 4/09).
13. “Predicting Gene Flow from Transgenic Pine Pollen”, US Department of Agriculture, Linden K.G. (Co-PI), Williams, C. (PI), Katul, G. (Co-PI) (\$196,000, 9/05-8/08).
 14. “Bioanalytical Analysis and Reproductive Effects of Environmental Endocrine Disruptors at Concentrated Animal Feed Operations Affecting North Carolina River Waters” Linden, K.G. (co-PI) Kullman, S.W. (PI) NC Water Resources Research Institute (\$35,000 [Shared with Kullman], 4/05 – 3/06)
 15. “DNA repair of UV irradiated *Giardia lamblia* cysts following low and medium pressure UV disinfection” National Science Foundation, BES - 0302609, Linden, K.G. (Co-PI), Gwy-Am Shin (PI), (\$110,355, 7/03 – 8/06)
 16. “Characterization of Microbial Populations in a Membrane Bioreactor with Powdered Activated carbon for Drinking Water Treatment”, Lord Foundation, (\$12,500 5/1/03 – 2/23/04) Linden, K.G. (Co-PI), Schuler, A.J. (PI)
 17. “UV Water Treatment with Short Wavelength Surface Discharge Lamps”, Phase II Small Business Innovations in Research, National Science Foundation, Subcontract from Phoenix Science and Technology, (\$83,500, 1/03-12/06)
 18. “UV Water Treatment with a Innovative Sparker Technology”, Phase I Small Business Innovations in Research, National Science Foundation, Subcontract from Phoenix Science and Technology, (\$28,527, 6/03-5/04)
 19. “Superfund Chemicals Impact on Reproduction and Development, Project 5: Biological and chemical transformations and subsequent toxicity implications for contaminants“, Subcontract from Superfund Hazardous Substances Basic Research Center, Dr. DiGiulio, Duke University, (\$110,000, 2/02 – 3/05)
 20. “Hydrodynamic characterization of UV reactors”, American Water Works Association Research Foundation, (\$123,000 3/1/01 – 2/28/04) Linden, K.G. (Co-PI), Ducoste, J. Civil Engineering, NC State University (PI)
 21. “Development of Toxicity Bioassays for Pharmaceuticals in Reclaimed Water”, Water Environment Research Foundation, (\$23,000, 10/01 – 10/05) Linden, K.G. (Co-PI), Kullman, S. NSOE, Duke University (PI)
 22. "Inactivation of pathogens by innovative UV technologies", American Water Works Association Research Foundation, Subcontract from University of New Hampshire, (\$85,000 1/1/00 - 12/31/02) Linden, K.G. (Co-PI), Malley, J. UNH (PI)
 23. “UV Water Treatment with a Short Wavelength Surface Discharge Lamps”, Phase I Small Business Innovations in Research, National Science Foundation, Subcontract from Phoenix Science and Technology, (\$22,500, 6/01-12/01)
 24. “Innovative Ultraviolet Light Source for Disinfection of Drinking Water” Phase II Small Business Innovative Research Program, Topic C. Clean Water, US EPA, Subcontract from Phoenix Science and Technology, (\$37,000, 12/01 – 12/02)

25. “Innovative Ultraviolet Light Source for Disinfection of Drinking Water” Phase I Small Business Innovative Research Program, Topic C. Clean Water, US EPA, Subcontract from Phoenix Science and Technology, (\$15,000, 12/00 – 3/01)

Other Funding

1. International Travel Grant to attend and present at IWA 2000, Paris, France. Duke University Office of the Vice Provost, \$750
2. International Travel Grant to attend and present at IWA 2002, Melbourne, Australia. Duke University Office of the Vice Provost, \$750
3. Seed Travel Grant to meet with NSF and WRF officers in Washington DC, April 2008. Dean’s Office, College of Engineering and Applied Science, CU Boulder. \$500

Peer Reviewed Publications

Notes: Names in **Bold** from Linden’s Lab, * indicates Linden is corresponding author; ^ denotes work published prior to academic appointments.

1. **Eischeid, A.**, Thurston, J., ***Linden, K.G.** (2011) ” UV Disinfection of Adenovirus: Current State of the Research and Future Directions” *Critical Reviews in Environmental Science and Technology* Vol. 41, 1375–1396
2. Shah, A.D., **Dotson, A.D.** **Linden, K.G.** Mitch, W.A. (2011) Impact of UV Disinfection Combined with Chlorination/ Chloramination on the Formation of Halonitromethanes and Haloacetonitriles in Drinking Water *Environmental Science and Technology* Vol. 45, 3657–3664.
3. Park, G-W., Vinjie, J., **Linden, K.G.**, Sobsey, M.D. (2011) “Comparative UV inactivation of murine norovirus, feline calicivirus, echovirus 12 and coliphage” Accepted in *Letters in Applied Microbiology* Vol. 52, No. 2. 162-167
4. **Eischeid, A.**, and ***Linden, K.G.** (2011) ”Molecular Indications of Protein Damage in Adenoviruses after UV Disinfection” *Applied and Environmental Microbiology*, Vol. 77, No. 3. Pp 1145-1147
5. **Chatterley, C.J.** and ***Linden K.G.** (2010) “Demonstration and evaluation of germicidal UV-LEDs for point-of-use water disinfection” *Journal of Water and Health*, Vol. 8, No. 3, pp 479 – 486.
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29. **Watts, M.J., *Linden, K.G.** (2007) “Chlorine Photolysis and Subsequent *OH Radical Production During UV Treatment of Chlorinated Water” *Water Research*, Vol. 41, No. 13, 2871-2878.
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Peer Reviewed Publications: Submitted

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2. Matafonova, G., Batoev, V. ***Linden, K.G.** (2011) "Photocatalytic enhanced inactivation of *E. coli* by UV 282 nm XeBr excilamp" *ASCE Journal of Environmental Engineering*
3. **Wu, C.,** Boyd, W., Rice, J., Cui, Y., Freedman, J., **Linden, K.** (2011) "Photodegradation of Organophosphorus Pesticides: Chemical Reduction vs. Toxicity Reduction" *Water Research*
4. **Keen, O.S.,** Thurman, E.M., Ferrer, I., **Dotson, A.D. and *Linden, K.G.** (2011) "Mechanism of dimer formation during UV photolysis of diclofenac" *Environmental Science and Technology*
5. **Keen, O.S., Dotson, A.D. and *Linden, K.G.** (2011) "Evaluation of hydrogen peroxide quenching methods following an advanced oxidation process" *ASCE: Journal of Environmental Engineering*

Peer Reviewed Publications: In Preparation

1. **Jin, S.,** Bolton, J., Cabaj, A., ***Linden, K.G.** (2012) "Determination of the quantum yield for iodide/iodate and uridine actinometers at germicidal UV wavelengths" *Journal of Photochemistry and Photobiology A: Chemistry*
2. **Keen, O.S.,** Love, N.G. and ***Linden, K.G.** (2012) "Advanced oxidation in nitrified effluent" *Water Research*
3. **Keen, O.S.,** Baik, S., ***Linden, K.G.,** Aga, D.S. and Love, N.G. (2012) "Enhanced biodegradation of carbamazepine after UV/H₂O₂ advanced oxidation" *Environmental Science and Technology*
4. **Beck, S.,** Salveson, A., ***Linden, K.G.** (2012). "Assessment of Disinfection Processes for Reuse of Graywater Generated in a Commercial Office Building," *ASCE: Journal of Environmental Engineering*
5. **Bounty, S. Rodriguez, R. Linden, K.G.** (2012), "Inactivation of Adenovirus using Low Dose UV/H₂O₂ Advanced Oxidation" *Water Research*
6. **Parker, A. M.,** Ferrer, I., Thurman, E. M., Rosario-Ortiz, F.L., **Linden, K.G.** (2012) "Determination of COREXIT Components in the Deepwater Horizon Cleanup by Liquid Chromatography-Ion Trap mass Spectrometry." *Journal of Chromatography (In preparation)*
7. Bonnie A. Lyon, **Aaron D. Dotson, Karl G. Linden,** Howard S. Weinberg (2012) The effect of inorganic precursors on disinfection byproduct formation during UV-chlorine/chloramine drinking water treatment" *Environmental Science and Technology*

Conference Proceedings (Competitive Peer Reviewed Abstracts)

1. Azaizeh, H., Linden, K., Kalbouneh, S., Tellawi, A., Gerchman, Y. (2012) Constructed Wetlands and UV Systems for Removal of Enteric Pathogens and Wastewater Contaminants” IWA Wastewater Purification and Reuse March 28-30, 2012, Crete, Greece.
2. Linden, K., Scheible, K., Posy, P. (2011) Regulatory implications of new findings on UV disinfection of Adenovirus in drinking water. AWWA Water Quality Technology Conference, Phoenix, AZ, November 13-16, 2011
3. Brooks, T., Dotson, A.D., Linden, K. (2011) "Nitrate Sensitized Degradation of Free Chlorine during Ultraviolet Irradiation", Water Quality Technology Conference, November 13-16, 2011.
4. Parker, A.M., Mestankova, H., von Gunten, U., Linden, K. G. (2011) “Evaluating the use of AOPs for Treating CCL3 Contaminants.” Water Quality Technology Conference, Phoenix, Arizona – November 13-16, 2011.
5. Thomas, E., Zumr, Z., Barstow, C., Linden, K., (2011) *Proving Sustainability: The International Development Monitoring Initiative* IEEE Global Humanitarian Technology Conference, Technology for the Benefit of Humanity, Seattle WA, October 30-November 1, 2011
6. Keen, O., Baik, S., Linden, K., Aga, D. and Love, N. (2011) “Enhanced biodegradation of carbamazepine after UV/H₂O₂ advanced oxidation.” WEFTEC, Los Angeles, CA, October 16-19, 2011
7. Chatterley, C., Linden, K., Javernick-Will, A. (2011) “Raising the Grade for WASH in Belizean Schools.” Water and Health: Where Science Meets Policy, Chapel Hill NC, Oct 3-7, 2011
8. McClelland, C.J., Linden, K.G. (2011) “Identifying Key Factors that Contribute to Water Reuse Feasibility Using a Hybridized Decision and Scenario Tool”, IWA Reuse Conference, Barcelona Spain, September 26, 2011
9. Beck, S., Salvesson, A., Linden, K. (2011) "Assessment of Disinfection Processes for Reuse of Graywater Generated in a Commercial Office Building," 8th Annual IWA Conference on Water Reclamation and Reuse. Barcelona, Spain. Sept 27, 2011.
10. Keen, O., Baik, S., Linden, K., Aga, D. and Love, N. (2011) “Enhanced biodegradation of carbamazepine after UV/H₂O₂ advanced oxidation.” International UV Association Conference, Toronto, Canada, September 18-21, 2011
11. Linden, K., (2011) “When Dose is not Dose: The Case of UV Disinfection of Adenovirus” International UV Association North American Congress, Toronto, Canada, Sept.18-21, 2011
12. Parker, A.M.,Glover, C. M., Rosario-Ortiz, F. L., Linden, K. G. (2011) “Photochemical degradation of oil dispersants in ocean waters”. IOA/IUVA North American Conference, Toronto, Canada, September 18-21, 2011.

13. Bounty, S., Martin, L., Rodriguez, R., Linden, K.G. (2011) "Inactivation of Adenovirus using Low Dose UV/H₂O₂ Advanced Oxidation", IUVA North American Conference, September 21, 2011 (First Place Student Paper Award)
14. Parker, A.M., Bracken, C., Dotson, A., Linden, K. G. (2011) "A New Approach to Evaluating UV/H₂O₂ Scavenging Demand." American Chemical Society (ACS) – Fall National Meeting – Denver, CO, August 29, 2011.
15. Keen, O., Baik, S., Linden, K., Aga, D. and Love, N. (2011) "Enhanced biodegradation of pharmaceuticals after UV/H₂O₂ advanced oxidation." American Chemical Society annual meeting, Denver, CO, Aug.28-Sept.1, 2011
16. Keen, O. and Linden, K. (2011) "Degradation of antibacterial activity of erythromycin in wastewater by UV/H₂O₂ advanced oxidation." International Water Association Micropol and Ecohazard Conference, Sydney, Australia, July 11-13, 2011
17. Collins, J., Cotton, C., Dotson, A.D., Linden, K. (2011) "Advanced Treatment for Impaired Water Supplies: When Advanced Oxidation Systems are the Best Option", AWWA Annual Conference and Exhibition, Washington D.C., June 12-15, 2011
18. Linden, K.G., Scheible, K., Chen, C., Shin, G-A., Lee, J-K., Posy, P. (2011) "Demonstrating 4-log Adenovirus Inactivation in a Medium Pressure UV Reactor" International UV Association World Congress and Exhibition, Paris, France, May 22-25, 2011
19. Salveson, A., Goel, N., Mackey, E., Kehoe, P., Rhodes, S., Kothari, M., Beck, S., Rodriguez, R., Linden, K.G. (2011) "Characterization of Graywater and Analysis of Treatment Requirements to bring to Title 22 Reuse Standards" 15th Annual Water Reuse and Desalination Conference, Water Reuse Foundation, Las Vegas, NV. May 16-17, 2011
20. Bounty, S., Martin, L., Linden, K.G. (2011) "Inactivation of Adenovirus using Low Dose UV/H₂O₂ Advanced Oxidation", AWWA Rocky Mountain Section Student Conference, May 17, 2011 (Third Place Student Paper Award)
21. Dotson, A.D., Linden, K.G. (2011) "Drinking Water Treatment: Applications of UV", Alaska Water and Wastewater Association, Anchorage, AK April 26, 2011
22. Linden, K. Posy, P. (2011) "Can UV Protect the Public from Adenovirus in Drinking Water?" Disinfection 2011, Water Environment Federation, Cincinnati Ohio, April 10-12, 2011
23. Keen, O., Baik, S., Stadler, L., Linden, K., Aga, D. and Love, N. (2011) "Assessing the use of advanced oxidation and biofiltration to remove recalcitrant pharmaceuticals downstream of biological treatment." The 22nd Triennial Symposium on Advancements in Water & Wastewater 2011 Borchardt Conference, Ann Arbor, MI, Feb.23-24, 2011
24. Barstow, C., Dotson, A., Linden, K.G. (2010) "POU UV Disinfection: Shedding Light on Appropriate Technologies for Developing Communities" Proceedings Water Quality Technology Conference, Savannah, GA, November 14-17, 2010. American Water Works Association, Denver, CO.

25. Dotson, A., Rowley, C., Downs, M., Corwin, C. Linden, K.G. (2010) "UV/H₂O₂: Dynamics of quenching hydrogen peroxide by GAC" Proceedings Water Quality Technology Conference, Savannah, GA, November 14-17, 2010. American Water Works Association, Denver, CO.
26. Lyon, B., Weinberg, H., Dotson, A., Linden, K.G. (2010) "Surrogate Measures for Evaluating Combined UV-Chlorine/Chloramine Drinking Water Treatment", Proceedings Water Quality Technology Conference, Savannah, GA, November 14-17, 2010. American Water Works Association, Denver, CO.
27. Cotton, C., Dotson, A., Jousset, S., Linden, K. Collins, J. (2010) "Applying UV AOP at an Existing WTP: Effects on Disinfection Strategy and DBP Formation" Proceedings Water Quality Technology Conference, Savannah, GA, November 14-17, 2010. American Water Works Association, Denver, CO.
28. Linden, K.G., Eischeid, A., Thurston, J. (2010) "Enhancing the UV Inactivation of Adenoviruses in Reclaimed Water" WaterReuse Research Conference, WaterReuse Research Foundation, Tampa, FL, May 25, 2010
29. McClelland, C.J., Linden, K.G., Drewes, J., Khan, S., Smith, J., Raucher, B. (2010) "Water Reuse 2030: Identifying Challenges" WaterReuse Research Conference, WaterReuse Research Foundation, Tampa, FL, May 25, 2010
30. Dotson, AD; Linden, KG, (2009) "Effect of advanced oxidation (UV/H₂O₂) followed by chlorination on the formation of disinfection by-products", Proceedings Water Quality Technology Conference, Seattle, WA, November, 2009. American Water Works Association, Denver, CO.
31. Bohrerova, Z; Linden, KG, (2009) "*E. coli* Repair under Water Treatment Conditions after Ultraviolet Light Disinfection", Proceedings IOA-IUVA North American Joint Conference, May, 2009, Cambridge, MA, International Ultraviolet Association
32. Eischeid, AC; Linden, KG, (2009) "Protein Damage in UV Treated Adenovirus", Proceedings Water Quality Technology Conference, Seattle, WA, November, 2009. American Water Works Association, Denver, CO.
33. Petri, B; Linden, K; Thurston, J, (2009) "UV Reactor Challenges with Adenovirus: A Comparison of Adenovirus and MS2 Inactivation in Low Pressure and Medium Pressure UV Reactors", Proceedings 5th UV World Congress, Amsterdam, The Netherlands, September, 2009, International Ultraviolet Association.
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35. Lyon, B; Weinberg, H; Dotson, A; Shah, A; Mitch, W; Linden, K, (2009) "Influence of Precursors on Byproducts Produced from UV-Chlorine/Chloramine Treatment of Natural Waters", Proceedings Water Quality Technology Conference, Seattle, WA, November, 2009. American Water Works Association, Denver, CO.

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37. McClelland, CJ; Linden, KG; Drewes, JE and Khan, S, (2009) "Water Reuse 2030: Identifying global challenges Australia and United States" REUSE 09, International Water Association, September 20-25, 2009 Brisbane Australia
38. Linden, K; Ruiz-Haas, P.; Bandy, J; Cho, K-D; Salveson, A; Thurston, J, (2009) Abstract: "Advanced treatment technologies for removal of pathogens and chemical pollutants for water reuse" 237th ACS NATIONAL MEETING & EXPOSITION – Salt Lake City, UT Environmental Chemistry Section, March 2009.
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45. Eischeid, A.C., Meyer, J., Linden, K. (2008) "Fundamental Mechanisms in the Extreme UV Resistance of Adenoviruses" AWWA Water Quality Technology Conference, Cincinnati, OH Nov. 16-19.
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47. Wade, T., Bandy, J., Linden, K., Salveson, A. (2008) "TiO₂ Photocatalysis for Trace Organics & Pathogen Destruction in Recycled Water" 12th Annual Water Reuse and Desalination Research Conference, Denver, CO May 5-6, 2008.
48. Thurston, J., Linden, K., and Salveson, A. (2008) "Occurrence and Disinfection of Adenoviruses in Reclaimed Waters" 12th Annual Water Reuse and Desalination Research Conference, Denver, CO May 5-6, 2008.
49. Barstow, C., Chatterley, C., Ashwood, W., Linden, K. (2008) University of Colorado Rwanda Project; EWB International Conference, March 27-30, 2008, Seattle, Washington.
50. Chatterley, C., Linden, K. (2008) "UV-LEDs for point-of-use water disinfection in developing communities", UCI/UNESCO Conference on Water Scarcity, Global Changes, and Groundwater Management Responses, December 1-5, 2008, Irvine, California.
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52. Eischeid, A., Linden K., (2008) "Direct Assessment of DNA Damage in UV-Treated Adenovirus Using PCR" Presented at the National Water Research Institute (NWRI) Graduate Student Research Fellowship Conference, Washington DC, April 2008.
53. Bandy, J.C., Linden, K.G. (2007) "Microbial Inactivation Using Current and Emerging Reuse Water Treatment Technologies" *Proceedings AWWA Water Quality Technology Conference*, Nov 4-8, Charlotte, NC
54. Ruiz-Haas, P., Cho, K-D., Linden, K.G. (2007) "Assessment of Advanced Treatment Technologies and Processes for Removal of Chemical Pollutants for Water Reuse" *Proceedings AWWA Water Quality Technology Conference*, Nov 4-8, Charlotte, NC
55. Cho, K-D., Ruiz-Haas, P., Linden, K.G., (2007) "Utilization of Estrogenic Screening Assays for Evaluating Innovative Technologies for Reuse Water Treatment" *Proceedings AWWA Water Quality Technology Conference*, Nov 4-8, Charlotte, NC
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58. Watts, M.J., Linden, K.G. (2007) "Photodegradation and Dehalogenation of Aqueous Flame Retardants and Plasticizers" *Proceedings AWWA Water Quality Technology Conference*, Nov 4-8, Charlotte, NC
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61. Salveson, A., Atapattu, K., Linden, K.G., Robinson, K., Bowman, R., Thurston, J., Cooper, R. (2007) "Innovative Treatment Technologies for Reclaimed Water: Ozone/Hydrogen Peroxide Pilot Test Report at DSRSD" Proceedings 22nd Annual WateReuse Symposium, Tampa, FL, Sept 9-12, 2007
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63. Ruiz-Haas, P., Bandy, J.C., Cho, K-D., Salveson, A., Linden, K.G. (2007) "Advanced treatment technologies and processes for removal of chemical pollutants for water reuse: A comparative evaluation" WateReuse Foundation Research Conference, El Paso TX, June 2007
64. Rosenfeldt, E.J., Linden, K.G., Canonica, S., von Gunten, U. (2007) "Comparison of the efficiency of OH radical formation during ozonation and the Advanced Oxidation Processes O₃/H₂O₂ and UV/H₂O₂" Proceedings 4th International Congress on Ultraviolet Technologies (IUVA), Los Angeles, CA, August 26-29, 2007
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66. Cho, K.D., Ruiz-Haas, P., Bandy, J., Linden, K.G. "Degradation of estrogenic disrupting compounds using UV and advanced oxidation processes" Proceedings 4th International Congress on Ultraviolet Technologies (IUVA), Los Angeles, CA, August 26-29, 2007
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70. Thurston, J., Linden, K.G., Salveson, A. (2007) "Adenovirus occurrence in wastewater and reduction by reclaimed water treatment technologies" Proceedings 4th International Congress on Ultraviolet Technologies (IUVA), Los Angeles, CA, August 26-29, 2007
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Environment, Honolulu, Hawaii, December 2005.

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96. Sharpless, C.M., Ijpelaar, G.F., Harmsen, D., Linden, K.G. (2005) "Development of an Online UV Dosimeter" Proceedings, *AWWA Water Quality Technology Conference*, Quebec City, Quebec Canada, November 2005
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 18. Linden, K.G., Scheible, K., Shen, C., Shin, G-A., Posy, P. (2007) "Full-scale validation of 4-log Adenovirus inactivation in medium pressure UV reactors" Proceedings 4th International Congress on Ultraviolet Technologies (IUVA), Los Angeles, CA, August 26-29, 2007
 19. Linden, K.G., Shemer, H., Reckhow, D.A., Makdissy, G. (2007) "Ultraviolet Light Induced Disinfection Byproducts: Realities and Challenges" *Disinfection 2007*, WEF, AWWA, WRF, Feb 5-7, Pittsburgh, PA, USA
 20. Linden, K., Simmons, O., Sobsey, M.D., Dubey, J.P. (2006) "UV Disinfection of *Toxoplasma gondii* oocysts in water", Awwa WQTC, Nov 5-9, Denver CO.
 21. Linden, K.G., Rosenfeldt, E.J., Kullman, S.W., (2006) "UV/H₂O₂ Degradation of EDCs in Water Evaluated via Toxicity Assays" 4th IWA Specialist Conference Oxidation Technologies for Water and Wastewater Treatment May 15-17, 2006, Goslar Germany
 22. Linden, K.G., Rosenfeldt, E.J., Chen, P.J., Kullman, S.W., (2006) "UV and UV/H₂O₂ degradation and subsequent toxicity of endocrine disrupting chemicals in water" Symposium: Safe Drinking Water: Where Science Meets Policy, UNC Chapel Hill, March 16-17, 2006.
 23. Linden, K.G., Rosenfeldt, E.J., Chen, P.J., Kullman, S.W. (2005) "Assessment of estrogenic activity following UV and UV/H₂O₂ degradation of endocrine disrupting chemicals in water" *Pacificchem: Environmental and Green Chemistry Free Radical Chemistry in the Environment*, Honolulu, Hawaii, December 2005.
 24. Pereira, V.J., Linden, K.G., Weinberg, H.S. (2005) "Photodegradation of pharmaceutical and contrast media agents in surface water by direct photolysis and UV advanced oxidation processes" *AWWA Water Quality Technology Conference*, Quebec City, Quebec Canada, November 2005
 25. Bohrerova, Z., Bohrer, G., Mohan, M., Ducoste, J.J., Linden, K.G. (2005) "Experimental Measurements of Fluence Distribution in a UV Reactor Using Fluorescent Dyed Microspheres" *AWWA Water Quality Technology Conference*, Quebec City, Quebec Canada, November 2005
 26. Shemer, H., Sharpless, C.M., Suffet, I.H., Linden, K.G. (2005) "Relative reactivity of Contaminant Candidate List pesticides to OH radical oxidation" *AWWA Water Quality Technology Conference*, Quebec City, Quebec Canada, November 2005
 27. Pereira, V.J., Linden, K.G., Weinberg, H.S. (2005) "Direct photolysis and UV advanced oxidation processes of pharmaceuticals in surface water" 3rd International Congress on Ultraviolet Technologies (IUVA). Whistler, BC, Canada, May 2005
 28. Linden, K.G. Johnson, S. Moore, A. and Malley, J.P. (2005). "Importance of wavelength for UV inactivation of adenovirus in water", 3rd International Congress on

- Ultraviolet Technologies (IUVA). Whistler, BC, Canada, May 2005
29. Linden, K.G., Eischeid, A. (2004) "Effect of Wavelength on Efficiency of DNA Damage During UV Disinfection of *E. coli*" *AWWA Water Quality Technology Conference*, San Antonio TX, November 14-17, 2004
 30. Linden, K.G., Rosenfeldt, E.J., Chen, P.J., Kullman, S.W. (2004) "UV and UV/H₂O₂ degradation and subsequent toxicity of endocrine disrupting chemicals in water" *European Conference on UV Radiation*, Karlsruhe, Germany Sept 22-24, 2004
 31. Linden, K.G., Bolton, J.R., Malley, J.P., Mofidi, A.A., Stefan, M.I. (2003) "Benchmarking UV collimated beam testing: Inter-laboratory comparison of the UV sensitivity of MS2 coliphage", *Proceedings, AWWA Water Quality Technology Conference*, Philadelphia, PA, November 2-6, 2003
 32. Linden, K.G., Sharpless, C.M, Chen, W.R., Suffet, I.H. (2003) "Processes for the treatment of Candidate Contaminant List (CCL) chemicals", *Proceedings, AWWA Water Quality Technology Conference*, Philadelphia, PA, November 2-6, 2003.
 33. Linden, K.G. (2003) Symposium: Treatment Methods for Inactivation of Pathogens in Juice, "UV Light Basics for Treatment of Juice", National Center for Food Safety & Technology, Orlando Fl, Feb 20-21, 2003 – Invited Speaker
 34. Linden, K.G. (2003) "UV and UV-advanced Oxidation processes for removal of EDC in water", IWA First Leading Edge Conference: Drinking Water and Wastewater Treatment Technologies, Noordwijk, The Netherlands, May 26-28, 2003. Invited
 35. Linden, K.G., Rosenfeldt, E.J., Johnson, S., Melcher, B. "Direct UV and UV Oxidation Processes for Treatment of Taste and Odor Causing Compounds in Water" *AWWA Water Quality Technology Conference*, Seattle, WA, November 10-14, 2002.
 36. Linden, K.G. "Teaching Through Research: New Technologies and Emerging Contaminants for Water" Association of Environmental Engineering and Science Professors (AEESP) Research and Teaching Conference Toronto, ON, Canada, 2002
 37. Linden, K.G., Batch, L., Schulz, C. "UV disinfection of filtered water supplies: Water Quality Impacts on MS2 Dose-Response Curves" *AWWA Annual Conference and Exhibition*, New Orleans, LA, June 16-20, 2002.
 38. Linden, K.G. and Ormeci, B. "Comparison of UV and Chlorine Inactivation of Particle and Non-Particle-Associated Coliform", *IWA Enviro 2002 – World Water Congress*, Melbourne, Australia, April 7-12, 2002
 39. Linden, K.G. and Ormeci, B. "Comparative Effectiveness of UV and Chlorine for Inactivation of Particle Associated Coliform", *WEF Disinfection 2002*, St. Petersburg FL, February 17-20, 2002
 40. Linden, K.G., Shin, G.A., and Sobsey, M.D. "Comparison of monochromatic and polychromatic UV light for disinfection efficacy" *Water Quality Technology Conference*, AWWA, Salt Lake City, UT. November 4-8, 2000
 41. Linden, K.G. "Application of UV disinfection for water treatment" *Proceedings, 2000 Annual Conference of the North Carolina Section of AWWA/WEA*, Charlotte, North

Carolina, November 12-14, 2000.

42. Linden, K.G. "Evaluating germicidal dose from UV sources with actinometry – theoretical considerations" *International Conference on Applications of Ozone, International Ozone Association, at Wasser Berlin, Berlin Germany, October 23-26, 2000.*
43. Linden, K.G., Krupa, K. and Harden, C. "Optimization and performance of a trickling filter for treatment of snack food processing plant wastewater" *WEFTEC 2000, 73rd Annual Conference and Exposition on Water Quality and Wastewater Treatment, Anaheim, CA, October 14-18, 2000.*
44. Linden, K.G. Shin, G.A., and Sobsey, M.D. "Relative efficacy of UV wavelengths for the inactivation of *Cryptosporidium parvum*" *Disinfection 2000, WEF Specialty Conference, New Orleans, LA. March 15-17, 2000.*
45. Bonislawsky, M. and K.G. Linden "Costs and performance for 3 BNR schemes at a full scale wastewater treatment plant" " *North Carolina AWWA/WEA Annual Meeting, Asheville, NC, November 15, 1999.*
46. Linden, K.G. and A.A. Mofidi "Measurement of UV irradiance: tools and considerations" *Water Quality Technology Conference, American Water Works Association, Tampa Bay, FL, November 3, 1999.*
47. Linden, K.G. "UV Disinfection: Process and Design Considerations" *North Carolina AWWA/WEA Annual Meeting, Research Triangle Park, NC, November 10, 1998.*
48. Linden, K.G. et al. "Investigation of disinfection byproduct formation following low and medium pressure UV irradiation of wastewater" *WEF Disinfection Specialty Conference, Baltimore, MD. April, 1998.*
49. Linden, K.G. and Darby, J.L. "Measuring UV absorbance of marginal effluents: Impact on UV dose estimation". Presented at *Water Environmental Federation 70th Ann. Conf. and Exhib, Chicago, IL. Oct., 1997.*
50. Linden, K.G. and Darby, J.L. "Estimating effective germicidal UV dose from medium pressure UV lamps using mathematical, bioassay, and chemical actinometry approaches". Presented at *Joint ASCE/CSCE Environmental Engineering Conference, Edmonton, Canada. July, 1997.*
51. Linden, K.G. "UV disinfection efficiency: effect of particulate matter". *California Water Environment Association Annual Conference, Sacramento, CA. April, 1996*
52. Linden, K.G. "Wastewater reuse for organic farmers". *Ecological Farming Conference, Asilomar CA. January, 1994.*
53. Linden(auer), K.G. and J.L. Darby. "Evaluation of ultraviolet light disinfection: significance of photoreactivation", *WEF Disinfection Specialty Conference, Whippany, NJ. May, 1993.*

Invited Lectures/Presentations/Workshops

1. “Expert Workshop on Toxicity Testing of Water Undergoing Advanced Oxidation Processes Prior to Discharge”, US EPA National Homeland Security Research Center, Water Environment Research Foundation, Alexandria, VA December 2, 2011
2. Low Wavelength UV Disinfection Issues Expert Workshop III, AWWA Water Quality Technology Conference, Phoenix, AZ, November 13, 2011
3. “Environmental Engineering FE Exam Review”, CEAE Department, October 13, 2011
4. “Water Reuse Realities”, Guest Lecture in EVEN 1000, October 13, 2011
5. “RES’EAU Knowledge Transfer Workshop –Panel on International Issues in Water”, University of British Columbia, Vancouver, B.C. Canada, October 6, 2011.
6. Low Wavelength UV Disinfection Issues Expert Workshop II, IUVA North American Regional Conference, Toronto, Canada, September 21, 2011
7. “Ozone for virus inactivation at Melbourne Water Eastern Treatment Plant” Victoria Department of Health, Melbourne Australia, August 17, 2011
8. Low Wavelength UV Disinfection Issues Expert Workshop I, AWWA Annual Conference and Exhibition, Washington D.C., June 13, 2011
9. “Ultraviolet Light: What’s Next?” UV Disinfection for the Real World: Back to Basics Workshop, AWWA Annual Conference and Exhibition, Washington D.C., June 12, 2011
10. “Advanced Oxidation Processes in Water Treatment: Monitoring Possibilities” HACH Corporation, Loveland, CO, June 9, 2011
11. “Investigations on the Extreme Resistance of Adenovirus to UV Disinfection” Environmental Engineering and Science Department, Tsinghua University, Beijing, China, June 1, 2011
12. “21st Century Water Treatment: The Case for Ultraviolet Light” Keynote Invited speaker, TEDA UV Workshop, Tianjin, China, May 30, 2011
13. “How Research is Determining Policy: Can UV Protect the Public from Adenovirus in Drinking Water?” Keynote Speaker, International UV Association World Congress and Exhibition, Paris, France, May 22-25, 2011
14. Expert Panel, Impacts of low wavelengths on disinfection credits for Cryptosporidium workshop. International Ultraviolet Association World Congress, Paris, France May 22-25, 2011
15. “Treatment Information Gaps and Research Needs – Identification and Prioritization: Contaminant Groups Treatment Research Prioritization Workshop.” Water Research Foundation, Boulder, CO, April 26-27, 2011
16. “UV Disinfection Basics- Mechanisms and Effectiveness “ UV Disinfection: Fundamentals, Regulations, and Applications Webcast. American Water Works Association, March 23, 2011
17. “Advanced Oxidation Processes in Water and Wastewater Treatment” Rocky Mountain Water and Wastewater Plant Operators School, Broomfield, CO, March 15,

- 2011.
18. “Ultraviolet Light Water Purification” Guest Lecture, CVEN 5524 Water Treatment, February 23, 2011
 19. “Investigations on the Extreme Resistance of Adenoviruses to UV Disinfection” Keynote Speaker: Symposium on Interfacial and Disinfection Chemistry: Fate, Transport, and Adsorption of Pathogens, Nanoparticles, Biocolloids, and Trace Organics in Aquatic Systems, PACIFICHEM 2010, Honolulu Hawaii Dec. 10-15, 2010.
 20. “Comparative roles of photolysis and OH radical in the UV AOP process” Symposium on Chemistry of Ultraviolet Treatment for Water, PACIFICHEM 2010, Honolulu Hawaii Dec. 10-15, 2010.
 21. “UV-Based Technology for Point-of-Use Water Disinfection in Developing Communities” University of California at Davis, Department of Civil and Environmental Engineering. Oct. 13, 2010
 22. “Investigations on the Extreme Resistance of Adenoviruses to UV Disinfection” Department of Civil and Environmental Engineering, University of Alberta, Edmonton, Canada, Oct. 7, 2010
 23. Science and Technology of Dispersants Relevant to Deep Sea Floor Oil Releases, Participant, National Science Foundation Workshop Washington DC Sept. 22, 2010
 24. “Water Reuse 2030: Identifying Challenges” Closing International Panel, 25th Annual WateReuse Symposium, WateReuse Research Foundation, Washington DC, Sept. 15, 2010.
 25. “Investigations on the Extreme Resistance of Adenoviruses to UV Disinfection” Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, Sept. 8 2010
 26. National Academy of Engineering, Frontiers in Engineering First US-EU Workshop, Invited Attendee. Poster Presented, Cambridge, England, Sept. 1-3, 2010
 27. “Emerging Issues in Medium Pressure UV Applications in Water: Pathogens, Organic Matter, and Emerging Contaminants”, Hanovia/Halma Group Inc., Slough UK Aug. 30, 2010.
 28. “Environmental Sustainability and Water Reuse – applications in Peru”, Prosul: VI Workshop Latinamericano; Universidad Catolica, San Pablo, Arequipa, Peru, Aug. 11-12, 2010.
 29. “UV Disinfection: an Emerging Technology for Safe Water” Mini-Course. Prosul: VI Workshop Latinamericano; Universidad Catolica, San Pablo, Arequipa, Peru, Aug. 11-12, 2010.
 30. “Advanced Issues in UV Water Treatment” Atlantium Technologies Industry, Bet Shemesh Israel, July 7, 2010
 31. “UV Disinfection: a technology review for applications to wetlands effluent”, Regional Research & Development Center, the Galilee Society, Shefa-Amr, Israel.

July 6, 2010

32. “UV Disinfection Differences Between LPHO and MP: the curious case of adenoviruses and disinfection byproduct implications”, UV Today – Ten Years Post-*Cryptosporidium*– Myths and Reality. American Water Works Association Annual Conference and Exhibition, Chicago, IL, June 20, 2010
33. “Environmental Sustainability: The Water (Re)Cycle” NSF REU Program Students, Department of Civil, Environmental, and Architectural Engineering, University of Colorado, Boulder, June 14 2010
34. “Training: UV Disinfection of Wastewater – Fundamentals and Emerging Issues” City of Boise, Boise, ID, June 2, 2010
35. “Training: UV Advanced Oxidation for Contaminant Destruction” City of Aurora, CO Training Seminar for start up of the Prairie Waters Water Purification Plant, Aurora, CO, May 7, 2010
36. “Communicating Science: Tools for Scientists and Engineers” Workshop, American Association for the Advancement of Science and the National Science Foundation, Invited Attendee, April 29, 2010
37. “Advanced Oxidation Processes in Water and Wastewater Treatment” Rocky Mountain Water and Wastewater Plant Operators School, Broomfield, CO, March 16, 2010.
38. “Investigations on the Extreme Resistance of Adenoviruses to UV Disinfection” Eawag - Swiss Federal Institute of Aquatic Science and Technology, Dübendorf, Switzerland, Feb. 18, 2010
39. US EPA Water Reuse Research Needs Workshop, Invited Attendee, UNC-Chapel Hill Feb 3-4, 2010
40. “Investigations on the Extreme Resistance of Adenoviruses to UV Disinfection” Department of Civil and Environmental Engineering, University of Michigan, Ann arbor, Jan. 6, 2010
41. WateReuse Foundation Research Needs Workshop, Invited Attendee, San Diego, CA Dec 1-3, 2009
42. “ Application of recent advances in process technology: Progress in Advanced Oxidation”. AWA Australian Water Association Technical Event, Rendevous hotel, Melbourne, Australia, Sept. 29, 2009,
43. “Water Reuse 2030: Identifying Challenges”. Invited Keynote plenary talk: WateReuse Foundation Research Needs Workshop, San Diego, CA Dec. 1-3, 2009
44. “Meeting the Millennium Development Goals: Safe Water and Sanitation” AWWA Water Quality Technology Conference Sunday Workshop: “*Creating Sustainable Water Quality in International Development* “, Nov. 15, 2009
45. “Innovative Treatment Technologies for Water Reuse” CH2MHill Company-wide webcast, Oct. 20, 2009.

46. “UV-Advanced Oxidation for Contaminant Destruction” Black and Veatch Company-wide Web-cast. Sept. 1, 2009.
47. “UV AOP Performance and Evaluation for Contaminant Destruction”, Sunday Workshop: UV and Ozone Advanced Oxidation Processes – Practical Information on an Emerging Treatment Approach, AWWA Annual Conference and Exhibition, June 14, 2009, San Diego, CA
48. From PAHs to Organophosphates: Photolytic Fate in Engineered and Natural Systems, Soil and Crop Science Seminar Series, Colorado State University, May 7, 2009
49. “Advanced treatment technologies for removal of pathogens and chemical pollutants for water reuse” Environmental Chemistry Section, 237th ACS National Meeting and Exhibition – Salt Lake City, UT, March 23, 2009
50. “UV-Advanced Oxidation: Principles UV Advanced Oxidation and UV New Applications” International UV Association 1-day Workshop, Long Beach, CA, March 12, 2009
51. “Directions in Water Treatment Technology - Implementation of improved and expanded treatment technology and management options that enhance reliability and performance of water and wastewater systems, including those in small and remote communities” Keynote Speaker, Canadian Water Network Researchers Retreat, Victoria, Vancouver Island, BC, Canada. June 24-26, 2008.
52. “Advancements in UV/Hydrogen Peroxide AOP”, Keynote Speaker, Leading Edge Technologies Conference, International Water Association, Zurich, Switzerland, June 1-4, 2008.
53. “Formation of Byproducts During Water Treatment by UV-AOP”, Disinfection Byproducts Workshop, Leading Edge Technology Conference, Zurich, Switzerland, June 1-4, 2008
54. “From Polycyclic Aromatic Hydrocarbons to Organophosphates: Photolytic Fate in Engineered and Natural Systems” June 11, 2008, Superfund Basic Research Program Special Seminar Series presented at NCEH/ATSDR Atlanta, Georgia.
55. “Validation Implications Adenoviruses and the Ground Water Rule” Special Workshop on the UV Disinfection Guidance Manual at the AWWA Water Quality Technology Conference, Cincinnati, OH Nov. 16-19, 2008 Linden, K. et al.
56. “What’s Happening in Water Reuse Research at CU Boulder?” Presentation to Front Range Drinking Water Consortium, CO, May 14, 2008.
57. “UV-Advanced Oxidation Process: Treatment of EDCs and PPCPs in Drinking Water” Presented to the Michigan, AWWA section, Lansing, MI May 20, 2008
58. “UV-Based Advanced Treatment Technology for Water Reuse” Sustainable reuse of WW in Agriculture – US-Israeli Binational Science Foundation, Haifa, Israel. Nov. 2008
59. “UV-Advanced Oxidation Process: Treatment of EDCs and PPCPs in Drinking Water” Presented at Center for Water Science, Cranfield University, UK May 28,

2008

60. “Fundamentals of UV-Based Advanced Oxidation Processes”, Special Workshop at Veolia Environment, Brisbane, Australia, October 26, 2007
61. “Validation of UV Disinfection Systems: Lessons from the US EPA UV Disinfection Guidance Manual” Workshop with engineering consultants, water utilities and government regulators, Brisbane, Australia, October 26, 2007
62. “Validation of UV Disinfection Systems: Lessons from the US EPA UV Disinfection Guidance Manual” Workshop with engineering consultants, water utilities and government regulators, Sydney, Australia, October 25, 2007
63. “Ultraviolet Light: Beyond Water Disinfection”, University of New South Wales, Sydney, Australia, October 24, 2007.
64. “Validation of UV Disinfection Systems: Lessons from the US EPA UV Disinfection Guidance Manual” Workshop with engineering consultants, water utilities and government regulators, Melbourne, Australia, October 23, 2007
65. “Applications of Advanced Oxidation Processes to Water Pollutants” and “Treatment of Chemical Contaminants with UV-AOP: The Pros and the Cons” Advanced Oxidation Workshop, Royal Melbourne Institute of Technology, Melbourne, Australia, October, 22, 2007
66. “Environmental Sustainability: The Water (Re)cycle”, A Public Lecture in Storey Hall, Royal Melbourne Institute of Technology, Melbourne, Australia, October, 18, 2007
67. “UV Disinfection: The Next Generation” post-grad mini symposium, RMIT University, Melbourne, Australia, October 16, 2007.
68. “UV Treatment: An Age-old Emerging Technology for Safe Water”, Guest Lecture, Advanced Environmental Class, RMIT University, Melbourne, Australia, October 9, 2007
69. “Production and Destruction of Disinfection Byproducts by UV and Advanced Oxidation Processes” in Organic Byproducts of Potential Health Concern Produced During Drinking Water Treatment Workshop, *AWWA Water Quality Technology Conference*, Nov 4-8, 2007, Charlotte, NC
70. “Treatment of Chemical Contaminants with UV-AOP: The Pros and the Cons” in Advanced Oxidation Technologies in Water Treatment: Fundamentals and Applications Workshop, *AWWA Water Quality Technology Conference*, Nov 4-8, 2007, Charlotte, NC
71. Safe Water Keynote: UV Technologies and the Future of Water Treatment. *Frontiers of Science – National Academy of Engineering*, September 24-26, 2007; Seattle Washington
72. “Advanced Oxidation: an emerging process for clean water” Chemeca 2007, September, 2007, Melbourne Australia. Invited Keynote. [Note: Declined Invite]
73. “Fundamentals and advances in UV based advanced oxidation processes”, Leading

- Edge Technology Conference, International Water Association, June 4-7 2007, Singapore.
74. "Ultraviolet Light Water Purification", University of Colorado Engineers Without Borders, Boulder CO, April 28, 2007
 75. "UV Disinfection: The Next Generation" Arizona State University, Tempe AZ, April 24, 2007
 76. "UV Photolysis and UV-Based Advanced Oxidation Processes" CIRSEE Workshop on Organic Byproducts of Potential Health Concern Produced During Drinking Water Treatment, Paris, France, March 5-9, 2007
 77. "Fundamentals of UV based advanced oxidation processes" and "Destruction of N-nitrosodimethylamine and endocrine disrupting contaminants via UV advanced oxidation" at the Southeastern Technology Transfer Conference, January 24-25, 2007, Greenville, SC.
 78. "UV/H₂O₂ Degradation of EDCs in Water Evaluated via Toxicity Assays" Research Development Group – HACH Corp, Loveland, CO. Nov 9, 2006.
 79. "Ultraviolet Light: Beyond Drinking water Disinfection" Water Engineering Group, CH2MHill, October 11, 2006. Denver, CO
 80. "Ultraviolet Light: Beyond Drinking water Disinfection" Environmental Engineering Seminar Series, Colorado School of Mines, October 19, 2006. Golden, CO
 81. "Ultraviolet Light-Based destruction of Endocrine Disrupting Compounds" Awwa Research Foundation Monthly Tech Talk – Sept. 13, 2006, Denver, CO.
 82. "Ultraviolet Light Induced Disinfection Byproducts: Realities and Challenges" Swiss Federal Institute for Environmental Science and Technology (EAWAG), von Gunten Lab group, May 18, 2006,
 83. "UV Disinfection and the Long Term 2 Enhanced Surface Treatment Rule" NC AWWA Section Special Workshop on LT2 Compliance June 7, 2006
 84. "Ultraviolet Light: Beyond Drinking water Disinfection" Environmental Engineering Seminar Series, University of Colorado at Boulder Jan. 18, 2006, Boulder, CO
 85. "UV-Based Advanced Oxidation for Emerging Contaminants" University of Massachusetts, March 30, 2006, Amherst, MA
 86. Vietnamese Government workshop on Water Pollution Prevention Technologies, Hanoi Vietnam, Nov. 15-16, 2005, "Ultraviolet light disinfection and beyond"
 87. Institute of Environmental Technology, Vietnamese Academy of Science and Technology, Hanoi, Vietnam, Nov. 17, 2005. "UV Oxidation and Subsequent Toxicity of Endocrine Disrupting Chemical in Water"
 88. Tel Aviv Israel – First Mid-East Conference on UV Technologies. Nov. 20-22, 2005 "Fundamentals of UV light based processes"
 89. Yale University, Chemical and Environmental Engineering Department. Sept. 28, 2005 "UV-its not just for disinfection anymore: oxidation of emerging contaminants"

90. State of the Science on Adenovirus, Expert Workshop, AWWA, Sept. 26-27, 2005
“Efficacy of water treatment for adenoviruses and other viruses”
91. “Wait, wait, don’t pump” Public Policies Before and After Hurricane Katrina: Government Responses and Environmental Choices. Terry Sanford Institute of Public Policy, Duke University, Sept. 8, 2005
92. NC AWWA: Stage 2 M/DBP Rules NCSU McKimmon Center Raleigh, June 7, 2005
“UV Disinfection for LT2ESWTR”
93. University of Tokyo Center for Sustainable Urban Regeneration Program, Oct. 7, 2004, "Ultraviolet Based Disinfection and Advanced Oxidation Processes for Drinking Water Treatment"
94. Swiss Federal Institute for Environmental Science and Technology (EAWAG), von Gunten Lab group, Sept 20, 2004, “UV and UV/H₂O₂ degradation and subsequent toxicity of endocrine disrupting chemicals in water”
95. US EPA Office of Water (2004) “Ultraviolet Disinfection and UV-Advanced Oxidation Research” Cincinnati, Ohio, Sept. 9, 2004
96. Gordon Research Conference on Environmental Science: Water (2004): Holderness School, Plymouth, NH, June 27 – July 1, 2004 – Workshop.
97. US EPA Science Advisory Board Meeting (2004) Poster: “UV light based treatment processes for emerging microbial and chemical contaminants” US EPA, Research Triangle Park, NC, May 24-25, 2004.
98. Emerging Contaminants (EDCs and PhACs) Tech Transfer Conferences (2004): “UV photolysis and oxidation for destruction of EDCs in drinking water”, Oakland, CA, May 20, 2004, Awwa Research Foundation
99. Advancing the Quality of Water, National Science Foundation Workshop at UNC Chapel Hill. March 10-12, 2004. Invited Workshop Participant.
100. Kansas University Environmental Engineering Conference, (2004) “UV disinfection and EPA guidance: Where do we go from here?” Lawrence Kansas, February 4, 2004.
101. Swiss Federal Institute for Environmental Science and Technology (EAWAG), Nov 21, 2003, “Kinetic Screening of Candidate Contaminant List (CCL) Chemicals for Treatment by Advanced Oxidation Processes”
102. KIWA-Netherlands “Investigation of an on-line fluence meter for UV disinfection”, progress review. Nov 12, 2003
103. IWA First Leading Edge Conference: Drinking Water and Wastewater Treatment Technologies, (2003) “UV and UV-advanced Oxidation processes for removal of EDCs in water”, Noordwijk, The Netherlands, May 26-28, 2003.
104. UV Technology Transfer conferences, American Water Works Association Research Foundation (AwwaRF) in Chicago (April 8, 2003), Los Angeles (Sept 9, 2003), Boston (May 16, 2003). 2 presentations: “What Else Can UV Do (or NOT do) for Me?: UV Light for Contaminant Degradation in Water” and “Measurement of UV Fluence at the Bench and Full Scale”.

105. International UV Association 2nd International Congress on UV Technologies: UV Disinfection Workshop, talk and demonstration, July 9, 2003, “UV Basics for Disinfection Applications”
106. DVGW UV Workshop, Siegburg, Germany. “Alternative Monitors for UV reactors: Impact on Validation and Operation”, July 7, 2003
107. EPA Science Forum 2003. May 5-7, 2003, “UV light based treatment processes for emerging microbial and chemical contaminants”, Poster Session.
108. University of Vienna, Department of Environmental Hygiene, March-April, 2003, “Balancing chemical and microbial risks in drinking water treatment” Seminar Series.
109. Swiss Federal Institute for Environmental Science and Technology (EAWAG), April 5, 2003, “Ultraviolet Light Photolysis and Advanced Oxidation of Emerging Contaminants in Drinking Water”.
110. International UV Association Texas Regional Workshop, “UV light Disinfection of Water: Fundamentals” Austin, TX. February 27, 2003.
111. Linden, K.G. (2003) Symposium: Treatment Methods for Inactivation of Pathogens in Juice, “UV Light Basics for Treatment of Juice”, National Center for Food Safety & Technology, Orlando Fl, Feb 20-21, 2003.
112. North Carolina Central University – Emerging Technologies Series. “UV treatment of endocrine disrupting contaminants”, Invited February 11, 2003.
113. UV Disinfection Workshop, AWWA Water Quality Technology Conference, Seattle, Washington, November 10, 2002, “UV Dose-Response of Drinking Water Pathogens”
114. Department of Civil and Environmental Engineering, University of Colorado at Boulder, Special Friday Seminar November 8, 2002, “UV Inactivation of Cryptosporidium and Other Drinking Water Pathogens”
115. AWWA Emerging Treatment Technologies Teleconference: Nation-wide broadcast from AT&T Studios, Denver, CO, November 7, 2002, “Emerging Treatment Technologies: UV Light”
116. UV for Cryptosporidium Workshop for the Scottish Executive, Edinburgh, Scotland, October 31, 2002, “Challenges to Accurate Measurement of UV Fluence: Bench and Full Scale”
117. Technologies to Meet Cryptosporidium - Workshop, Birmingham, England, October 29, 2002, “UV Inactivation of Cryptosporidium and other Drinking Water Pathogens”
118. International UV Association Midwest Regional Workshop, Milwaukee, WI. September 23, 2002, “Fundamentals of UV Disinfection”
119. International UV Association Southern Regional Workshop, Tampa, FL. September 6, 2002, “Fundamentals of UV Disinfection”
120. Drinking Water Research Center Symposium, International Ozone Association Annual Conference. May 22, 2002, “Ultraviolet light disinfection of water”
121. Drinking Water Leadership Program: UNC Kenan Flagler Business School. April 24,

- 2002, "Ultraviolet Light for Water and Wastewater Treatment *Facts and Fiction*"
122. Expert Workshop on identifying research needs UV in drinking water treatment: Scientific foundation of successful application. Kiwa Water Research at Nieuwegein, Netherlands. March 22, 2002, "From Collimated Beam to Full Scale UV Treatment"
 123. Bourchart Conference 2002, University of Michigan, Ann Arbor MI. February 27, 2002, "Ultraviolet Light and Advanced Oxidation Processes for Drinking Water Treatment"
 124. South Carolina AWWA Technology Transfer Conference. January 24-25, 2002, "Primer on UV Light Technology" and "UV Light for Disinfection and Contaminant Degradation in Water"
 125. Government of Hong Kong, Water Supplies Department, "UV Disinfection for Control of Cryptosporidium and Giardia in Water", December 17, 2001, China
 126. Government of Hong Kong, Drainage Services Department, "UV applications in Wastewater Disinfection" December 18, 2001, China
 127. Binnie Black & Veatch Engineering Consultants, "UV Disinfection for Drinking Water, Engineering Applications", December 19, 2001, Hong Kong, China
 128. Virginia AWWA Section Seminar Series; "UV Disinfection: Determination of UV Dose", May 1, 2001, Richmond, VA
 129. Water Quality Association Annual Conference and Exhibition, "The Growing Importance of UV in Water Treatment", March 31, 2001, Orlando, FL.
 130. Department of Civil Engineering, NC State University "Ultraviolet Light Photolysis and Advanced Oxidation of Contaminants in Drinking Water", Environmental Engineering Seminar Series, November 19, 2001
 131. AWWA Water Quality Technology Conference, Nashville, TN, "UV Disinfection: Determination of UV Dose in a Collimated Beam and in a UV Reactor" Turning the Lights On: UV Disinfection Workshop, November 11-14, 2001
 132. UV for Drinking Water Seminar, "Recent Advances in UV Research", Boston, MA, November 5, 2001
 133. UV for Drinking Water Seminar, "Overview of the UV Guidance Manual", Boston, MA, November 5, 2001
 134. NC AWWA Drinking Water Seminar Series; "Determination of UV Dose in Bench and Full Scale UV Reactors", UV Disinfection for Drinking Water: Its Coming. October 29, 2001, Raleigh, NC
 135. First International Congress on UV Technologies, "UV Disinfection: Determination of UV Dose in a Collimated Beam and in a UV Reactor" UV Disinfection Basics Workshop, International Ultraviolet Association Washington DC, June 14-16, 2001
 136. UV Disinfection Workshop, "UV Basics", Kansas City, Kansas, March 21, 2001
 137. UV Disinfection Workshop, "UV Disinfection for Water: Reactor Dose Validation", Kansas City, Kansas, March 21, 2001

138. *Water Quality Technology Conference, AWWA, "UV Collimated Beam Testing" UV Fundamentals Workshop, Utah Valley Water Treatment Plant, Salt Lake City, UT. November 4-8, 2000*
139. *International Conference on Applications of Ozone, International Ozone Association, at Wasser Berlin, "Evaluating germicidal dose from UV sources with actinometry – theoretical considerations" Berlin Germany, October 23-26, 2000.*
140. *Advanced Oxidation Technologies International Congress, "Applications of chemical actinometry for measurement of polychromatic UV irradiance" London, Ontario, Canada, June 26-30, 2000*
141. *Trojan Technologies Inc., "Inactivation of *Giardia lamblia* and *Cryptosporidium* in water" London, Ontario, Canada, June 25, 2000*
142. *Keynote Presentation, Trojan Technologies Inc. UV Luncheon Forum at AWWA Annual Conference and Exhibition, "UV Disinfection for *Giardia* and *Cryptosporidium* in Drinking Water" Invited Denver, CO, June 12, 2000*
143. *Israeli Bi-national Science Foundation Workshop, "Ultraviolet disinfection: advances in dose measurement and disinfection efficiency" Invited Participant, Tel Hai Academic College, Kibbutz Kfar Giladim, Upper Galilee Israel, March 8-10 2000.*
144. *UV 2000 Technical Symposium, "UV Dose Verification Using Chemical Actinometry and Biosimetry Methods", Invited presentation, National Water Research Institute, Costa Mesa, CA January 27-28, 2000*
145. *UNC-Charlotte Professional Development Series, "Physical and Chemical Treatment Fundamentals for Water and Wastewater" November 12, 1999*
146. *Duke University Mechanics and the Environment Research Colloquia, "Physical and chemical models for evaluation of germicidal UV irradiance" Oct. 20, 1999.*
147. *Drinking Water Research Needs Workshop, Expert Participant, US EPA, AWWARF, Sept. 27-29, 1999*
148. *USEPA Workshop on UV disinfection of drinking water, "Ultraviolet Disinfection: Factors affecting UV Dose" invited: Washington, DC, April 28, 1999.*
149. *USEPA ICR Stakeholders Meeting, "Ultraviolet Disinfection: Inactivation of Microorganisms" invited: Washington, DC, March 12, 1999.*
150. *University of Cincinnati, "Ultraviolet Disinfection: Understanding Germicidal UV Intensity for Evaluation of New UV Technologies" invited: Cin., OH, Feb 25, 1999.*
151. *UNC-Charlotte PDH Series, "Physical and Chemical Treatment Fundamentals for Water and Wastewater" November 6, 1998*
152. *UNC-Charlotte Spotlight on Research "Disinfection of water and wastewater" (for television broadcast) series September 24, 1998*
153. *UNC-Charlotte MEGR 5090: "Introduction to Bioremediation" Biotechnology and Bioengineering, February, 1998*

154. North Carolina Urban Water Consortium, "UV Disinfection in North Carolina: Needs for Assessment" February, 1998
155. Trojan Technologies Inc., "Determining UV dose in medium pressure UV systems" London, Ontario, Canada, September 17, 1997
156. Maxwell/PurePulse Technologies, "Advances and issues in UV disinfection" San Diego, CA June 3, 1997
157. NC Water Resources/Environmental Engineering Teleconference Series "UV disinfection: determining true UV absorbance and subsequent estimation of UV intensity", April 23, 1997
158. Indian Institute of Technology, "Anaerobic treatment of municipal solid waste" Kanpur, India, January, 1992.

Posters Presented at Conferences

1. Bounty, S., Rodriguez, R., Linden, K. (2011) "Molecular Mechanisms of Adenovirus Resistance to Ultraviolet Disinfection", Water Quality Technology Conference, November 13-16, 2011 (First Place – Best Poster of Conference)
2. Brooks, T., Dotson, A.D., Linden, K. (2011) "Nitrate Sensitized Degradation of Free Chlorine during Ultraviolet Irradiation", Water Quality Technology Conference, November 13-16, 2011.
3. Keen, O. and Linden, K. (2011) Degradation of antibacterial activity of antibiotics during UV/H₂O₂ advanced oxidation. EPA Fellows Conference, Washington, DC, September 19-20, 2011
4. Keen, O.S., Thurman, E. M., Ferrer, I., Dotson, A.D. and Linden, K.G. (2011) Degradation products of pharmaceutical diclofenac during UV photolysis. Annual Mass Spectrometry Workshop, Buffalo, NY, June 13-14, 2011
5. Glover, C.M., Parker, A.M., Linden, K.G., Rosario-Ortiz, F. (2011) "Photochemical Degradation of COREXIT in Surface Ocean Water" American Chemical Society National Conference, Anaheim, CA, March 27-31, 2011
6. Barstow, C., Dotson, A., Linden, K.G. (2010) "Development of a POU UV Device for Household Water Disinfection", Where Science Meets Policy, UNC Water Institute, Chapel Hill, NC Oct 24-26, 2010
7. Chatterley, C., Linden, K.G. (2010) "Local Perspectives and Challenges to Cleaning up School WASH in the Peruvian Amazon" Where Science Meets Policy, UNC Water Institute, Chapel Hill, NC Oct 24-26, 2010
8. Parker, A-M, McIntosh, C., Dotson, A.D., Linden, K.G. (2010) "Modeling the hydroxyl radical scavenging potential of natural waters" Gordon Research Conference, Environmental Sciences: Water. Holderness, New Hampshire, June 20-25, 2010
9. Dotson, A.D., Beggs, K., Linden, K.G. (2010) "Phototransformation of natural organic

- matter during UV disinfection of drinking water” Gordon Research Conference, Environmental Sciences: Water. Holderness, New Hampshire, June 20-25, 2010
10. Barstow, C., Chatterley, C., Linden, K (2010) "UV-LEDs for Point-of-Use Water Disinfection in Developing Communities" Water Science Day, University of Colorado, June 23, 2010
 11. Cotton, C., Collins, J., Jousset, S. Dotson, A., Linden, K.G. (2010) “Selection of Hydrogen Peroxide Quenching Process for AOP Treatment: Options, Water Quality Issues, and Costs” AWWA ACE, Chicago, IL, June 20-24, 2010
 12. Barstow, C., Chatterley, C., Linden, K (2010) "UV-LEDs for Point-of-Use Water Disinfection in Developing Communities" Rocky Mountain WEA/AWWA Student Conference, University of Colorado, May 18, 2010
 13. Brooks, T., Dotson, A., Linden, K.G. (2010) “Enhanced UV photolysis of free chlorine in the presence of nitrate” Rocky Mountain WEA/AWWA Student Conference, University of Colorado, May 18, 2010
 14. Keen, O., Thurman, E.M., Ferrer, I., Dotson, A., Linden, K.G. (2010) “Degradation and products of the pharmaceutical Diclofenac during UV Photolysis” American Chemical Society National Meeting in San Francisco, CA, March 21-24, 2010
 15. Ruiz-Haas, P., Cho, K-D., Linden, K.G. (2010) “Comparative Evaluation on Fate and Treatability of Estrogenic Contaminants in Conventional Wastewater Treatment Plants” American Chemical Society National Meeting in San Francisco, CA, March 21-24, 2010
 16. Barstow, C., Chatterley, C., Linden, K (2010) "UV-LEDs for Point-of-Use Water Disinfection in Developing Communities", Graduate Student Visitation Day, University of Colorado. March 5, 2010
 17. Lyon, B. Howard Weinberg, Ana M. Sáenz de Jubera, Jennifer Chu, Sara Rodriguez-Mozaz, Karl Linden, Aaron Dotson, (2009) “Relationship Between Natural Organic Matter Polarity and Disinfection Byproduct Formation During Ultraviolet Treatment and Disinfection of Drinking Water” Micropol and Ecohazard 2009 June 8-10, 2009, San Francisco, CA
 18. Chatterley, C., Linden, K., (2008) “UV-LEDs for Point-of-Use Water Disinfection in Developing Communities” Energy Initiative Research Symposium, University of Colorado, Boulder, CO, November 17, 2008
 19. Watts, M.J., Linden, K.G. (2007) “OH-Radical Oxidation of Chlorinated Organophosphate Esters” AWWA *Water Quality Technology Conference*, Nov 4-8, Charlotte, NC
 20. Rosenfeldt, E.J., Linden, K.G. (2006) “Destruction of estrogenic activity in water using UV oxidation technology” *Gordon Research Conference: Environmental Science – Water*. Holderness School, Plymouth, NH, June 26 - 30 2006.
 21. Mamane, H., Shemer, H. Linden, K.G. (2006) “Advanced Oxidation of Viruses and Microorganisms” *4th IWA Specialist Conference Oxidation Technologies for Water and Wastewater Treatment* May 15-17, 2006, Goslar Germany

22. Schaefer, R., Grapperhaus, M. Linden, K.G., Bohrerova, Z., Mamane, H. (2005) "Improved Disinfection with a New Pulsed UV Lamp" *WEF/AWWA Disinfection 2005*, Phoenix, AZ, February 6-9, 2005
23. Linden, K.G., Rosenfeldt, E.J., Chen, P.J., Kullman, S.W. (2004) "Effect of UV based treatments on endocrine disrupting chemical bio-activity in water" *Gordon Research Conference Environmental Science: Water* Holderness School, Plymouth, NH, June 27 – July 1, 2004.
24. Chen, P.J., Rosenfeldt, E.J., Linden, K.G., Kullman, S.W. (2004) "Effect of UV based treatments on endocrine disrupting chemical bio-activity in water" Research Division: *Annual Conference and Exhibition of the American Water Works Association*, Orlando, FL, June 13 –16, 2004.
25. Mamane-Gravetz, M., Linden, K.G. (2003) "UV disinfection of indigenous aerobic spores: Implication for UV reactor validation in unfiltered waters" International UV Association 2nd International Congress on UV Technologies. **First Place, Best Poster of Conference**
26. Linden, K.G. (2003) "UV light based treatment processes for emerging microbial and chemical contaminants", EPA Science Forum 2003. May 5-7, 2003, Invited
27. Shin, G-A, Sobsey M.D., Linden, K.G. (2003) "Balancing chemical and microbial risks in drinking water treatment" EPA All investigators Meeting, Cincinnati, OH, Aug 5-7, 2003, Invited
28. Rosenfeldt E.J., and Linden, K.G. (2002) "Treatment of the endocrine disrupting compounds bisphenol A and ethinyl estradiol using direct UV photolysis and UV/H₂O₂ advanced oxidation process" 2002 NC AWWA/WEA Annual Conference, Winston Salem, NC, Nov. 18-20, 2002 – **Second Place Winner**
29. Rosenfeldt E.J., and Linden, K.G. (2002) "Treatment of the endocrine disrupting compounds bisphenol A and ethinyl estradiol using direct UV photolysis and UV/H₂O₂ advanced oxidation process" 2002 Endocrine Disruptors Symposium, AWWA, Cincinnati, Ohio, April 18-20,2002
30. Linden K.G., Jin, S., Mofidi, A. (2000) "Disinfection Efficiency and Dose Measurement for Polychromatic UV Systems" Research Division: *Annual Conference and Exhibition of the American Water Works Association*, Denver, CO, June 11 –15, 2000 – **Research Division: 3rd Place Winner**
31. Linden, K.G. Shin, G.A., and Sobsey, M.D. (2000) "Comparative effectiveness of UV wavelengths for the inactivation of *Cryptosporidium parvum* in water" *International Water Association First World Congress*, Paris France, July 5-8, 2000.
32. Linden, K.G. (2000) "Application of UV Disinfection for Water Treatment", *Annual North Carolina Water Resources Research Conference*, N.C. State University - McKimmon Center Raleigh, North Carolina, March 30, 2000

Graduate Students Theses Directed or Co-Directed

1. Wilkerson, Shawn “Application of Morphologic Characterization to Urban Watersheds for Developing Stream Restoration Techniques”, MS Dec. 1998. Current Position: Engineer at City of Charlotte Storm Water Services, Charlotte, NC
2. Osborne, Michael “Performance and optimization of biotower for treatment of beverage industry wastewater”, MS Dec. 1998. Current Position: Engineer at WK Dickson and Associates in Charlotte, NC
3. Keaton, Jeffrey “Criteria and identification of reference reaches for urban stream restoration”, MS May 1999. Current Position: Process Engineer at CH2MHill in Charlotte, NC.
4. Soriano, Girlie “Investigation of disinfection by-product formation following low and medium pressure UV irradiation of wastewater” MS UC Davis, May 1998. Current Position: Engineering Consultant, Northern CA. (Co-directed)
5. Bonislowsky, Mary “Comparison of performance and operations and maintenance costs for three biological nutrient removal schemes at a full-scale wastewater treatment plant”, MS December 2000. Current Position: Process Engineer at Black & Veatch in Charlotte, NC
6. Christensen, Jason “Impacts of particles on dose delivery in UV disinfection systems”, MS March 2001. Current Position: Project Engineer at HDR in Austin, TX.
7. Jin, Shanshan “Practical considerations for actinometer based UV dosimetry: stability of uridine and iodide/iodate actinometers under experimental conditions”, MS 2002. Current Position, Consulting Engineer, Hazen and Sawyer, Alexandria, VA.
8. Jin, Shanshan “Fluence Measurement for Polychromatic UV Disinfection Systems: Bench Scale Modeling and Applications to Characterization of UV Reactors”, Ph.D. 2003. Current Position, Consulting Engineer, Hazen and Sawyer, Alexandria, VA.
9. Ishida, Gina “Sequential inactivation of microorganisms: UV and chlorine”, MS June 2001 - UNC. Current Position: Project Engineering at Carollo Engineers in Phoenix, AZ. (Co-Directed)
10. Batch, Lawrence “Water Quality Impacts on UV Disinfection of MS2 Virus in Filtered Water Supplies”, MS May 2002. Current Position: Naval Engineering, San Diego, CA
11. Khanna, Nitin “ Ultraviolet Inactivation Kinetics and Time-Dose Reciprocity of *E. coli* and *S. typhimurium*.” MS December 2003. Current Position, MacConnell and Associates, Morrisville, NC
12. Rosenfeldt, Erik “Destruction of endocrine disrupting compounds in water with direct UV and UV/H₂O₂ advanced oxidation” MS December 2003, Current Position, Assistant Professor, Department of Civil and Environmental Engineering, University of Massachusetts, Amherst, MA.
13. Shringapure, Nilesh “Predicting medium pressure UV fluence via biodosimetry using *Escherichia coli*, MS2 Bacteriophage and *Bacillus subtilis* spores” MS May 2004, Current Position, Black and Veatch Engineers

14. Eischeid, Anne “UV inactivation of E. coli measured by ESS assay” MS June 2004, Current Position, PhD Student, Duke University.
15. Mamane, Hadas, Ph.D. December 2004. “Factors affecting UV inactivation of pathogens in unfiltered waters” Environmental Engineering. Current Position: Lecturer, School of Engineering, Tel Aviv University, Israel.
16. Pereira, Vanessa, Ph.D. 2005. “UV and ozone degradation of pharmaceuticals in water” UNC (2005) (Co-Directed with H. Weinberg). Currently Research Associate, Portugal
17. Hannah Saunders, M.S. 2005. “UV disinfection of adenovirus in water” UNC (Co-directed with Mark Sobsey), Currently with NIEHS, Raleigh, NC
18. Chen, Pei-Jen, Ph.D. December 2005. Environmental Engineering – “Application of Bioanalytical techniques for evaluation of UV based treatment of EDCs in water”. Currently Assistant Professor, National University of Taiwan
19. Rosenfeldt, Erik, Ph.D. May 2007. Environmental Engineering – UV oxidation of emerging contaminants. Recipient of 2005 Abel Wolman Award, AWWA. Recipient of 2005-2007 NWRI Doctoral Fellowship. Current Position: Assistant Professor, Department of Civil and Environmental Engineering, University of Massachusetts, Amherst, MA.
20. Wu, Changlong, Ph.D. December 2008. Development of fundamental UV reaction parameters for CCL contaminants. Research Scientist, Syngenta
21. Bandy, Jeffrey, Ph.D. 2009. Integrating synergistic multiple barriers in Water Reuse treatment. Research Engineer at Carollo Engineers
22. Watts, Michael, Ph.D. May 2008. Oxidation and photodegradation of emerging contaminants in water. Currently Assistant Professor, Florida State University.
23. Eischeid, Anne, Ph.D. 2009. Molecular basis for viral resistance to UV disinfection. Currently Research Scientist at US FDA.
24. Christie Chatterley, M.S. (Colorado) –2009. UV LEDs for sustainable disinfection
25. Olya Keen, Current Ph.D. student (Colorado) – Exp 2011. Advanced oxidation of pharmaceuticals in wastewater. US EPA STAR Fellow. ACS Graduate Student Award in Environmental Chemistry.
26. CJ McClelland, Ph.D. student (Colorado) – 2011. Decision Support for implementing water reuse in arid regions.
27. Christina Barstow, M.S., Dec 2010 (Colorado). UV in a can – developing on-demand household water treatment systems
28. Cole Sigmon, M.S. August 2011 (Colorado). Ozonation of wastewater for inactivation of viruses. Currently Engineer at Boulder Wastewater Treatment Plant, CO
29. Christie Chatterley, Current Ph.D. student (Colorado) – Exp 2012. Evaluation of School based water sanitation and hygiene programs in Peru. Mortenson Research Fellow
30. Sara Beck, Current Ph.D. student (Colorado) – Exp 2013. Development of novel on-demand household water treatment for developing communities. EPA STAR Fellow,

AWWA Pirnie Fellowship, Civil Engineering Dean's Outstanding Graduate Research Assistantship, Mortenson Center Dean's Outstanding Merit Fellowship

31. Austa Parker, Current Ph.D. student (Colorado) – Exp 2013. Oxidation processes and subsequent toxicity for EPA CCL3 contaminants. NSF Graduate Research Fellow.
32. Traci Brooks, M.S. student (Colorado) – 2011. UV photolysis for production of ultrapure water – impact of nitrate.
33. Sarah Bounty, Current M.S. (Colorado) – Exp 2012. DNA and protein damage of adenoviruses from UV disinfection in water.
34. Christina Barstow, Current Ph.D. Student (Colorado) – Exp 2013. Monitoring strategies for assessing engineering interventions for water treatment in developing communities. Two time Boren Fellow for study in Rwanda. Beverly Sears Award 2011.
35. Stephanie Kover, Current M.S. Student (Colorado) – Exp 2013. Co-advised with Rosario. Degradation of dispersants used in oil spills via sunlight.
36. Sonya Milonova, Current M.S. Student (Colorado) – Exp 2013. Optimization of household UV system for point of use.
37. Christopher Poepping, Current M.S. Student (Colorado) – Exp 2013. Impact of time and light exposure on UV disinfection of pathogens.
38. Kate Dowdell, Current M.S. Student (Colorado) – Exp 2012. Co-advised with Summers. Biofiltration following advanced oxidation – impact on contaminant toxicity.
39. Lia Brune, Current Ph.D. Student (Colorado) – Exp 2015. Appropriate water treatment processes for remote developing communities. Mortenson Research Fellow
40. Simon Mostafa, Current Ph.D. Student (Colorado) – Exp 2014. Co-advised with Rosario. Sunlight driven processes for inactivation of pathogens in wastewater.

Undergraduate Researchers Directed

1. Emily Spangler, Undergraduate Research Assistant, “Toxicity assays for assessing oxidation of chemical contaminants” (2011-2012)
2. Louis Dankovich, Discovery Learning Apprentice (DLA), “Assessment of exposure wavelengths for sunlight UV experiments” (2011-2012)
3. Connie Chan, SMART Summer student, “UV disinfection and photoreaction of phage”, from Columbia University (Summer 2011)
4. Christian McGuire, NSF REU Fellow, “UV disinfection and photoreaction of phage”, from Columbia University (Summer 2011)
5. Erinn Kunick, NSF REU Fellow, “Solar powered UV disinfection for household water treatment” from University of Wisconsin-Madison (Summer 2010)
6. Chayla Rowley, Undergraduate Research Opportunity (UROP) fellow (2009), Discovery Learning Apprentice (DLA) (2010), University of Colorado- Boulder
7. Charlie McIntosh, Undergraduate Research Assistant, Chemical Engineering, University of Colorado- Boulder (2010)

8. Caitlin Rodriguez, Undergraduate Research Assistant, Environmental Engineering, University of Colorado- Boulder (2009-2010)
9. Bibek Joshi, Pratt Research Fellow “Appropriate technology disinfection for Nepal” (2006-2007). Currently Graduate Student, Stanford University
10. Kirsten Studer, NSF REU Fellow “Evaluation of estrogenic contaminant destruction via in vitro screening assay” (Summer 2005). Currently Graduate Student at UMass 2006-2009.
11. Chris Einmo – Pratt Research Fellow “UV based treatment for removal of arsenic” (2004-2005). High School Teacher.
12. Debbie Seibold – Pratt Research Fellow “UV based treatment for emerging chemical contaminants” (2001-2003) Currently in Grad School at Stanford 2005-2007.
13. Lisa Rauenzahn – UG research assistant “Investigation of emerging water contaminants” (2000-2002) Currently working as Engineering consultant.
14. Mollie Page – UG research assistant “Impact of pH and alkalinity on photolysis of nitrate in water” (2001) Currently working at Research Triangle Institute
15. Jennifer Buckman – NSF REU, Deaf Student for Summer 2001 “Impact of water quality on Nitrate photolysis” from Galludet University
16. Travis Bastow– NSF REU, Deaf Student for Summer 2000 “UV Photolysis of Nitrate in Water” from Galludet University

High School Students Directed

1. Luke Martin – Broomfield High School “Molecular indications of virus damage from UV irradiation” (2010-11). Current
2. Naomi Levine – Shining Mountain Waldorf School “Quenching H₂O₂ with GAC following a UV-AOP” (2009-10). Currently at Cornell University
3. Jeff Hu – NC School of Science and Mathematics “Effect of antioxidants on inactivation of bacteria” (2004-2005). Currently at Duke University
4. Ying Liu – NC School of Science and Mathematics “Effect of antioxidants on inactivation of bacteria” (2004-2005)
5. Tamarin Riboli – Chapel Hill HS “Utilization of Medaka as biomarker for endocrine disrupter activity following UV treatment” (2002)

Post-Doctoral Researchers Directed

1. Charles Maxwell Sharpless, Ph.D. 2000 “Investigations of contaminant degradation utilizing UV based treatment processes” (2001-2004) Current Position, Associate Professor, Environmental Chemistry, Mary Washington College, Fredricksburg, VA.
2. Banu Ormeci, Ph.D. 2000 “Investigations of particle impacts on inactivation of pathogens in water and wastewater” (2001-2003) Current Position, Associate Professor and Canada Research Chair, Environmental Engineering, Carleton University, Ottawa, ON Canada.
3. Zuzana Bohrer, Ph.D. 2001 “Molecular investigations as a basis for evaluation of UV disinfection efficiency” (2003-2007) Currently Lecturer and Associate Director of the Ohio Water Resources Center at Ohio State University.

4. Hilla Shemer, Ph.D. 2004 “Investigations of contaminant degradation utilizing UV based treatment processes” (2004-2006). Currently Research Professor, Technion, Haifa Israel.
5. Ki Don Cho, Ph.D. 2006 “Toxicity evaluations for estrogens in wastewater” (2006-2008). Current Position Environmental Engineer, District Department of the Environment in Washington, DC
6. Peter Ruiz-Haas, Ph.D. 2006 “Chemical analysis of emerging contaminants in water following advanced treatment” (2006-2008). Currently Assistant Professor, Mary Baldwin College, VA.
7. Aaron Dotson, Ph.D. 2008 “UV induced disinfection byproducts” (2008-2010). Currently Assistant Professor in Environmental Engineering at University of Alaska, Anchorage.
8. Alina Handorean, Ph.D. 2009 “Bioassays for determining toxicity of oxidation products from UV and ozone processes” (2009-10). Currently a post-doc for Professor Hernandez.
9. Megan Howard, Ph.D. 2007 “Molecular method development to better understanding the fundamentals of virus disinfection by UV light” (2010) Currently Lecturer at Cal Poly San Luis Obispo, CA.
10. Imma Ferrer, Ph.D. 2007 “Advanced Analytical Chemistry via LC Time of Flight Mass Spectrometry” (2009 – 2012)
11. Roberto Rodriguez, Ph.D. 2007 “Fundamentals of virus inactivation by UV Light: Adenoviruses” (2010 – 2012)

Theses Committees Served On (other than for my own students)

1. Jousset, Stephane, MS Degree: *Contributions from Autotrophic Nitrification and Respiratory Denitrification to Nitric Oxide Emissions from Soil*, May 1999
2. Baker, Rebecca, MS Degree: *Effects of Water-Filled Pore Space on Nitric Oxide Emissions from Soil*, May 2000
3. Tabachow, Ross, MS Degree: *Nitric Oxide Emissions from Unamended, Biosolids Amended and Mineral Fertilizer Amended Agricultural Soil*, May 2000
4. Ramon, Desiree, Ph.D. Degree: *Estimating Modeling Nitric Oxide Emissions from the Soil to the Lower Levels of the Troposphere*, May 2000
5. Dingding An, MS Degree: *Identification of polyphosphate-accumulating organisms candidates in an enhanced biological phosphorus removal (EBPR) system by density separation and molecular methods*, May 2001
6. Ross Tabachow, Ph.D. Degree: *Nitric oxide emissions as an indicator of bioremediation*, May 2002
7. Baneeta Sabherwal, MS Degree, *Effects of Salt and Phosphorus Release/Uptake on biomass density and biomass settling rates in Full Scale Activated Sludge*, Dec. 2002
8. Xuyi Cai, MS Degree, *Role of Sea Salt Aerosol Organic Layers in The Formation of Secondary Organic Aerosol in Coastal Areas*, May 2002

9. Kat Stauffenberg, *Natural sunlight decay of pharmaceuticals in water*. UNC Graduate Student, MS, 2006 (Howard Weinberg)
10. Bonnie Lyon, University of North Carolina Ph.D. Student (Howard Weinberg)
11. Kari Leech, University of North Carolina MS Student (Mark Sobsey)
12. Kaelin Cawley, Ph.D. Student (Diane McKnight)
13. Bailey Simone, M.S. (Diane McKnight)
14. Kate Beggs, Ph.D. Student (Scott Summers)
15. Chris Corwin, Ph.D. Student (Scott Summers)
16. Sarah Gonzales, M.S. Student (Fernando Rosario)
17. Mei Mei Dong, Ph.D. Student (Fernando Rosario)
18. David Sparkman, Ph.D. Student (Scott Summers)
19. Caitlin Glover, Ph.D. Student (Fernando Rosario)
20. Josh Kearns, Ph.D. Student (Scott Summers)
21. Varun Ghandi, Georgia Tech, Ph.D. (Jaehong Kim)

Visiting Researchers Hosted

1. Oguma, Kumiko, Ph.D., Research Associate, Environmental Engineering Group, Department of Urban Engineering, University of Tokyo. June-August 2005
2. Li Dong, Ph.D., Associate Professor, Resources & Environmental Science School, Chongqing University, Chongqing, China. July 2005 – June 2006.
3. Galina Matafonova, Ph.D. Fulbright Scholar, Lake Baikal, Russian Academy of Sciences August – November 2010.

Curriculum Vita of Dr. Michael J. Plewa
College of Agricultural, Consumer and Environmental Sciences
University of Illinois at Urbana-Champaign
Department of Crop Sciences
May 2012

TITLE: Professor of Genetics and University Scholar

WaterCAMPWS Investigator. Center of Advanced Materials for the Purification of Water with Systems

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EDUCATION:

B.S. degree in Biology, Minors in Philosophy and Chemistry, Loyola University of Chicago, 1969.

M.S. degree in Biology (Genetics Group), Illinois State University, 1971.

Ph.D. degree in Biology (Genetics Group), Illinois State University, 1974.

Postdoctoral Research Associate, Department of Agronomy, University of Illinois, 1974-1976.

PROFESSIONAL EXPERIENCE:

Graduate Teaching Assistantship, Illinois State University, 1969-1970.

Graduate Research Assistantship, Illinois State University, 1970-1974.

Assistant Research Geneticist, Institute for Environmental Studies, University of Illinois, 1976-1978.

Assistant Professor of Genetics, Institute for Environmental Studies, University of Illinois, 1978-1982.

Associate Professor of Genetics, Institute for Environmental Studies, University of Illinois, 1982-1986.

Departmental Affiliate, School of Clinical Medicine, University of Illinois, 1981-1982.

Associate Professor of Genetics, Department of Agronomy, University of Illinois, 1983-1986.

Departmental Affiliate, Department of Genetics and Development, 1983-1987.

Visiting Scientist, Biology Division, Molecular Biology Program, Oak Ridge National Laboratory, Oak Ridge, TN. Sabbatic from the University of Illinois, December 1984- June 1985.

Professor of Genetics, Institute for Environmental Studies, University of Illinois, 1986-1996.

Professor of Genetics, Department of Microbiology, University of Illinois, 1987-2002.

Research Geneticist, Experimental Carcinogenesis and Mutagenesis Branch, National Institute for Environmental Health Sciences, Research Triangle Park, NC. Sabbatic from the University of Illinois, August 1992 - June 1993.

Associate Director, Institute for Environmental Studies, University of Illinois, July 1994-July 1995.

Interim Director, Institute for Environmental Studies, University of Illinois, July 1995-November 1996. Service on the Council of Deans, UIUC, 1994-1996.

Member Campus Honors Faculty, 1990-present.

Honorary Professor, Department of Biomedical Sciences, University of Bradford, UK. Sabbatic from the University of Illinois, January - May 2003.

Professor of Genetics, Department of Agronomy, University of Illinois, 1986-1995; Department of Crop Sciences, 1995-present.

Director, Howard Hughes Medical Institute Programs, University of Illinois, College of Liberal Arts and Sciences, 2003-2007.

Interim Associate Head, Department of Crop Sciences, University of Illinois, 2004-2005.
Associate Head, Department of Crop Sciences, March 2005-present.

WaterCAMPWS Investigator 2007-present. Center of Advanced Materials for the Purification of Water with Systems, a National Science Foundation Science and Technology Center, under Award CTS-0120978.

HONORS AND PROFESSIONAL SERVICE:

Phi Sigma Society Award for outstanding graduate research, 1974.

Donald F. Jones Scholar in Cytogenetics, Research Corporation, New York, 1973-1974.

Donald F. Jones Fellow in Cytogenetics, Research Corporation, New York, 1974-1976.

North Atlantic Treaty Organization Travel Fellowship, 1979.

Member, Editorial Board, *Environmental Mutagenesis*, 1979-1982; *Environmental and Molecular Mutagenesis*, 1993-1998.

Member, Gene-Tox Commission (Committee on Plant Systems), U.S. Environmental Protection Agency, 1980-1982.

Invited Speaker and Travel Fellowship, Third International Conference on Environmental Mutagens, Tokyo/Mishima, Japan, 1981. Travel Fellowship, Fourth International Conference on Environmental Mutagens, Stockholm, Sweden, 1985. Invited Speaker, Fifth International Conference on Environmental Mutagens, Cleveland, USA, 1989. Invited Speaker, Eighth International Conference on Environmental Mutagens, Shizuoka, Japan, 2001.

Invited Lecturer, Workshop and International Symposium on Agricultural Genotoxicity in Developing Countries. Government of Pakistan and U.S. National Science Foundation, Islamabad, Pakistan, 1982.

Invited Speaker, National Institute of Environmental Health Sciences Lecture Series, "New Frontiers in Genetics," 1983.

Member, NIH Environmental Health Sciences Review Committee, National Institute of Environmental Health Sciences, July 1, 1985-June 30, 1988.

Named **University Scholar** for distinction as a member of the faculty of the University of Illinois, 1986.

Member, Editorial Board, *Mutation Research*, 1987-1993; 2000-present.

Editor, Special Issue of *Mutation Research* devoted to the topic, "The Activation of Promutagens by Plant Systems." 1988.

Appointed to the National Institutes of Health Reviewers Reserve, July 1, 1988 - June 30, 1992.

Invited Speaker, International Association of Environmental Mutagen Societies - Latin American Symposium on "Genetic Monitoring for Protection of Human Health and the Environment" San Jose, Costa Rica, March 6-11, 1988. Editor of Symposium Proceedings.

Elected as Councillor, Environmental Mutagen Society 1988-1991.

Appointed to serve on the International Program Advisory Committee for the Fifth International Conference on Environmental Mutagens, 1989.

Federal Job Training Partnership Act, Summer Youth Program, Champaign Consortium, 1988 JTPA Summer Youth Employment and Training Program Worksite of the Year.

Elected to the Executive Board of the Environmental Mutagen Society, 1990-1991; 2000-2002.

Invited Speaker, Third International Conference on Mechanisms of Antimutagenesis and Anticarcinogenesis, Lucca, Italy, 1991. Fourth International Conference on Mechanisms of Antimutagenesis and Anticarcinogenesis, Banff, Canada, 1994. Fifth International Conference on Mechanisms of Antimutagenesis and Anticarcinogenesis, Okayama, Japan, 1996. Seventh International Conference on Mechanisms of Antimutagenesis and Anticarcinogenesis, Grand Rapids, USA, 2000.

Invited Speaker, European Environmental Mutagen Society, August 1991, Prague, Czechoslovakia.

Member, Environmental Biology Science Review Panel, U.S. Environmental Protection Agency, 1991-1994.

Invited Visiting Scientist, Czechoslovakian Academy of Sciences, Prague, August 25 - September 8, 1991.

University of Manitoba Visiting Distinguished Professor Lectureship, Awarded by the Board of Regents, University of Manitoba, November 1991.

J. William Fulbright Senior Scholar, The Board of Foreign Scholarships and the U.S. Information Agency, 1992-1993, Prague, Czech Republic, June - November 1993.

Corresponding Scientist: U.S. C Czech Science and Technology Program. Office of International Cooperation and Development, U.S. Department of Agriculture 1993-1996; Academy of the Czech Republic, Visiting Scientist 1993, 1994, 1995, 1996, 1998, 2000.

Visiting Scientist at BIBRA International (Great Britain) January 1995; February 1996; 1997, 1998, 1999, presenter of invited lectures.

Kyoto University Scholar, Faculty of Engineering, Ministry of Education, Kyoto University, Japan, August - December, 1997; December 1999, October 2001.

William and Flora Hewlett Summer International Research Fellow, 1998.

Elected as Treasurer, Environmental Mutagen Society, 1999 - 2004.

Invited Keynote Speaker for the Third IWA Specialized Conference on Hazard Assessment and Control of Environmental Contaminants B ECOHAZARD=99, December, 1999, Otsu, Japan.

Broadrick-Allen Award for Excellence in Honors Teaching, University of Illinois, 1999.

Campus Wide Award for Excellence in Guiding Undergraduate Research, University of Illinois, 2000.

Editorial Board: Environmental Mutagens and Carcinogens, 2001- present.

Distinguished Member, The National Society of Collegiate Scholars, 2002.

Illinois State University Alumnus Achievement Award, 2003.

Keynote speaker at the European Union Conference on Plant Bioassays, Poland, May 2003.

Plenary lecturer at the EcoHazard 2009 MicroPol meeting, June 2009

Phi Kappa Phi Honor Society, UIUC Chapter 46. President 2008-present.

Environmental Mutagen Society, President-Elect, 2008-2009; President 2009-2010.

Plenary Speaker at the Gordon Research Conference on DBPs 2006, 2009, Elected as the Vice-Chair for the GRC 2012 meeting and Chair for the 2015 meeting.

Teacher-Fellow (national teaching award).

Dr. Plewa has received research grants from federal (NIH, NSF, USEPA, DOD, USDA) state (OSWR, IL EPA, HWRIC, WRC, WMRC, C-FAR) and private sources (HyClone, Research Corporation, Joyce Foundation, Research Board)..

Dr. Plewa has been named 21 times on the University of Illinois Incomplete List of Teachers Rated as Excellent by their Students.

Undergraduate and Graduate Research Students in the Plewa Laboratory				
Undergraduate Research Students			M.S. Degree Graduate Students	Ph.D. Degree Graduate Students
Maria Ho	Kathy Hajek	Kristin McCalla	Sara Engl	L. Curt Blair
Tim Wilkins	Christine Chorney	Janet Pavese	William Schy	Van Anderson
Pat Dowd	Jamison Allen	Nancy Hsu	Patricia Stapleton	William Schy
Kathy Grant	Michele Sharon	Rebecca Milsk	Monica Lhotka	Doug Kalinowski
William Schy	Lucie Dobrovolny	Jon Zolt	Dan Krompitz	Kathleen Mottus

Undergraduate and Graduate Research Students in the Plewa Laboratory				
Undergraduate Research Students			M.S. Degree Graduate Students	Ph.D. Degree Graduate Students
Rachel Shefner	Frances Hoff	Angelica Laguna	Janet Minton	Kwang-Young Seo
Barb Egan	Joan Riley	Justin Ang	Pam Landos	Young Hwa Ju
Monica Lhotka	Amit Shah	Vince Siebert	Paul Ariagno	Yahya Kargalioglu
Carol Hansen	David Cortez	Kevin Homman	Shannon Smith	Kara Sorensen*
Richard Carr	Erica Blaford		Tammy Stinson	Mark Rundell
Mary Verdier	James Lodolce		Michelle Silkowski	Mark Muellner
Rebecca Liggin	Anupam Basu		Scott Taylor	Matias Attene Ramos*
Jennifer Pillote	Sarah Connolly		John Opilka	Clara Jeong
Paul Cihak	Jane Tan		Margaret Timme	Justin Pals
Shannon Smith	Bob Stringham		Paul Connelly	Azra Dad
Calvin Ke	RyAnn Nelson		Karen Repetny	Yukako Kamura*
Paul Theodorakis	Adam Conway		Lynn Kirchoff	
Anita Kumar	Bryant Kiliman		Tae-Hee Kim	
Dana Kaiser	Kristen Naschansky		Danielle Vanker	
Brian McMillan	Susan Bartolini		Emilie Woods	
Megan	Megan Anderson		Mark Rundell	

Undergraduate and Graduate Research Students in the Plewa Laboratory				
Undergraduate Research Students			M.S. Degree Graduate Students	Ph.D. Degree Graduate Students
Sullivan				
Matt Marengo	Mark Rundell		Mark Muellner	
Mark Muellner	Irene Masiulis		Nancy Hsu	
Paras Mehta	Amar Chadaga		Justin Pals	
Alex Kim	Eping Li		Jessica Wallace	
Paulina Jazwierska	Kearney Gunsalus		Jessica Osiol	
Shannon McMillan	Margo Mejia			

*Co-advisor

Academic Professional Staff, Visiting Scholars, Post-Doctoral Associates and Sabbatical Associates in the Plewa Laboratory	
Elizabeth Wagner	Patrick Dowd
Danny Weaver	R. Garton
Susan Wood	L. C. Blair
Hwa Xin	Diane Ades-McInerney
Shannon Smith	Jane Fang
Tomas Gichner	Young Ju
Kristen Naschansky	May Al-Doori
Jin Kim	Steve Daniel



PROFESSIONAL ASSOCIATIONS

Environmental Mutagen Society (USA)
Midwest Society of Toxicology
Phi Sigma Honor Society
Sigma Xi Society
Phi Kappa Phi Honor Society
American Chemical Society

PUBLISHED ABSTRACTS:

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Biosketch of Dr. Michael J. Plewa.

Dr. Michael J. Plewa is University Scholar and Professor of Genetics (College of Agricultural, Consumer and Environmental Sciences), member of the Campus Honors Faculty, and the WaterCAMPWS Program, College of Engineering, at the University of Illinois. He has an international reputation for research and teaching in environmental and molecular mutagenesis. His research program has been continuously funded by competitive national and regional research grants for over 36 years and he has published >200 scientific papers and reports and books. Dr. Plewa has been with the University of Illinois at Urbana-Champaign where he was promoted from Assistant Professor to Full Professor in eight years. His current research interests include the isolation and chemical characterization of antimutagens and anticarcinogens from commercial agricultural by-products, the analysis of mutagenic synergy of aromatic amines and OP insecticides, and the calibration of cytotoxic, genotoxic and toxicogenomic responses induced by drinking-water disinfection by-products. His first sabbatic was at the Biology Division at Oak Ridge National Laboratory during 1985. In 1986 he was awarded the title of University Scholar as a distinguished faculty member of the University of Illinois. In 1991 Dr. Plewa was awarded a Distinguished Professor Lectureship from the University of Manitoba Board Of Regents. That same year Dr. Plewa was named a Visiting Scientist at the Academy of Sciences of Czech Republic and he has continued to work in Prague. In 1992-93 he was a Visiting Scientist at the National Institutes of Health for 10 months during his sabbatical year. During this time Dr. Plewa was named a J. William Fulbright Senior Scholar, by the Board of Foreign Scholarships and the U.S. Information Agency. Dr. Plewa took his Fulbright Scholarship to Prague. Dr. Plewa was named as a Kyoto University Scholar in the Faculty of Engineering. This award was provided by the Japan Ministry of Education and he spent from August to December 1997 conducting research and delivering lectures throughout Japan. He has continued his scholarly activity at Kyoto University to the present. In 1998 Dr. Plewa, was awarded a William and Flora Hewlett International Research Grant to develop a new environmental program with the Academy of Sciences of the Czech Republic. Dr. Plewa served as a Councilor, member of the Executive Board and was elected as the Treasurer of the Environmental Mutagen Society in 2000 and 2002. Dr. Plewa teaches, CPSC 336 Tomorrow's Environment, CPSC 432 Genetic Toxicology and Molecular Mutagenesis, CPSC 449 Basic Toxicology, CHP 395 Controversial Environmental Issues, and is a participant in the ACES 100 Discovery Course for freshmen students. Dr. Plewa was appointed to the College of ACES Teaching Academy of Excellence in 1999 and he currently is a member of the Honors Council. He received the 1999 Broadrick-Allen Award for Excellence in Honors Teaching from the Campus Honors Program. In 2000 he was the recipient the University of Illinois Campus Award for Excellence in Guiding Undergraduate Research and in 2009 he was named a NACTA Teacher Fellow. In 2002 he was named a distinguished member of the National Society of Collegiate Scholars. Dr. Plewa received the 2003 Illinois State University Alumnus Achievement Award. In 2008 Dr. Plewa was elected as President of the UIUC Chapter of Phi Kappa Phi Honor Society, and in he was the President of the Environmental Mutagen Society (2010) and was the Program Chair for the 2009 40th EMS annual meeting. Dr. Plewa is the Vice Chair of the 2012 Gordon Research Conference on Drinking Water DBPs; he was elected as chair for the 2015 Gordon Research Conference. For 2010 he was awarded the College of ACES Senior Faculty Award for Excellence in Research. Dr Plewa's name has appeared 23 times on the University of Illinois List of Teachers Rated as Excellent by their Students.

State Water Resources Control Board

[Date]

[Example of a letter initiating review.]

[Name and
professional address
of reviewer]

Dear Professor _____,

[SUBJECT] PEER REVIEW OF _____

[Optional Introductory Paragraph]

My letter today is intended to initiate the next phase of the external review – the actual review itself.

Included in this letter are the following:

- a) The [date] request for external reviewers, including [#] attachments, signed by _____;
- b) January 2009 Supplement to the Cal/EPA Peer Review Guidelines;
- c) Key documents for review (if not included with request letter attachments);
- d) Key supporting documents, including all references in hard copy and/or on CD.

Comments on the foregoing:

1. You have been sent the request letter during the solicitation process for reviewer candidates conducted by the University of California.
2. Attachment 2 to the request letter provides focus for the review. I ask that you address all topics, as expertise allows, in the order listed.
3. The January 7, 2009 Supplement. In part, this provides guidance to ensure the review is kept confidential through its course. The Supplement notes reviewers are under no obligation to discuss their comments with third-parties after reviews have been submitted. We recommend they do not. All outside parties are provided opportunities to address a proposed regulatory action through a well-defined regulatory process. Direct third-parties to me.

Please return your review directly to me. Questions about the review, or review material,

Professor _____

- 2 -

[Date of Letter]

should be for clarification, in writing – email is fine, and addressed to me. My responses will also be in writing. The State Water Resources Control Board (Water Board) should not be contacted. All this information will be posted at the program website, and the State and Regional Water Board's Scientific Peer Review website.

I would appreciate your review being completed by _____ [30-day period recommended].

Your acceptance of this review assignment is most appreciated.

Sincerely,

[Signature and professional affiliation,
as well as contact information.]

**Supplement to Cal/EPA External Scientific Peer Review Guidelines –
“Exhibit F” in Cal/EPA Interagency Agreement with University of California
Gerald W. Bowes, Ph.D.**

Guidance to Staff:

1. Revisions. If you have revised any part of the initial request, please stamp “Revised” on each page where a change has been made, and the date of the change. Clearly describe the revision in the cover letter to reviewers, which transmits the material to be reviewed. The approved reviewers have seen your original request letter and attachments during the solicitation process, and must be made aware of changes.
2. Documents requiring review. All important scientific underpinnings of a proposed science-based rule must be submitted for external peer review. The underpinnings would include all publications (including conference proceedings), reports, and raw data upon which the proposal is based. If there is a question about the value of a particular document, or parts of a document, I should be contacted.
3. Documents not requiring review. The Cal/EPA External Peer Review Guidelines note that there are circumstances where external peer review of supporting scientific documents is not required. An example would be "A particular work product that has been peer reviewed with a known record by a recognized expert or expert body." I would treat this allowance with caution. If you have any doubt about the quality of such external review, or of the reviewers' independence and objectivity, that work product – which could be a component of the proposal - should be provided to the reviewers.
4. Implementation review. Publications which have a solid peer review record, such as a US EPA Criteria document, do not always include an implementation strategy. The Cal/EPA Guidelines require that the implementation of the scientific components of a proposal, or other initiative, must be submitted for external review.
5. Identity of external reviewers. External reviewers should not be informed about the identity of other external reviewers. Our goal has always been to solicit truly independent comments from each reviewer. Allowing the reviewers to know the identity of others sets up the potential for discussions between them that could devalue the independence of the reviews.
6. Panel Formation. Formation of reviewer panels is not appropriate. Panels can take on the appearance of scientific advisory committees and the external reviewers identified through the Cal/EPA process are not to be used as scientific advisors.
7. Conference calls with reviewers. Conference calls with one or more reviewers can be interpreted as seeking collaborative scientific input instead of critical review. Conference calls with reviewers are not allowed.

Guidance to Reviewers from Staff:

1. Discussion of review.

Reviewers are not allowed to discuss the proposal with individuals who participated in development of the proposal. These individuals are listed in Attachment 3 of the review request.

Discussions between staff and reviewers are not permitted. Reviewers may request clarification of certain aspects of the review process or the documents sent to them.

Clarification questions and responses must be in writing. Clarification questions about reviewers' comments by staff and others affiliated with the organization requesting the review, and the responses to them, also must be in writing. These communications will become part of the administrative record.

The organization requesting independent review should be careful that organization-reviewer communications do not become collaboration, or are perceived by others to have become so. The reviewers are not technical advisors. As such, they would be considered participants in the development of the proposal, and would not be considered by the University of California as external reviewers for future revisions of this or related proposals. The statute requiring external review of science-based rules proposed by Cal/EPA organizations prohibits participants serving as peer reviewers..

2. Disclosure of reviewer Identity and release of review comments.

Confidentiality begins at the point a potential candidate is contacted by the University of California. Candidates who agree to complete the conflict of interest disclosure form should keep this matter confidential, and should not inform others about their possible role as reviewer.

Reviewer identity may be kept confidential until review comments are received by the organization that requested the review. After the comments are received, reviewer identity and comments must be made available to anyone requesting them.

Reviewers are under no obligation to disclose their identity to anyone enquiring. It is recommended reviewers keep their role confidential until after their reviews have been submitted.

3. Requests to reviewers by third parties to discuss comments.

After they have submitted their reviews, reviewers may be approached by third parties representing special interests, the press, or by colleagues. Reviewers are under no obligation to discuss their comments with them, and we recommend that they do not.

All outside parties are provided an opportunity to address a proposed regulatory action during the public comment period and at the Cal/EPA organization meeting where the proposal is considered for adoption. Discussions outside these provided avenues for comment could seriously impede the orderly process for vetting the proposal under consideration.

4. Reviewer contact information.

The reviewer's name and professional affiliation should accompany each review. Home address and other personal contact information are considered confidential and should not be part of the comment submittal.