

CV/Resume

Frank M. Dunnivant Associate Professor

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Current Position

Associate Professor, Department of Chemistry, Whitman College

Education

Ph.D., Clemson University, **1988**, Environmental Chemistry option in Environmental Systems Engineering.

M.S., Clemson University, **1985**, Environmental Chemistry option in Environmental Systems Engineering.

B.S., Auburn University, **1980**, Environmental Science. Emphasis in Chemistry, Engineering, and Environmental Sciences.

Professional Experience

Whitman College, **1999-present**, Assistant Professor of Chemistry (1999-2004); Associate Professor (**2004-present**); Department Chair (2005-2007, 2010-2012). Responsibilities include (1) teaching freshman chemistry, instrumental analysis, environmental chemistry, mass spectrometry, and chemistry for nonscience majors, (2) pursuing external funding for equipping instrumental labs and funding student research, (3) designing educational computer software and educational media, (4) undergraduate research in analytical and environmental areas, and (5) serving as senior research advisor.

Hartwick College, **1996-1999**, Assistant Professor (term position). Responsibilities included (1) teaching various courses in chemistry, (2) developing new interdisciplinary science-for-non-majors courses integrating chemistry, biology, mathematics and geology, (3) developing an externally-funded research program, (4) developing interactive computer software for use in quantitative analysis, environmental chemistry, geochemistry, and hydrology, (5) developing and conducting field trips for January term including a trip to Switzerland, and (6) serving as student research advisor.

State College of Oneonta (State University of New York at Oneonta), **1997-1999**, Adjunct Professor, My responsibilities were to teach Quantitative Analysis and Instrumental Analysis.

Clemson University, **1996-2005**, Adjunct Professor. Responsibilities were to advise researchers and mentor graduate students.

Clemson University, **1995-1996**, Assistant Professor (nontenure track), Responsibilities included (1) teaching courses in environmental chemistry, science, or engineering, (2) serving on student advisory committees, and (3) proposal development and procurement of national research funds for environmental chemistry and engineering projects.

INEL, **1992-1996**, Senior Scientist 1992-1995; Consultant 1995-1996, Responsibilities included proposal development and procurement of funding for DOE research and compliance projects. Projects included conducting remedial investigation and feasibility studies for CERCLA sites, developing analytical procedures, designing laboratory studies to aid in the design of a large, field-scale radionuclide fate and transport experiment, designing and conducting a large, field-scale fate and transport experiment to determine the migration of radionuclides in the subsurface media underlying the INEL, and designing a treatability study to evaluate the effectiveness of surfactant injection to recover free-product trichloroethylene (DNAPL) from a contaminated aquifer.

The University of Idaho (Idaho Falls campus), **1993-1994**, Taught a night-course on Contaminant Fate and Transport.

EAWAG/ETH (Swiss Federal Institute for Water Resources and Water Pollution Control), **1989-1992**, Post-Doctoral Researcher with Dr. Rene Schwarzenbach. My principal area of research was investigation of the chemical processes responsible for the abiotic reduction of nitro-aromatic compounds in surface, sediment, and ground waters containing dissolved organic matter and redox-active metals. This research, coupled with my graduate work, has allowed me to develop research proposals dealing with abiotic transformation reactions between organic pollutants, natural organic matter, and mineral surfaces.

Oak Ridge National Laboratory, **1988-1989**, Post-Doctoral Fellow, Environmental Science Division. My primary responsibility was designing and conducting experiments to determine the interaction of humic colloids with aquifer materials and the subsequent transport of ionic and hydrophobic pollutants associated with humic

colloids in ground waters. This work provided some of the most confirmatory experimental data supporting the facilitated or co-transport theories of pollutants by colloids in ground water.

Clemson University, **1983-1988**, Graduate Student and Instructor, Environmental Systems Engineering. As a graduate student I have consistent and various teaching and lab assistant responsibilities. During the sabbatical leave of my Ph.D. advisor and my final year in graduate school, I had full-teaching responsibility for the graduate-level environmental chemistry courses in our department. Courses included Introduction to Environmental Chemistry (inorganic and organic chemistry, kinetics, thermodynamics, and mass balances) and Advanced Topics in Environmental Chemistry (numerous topics pertaining to the fate and transport of inorganic and organic pollutants).

Harmon Engineering, **1982-1983**, Analytical Bench and Field Chemist (Consultant). Duties initially involved routine analyses (organic and inorganic compounds; wet and instrumental techniques) of environmental samples; however, later during my employment I was involved in developing and implementing quality assurance programs, supervising and training laboratory personnel, developing client contacts, and writing proposals.

Scientific Services, Inc., **1981-1982**, Analytical Bench and Field Chemist (Consultant). Supervised and personally operated (1) electron capture, flame ionization, and thermal conductivity gas chromatography systems, (2) spectrophotometers, (3) flame and graphite furnace atomic absorption spectrophotometers, and (4) a mass spectrometer, and (5) a broad range of field sampling equipment and standard analytical procedures necessary "wet" chemical extractions and analyses.

PBR, Inc., **1980-1981**, Analytical Bench Chemist. Responsible for monitoring and treating wastewater effluent from a metal plating facility.

Courses Taught

Quantitative Analysis
General Chemistry
Advance Topics in Environ. Chem.
Earth Cycles
Chemistry of the Natural World
Mass Spectrometry

Instrumental Analysis
Environmental Chemistry
Environmental Science
Chemistry of the Atmosphere
Hazardous Waste Treatment
and Contaminant Fate and
Transport Management

Memberships

Member, American Chemical Society Division of Environmental Chemistry (1985-present)
Member, American Chemical Society Division of Chemical Education (1996-present)
Member, American Chemical Society Division of Geochemistry (1988-2008)
Member, The American Biology Teacher (2004-2007)

Member, American Geophysical Union (1994-2000)
Member, American Water Works Association (1993-1995)
Member, National Association of Geoscience Teachers (1997-2001)
Member, North American Association for Environmental Education (1996-2000)
Member, Sigma Xi (1986)
Member, Society of Environmental Toxicology and Chemistry (1988-1992)

Peer-Reviewed Journal Publications

Detailed below are 27 peer-reviewed articles that I have published in the areas of analytical chemistry, environmental chemistry, hydrology, radionuclide transport, and undergraduate teaching methodologies.

* Student collaborators are indicated by an asterisk.

Kari Norgaard , Spenser Meeks*, Brice Crayne*, and Frank Dunnivant¹. **2012**. Trace Metal Analysis of Karuk Traditional Foods in the Klamath River Basin. Manuscript submitted in Feb., 2012, to *Northwest Science*. Revised manuscript submitted Aug., 2012.

Ginsbach*, J.W., K.L. Taylor*, R.M. Olsen*, B. Peterson*, and F.M. Dunnivant¹. **2010**. The Fraction of Organic Carbon Predicts Labile Desorption Rates of Chlorinated Organic Pollutants in Laboratory-Spiked Geosorbents. *Environmental Toxicology and Chemistry*, 29(5), 1049-1055.

Dunnivant, F.M. and R. Olsen*, **2007**. A Simple Sand Column Experiment to Illustrate Pollutant Hydrology in Groundwater Systems. of *Journal of Geoscience Education*, January, 2007, Vol. 55(1), 51-55.

Dunnivant, F.M. and M.C. Reynolds*. **2007**, A Chemical Transformation Laboratory Exercise for Environmental Chemistry: The Reduction of Nitrobenzenes by Anaerobic Solutions of Humic Acid, *Journal of Chemical Education*. February, Vol. 84(2), 315-317.

Saalfeld*, S.L., J. D. Wnuk*, M. M. Murray*, and F. M. Dunnivant. **2006**. A Comparison of Two Techniques for Studying Sediment Desorption Kinetics of Hydrophobic Pollutants, *Chemosphere*, Vol 61(3), pp 332-340.

Dunnivant, F.M. **2006**. An Integrated Limnology, Microbiology, and Chemistry Exercise for Teaching Thermodynamics. *American Biology Teacher*, 68(7), 424-427, Sept.

Dunnivant, F.M., J.T. Coates, and A.W. Elzerman. **2005**. Labile and Non-labile Desorption Rate Constants for 20 PCB Congeners from Lake Sediment Suspensions, *Chemosphere*, 61, 332-340.

Tenured at Whitman, 2004

Dunnivant, F.M., D. Danowski*, and M. Newman. **2002**. Teaching Pollutant Fate and Transport Concepts to Undergraduate Non-Science Majors, Environmental Scientists, and Hydrologists using EnviroLand, November-December issue of the *Journal of Geoscience Education*, 50(5), pp 553-558, 2002.

Dunnivant, F.M., D. Danowski*, M. Newman, T. Spano*, and F. Frye*. **2002**. Teaching Chemical Speciation to Environmental Chemists and Geochemists using EnviroLand, November-December issue of the *Journal of Geoscience Education*, 50(5), pp 549-552, 2002.

Dunnivant, F.M., D. Danowski*, and A. Timmens-Haroldson*. **2002**. EnviroLand: A Simple Computer Program for Quantitative Stream Assessment, *The American Biology Teacher*, 64 (8), pp 589-595.

Dunnivant, F.M., D.M. Simon, and S. Willson. **2002**. The Making of a Solution: A Simple but Poorly Understood Concept in General Chemistry, *The Chemical Educator*, 7(4), pp 207-210.

Dunnivant, F.M. and J. Kettel*. **2002**. An Environmental Chemistry Laboratory for the Determination of a Distribution Coefficient, *Journal of Chemical Education*, 79(6), 715-717.

Dunnivant, F.M. **2002**. Analytical Problems Associated with the Analysis of Metals in a Simulated Hazardous Waste, *Journal of Chemical Education*, 79(6), 718-720.

Dunnivant, F.M., M.J. Alfano*, R. Brzenk, P.T. Buckley, A. Moore, and M.E. Newman. **2000**. Understanding Global Warming: Is Global Warming Real? An Integrated Lab-Lecture Exercise for Non-Science Majors. *Journal of Chemical Education*, December, 77(12), 1602-1603.

Porro, I., M.E. Newman, and F.M. Dunnivant. **2000**. Strontium Distribution Coefficients Determined by Column and Batch Techniques and Under Various Moisture Contents in Crushed Basalt Columns. *Environ. Sci. and Technol.* 34(9), 1679-1687.

Dunnivant, F.M., M.E. Newman, R. Brzenk, A. Moore, M.J. Alfano*. **1999**. A Comprehensive Stream Study Designed for An Undergraduate Non-majors Course in Earth Science. *Journal of Geoscience Education* 47, 158-165.

Arrived at Whitman, Fall 1999

Dunnivant, F.M., C.W. Bishop, J.D. Burgess, J.R. Giles, B.D. Higgs, J.M. Hubbell, E. Neher, M.E. Newman, G.T. Norrell, M.C. Pfeifer, I. Porro, J.B. Sisson, R.C. Starr, and A.H. Wylie. **1998**. Water and Tracer Flow in A Field-Scale Heterogeneous System. *Ground Water*. 36 no. 6, 949-958.

Dunnivant, F.M., M.E. Newman, I. Porro, C. Bishop, J. Hubbell, and J.R. Giles. **1997**. Verifying The Integrity of Annular Space and Back-Filling Seals for Monitoring Wells. *Ground Water*, 35, no. 1, pp. 140-148.

Dunnivant, F.M., D.L. Macalady, and R.P. Schwarzenbach. **1992**. Reduction of Substituted Nitrobenzenes in Aqueous Solutions Containing Natural Organic Matter. *Environ. Sci. Technol.*, 26, 2133-2141.

Dunnivant, F.M., A.W. Elzerman, P.C. Jurs, and M.N. Hasan. **1992**. Prediction of Aqueous Solubility and Henry's Law Constants for PCB Congeners Using Quantitative Structure-Property Relationships. *Environ. Sci. Technol.*, 26, 1567-1573.

Dunnivant, F.M. P.M. Jardine, D.L. Taylor, and J.F. McCarthy. **1992**. The Cotransport of Cadmium, 2,2',4,4',5,5'-Hexachlorobiphenyl, and 2,2',4,4',6,6'-Hexachlorobiphenyl by Dissolved Organic Carbon in Laboratory Columns Containing Aquifer Material. *Environ. Sci. Technol.*, 26, 360-368.

Jardine, P.M., F.M. Dunnivant, J.F. McCarthy, and H.M. Selim. **1992**. Transport of Dissolved Organic Carbon in Laboratory Columns II: Modeling. *Soil Sci. Soc. Am. J.*, 56, 393-401.

Dunnivant, F.M., P.M. Jardine, D.L. Taylor, and J.F. McCarthy. **1992**. Transport of Naturally-Occurring Dissolved Organic Carbon in Laboratory Columns Containing Aquifer Material. *Soil Sci. Soc. Am. J.*, 56, 437-444.

Dunnivant, F.M., A.W. Elzerman, and A.L. Polansky. **1989**. Persistence and Distribution of PCBs in the Sediments of a Reservoir (Lake Hartwell, South Carolina). *Bull. Contamin. Tox.*, 43, 870-878.

Dunnivant, F.M. and A.W. Elzerman. **1988**. Aqueous Solubility and Henry's Law Constant Data for PCB Congeners for Evaluation of Quantitative Structure-Property Relationships (QSPRs). *Chemosphere*. 17(3):525-541.

Dunnivant, F.M. and A.W. Elzerman. **1988**. Determination of PCBs in Sediments using Sonication Extraction and Capillary Column Gas Chromatography/Electron-Capture Detection with Internal Standard Calibration. *J. Assoc. Official Anal. Chem.* 71:551-556.

Dunnivant, F.M., J.T. Coates and A.W. Elzerman. **1988**. Experimentally Determined Henry's Law Constants for 17 Polychlorobiphenyl Congeners. *Environ. Sci. Technol.*, 22, 448-453.

Other Professional Publications

Newman, M.E. and F.M. Dunnivant. **1996**. Results from the Large-Scale Aquifer Pumping and Infiltration Test: Transport of Tracers Through Fractured Media. Idaho National Engineering Laboratory Report Number INEL-96/146.

Newman, M.E., R. Fjeld, T. DeVol, A.W. Elzerman, M. Belvins, R. Goff, S. Ince, I. Porro, R. Scott, and F.M. Dunnivant. October, **1995**. Evaluation of the Mobility of Am, Cs, Co, Pu, Sr, and U through INEL Basalt and Interbed Material: Summary Report of the INEL/Clemson University Laboratory Studies. Idaho National Engineering Laboratory Report. Report Number INEL-95/282, ER WAG7-82.

Dunnivant, F.M. and M.E. Newman. **1996**. Migration of Radionuclide Tracers through Fractured Media: Preliminary Modeling of Breakthrough Curves Obtained during the Large-Scale Aquifer Pumping and Infiltration Test. Idaho National Engineering Laboratory Report. Report Number INEL-96/288, ER-WAG7-84.

Elzerman, A.W., K. Farley, F.M. Dunnivant, and C. Cooper. **1994**. South Carolina Water Resources Research Institute. Report # 139. Predicting the Future Fate of PCBs in Lake Hartwell.

Dunnivant, F.M., G.J. Stormberg, A.H. Wylie, C.M. Hamel, and C.A. Leon. January, **1994**. Feasibility Study Report for Test Area North Groundwater Operable Unit 1-07B at the Idaho National Engineering Laboratory. EGG-ER-10802.

Dunnivant, F.M. and M.E. Newman. **1996**. Environmental Chemistry 101: What are The Necessary Components of An Effective Course?, *14th Biennial Conference on Chemical Education*, Clemson University, Clemson, SC.

Dunnivant, F.M., M.E. Newman, S. Magnuson, and J. McCarthy. **1995**. Modeling of Radioactive Tracer Data Collected during The Large-Scale Pumping and Infiltration Test: Water Velocity and Dispersivity Estimates, *American Geophysical Union*, Fall Meeting, San Francisco, CA.

Peer-Reviewed Books Published, * indicates student co-author. The most recent three books have been published since I was tenured at Whitman.

Gas Chromatography-, Liquid Chromatography-, Capillary Electrophoresis- and Mass Spectroscopy. F.M. Dunnivant and J.K. Ginsbach*. The third edition of the GC-MS book listed immediately below this listing. Target audience: Undergraduate chemistry majors, laboratory technicians, and researchers. **2008, 2011**. Available from http://people.whitman.edu/~dunnivfm/C_MS_Ebook/Prelim/index.html
ISBN: 978-0-9882761-0-9

Flame Atomic Absorption Spectroscopy, Atomic Emission Spectroscopy, and Inductively Coupled Plasma—Mass Spectroscopy. F.M. Dunnivant and J.K. Ginsbach*. An Internet eTextbook First edition published in **2009**. Third edition published in **2011**. This is available from http://people.whitman.edu/~dunnivfm/FAASICPMS_Ebook/Prelim/index.html
ISBN: 978-0-9882761-1-6

A Basic Introduction to Pollutant Fate and Transport: An Integrated Approach including Chemistry, Modeling, Risk Assessment, and Environmental Legislation. F.M. Dunnivant and E. Anders*. Target audience: strictly undergraduates who have

taken general chemistry and algebra. John Wiley and Sons, Inc., Published January, **2006**. ISBN 0-471-65128-1

Environmental Chemistry Laboratories for Instrumental Analysis and Environmental Chemistry. F.M. Dunnivant. Target audience: upper-level undergraduate and graduate courses in environmental engineering and chemistry. Published by John Wiley and Sons, Inc, August, **2004**. ISBN 0-471-48856-9

Peer-Reviewed Electronic Publications (CD-ROM and Internet-Download Educational Packages), * indicates student collaborators or co-authors.

All of these software packages have been published since my arrival at Whitman. In general, each package took at least a year to complete, including the selection and discussion of each topic with my peers across the nation, the design/layout, programming, debugging and editing, and production and testing (and more debugging). Peer-review occurred at several stages (1) in the beginning with topic and concept selection and design, (2) prior to the release of the software package, and (3) by peer acceptance as explained in the following statement. Given the nature of web page statistics counters, it is impossible to tell how many people used our software, but in 2010, over 19,000 hits from over 105 countries were recorded for our download pages. Internet statistics show that users include government organizations, secondary education, colleges and research universities, and industry. All are available from www.edusolns.com and <http://people.whitman.edu/~dunnivfm/software.html>.

EnviroLab. Angela Raso*, Benjamin Elstrott*, William Ethier Colon*, and Frank M. Dunnivant. Under beta testing, a Spanish and English version will be available by Dec., **2012**. The software package is an update and expansion of the laboratory components in our 1999 *EnviroLand*.

Dispersion Calculator. Gabrielle Boisrame*, Albert Schueller, Frank M. Dunnivant. **2010**. A computer package that estimates the degree of dispersion for laboratory soil/sediment columns using pulse and step inputs.

pC-pH Simulator. Elliot Anders* and Frank M. Dunnivant. **2004**. A computer package for drawing pC-pH diagrams for open and closed systems.

Fate. Elliot Anders* and Frank M. Dunnivant. **2004, 2009, 2011**. An upgrade of the fate and transport components of *EnviroLand*. A computer package for simulating pollutant fate and transport of streams, lakes, groundwater, and atmospheric systems.

Tenured at Whitman, 2004

The GC Tutorial. Cody Reynolds*, Elliot Anders*, and Frank M. Dunnivant. **2004**. An educational package for teaching gas chromatography to senior level chemistry majors.

Water. Joshua Wnuk*, Cody Reynolds* and Frank M. Dunnivant. **2003**. An educational package illustrating how a water treatment and a wastewater treatment plant works.

Global Environmental Issues. Ethan Aumann*, Elliot Anders*, and Frank M. Dunnivant. **2002**. An educational package illustrating global environmental issues including global warming, ozone depletion, and acid rain.

The HPLC Tutorial. Elliot Anders*, Jeni Brown*, and Frank M. Dunnivant. **2001**. An educational package for teaching high performance liquid chromatography to senior level chemistry majors.

EnviroLand versions 1.0 to 4.0. Dan Danowski*, Alice Timmens-Haroldson*, Franz Frye*, and Frank M. Dunnivant. **2000**. An interactive, educational package for teaching environmental chemistry, geochemistry, science courses for students not majoring in science, and hydrogeology.

Selected Presentations

The presentations cited below are my major presentations from each year and does not include numerous (one to five per year) student co-authored presentations and posters at regional and national meetings.

Dunnivant, F.M. 2012. **Invited** presentation at Clemson University honoring the retirement of Dr. Alan Elzerman. April 27, 2012, Department of Environmental Engineering and Science, Clemson, SC.

Dunnivant, F.M. 2011 Conference on Remediation of Contaminated Sediments. (Invited Poster) Invalidating Previous Assumptions Concerning Hydrophobic Pollutant Desorption Kinetics from Resuspended Sediments. Feb., 2011, New Orleans, LA.

Dunnivant, F.M and J. Ginsbach. Free Open-Access eTextbooks for Teaching Instrumental Analysis. American Chemistry Society National Meeting, Division of Chemical Education, March 2010, San Francisco.

Dunnivant, F.M. 2010 Sediment Management Annual Review Meeting hosted by Washington Department of Ecology. Laboratory Experiments to Evaluate the Release of Hydrophobic Pollutants during Dredging and Resuspension Events. May, 2010. Seattle, WA.

Dunnivant, F.M. Electronic-Media Resources for Teaching Environmental Chemistry. Plenary (**Invited**) address to the American Chemistry Society Regional Meeting, Division of Chemical Education, Oct. **2009**, San Juan, Puerto Rico.

Dunnivant, F.M and J. Ginsbach. Computer Animations for Etextbooks in Chemistry. American Chemical Society National Meeting, Division of Chemical Education, March, **2009**, Salt Lake City, UT.

Dunnivant, F.M. Educational Software for Environmental Chemistry: A Ten-Year Effort. American Chemical Society National Meeting, Division of Chemical Education, April, **2008**, New Orleans, LA.

Dunnivant, F.M., S. Saalfield, M. Murray, and K. Taylor. Recent Advances in Understanding Desorption Kinetics of Hydrophobic Pollutants from Sediment Suspensions. American Chemical Society National Meeting, Division of Environmental Chemistry, Sept, **2006**, San Francisco, CA.

Dunnivant, F.M., S. Saalfield, M. Murray, K. Taylor, and J. Wnuk. A Comparison of Techniques for Studying Sediment Desorption Kinetics for Hydrophobic Pollutants. American Chemical Society National Meeting, Division of Environmental Chemistry, August, **2004**, Philadelphia, PA.

Tenured at Whitman, 2004

Dunnivant, F.M. Advanced Laboratory Exercises for Environmental Chemistry. 225th American Chemical Society National Meeting, Division of Chemical Education, March, **2003**, New Orleans, LA.

Dunnivant, F.M. and M.C. Reynolds. A Chemical Transformation Laboratory for Environmental Chemistry. 225th American Chemical National Meeting, Division of Chemical Education, March, **2003**, New Orleans, LA.

Dunnivant, F.M., J. Wnuk, and J. Jacka, Desorption Kinetics of Hydrophobic Compounds from Lake Sediment Suspensions. 225th American Chemical Society National Meeting, Division of Chemical Education, March, **2003**, New Orleans, LA.

Dunnivant, F.M. F. Frye, and D. Danowski. EnviroLand 3.00: An Interactive Teaching Tool for the Environmental Sciences. 222nd American Chemical National Meeting, Division of Environmental Chemistry and Division of Chemical Education, April, **2001**, San Diego, CA.

Dunnivant, F.M. Critical Assessment of Environmental Chemistry Textbooks. 222nd American Chemical Society National Meeting, Division of Environmental Chemistry and Division of Chemical Education, April, **2001**, San Diego, CA.

Dunnivant, F.M., E. Anders, and J. Brown. A Computer-Based Tutorial for HPLC. Pittcon. April, **2001**. New Orleans, LA.

Dunnivant, F.M., M. E. Newman, D. Danowski, F. Frye, T. Spano, and A. Timmens-Haroldson. EnviroLand: An Interactive Computer Tool for Teaching Environmental Chemistry and Hydrology. 218th American Chemical Society National Meeting, Division of Environmental Chemistry, August 21-25, **1999**, New Orleans, LA.

Arrived at Whitman, Fall 1999

Dunnivant, F.M., M.E. Newman, I. Porro, C. Bishop. **1995**. Migration of Radionuclide Tracers through Fractured Media: Results from the Large-Scale Aquifer Pumping and Infiltration Test at the Idaho National Engineering Laboratory,

Migration '95: Chemistry and Migration Behaviour of Actinides and Fission Products in the Geosphere, Saint-Malo, France.

Dunnivant, F.M., M.E. Newman, I. Porro, C. Bishop, J. Hubbell, and J.R. Giles. **1995**. Verifying The Integrity of Annular Space and Back-Filled Seals for Monitoring Wells, *American Geophysical Union*, Spring Meeting, Baltimore, MD.

Dunnivant, F.M., D.L. Macalady, and R.P. Schwarzenbach. **1992**. Reduction of Substituted Nitrobenzenes in Aqueous Solutions Containing Natural Dissolved Organic Matter, American Chemical Society National Meeting, Spring Meeting, San Francisco, CA.

Dunnivant, F.M., D.L. Macalady, and R.P. Schwarzenbach. **1991**. Reduction of Substituted Nitrobenzenes in Aqueous Solutions Containing Natural Organic Matter. *Interfacial Phenomena in the Environment*, Davos, Switzerland.

Dunnivant, F.M. and P.M. Jardine. **1990**. The Cotransport of Pollutants by Natural Organic Matter in Soil Columns. *European Science Foundation Congress: Particles in Natural Waters*, li Ciocco, Italy.

Dunnivant, F.M., P.M. Jardine, D.L. Taylor, and J.F. McCarthy. **1990**. The Cotransport of Cadmium and PCBs by Naturally-Occurring Dissolved Organic Matter in Soil Columns, American Chemical Society National Meeting, Spring Meeting, Boston, MA.

Dunnivant, F.M. and A.W. Elzerman. **1990**. Evaluation of Current Kinetic Desorption Models to Predict the Desorption of Hydrophobic Compounds from Lake Sediments with Emphasis on Biological Exposure. American Chemical Society National Meeting, Spring Meeting, Boston, MA.

Dunnivant, F.M. and A.W. Elzerman. **1987**. (Graduate Student Paper Award). Aqueous Solubility and Henry's Law Constants for PCB Congeners for Evaluation of Quantitative Structure-Property Relationships (QSPRs). American Chemical Society National Meeting, Fall Meeting, New Orleans, LA.

Dunnivant, F.M. and A.W. Elzerman. **1987**. Experimentally Determined Henry's Law Constants for Selected PCB Congeners. *Seventeenth Annual Symposium on the Analytical Chemistry of Pollutants*, Jekyll Island, GA.

Dunnivant, F.M. and A.W. Elzerman. **1985**. Analysis of Total PCBs and Individual Congeners in Sediments by Sonication Extraction and Capillary Column/ECD Gas Chromatography with Internal Standard Calibration. American Chemical Society National Meeting, Fall Meeting, Chicago, IL.

Dunnivant, F.M. and A.W. Elzerman. **1985**. Congener-Specific Determination of PCBs in Lake Sediments, *Sixteenth Annual Symposium on the Analytical Chemistry of Pollutants*, Jekyll Island, GA.

Funded Research

I have been the PI or co-PI for research and educational projects totaling approximately 7.5 million dollars in funding. These projects range from small internal projects from Whitman College to externally competitive funded projects while at Whitman to multimillion-dollar projects with the Department of Energy.

Principal Investigator. Perry Grant with Peter Mullins*. **2012**. PCB and DDT Concentrations in Remote Alpine Lakes in the Pacific Northwest.

Principal Investigator. Abshire Grant with Angela Raso*. **2011**. Development of Mathematical Problems for Environmental Chemistry.

Principle Investigator. **2011**. HHMI Grant with Andrew Molina* and Mzuri Handlin*. Determining the Release of Chlorinated Pesticides during Simulated River Dredging Events.

Principle Investigator. **2011**. Perry Grant with Angela Raso*. Determining the Presence of Dense Non-Aqueous Phase Liquid (DNAPL) Pollutants in River Sediments.

Principal Investigator. Support for Innovation in Teaching and Learning Initiative Grant. **2008**. Redesigning CHEM361 and Creating CHEM420. Preparation of an Ebook on inductively coupled plasma - mass spectroscopy. Published in 2009.

Principal Investigator. Abshire Grant for Emily Doyle*. **2009**. Development of homework problem for Environmental Chemistry and a new version of a textbook.

Principal Investigator. Perry Grant with Nate Conroy*. **2009**. PCB and DDT Concentrations in Remote Alpine Lakes in the Pacific Northwest.

Principal Investigator. Abshire Grant with Jake Ginsbach*. **2007**. Development of figures and illustrations for a layperson's book on environmental chemistry issues.

Principal Investigator. Perry Grant with Jake Ginsbach*. **2007**. Development of Laboratory Exercises and an Internet Textbook on Mass Spectroscopy. Published in 2008.

Principle Investigator. The Camille and Henry Dreyfus Foundation. Matching funding for the purchase of an ICP-MS system. **2007**. Funding: \$50,000.00

Principle Investigator. M.J. Murdock Charitable Trust Instrumentation Grant. Funding was used to purchase a GC-MS and CE system. **2006-2007**. Funding: \$182,500.00.

Principal Investigator. Abshire Grant with Nora Hawkins. **2006-2007**. Development of materials for a layperson's book on environmental chemistry issues.

Principle Investigator. M.J. Murdock Charitable Trust Startup Grant for new Chemistry Faculty, Tim Machonin's Inorganic position. **2005-2006**. Funding: \$25,000.00

Principal Investigator. Abshire Grant. **2004-2005**. Development of materials for a textbook on environmental chemistry. Book published in 2006.

Tenured at Whitman, 2004

Principal Investigator. Perry Grant. **2000-2001** with Mark-Cody Reynolds* and Josh Wnuk*. Development of CD-ROM educational packages: Waste Water Treatment and Drinking Water Treatment.

Principal Investigator. National Collegiate Inventors and Innovators Alliance (NCIIA). **2000**. Funding: \$16,000. Development of Computer-Based Tutorials for Teaching Chemistry.

Principal Investigator. Perry Foundation Grant. **2000-2001**. Community Topics for Environmental Education for the Walla Walla Area.

Arrived at Whitman, Fall 1999

Principal Investigator. Camille and Henry Dreyfus Foundation. **1999-2000**. Funding: \$25,000. Development of Interactive Computer Tools for the Environmental Chemistry and Science Curriculum.

Principal Investigator. Hartwick College Trustee Grant with Dan Danowski*. **1999**. Funding: \$3,000. Development of Interactive Software (EnviroLand) for Use In Classroom Instruction.

Principal Investigator. Hartwick College Trustee Grant with Dan Danowski*. **1998**. Funding: \$5,000. Development of Interactive Software (EnviroLand) for Use In Classroom Instruction.

Principal Investigator. Hartwick College Trustee Grant with Dan Danowski*. **1997**. Funding: \$2,500. Development of Interactive Software (EnviroLand) for Use In Classroom Instruction.

Principal Investigator. Hartwick College Culpeper Grant. **1997**. Funding: \$2,000. Development of Interactive Software (EnviroLand) for Use In Classroom Instruction.

Principal Investigator. Down-Hole Gamma Spectroscopy for Real-Time Contaminant Monitoring. U.S. Department of Energy: Laboratory Directed Research and Development (LDRD). **1994** Funding: \$32,000.

Co-Investigator. Large-Scale Infiltration Experiment to Determine the Retardation and Migration Potential of Radionuclides in the Subsurface Environment Underlying

the INEL. U.S. Department of Energy. **1993** Funding: \$2,000,000. **1994** Funding: \$2,400,000. **1995** Funding: \$900,000.

Co-Principal Investigator. Laboratory Experiments to Determine the Migration Potential of Radionuclides in Subsurface Material of the INEL. U.S. Department of Energy. **1993** Funding: \$980,707. **1994** Funding: \$298,515. **1995** Funding: \$56,723.

Co-Principal Investigator. Experiments Using Natural Organics. U.S. Department of Energy. June **1989**-June **1991**. \$400,000/yr.

Co-Principal Investigator. Congener-Specific PCB Analyses. Oak Ridge National Laboratory. November **1987**-June **1988**. \$5,000.

Co-Principal Investigator. Investigation of Organic Carbon Adsorption Sites in Sediments. U.S. Environmental Protection Agency, Athens Environmental Research Laboratory, October **1987**-June **1988**. \$4,000.

Instrumentation acquired through government grants or donations during my tenure at Whitman College (the only cost to the College for each instrument was shipping)

Hewlett Packard 5890 Capillary Column Gas Chromatograph from the U.S. EPA. (estimated savings to Whitman: \$40,000)

Perkin Elmer 3030 Flame and Graphite Furnace Atomic Absorption Spectrometer from the U.S. Department of Energy. (estimated savings to Whitman: \$40,000)

Perkin Elmer 1100B Flame Atomic Absorption Spectrometer from the U.S. Department of Energy. (estimated savings to Whitman: \$40,000)

Environmental Temperature Control Unit from the U.S. Department of Energy. (estimated savings to Whitman: \$5,000)

High Performance Liquid Chromatograph with UV-Vis and Fluorescence detectors from the U.S. Department of Energy. (estimated savings to Whitman: \$25,000)

Ion Chromatograph from the City of Walla Walla. (estimated savings to Whitman: \$25,000)

Total Organic Carbon Analyzer from the U.S. Department of Energy. (estimated savings to Whitman: \$15,000)

Numerous broken instruments used in class demonstrations from the U.S. Department of Energy. (estimated savings to Whitman: priceless to students)

Honors and Awards

Hartwick College Teaching Award for Challenging and Engaging Undergraduate Students (1997)
American Chemical Society, Division of Environmental Chemistry, Graduate Student Paper Award (1987)
American Chemical Society, Division of Environmental Chemistry, Graduate Student Award (1986)
Sigma Xi (1986)
Environmental Protection Agency Traineeship (1983)
Alabama Environmental Health Student Award (1980)

College and Community Service while at Whitman College

-Served on the following committees: the ES committee (2000-present), Student Life Committee (2000), as the external Div III committee member for the Environmental-Sociology search in 2006, 3-2 Engineering and Computer Science Committee (2009-present), Biosafety Committee (2000-2005), the hiring committee for the Corporate and Foundation Development Officer (2006), volunteered for ASID committee (2008), but was not elected, volunteered for the Personnel Committee (2009), but was not elected, served on the library access position committee (2009), served on the Personnel Committee in 2010-11, and Campus Safety Committee (2011-present). Currently serving to interview and select our new Director of Environmental Health and Safety.

-Chair of Chemistry Department: 2005-2007, 2010-present.

-Chair of our first-in-twenty-year's External Departmental Review; prepared the Committee's review material, suggested potential reviewers, scheduled the meeting, hosted the review committee, and prepared the response to our review.

-Within the Chemistry Department I served on many Contingency Faculty searches (2001 Chaired my sabbatical replacement search, 2007 Chaired my sabbatical replacement search; and served as a member on approximately 8 adjunct visiting faculty searches in Chemistry); Served as Chair or as a member of search committee for eight years of tenure-track chemistry faculty searches (2002, Physical Chemistry; 2006, Organic Chemistry; 2008 and 2009, Organic Chemistry; 2009, 2010, and 2011 (Chair) Bio-Analytical Chemistry, and 2011 (Chair) Analytical Chemistry. I also served on the committee to hire our Laboratory Managers in 2002 and 2011 (Chair).

-My annual contributions to the Chemistry Department include selecting equipment to be purchased with our SERF budget, participate as the senior and historical archive for our weekly meeting (which I attend while on sabbatical), selection of students and coordination of our tutoring program, participate in our senior oral assessment, involvement in our transition to the five-course load, contributors to the re-organization of the content in our labs, mentoring young faculty, selection and mentoring of visiting faculty, as well as other more minor responsibilities.

-Since my arrival at Whitman in 1999, I have advised 5-10 “undeclared” students per year; advised 6-8 chemistry majors per year; conducted research with, on average, 4 chemistry majors per year.

-Designed and maintained a community educational Internet page on environmental issues in the Walla Walla area. 1999-discontinued in 2004.

-Maintained the Chemistry Department web page from 2000-2010.

--~2004, Pioneered the concept of a shared instrumentation center for the Hall of Sciences which, in part, has been used successfully in grant writing throughout Division III. A complete list of instrumentation is available at <http://www.whitman.edu/chemistry/equipment/equipment.html>

-Member of the City of Walla Walla Water and Wastewater Advisory Board, 2000-2003.

-Arranged, secured funding, and chaperoned students to National American Chemical Society meeting (six students to New Orleans in 2003; four students to Washington, DC in 2005; three students to New Orleans in 2008; 12 students to Salt Lake City in 2009; 16 students to San Francisco in 2010; eight students in San Diego in 2012) where they all presented their research.

-Sponsored at least two students per year at the last five Murdock Conference.

-Member of Walla Walla 20-20, an environmental community watch group, 2007-present.

-In 2011, I worked with the Advanced Placement (AP) testing board to help guide changes in the selection of topics (actually narrowing of topics) to be covered in their high school chemistry courses.

-In 2012 I joined the mentoring program.

-Distribution of Free Environmental Educational Software and eTextbooks created in my research group, 1999-present.

-HHMI Workshop on Water for Walla Walla County Middle School Teachers, January, 2010.

-HHMI Workshop on Environmental Success Stories (and failures...) for Walla Walla County Middle School Teachers, June, 2011.

-Participant in the Environmental Studies Innovation in Teaching and Learning Initiative Grant, Summer, 2011.

-Searched and located, acquired, and setup surplus instrumentation for teaching and research (listed earlier).

-Weekly maintenance of numerous instruments in the Chemistry Dept.

-On a fairly regular basis, I review journal manuscripts for The Chemical Educator, Chemosphere, Environmental Science and Technology, Environmental Toxicology and Chemistry, The Journal of Environmental Quality, and the Journal of Chemical Education.

-Periodic reviewer of textbooks for science publishers, especially Wiley InterScience.