

## Curriculum Vita Cass T. Miller

Department of Environmental Sciences and Engineering  
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## Education

University of Toledo, B.S. Civil Engineering, 1977  
University of Toledo, M.S. Civil Engineering, 1979  
University of Michigan, M.S. Environmental Engineering, 1981  
University of Michigan, Ph.D. Environmental Engineering, 1984

## Professional Experience

1985–Present

Department of Environmental Sciences and Engineering  
University of North Carolina  
Chapel Hill, North Carolina

Teaching and research activities are focused on theoretical, computational, and experimental aspects of single-phase and multiphase fluid flow, and contaminant transport and reaction phenomena in natural and engineered systems, especially porous medium systems.

- 1985–1991, 1991–1995, 1995–2011, 2012–Present  
Assistant Professor, Associate Professor, Professor, Okun Distinguished Professor of Environmental Sciences and Engineering
- 1999–2005  
Chair
- 1998–1999  
Director of the Environmental Modeling Program Area
- 1992–1999  
Director of the Center for Multiphase Research

2017–Present

Adjunct Professor  
Department of Applied Physical Sciences  
University of North Carolina

Chapel Hill, North Carolina

1973–1977, 1977–1980, 1980–1985

Technician, Staff Engineer, Senior Engineer

L.M. Miller & Associates

Consulting Engineers and Geologists

Ann Arbor, Michigan

Hydrogeological investigations, groundwater resource evaluations, mathematical modeling studies, sanitary landfill evaluation and design, groundwater pollution evaluation and remediation, geophysical surveys, and combined groundwater and surface-water management.

1982–1984

Research Associate

Environmental Engineering

University of Michigan

Ann Arbor, Michigan

## **Professional Registration**

Registered Professional Engineer Michigan, Number: 27613

Registered Professional Engineer Ohio, Number: E-46661

## **Awards and Honors**

Kenan Leave, University of North Carolina (2008)

Fellow of the American Geophysical Union (2002)

Delta Omega Honorary Public Health Society, Theta Chapter (2001)

Junior Faculty Development Award, University of North Carolina (1987)

Chi Epsilon Honorary Civil Engineering Fraternity (1984)

University of Michigan Engineering College Graduate Student Scholarship Award (1983, 1984)

## **Editorial and Scientific Leadership Positions**

Advances in Water Resources, Elsevier Science, Editor (1997–2015)

Advances in Water Resources, Elsevier Science, Editorial Board (1994–1997)

Bi-Annual International Conferences on Computational Methods in Water Resources, Organizing Committee (with R. Helmig, B. Sleep) (2010–Present)

XV International Conference on Computational Methods in Water Resources, Conference Organizer and Proceedings Editor (2004)

Environmental Science & Technology, American Chemical Society, Associate Editor (1992–1996)

Ground Water, National Ground Water Association, Editorial Board (1990–1992)  
United States Environmental Protection Agency, Scientific Advisory Board, Hydraulic Fracturing Research Advisory Panel (2013–2016)

## Recent Collaborators

D. Adalsteinsson (Univ. NC), M.D. Aitken (Univ. NC), D.M. Anderson (George Mason Univ.), R.T. Armstrong (Univ. New South Wales), S. Berg (Shell Global Solutions, Rijswijk), M.A. Berrill (Oak Ridge National Laboratory), O. Coronell (Univ. NC), C.N. Dawson (Univ. Texas), T. Dingemans (Univ. NC), M.W. Farthing (US Army ERDC), M.G. Forest (Univ. NC), W.G. Gray (Univ. NC), S.C. Hauswirth (California State University, Northridge), R. Helmig (Univ. of Stuttgart), T.Y. Hou (Cal Tech), J. Huang (Univ. NC), P.T. Imhoff (Univ. Delaware), C.E. Kees (US Army ERDC), C.T. Kelley (NC State Univ.), J.E. McClure (Virginia Tech), R.M. McLaughlin (Univ. NC), J.F. Prins (Univ. NC), L.J. Pyrak-Nolte (Purdue), I. Rybak (University of Stuttgart), S. Schlüter (Helmholtz-Centre for Environmental Research), B.A. Schrefler (Universita 'degli Studi di Padova, Italy), F.J. Valdés-Parada (Universidad Autónoma Metropolitana-Iztapalapa), D. Wildenschild (Oregon State Univ.), and B.D. Wood (Oregon State Univ.).

## Professional Societies

American Geophysical Union, Member of Groundwater Committee (1989–1993)  
Society for Industrial and Applied Mathematics, Member of Geosciences Activity Group

## Professional Service

1. Academic Press, Estuarine, Coastal and Shelf Science  
Peer Reviewer (1989)
2. Academic Press, Journal of Computational Physics  
Peer Reviewer (2000)
3. American Association for the Advancement of Science, Science  
Peer Reviewer (2003)
4. American Chemical Society and American Institute of Chemical Engineers, Biotechnology Progress  
Peer Reviewer (1992)
5. American Chemical Society, Environmental Science & Technology  
Peer Reviewer (1987–Present)  
Associate Editor (1992–1996)

6. American Chemical Society, Industrial & Engineering Chemistry Research  
Peer Reviewer (1998)
7. American Chemical Society, Petroleum Research Fund  
Peer Reviewer (2000–Present)
8. American Geophysical Union, Water Resources Research  
Peer Reviewer (1988–Present)  
Member of Groundwater Committee (1989–1993)
9. American Scientist  
Book Reviews (1990, 1992, 1995)
10. American Society of Agronomy, Journal of Environmental Quality  
Peer Reviewer (1987, 1997)
11. Army Research Office  
Peer Reviewer (1992–1999)
12. Association of Ground Water Scientists and Engineers, Ground Water  
Peer Reviewer (1988–1992, 2004)  
Editorial Board (1990–1992)
13. Australian Research Council  
Federation Fellowship Peer Reviewer (2004)
14. Baltzer, Computational Geosciences  
Peer Reviewer (2001)
15. Cambridge University Press, Journal of Fluid Mechanics  
Peer Reviewer (2001, 2016, 2018)
16. Elsevier, Advances in Water Resources  
Peer Reviewer (1991)  
Editorial Board (1994–1997)  
Co-Editor (1997–2015)
17. Elsevier, Computers & Geosciences  
Peer Reviewer (2004)
18. Elsevier, Environmental Modelling & Software  
Peer Reviewer (1999)
19. Elsevier, International Journal of Multiphase Flow  
Peer Reviewer (1999)
20. Elsevier, International Journal of Thermal Sciences  
Peer Reviewer (2002)

21. Elsevier, Journal of Colloid and Interface Science  
Peer Reviewer (2000–2001, 2003)
22. Elsevier, Journal of Contaminant Hydrology  
Peer Reviewer (1985, 1993, 1998–2004)
23. Elsevier, Journal of Hydrology  
Peer Reviewer (1992)
24. Elsevier, Powder Technology  
Peer Reviewer (1999)
25. European Physical Society, Europhysics Letters  
Peer Reviewer (2002)
26. Graduate Women in Science  
Graduate Student Fellowship Reviewer (2017)
27. International Association on Water Pollution Research and Control, Water Research  
Peer Reviewer (1987–1990)
28. John Wiley and Sons, Inc., International Journal for Numerical Methods in Engineering  
Peer Reviewer (2000, 2003)
29. John Wiley and Sons, Inc., Numerical Methods for Partial Differential Equations  
Peer Reviewer (1997)
30. Mary Ann Liebert, Inc. Publishers  
Peer Reviewer (2004)
31. National Computational Science Alliance  
Peer Reviewer (1998)
32. National Institute of Environmental Health Sciences  
Proposal Review Committee (2004, 2007)  
Environmental Health Perspectives, Peer Reviewer (2005)
33. National Science Foundation  
Peer Reviewer (1992–Present)  
Panel Member (1993)
34. Natural Environmental Research Council, United Kingdom  
Proposal Reviewer (1999)
35. New York Center for Hazardous Waste Management  
Peer Reviewer (1990)
36. North Carolina Albemarle-Pamlico Estuarine Study  
Peer Reviewer (1991)

37. North Carolina Biotechnology Center  
Peer Reviewer (1986)
38. North Carolina State University, Raleigh  
Dissertation Reviewer (1993, 1997, 2000, 2007, 2012)
39. North Carolina Supercomputing Center  
Allocation Committee Member (1995–2002)
40. Pergamon, Chemical Engineering Science  
Peer Reviewer (2002)
41. Simula Research Laboratory, Lysaker, Norway  
Program Planning Review (2004)
42. Society for Industrial and Applied Mathematics  
Journal on Applied Mathematics, Peer Reviewer (2008–2009)
43. Soil Science Society of America, Soil Science Society of America Journal  
Peer Reviewer (1997)
44. Springer Science Publishers, Meccanica  
Peer Reviewer (2005)
45. South Carolina Hazardous Waste Management Research Fund  
Peer Reviewer (1991)
46. Swiss National Science Foundation  
Peer Reviewer (2014)
47. The Universities Council on Water Resources  
Peer Reviewer (1987–1992)
48. United States Department of Agriculture  
Peer Reviewer (2003)
49. United States Department of Energy  
Review of Subsurface Science Research Program, Multiphase Flow Panel Chair (1991)  
Vadose Zone Roadmapping Working Group Member (2000–2001)  
Engineering Management Science Program Review Panel (2002)  
Peer Reviewer for Office of Basic Energy Sciences (2003–2005)  
Multiscale Mathematics Workshop, Environmental and Geosciences Co-Leader (2004)  
Office of Basic Energy Sciences, Graduate Fellowship Proposal Reviews (2010–2012)  
Office of Basic Energy Sciences, Early Career Awards (2012–2016)  
INCITE Program, Panel Member (2011, 2012)  
Office of Basic Energy Sciences (2014)  
Exascale project proposal review (2016)

50. U.S. Civilian Research and Development Foundation  
Peer Reviewer Cooperative Grants Program (2003)
51. University of Pittsburgh, Pittsburgh, Pennsylvania  
Bachelors Honors Thesis Reviewer (2006)
52. University of Oslo, Oslo, Norway  
Dissertation Reviewer (1996)
53. University of Stuttgart, Stuttgart, Germany  
Habilitation Reviewer (2010)
54. University of Western Australia, Perth, Australia  
Dissertation Reviewer (1999)
55. Water Environment Federation, Water Environment Research Journal  
Peer Reviewer (1989–1991)  
Research Committee (1986–1992)
56. Water Resources Research Institute of North Carolina  
Technical Committee Member (1986–1989, 1992–1995)  
In-Service Training Program Contributor (1986)  
Peer Reviewer (1986–1996)

## University of North Carolina Service

Department of Environmental Sciences and Engineering

- Triangle Conference on Environmental Technology—Conducted Workshop “Monitoring and Modeling of Groundwater Contamination” (1986)
- Developed and Directed Short Course “Groundwater Quality Management” (1988)
- Computer Committee (1986–1996)
- Shop Committee (1988–1995)
- Space Committee (1989–1990)
- Water Resources Engineering, Hydrologist Search Committee (1989–1990)
- Strategic Planning and Development Committee (1990–1992)
- Water Resources Engineering, Surface Chemist Search Committee (1995)
- Environmental Management and Policy, Search Committee (1996)
- Department Chair (1999–2005)
- Environmental Chemistry and Hydrology, Search Committee (2007–2008)

- Ad Hoc Promotion Review Committee Chair (2016, 2017)
- Awards Committee Chair (2017–)

#### Department of Applied Physical Sciences

- Graduate Studies Committee (2017–)

#### School of Public Health

- Department of Epidemiology Chair Review Committee, Chair (2000–2001)
- Web Steering Committee (2000–2001)
- Strategic Planning Committee, Chair (2001)
- Associate Dean for External Affairs Search Committee (2002)

#### Marine Sciences Program

- Large-Scale Numerical Modeler Search Committee (1989–1992)
- Appointment and Promotion Committees (1995–1996, 1998–1999, 2001)

#### University Committees

- University Faculty Council  
Alternate Member (1986–1988, 1990)
- University Research Council  
Chairman Physical Sciences and Mathematics Review Committee (1994–1995)
- Science Advisory Committee, Division of Basic and Applied Sciences (1998–2000)
- Ad Hoc Committee on Research Administration (1999)
- Environmental Sciences Building Committee, Chair (2001–2003)
- Inside Carolina, Environmental Programs Committee (2002)
- Postdoctoral Advisory Committee (2002–2003)
- Tuition Remission Task Force (2002–2003)
- High-Performance Computing and Communications Advisory Committee (2002–2003)
- University Uses Working Group for Carolina North (2002–2003)
- Tuition Task Force (2004)
- Applied Physical Sciences User Group Committee (2017–)



## Research Grants and Contracts

1. Methodology for Assessment of Contamination of the Unsaturated Zone by Leaking Underground Storage Tanks. Sponsored by: Water Resources Research Institute of North Carolina (7/85–6/87). Co-Principal Investigator with F.A. DiGiano. Amount: \$70,169.
2. The Transport and Fate of Organic Contaminants in Ground Water Systems. Sponsored by: National Science Foundation (9/85–2/88). Principal Investigator. Amount: \$41,521.
3. Mathematical Model for Assessing Multiphase Organic Contaminant Transport in Ground Water. Sponsored by: University of North Carolina at Chapel Hill University Research Council (11/85–10/87). Principal Investigator. Amount: \$1,500.
4. Modeling Organic Contaminant Sorption Impacts on Aquifer Restoration. Sponsored by: Water Resources Research Institute of North Carolina (6/86–5/87). Principal Investigator. Amount: \$37,587.
5. Characterization of the Adaptive Abilities of Groundwater Microbial Communities. Sponsored by: U.S. Environmental Protection Agency, R. S. Kerr Laboratory (10/86–7/87). Principal Investigator. Amount: \$104,000.
6. Development of an Improved Methodology for Assessing the Movement of Gasoline Origin Contaminants in Ground Water Systems. Sponsored by: University of North Carolina at Chapel Hill Foundation R. J. Reynolds Fund—Jr. Faculty Development Award (1/87–12/87). Principal Investigator. Amount: \$3,000.
7. Effect of Vapor-Phase Mass Transfer on Aquifer Restoration. Sponsored by: Water Resources Research Institute of North Carolina (6/87–5/89). Principal Investigator. Amount: \$73,707.
8. Development of a Variable, Dual-Energy Attenuation Method for Measuring Fluid Saturation in Multiphase Systems. Sponsored by: Biomedical Research Support Funds, School of Public Health, University of North Carolina at Chapel Hill (6/87–5/88). Principal Investigator. Amount: \$7,257.
9. Investigation of Multi-Component Sorption and Desorption Rates in Saturated Ground Water Systems. Sponsored by: United States Geological Survey and the Water Resources Research Institute of North Carolina (8/87–10/90). Principal Investigator. Amount: \$321,314.
10. Investigation of Aquifer Response to Purge-Well Rehabilitation. Sponsored by: U.S. Environmental Protection Agency, R. S. Kerr Laboratory (10/87–9/89). Principal Investigator. Amount: \$101,400.
11. The Impact of Interphase Mass-Transfer Rate and Equilibrium for Multiphase Groundwater Systems. Sponsored by: Army Research Office (11/87–2/91). Principal Investigator. Amount: \$306,739.

12. Groundwater Quality Management—Continuing Education. Sponsored by: Grumman Grant, University of North Carolina at Chapel Hill (1/88–12/88). Principal Investigator. Amount: \$4,900.
13. Development of a Modified Elutriate Test to Predict Release of Contaminants from Sediment Material at the Point of Dredging. Sponsored by: United States Army Engineer Waterways Experiment Station (8/88–2/90). Co-Principal Investigator with F.A. DiGiano. Amount: \$161,901.
14. Movement and Dissipation of Toxicants and Water in Natural Soil Environments. Sponsored by: United States Geological Survey and the Water Resources Research Institute of North Carolina (6/89–5/92). Principal Investigator. Amount: \$95,590 (UNC Share) from \$349,788 (Total Project).
15. Investigation of a Cosolvent Strategy for Groundwater Quality Restoration. Sponsored by: Biomedical Research Support Funds, School of Public Health, University of North Carolina at Chapel Hill (6/89–4/90). Principal Investigator. Amount: \$8,450.
16. An Investigation of Waste Burial Areas. Sponsored by: Health and Safety Office, University of North Carolina at Chapel Hill (11/89–5/91). Principal Investigator. Amount: \$33,500.
17. Computer Simulation of Push-Pull Systems. Sponsored by: National Institutes of Health (9/90–8/92). Co-Principal Investigator with M.R. Flynn. Amount: \$157,940.
18. An Evaluation of Scale Effects in Multiphase Porous Media Systems. Sponsored by: University of North Carolina at Chapel Hill University Research Council (11/90–10/92). Principal Investigator. Amount: \$2,000.
19. RCRA Facility Investigation for Waste Drum and Landfill Areas. Sponsored by: Health and Safety Office, University of North Carolina at Chapel Hill (10/90–9/91). Principal Investigator. Amount: \$26,350.
20. Investigation of Scale and Heterogeneity Effects on Flow and Transport in Multiphase Systems. Sponsored by: United States Army Research Office (5/91–4/94). Principal Investigator. Amount: \$435,000.
21. Simulation of Multiphase Flow and Transport Phenomena in Subsurface Systems. Sponsored by: North Carolina Supercomputing Center (7/91–6/92). Principal Investigator. Amount: 200 hours of Cray Y-MP time.
22. Computer Simulation of Push-Pull Systems. Sponsored by: North Carolina Supercomputing Center (7/91–6/92). Co-Principal Investigator with M.R. Flynn. Amount: 100 hours of Cray Y-MP time.
23. An Evaluation of Enhanced Aquifer Remediation Strategies for Subsurface Restoration. Sponsored by: Water Resources Research Institute of North Carolina (7/91–12/92). Principal Investigator. Amount: \$39,902.

24. The Role of Biosurfactants in Biodegradation of Hydrophobic Pollutants by Indigenous Microorganisms in Soil. Sponsored by: United States Geological Survey and the Water Resources Research Institute of North Carolina (8/91–7/94). Co-Principal Investigator with M.D. Aitken. Amount: \$348,631.
25. Supercomputer Simulation of Pump-and-Treat Methods for Aquifer Restoration. Sponsored by: U.S. Environmental Protection Agency, R. S. Kerr Laboratory (10/91–8/93). Principal Investigator. Amount: \$100,000.
26. Supercomputer Simulation of Pump-and-Treat Methods for Aquifer Restoration. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center. (1/92–12/92). Principal Investigator. Amount: \$7,000 and 80 hours of Cray Y-MP time.
27. An Investigation of Flow and Transport Phenomena in Multicomponent, Multiphase Subsurface Systems. Sponsored by: National Institute of Environmental Health Sciences (4/92–3/95). Principal Investigator. Amount: \$618,315.
28. Stochastic Analysis of Flow and Transport Phenomena in Subsurface Systems Using a Space Transformation Method. Sponsored by: National Institute of Environmental Health Sciences (4/92–3/95). Co-Principal Investigator with G. Christakos. Amount: \$507,465.
29. An Investigation of Fluid Flow and Contaminant Transport Processes in Heterogeneous Multiphase Systems. Sponsored by: Army Research Office (7/92–6/97). Principal Investigator. Amount: \$2,200,856.
30. Supercomputer Simulation of Aquifer Remediation. Sponsored by: North Carolina Supercomputing Center (1/93–12/93). Principal Investigator. Amount: 450 hours of Cray Y-MP time.
31. Supercomputer Simulation of Pump-and-Treat Methods for Aquifer Restoration. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center. (1/93–12/93). Principal Investigator. Amount: \$7,000 and 100 hours of Cray Y-MP time.
32. Supercomputer Simulation of Fixed and Adaptive Solutions to the Richards' Equation. Sponsored by: North Carolina Supercomputing Center (2/93–2/94). Co-Principal Investigator with R.W. Skaggs, North Carolina State University. Amount: 25 hours of Cray Y-MP time.
33. Modeling Enhanced Remediation Methods for Multiphase Subsurface Systems. Sponsored by: Hoechst Celanese Corporation (3/93–6/95). Principal Investigator. Amount: \$52,800.
34. Simulation of Flow and Transport Phenomena in Heterogeneous Multiphase Systems. Sponsored by: National Science Foundation, Pittsburgh Supercomputing Center (12/93–1/95). Principal Investigator. Amount: 200 hours of Cray C90 time.

35. Simulation of Flow and Transport Phenomena in Heterogeneous Multiphase Multicomponent Systems. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center (1/94–3/96). Principal Investigator. Amount: \$15,000 and 200 hours of Cray Y-MP time.
36. Simulating Flow and Transport Phenomena in Heterogeneous Multiphase Systems. Sponsored by: North Carolina Supercomputer Center (7/94–6/96). Principal Investigator. Amount: 450 hours Cray Y-MP time.
37. An Investigation of Multiphase Mass Transfer Phenomena. Sponsored by: National Institute of Environmental Health Sciences (4/95–3/00). Principal Investigator. Amount: \$1,085,110.
38. Stochastic Analysis of Flow and Transport Phenomena. Sponsored by: National Institute of Environmental Health Sciences (4/95–3/00). Co-Principal Investigator with G. Christakos. Amount: \$1,052,890.
39. Superfund Center Outreach. Sponsored by: National Institute of Environmental Health Sciences (4/95–3/00). Principal Investigator. Amount: \$221,360.
40. An Investigation of Fluid Flow and Contaminant Transport Processes in Heterogeneous Multiphase Systems—AASERT Supplemental Request for Student Support. Sponsored by: United States Army Research Office (5/95–5/98). Principal Investigator. Amount: \$100,000.
41. Equipment to Support Research on Mass Transfer Phenomena in Multiphase Systems. Sponsored by: Department of Defense, DURIP (8/95–7/96). Principal Investigator. Amount: \$380,662.
42. Simulating Flow and Transport Phenomena in Heterogeneous Multiphase Systems. Sponsored by: U.S. Army Engineer Waterways Experiment Center through MCNC (10/95–9/98). Principal Investigator. Amount: \$233,262 (UNC Share).
43. Development and Application of Models for Multiphase Porous Media Systems. Sponsored by: North Carolina Supercomputer Center (7/96–2/98). Principal Investigator. Amount: 980 hours Cray T916 time, and 5,000 hours of Cray T3D/T3E time.
44. Modeling Subsurface Transport Phenomena. Sponsored by: North Carolina Supercomputer Center (7/96–2/98). Principal Investigator. Amount: 900 hours Cray T916 time; and 3,000 hours of Cray T3E time.
45. Simulation of Multiphase Flow and Multicomponent Transport Phenomena in Heterogeneous Porous Media Systems. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center (1/97–12/97). Principal Investigator. Amount: \$8,000, and 100 hours of Cray T916 time.

46. Simulation of Biodegradation and Multicomponent Transport Phenomena in Heterogeneous Porous Media Systems. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center (1/98–12/98). Principal Investigator. Amount: \$8,000; 100 hours of Cray T916 time, and 1,000 hours of Cray T3E time.
47. Modeling Subsurface Transport Phenomena. Sponsored by: North Carolina Supercomputer Center (2/98–8/99). Principal Investigator. Amount: 900 hours Cray T916 time, and 6,000 hours of Cray T3E time.
48. Technology Transfer of Basic Research on Multiphase Subsurface Fate and Transport. Sponsored by: Army Research Office (4/98–1/99). Principal Investigator. Amount: \$60,000.
49. The Role of Chemotaxis in the Biodegradation of Naphthalene in Porous Media. Sponsored by: National Science Foundation (9/98–8/00). Co-Principal Investigator with M.D. Aitken. Amount: \$215,000.
50. DAE/MOL Approach for Simulating Multiphase Flow. Sponsored by: Cray Research Environmental and Computational Science Program through the North Carolina Supercomputing Center (1/99–12/99). Principal Investigator. Amount: \$8,000; 100 hours of Cray T916 time, and 1,000 hours of Cray T3E time.
51. Atomic Force Microscopy Presents New Opportunities for Environmental Research. Sponsored by: Department of Defense, DURIP (3/99–2/00). Co-Principal Investigator with S.T. Martin. Amount: \$147,000.
52. Closure of Thermodynamically Constrained Models of Multiphase Flow. Sponsored by: University of North Carolina at Chapel Hill University Research Council (4/99–3/01). Principal Investigator. Amount: \$2,600.
53. Collaborative Research: Closure of Thermodynamically Constrained Models for Multiphase Systems. Sponsored by: National Science Foundation (9/99–8/02). Principal Investigator, Collaborator: W.G. Gray, University of Notre Dame. Amount: \$183,312 from total award of \$300,000.
54. Supercomputing Support for Investigations of Multiphase Flow and Transport Phenomena in Porous Medium Systems. Sponsored by: North Carolina Supercomputer Center (11/99–10/00). Principal Investigator. Amount: 60,000 hours IBM SP time, and 10,000 hours of SGI Origin 2000 time.
55. An Object Oriented Model for Nitrogenous Pollutants. Sponsored by: U.S. Environmental Protection Agency (3/00–3/03). Co-Principal Investigator. Amount: \$345,533.
56. Environmental Exposure and Effect of Hazardous Chemicals. Sponsored by: National Institute of Environmental Health Sciences (4/00–3/06). Component Project and Core Principal Investigator (J.A. Swenberg, Principal Investigator). Total Award Amount: \$17,800,017.

57. Modeling Multiscale, Multiphase Porous Medium Systems. Sponsored by: North Carolina Supercomputer Center (11/00–10/01). Principal Investigator. Amount: 240,000 hours IBM SP time, 9,000 hours of SGI Origin 2000 time, and 1225 hours of Cray T916 time.
58. Flow and Transport in Porous Media. Sponsored by: Army Research Office (5/01–4/02). Principal Investigator. Amount: 200,000 hours of IBM SP3 time.
59. A Distributed, High Performance Computing System for the Applied Sciences. Sponsored by: National Science Foundation (8/01–7/04). Co-Principal Investigator. Amount: \$598,173.
60. Bacterial Chemotaxis to Naphthalene Desorbing from a Nonaqueous-Phase Liquid. Sponsored by: National Science Foundation (9/01–8/04). Investigator (M.D. Aitken, Principal Investigator). Amount: \$386,072.
61. ITR/AP: Collaborative Research: Sampling Methods for Optimization and Control of Subsurface Contamination. Sponsored by: National Science Foundation (10/01–9/04). Principal Investigator for UNC, Collaborators: J.E. Dennis, Rice University; and C.T. Kelley, North Carolina State University. Amount: \$166,667 from total award of \$500,000.
62. Supercomputing Support for Modeling Multiphase Flow and Transport in Porous Medium Systems. Sponsored by: North Carolina Supercomputer Center (11/01–10/02). Principal Investigator. Amount: 377,000 hours IBM SP3 time, 7,400 hours of SGI Origin 2000 time, and 25 hours of Cray T916 time.
63. Environmental Modeling Research at the University of North Carolina at Chapel Hill. Sponsored by: U.S. Department of Energy (4/02–4/05). Principal Investigator. Amount: \$969,000.
64. Modeling Multiphase Transport Phenomena from the Pore to the Field Scale. Sponsored by: North Carolina Supercomputer Center (11/02–10/03). Principal Investigator. Amount: 285,000 hours IBM SP3 time, and 1,400 hours of SGI Origin 2000 time.
65. CMG: Multiphase Porous Medium Dynamics: Pore to Field Scale. Sponsored by: National Science Foundation (8/03–7/08). Principal Investigator. Amount: \$662,000.
66. DNAPL Source Remediation Using Brine Barriers. Sponsored by: National Institute of Environmental Health Sciences (4/4–3/6). Component Project Principal Investigator (J.A. Swenberg, Research Center Principal Investigator). Total Award Amount: \$509,549.
67. Collaborative Research: Upscaled Mass Transfer Coefficients for Modeling Dissolution of Nonaqueous Phase Liquids in Homogeneous and Heterogeneous Porous Media in the Field. Sponsored by: National Science Foundation (1/05–12/08). Principal Investigator. Amount: \$196,494.

68. Environmental Exposure and Effect of Hazardous Chemicals. Sponsored by: National Institute of Environmental Health Sciences (4/06–3/10). Component Project and Core Principal Investigator (J.A. Swenberg, Principal Investigator). Total Award Amount: \$12,103,713.
69. Promoting North Carolina’s Economic Development Through Strategic Water Resource Management. Sponsored by: University of North Carolina Research Competitiveness Fund (1/08–12/08). Co-Principal Investigator (G.W Characklis, Principal Investigator). Total Award Amount: \$245,650.
70. Environmental Exposure and Effect of Hazardous Chemicals, Supplement to Project 6. Sponsored by: National Institute of Environmental Health Sciences (9/09–8/11). Component Project Principal Investigator (J.A. Swenberg, Principal Investigator). Total Award Amount: \$221,994.
71. SISGR—Multiscale Modeling of Multiphase Flow, Transport, and Reactions in Porous Medium Systems, Sponsored by: U.S. Department of Energy (9/15/09–9/14/12). Principal Investigator. Total Award Amount: \$600,000.
72. Collaborative Research: CDI-Type II—Revolutionary Advances in Modeling Transport Phenomena in Porous Medium Systems. Sponsored by: National Science Foundation (12/1/09–09/30/15). Principal Investigator. Total Award Amount: \$1,700,000 (UNC Award Amount: \$1,100,000).
73. Multiscale Modeling of Multiphase Flow, Transport, and Reactions in Porous Medium Systems. Sponsored by: U.S. Department of Energy (9/15/12–9/14/16). Principal Investigator. Total Award Amount: \$623,474.
74. CC-NIE Network Infrastructure: Enabling Data-Driven Research. Sponsored by: National Science Foundation (12/1/12–11/30/14). Co-Principal Investigator (Jay Aikat, Principal Investigator). Total Award Amount: \$499,529.
75. Advancing Models for Multiphase Flow and Transport in Porous Medium Systems. Sponsored by: U.S. Department of Energy (1/1/14–12/31/16). Co-Principal Investigator (James E. McClure, Principal Investigator). Total Award Amount: 180 million core hours of computational time on Cray XK7 Titan at Oak Ridge National Laboratory.
76. Thermodynamically Constrained Averaging Theory for Multiscale Systems. Sponsored by: Army Research Office (6/6/14–8/31/18). Principal Investigator. Total Award Amount: \$693,794.
77. Advancing Mechanistic Understanding of Two-Fluid-Phase Flow in Porous Medium Systems. Sponsored by : National Science Foundation (4/1/16–3/31/19). Principal Investigator. Total Award Amount: \$460,762.
78. Elucidating Physicochemical Processes Affecting Transport Phenomena Resulting from Hydraulic Fracturing of Natural Gas Reservoirs. Sponsored by : National Science Foundation (9/1/16–8/31/19). Principal Investigator. Total Award Amount: \$340,000.

79. Advancing Models for Multiphase Flow and Transport in Porous Medium Systems. Sponsored by: U.S. Department of Energy (1/1/17–12/31/18). Co-Principal Investigator (James E. McClure, Principal Investigator). Total Award Amount 215 million core hours of computational time on Cray XK7 Titan at Oak Ridge National Laboratory.

## Post-Doctoral Associates

1. Paul T. Imhoff (1992–1996)  
Education: Ph.D. Civil Engineering, Princeton University (1992);  
Nature of Collaboration: analysis of aqueous-gas phase mass transfer in porous media, experimental investigations of finger formation in multiphase porous media systems, stability analysis for finger formation, and experimental investigations of enhanced remediation methods.
2. Itaru Okuda (1993–1995)  
Education: Ph.D. Soil and Water Science, University of Florida, Gainesville (1993);  
Nature of Collaboration: experimental and theoretical analysis of cosolvent, thermal, and surfactant methods of enhanced remediation.
3. Simon Gleyzer (1993–1998)  
Education: Ph.D. Civil Engineering, Ufa, Institute of Oil, Russia (1991);  
Nature of Collaboration: mathematical model formulation and experimental investigation of cosolvent, thermal, and surfactant methods of enhanced remediation.
4. Joseph A. Pedit (1994–2010)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (1994);  
Nature of Collaboration: experimental and mathematical modeling aspects of sorption/desorption processes, modeling of advanced oxidation processes, modeling chemotaxis in porous medium systems, pesticide transport and fate, and experimental aspects of multiphase systems.
5. Clinton S. Willson (1996–1998)  
Education: Ph.D. Civil Engineering, University of Texas, Austin, Texas (1996);  
Nature of Collaboration: experimental and mathematical modeling aspects of enhanced remediation of DNAPL-contaminated systems.
6. Markus Hilpert (1997–2002)  
Education: Ph.D. Engineering, University of Karlsruhe, Germany (1997);  
Nature of Collaboration: mobilization of residual NAPLs using sound waves, and pore-scale modeling of multiphase systems.
7. Marylene Moutier (1998–1999)  
Education: Dr. Ing. Soil Physics, Catholic University of Louvain, Louvain-la-Neuve, Belgium (1996);



Nature of Collaboration: density-enhanced mobilization of DNAPLs, and colloidal transport and reaction phenomenon.

8. Christopher E. Kees (2001–2002)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2001);  
Nature of Collaboration: adaptive temporal integration, domain decomposition preconditioning, multiphase flow and transport simulation, hydrologic modeling.
9. Matthew W. Farthing (2002–2004)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2002);  
Nature of Collaboration: problem solving environments, higher-order time integration, locally conservative finite element methods, adaptive numerical methods.
10. Joseph F. Kanney (2002–2003)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2002);  
Nature of Collaboration: problem solving environments, split-operator approaches, geochemical modeling.
11. Chongxun Pan (2003–2006)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2003);  
Nature of Collaboration: pore-scale modeling, multiphase porous medium physics, problem solving environments.
12. Sarah E. Gasda (2007–2011, co-advised along with W.G. Gray)  
Education: Ph.D. Princeton University (2007);  
Nature of Collaboration: development of adaptive integration methods, error estimation and control for split-operator methods, and NAPL dissolution fingering in heterogeneous systems.
13. Amber S. Jackson (2011)  
Education: Ph.D. Mathematics, University of North Carolina at Chapel Hill (2011);  
Nature of Collaboration: development of the thermodynamically constrained averaging theory.
14. James E. McClure (2011–2012)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2011);  
Nature of Collaboration: pore-scale modeling, multiphase porous medium physics.
15. Pamela B. Schultz (2011–)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2011);  
Nature of Collaboration: modeling non-dilute systems using the thermodynamically

constrained averaging theory, physicochemical mechanisms and risk assessment of hydraulic fracturing.

16. Roham Bakhtyar (2012–2014)  
Education: Iran University of Science and Technology and Ecole Polytechnique Fédérale de Lausanne, Switzerland (2009);  
Nature of Collaboration: modeling sediment transport processes.
17. Hauswirth, Scott C. (2014–2016)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2014);  
Nature of Collaboration: transport phenomena during hydraulic fracturing, carbon sequestration, and environmental remediation.
18. Dye, Amanda L. (2015–2016)  
Education: Ph.D. Environmental Sciences and Engineering, University of North Carolina at Chapel Hill (2015);  
Nature of Collaboration: experimental and modeling of multiphase flow in porous media.

## Doctoral Students Directed

1. Mayer, Alex S. (1992) An Investigation of Residual Nonaqueous Phase Liquid Dissolution in Saturated Groundwater Systems.
2. Rabideau, Alan J. (1994) Modeling of Reactive Solute Transport in Heterogeneous Porous Media: Application to Aquifer Remediation by Pump-and-Treat.
3. Pedit, Joseph A. (1994) An Investigation of Sorption by Heterogeneous Natural Solids.
4. Williams, Glenn A. (1998) Numerical Modeling of Variably Saturated Flow in Porous Media.
5. Kees, Christopher E. (2001) Multiphase Flow Modeling with DAE/MOL Methods.
6. Hill III, Edward H. (2001) An Investigation of Enhanced Remediation Techniques for the Cleanup of Subsurface DNAPL Spills.
7. Kanney, Joseph F. (2002) Numerical Solution of Reactive Transport Problems in Subsurface Systems.
8. Farthing, Matthew W. (2002) Accurate, Efficient Methods for Modeling Flow and Transport in Porous Media.
9. Pan, Chongxun (2003) Use of Pore-scale Modeling to Understand Flow and Transport in Porous Media.

10. Li, Huina (2006) Modeling Multiphase Flow in Porous Medium Systems at Multiple Scales.
11. Johnson Wright, Deona N. (2010) Remediation of Dense Nonaqueous Phase Liquids from Contaminated Subsurface Systems Using a Class of Brine-Based Remediation Technologies.
12. McClure, James E. (2011) Microscale Modeling of Fluid Flow in Porous Medium Systems.
13. Jackson, Amber S. (2011) Multiscale Modeling of Multiphase Flow in Porous Medium Systems Using the Thermodynamically Constrained Averaging Theory Approach, Department of Mathematics.
14. Birak, Pamela S. (2011) Remediation of Multicomponent Dense Nonaqueous Phase Liquids in Porous Media.
15. Hauswirth, Scott C. (2014) Physicochemical Approaches for the Remediation of Manufactured Gas Plant Tar in Porous Media.
16. Dye, Amanda L. (2015) Analysis of Two-Fluid-Phase Porous Medium Systems Using Microscale Experiments and Lattice Boltzmann Modeling.
17. Weigand, Timothy M. (—) Validation of Thermodynamically Constrained Averaging Theory Models.
18. Bowers, Christopher A. (—) Transport Phenomena Resulting from Hydraulic Fracturing.
19. Bruning, Kelsey (—) Pore-Scale Modeling of Transport Phenomena in Porous Medium Systems.
20. Fowler, Christopher P. (—) Development and Application of an Adaptive Lattice Boltzmann Modeling Approach for Two-Fluid-Phase Flow in Porous Medium Systems, Department of Mathematics.
21. Shepherd, Brittany J. (—) Modeling Sediment Transport in Surface Water Systems, Department of Mathematics.

## Masters Students Directed

1. Gilbertsen, Robert H. (1987) Application of Contaminant Fate and Transport Models in Saturated Soils.
2. Wallingford, Edward D. (1987) Evaluation of a Carbon Sorption Method for Sampling Gasoline Vapors in the Subsurface, (Co-Directed).
3. Mayer, Alex S. (1987) Development of a Three-Dimensional Groundwater Flow Model.

4. Roche, Anne C. (1988) Assessment of Extraction Methodologies for Measuring Sub-surface Contamination, (Co-Directed).
5. Corn, Frederick E. (1989) Vapor Phase Mass Transfer in Partially-Saturated Porous Media.
6. Eckert, Donna C. (1989) An Analysis of Petrov-Galerkin Methods for Simulating Sorption and Biodegradation in Groundwater Systems.
7. Staes, Edward G. (1989) Vapor Phase Contaminant Transport Above a Shallow Aquifer.
8. Poirier-McNeill, Michele M. (1989) Mass Transfer from Non-Aqueous Phase Liquids to the Aqueous Phase in Groundwater Systems.
9. Chang, Shiou-Ling (1989) Sorption-Desorption of Diuron in Subsurface Systems: An Investigation of Desorption Hysteresis.
10. Szatkowski, Andrew (1990) An Investigation of Interphase Mass Transfer at the Saturated-Unsaturated Zone Interface.
11. Yoon, Jeyong (1990) A Method for Predicting Release of Contaminants at the Point of Dredging, (Co-Directed).
12. Levert, Angela M. (1990) Investigation of Competitive Sorption of Hydrophobic Organic Contaminants on Subsurface Materials.
13. Bordelon, Jeffery P. (1991) An Investigation of Gas Phase Mass Transport in Porous Media Systems.
14. Wisniewski, Rebecca D. (1991) An Analysis of Two-Well Tracer Tests.
15. Rossabi, Joseph (1991) A Fiber Optic Spectroscopic Analysis of Diuron Sorption/Desorption Processes in Subsurface Media.
16. Nelson, Elizabeth M. (1991) An Investigation into the Effects of Heterogeneity on Subsurface Flow and Transport.
17. Cornew, Frank H. (1992) An Analysis of Methods for Modeling Advective-Dominated Transport.
18. Williams, Glenn A. (1992) An Analysis of Adaptive Finite Element Methods for Simulating Two-Dimensional Contaminant Transport in Groundwater Systems.
19. AVS, Mallikarjun (1993) Modeling Aquifer Storage and Recovery of Treated Drinking Water.
20. Harrington, Natalie W. (1993) Modeling Subsurface Effects of Organic Waste Land Application.
21. Lowry, Michael I. (1993) Pore-Scale Modeling of Nonwetting-Phase Residual in Porous Media.

22. Frizzell, Angela (1994) An Evaluation of Thermal Effects on Nonaqueous Phase Liquid Dissolution in Porous Media.
23. Grant, Jeffrey D. (1994) Development and Analysis of Spatially Adaptive Methods for the Numerical Solution of Richards' Equation.
24. Vancho, Laura A. (1994) The Cosolvent Effect of Methanol on the Equilibrium Between Tetrachloroethylene and Water.
25. Bethea III, John H. (1994) An Evaluation of Long-Term Sorption Phenomena.
26. Thyrum, Geoffery P. (1994) An Investigation of Residual Nonaqueous Phase Liquid Dissolution in Water Saturated Porous Media.
27. Houyoux, Marc R. (1995) An Evaluation of Decision Making for Aquifer Restoration.
28. Yang, Aiwei (1995) Simulating Random Packing of Porous Media.
29. Hemmer, Paula M. (1995) Investigation of Methods for Determining Hydraulic Property Models for Unsaturated Flow.
30. Corson, Drew R. (1995) Long-Term Batch Sorption of Naphthalene and Phenanthrene on Sandy Aquifer Materials.
31. Weeber, Philip A. (1996) An Integral Continuum Approach to the Formulation of Flow and Transport Equations in Porous Media Systems.
32. Homewood, Susan L. (1997) Analysis of Processes Affecting Subsurface Biodegradation of BTEX Compounds.
33. Hall, Joy L. (1997) Surfactant Enhanced Mobilization of Nonaqueous Phase Liquids in Porous Media.
34. Arthur, Morris H. (1998) Complete Dissolution of Trichloroethylene in Saturated Porous Media.
35. Pau, Oliver (1998) Mass Transfer Rate Limitation Effects on Partitioning Tracer Tests.
36. Bond, Rick G. (2000) An Analysis of Density Enhanced Remediation of DNAPLs.
37. Alfaro, José L. (2001) Surfactant Enhanced DNAPL Pool Removal with a Dense Brine Barrier Strategy in Heterogeneous Porous Media.
38. Abhishek, Chandra (2002) Method of Lines Solution of Richards' Equation with Spatially and Temporally Adaptive Discretization Techniques.
39. Nienhueser, Ian A. (2002) Discontinuous Galerkin Methods and Higher-Order Temporal Approximations for Modeling Saturated Groundwater Flow.
40. Johnson, Deona N. (2003) Controlled Density-Motivated Mobilization of DNAPL Using a Brine Barrier Technology in Heterogeneous Porous Media.

41. Fitchett, Ebony V. (2004) An Investigation of Residual Coal Tar Mobilization in Water Saturated Porous Media.
42. Sanderson, Patrick M. (2006) Development and Application of Analytical Methods to Evaluate DNAPL Remediation Using a Brine Based Remediation Technology.
43. Murphy, Lauren L. (2006) The Effects of Viscosity and Subsurface Heterogeneity on a Brine Barrier Approach to DNAPL Remediation.
44. Fan, Xiangyu (2008) Multiscale Modeling of Surfactant Phase Behavior in the Remediation of DNAPL Contamination.
45. Lee, Juneil (2008) Modeling Groundwater for the Coastal Plain Region of North Carolina.
46. Newman, Arne P. (2008) An Investigation of Cosolvent Flushing for the Remediation of PAH's from Former Manufactured Gas Plant Sites.
47. Lebron, Benjamin L. (2008) Remediation of Contaminated Soil from a Former Manufactured Gas Plant with Heat-Activated Sodium Persulfate.
48. Rylander, Seth C. (2010) Remediation of Coal Tar Contaminated Porous Medium Systems.
49. Dye, Amanda L. (2011) Lattice Boltzmann Simulation of Non-Darcy Flow in Sphere Packings.
50. Tapscott, Caroline E. (2015) An Evaluation of Flow and Transport Properties for Hydraulic Fracturing Fluids in Porous Medium Systems.
51. Tao, Ranxin (2016) An Investigation of Flow Rate Motivated Mobilization of Entrapped Organic Liquids in Two-Fluid Phase Porous Medium Systems.

## **Bachelors Honors Students Directed**

1. Granbery, Emmie K. (2007) Characterization of PCE Source Zone Mass Flux in a Three-Dimensional, Heterogeneous System.
2. Williams, Dana A. (2008) Chemical and Physical Properties of Coal Tar from Former Manufactured Gas Plants.
3. Tsang, M. Ashley (2010) The Influence of Heterogeneity and Spill Size on Dissolution Fingering.
4. Crockett, Audrey (2013) An Investigation of Species Transport in Non-Dilute Porous Medium Systems for Varying Density, Viscosity, and Chemical Potential.
5. Schaberg, Erin (2014) Characterizing Pore-Scale Morphology of Non-Aqueous Phase Liquids Using Three-Dimensional Image Analysis.

# Publications

## Dissertation

1. Modeling of sorption and desorption phenomena for hydrophobic organic contaminants in saturated soil environments, Ph.D. Dissertation, University of Michigan, Ann Arbor, Michigan, 1984.

## Books

2. Miller, C.T., M.B. Parlange, and S.M. Hassanizadeh, Editors (2003) 25 Years of Advances in Water Resources, Elsevier, Amsterdam, The Netherlands, 534 pp.
3. Miller, C.T., M.W. Farthing, W.G. Gray, and G.F. Pinder, Editors (2004) Computational Methods in Water Resources, Volume 1, Developments in Water Science 55, Proceedings of the 15<sup>th</sup> International Conference on Computational Methods in Water Resources (CMWR XV), June 13–17 2004, Chapel Hill, North Carolina, Elsevier, Amsterdam, The Netherlands, 949 pp.
4. Miller, C.T., M.W. Farthing, W.G. Gray, and G.F. Pinder, Editors (2004) Computational Methods in Water Resources, Volume 2, Developments in Water Science 55, Proceedings of the 15<sup>th</sup> International Conference on Computational Methods in Water Resources (CMWR XV), June 13–17 2004, Chapel Hill, North Carolina, Elsevier, Amsterdam, The Netherlands, 903 pp.
5. Gray, W.G., and C.T. Miller (2014) Introduction to the Thermodynamically Constrained Averaging Theory for Porous Medium Systems, Series Title: Advances in Geophysical and Environmental Mechanics and Mathematics, Series Editor: K. Hutner, Springer International Publishing, Switzerland, 582 pp, ISBN 978-3-319-04010-3, doi: 10.1007/978-3-319-04010-3\_8.

## Journals

6. Miller, C.T., D.G. Bensch and D.C. Colony (1980) Possolanic Concrete Base Courses Using Cement Kiln Dust and Fly Ash, Transportation Research Record, Vol. 754, pp. 36–41.
7. Miller, C.T., and W.J. Weber, Jr. (1983) Rapid Solution of the Nonlinear Step-Drawdown Equation, Ground Water, Vol. 21, No. 5, pp. 584–588.
8. Miller, C.T., and W.J. Weber, Jr. (1984) Modeling Organic Contaminant Partitioning in Ground Water Systems, Ground Water, Vol. 22, No. 5, pp. 584–592.
9. Miller, C.T., and W.J. Weber, Jr. (1986) Sorption of Hydrophobic Organic Pollutants in Saturated Soil Systems, Journal of Contaminant Hydrology, Vol. 1, pp. 243–261.

10. Miller, C.T. (1987) Groundwater Quality, *Journal Water Pollution Control Federation*, Vol. 59, No. 6, pp. 513–531.
11. Miller, C.T., and D.R. Comalander (1988) Groundwater Quality, *Journal Water Pollution Control Federation*, Vol. 60, No. 6., pp. 961–978.
12. Weber, W.J., Jr., and C.T. Miller (1988) Modeling the Sorption of Hydrophobic Compounds by Aquifer Materials—I. Rates and Equilibria, *Water Research*, Vol. 22, No. 4, pp. 457–464.
13. Miller, C.T., and W.J. Weber, Jr. (1988) Modeling the Sorption of Hydrophobic Compounds by Aquifer Materials—II. Column Reactor Studies, *Water Research*, Vol. 22, No. 4, pp. 465–474.
14. Wallingford, E.D., F.A. DiGiano, and C.T. Miller (1988) Evaluation of a Carbon Adsorption Method for Sampling Gasoline Vapors in the Subsurface, *Ground Water Monitoring Review*, Vol. 7, No. 4, pp. 85–92.
15. Flynn, M.R., and C.T. Miller (1988) Comparison of Models for Flow Through Flanged and Plain Circular Hoods, *Annals of Occupational Hygiene*, Vol. 32, No. 3, pp. 373–384.
16. Flynn, M.R., and C.T. Miller (1989) The Boundary Integral Equation Method (BIEM) for Modeling Local Exhaust Hood Flow Fields, *American Industrial Hygiene Association Journal*, Vol. 50, No. 5, pp. 281–288.
17. Miller, C.T., and A.S. Mayer (1989) Groundwater, *Journal Water Pollution Control Federation*, Vol. 61, No. 6., pp. 954–984.
18. Miller, C.T., and A.S. Mayer (1990) Groundwater: A review of the 1989 Literature, *Research Journal Water Pollution Control Federation*, Vol. 62, No. 5, pp. 700–737.
19. Miller, C.T., M.M. Poirier-McNeill, and A.S. Mayer (1990) Dissolution of Trapped Nonaqueous Phase Liquids: Mass Transfer Characteristics, *Water Resources Research*, Vol. 26, No. 11, pp. 2783–2796.
20. Flynn, M.R., and C.T. Miller (1991) Discrete Vortex Methods for the Simulation of Boundary Layer Separation Effects on Worker Exposure, *Annals of Occupational Hygiene*, Vol. 35, No. 1, pp. 35–50.
21. Miller, C.T., A.J. Rabideau, and A.S. Mayer (1991) Groundwater, *Research Journal Water Pollution Control Federation*, Vol. 63, No. 4., pp. 552–593.
22. Roche, A.C., and C.T. Miller (1991) Assessment of Extraction Methodologies for Measuring Subsurface Contamination, *Fresenius Journal of Analytical Chemistry*, Vol. 339, pp. 732–739.



23. Miller, C.T., and J.A. Pedit (1992) Use of a Reactive Surface-Diffusion Model to Describe Apparent Sorption-Desorption Hysteresis and Abiotic Degradation of Lindane in a Subsurface Material, *Environmental Science & Technology*, Vol. 26, No. 7, pp. 1417–1427.
24. Mayer, A.S., A.J. Rabideau, and C.T. Miller (1992) Groundwater, *Water Environment Research*, Vol. 64, No. 4., pp. 535–570.
25. Kandil, H., C.T. Miller, and R.W. Skaggs (1992) Modeling Long-Term Solute Transport in Drained Unsaturated Zones, *Water Resources Research*, Vol. 28, No. 10, pp. 2799–2809.
26. Mayer, A.S., and C.T. Miller (1992) The Influence of Porous Medium Characteristics and Measurement Scale on Pore-Scale Distributions of Residual Nonaqueous Phase Liquids, *Journal of Contaminant Hydrology*, Vol. 11, No. 3/4, pp. 189–213.
27. DiGiano, F.A., C.T. Miller, and J. Yoon (1993) Predicting Release of PCBs at Point of Dredging, *American Society of Civil Engineering, Journal of Environmental Engineering*, Vol. 119, No. 1, pp. 72–89.
28. Mayer, A.S., and C.T. Miller (1993) An Experimental Investigation of Pore-Scale Distributions of Nonaqueous Phase Liquids at Residual Saturation, *Transport in Porous Media*, Vol. 10, No. 1, pp. 57–80.
29. Christakos, G., C.T. Miller, and D. Oliver (1993) The Development of Stochastic Space Transformation and Diagrammatic Perturbation Techniques in Subsurface Hydrology, *Stochastic Hydrology and Hydraulics*, Vol. 7, No. 1, pp. 14–32.
30. Mayer, A.S., A.J. Rabideau, R.J. Mitchell, P.T. Imhoff, M.I. Lowry, and C.T. Miller (1993) Groundwater Quality, *Water Environment Research*, Vol. 65, No. 4, pp. 486–534.
31. Miller, C.T., and A.J. Rabideau (1993) Development of Split-Operator, Petrov-Galerkin Methods to Simulate Transport and Diffusion Problems, *Water Resources Research*, Vol. 29, No. 7, pp. 2227–2240.
32. Muñoz-Carpena, R., C.T. Miller, and J.E. Parsons (1993) A Quadratic Petrov-Galerkin Solution for Kinematic Wave Overland Flow, *Water Resources Research*, Vol. 29, No. 8, pp. 2615–2627.
33. Christakos, G., C.T. Miller, and D. Oliver (1993) Stochastic Perturbation Analysis on Groundwater Flow. Spatially Variable Soils, Semi-Infinite Domains and Large Fluctuations, *Stochastic Hydrology and Hydraulics*, Vol. 7, No. 3, pp. 213–239.
34. Singer, P.C., R.D.G. Pyne, M. AVS, C.T. Miller, and C. Mojonier (1993) Examining the Impact of Aquifer Storage and Recovery on DBPs, *Journal of the American Water Works Association*, Vol. 85, No. 11, pp. 85–94.

35. Rabideau, A.J., and C.T. Miller (1994) Two-Dimensional Modeling of Aquifer Remediation Influenced by Sorption Nonequilibrium and Hydraulic Conductivity Heterogeneity, *Water Resources Research*, Vol. 30, No. 5, pp. 1457–1470.
36. Mayer, A.S., P.T. Imhoff, A.J. Rabideau, R.J. Mitchell, J.F. McBride, and C.T. Miller (1994) Groundwater Quality, *Water Environment Research*, Vol. 66, No. 4, pp. 532–585.
37. Pedit, J.A., and C.T. Miller (1994) Heterogeneous Sorption Processes in Subsurface Systems: 1. Model Formulations and Applications, *Environmental Science & Technology*, Vol. 28, No. 12, pp. 2094–2104.
38. Szatkowski, A., P.T. Imhoff, and C.T. Miller (1995) Development of a Correlation for Aqueous-Vapor Phase Mass Transfer in Porous Media, *Journal of Contaminant Hydrology*, Vol. 18, No. 1, pp. 85–106.
39. Lowry, M.I., and C.T. Miller (1995) Pore-Scale Modeling of Nonwetting-Phase Residual in Porous Media, *Water Resources Research*, Vol. 31, No. 3, pp. 455–473.
40. Pedit, J.A., and C.T. Miller (1995) Heterogeneous Sorption Processes in Subsurface Systems: 2. Diffusion Modeling Approaches, *Environmental Science & Technology*, Vol. 29, No. 7, pp. 1766–1772.
41. Christakos, G., D.T. Hristopulos, and C.T. Miller (1995) Stochastic Diagrammatic Analysis of Groundwater Flow in Heterogeneous Porous Media, *Water Resources Research*, Vol. 31, No. 7, pp. 1687–1703.
42. Flynn, M.R., K. Ahn, and C.T. Miller (1995) Three-Dimensional Finite Element Simulation of a Turbulent Push-Pull Ventilation System, *Annals of Occupational Hygiene*, Vol. 39, No. 5, pp. 573–589.
43. Imhoff, P.T., S.N. Gleyzer, J.F. McBride, L.A. Vancho, I. Okuda, and C.T. Miller (1995) Cosolvent-Enhanced Remediation of Residual Dense Nonaqueous Phase Liquids: Experimental Investigation, *Environmental Science & Technology*, Vol. 29, No. 8, pp. 1966–1976.
44. Barry, D.A., C.T. Miller, and P.J. Culligan-Hensley (1996) Temporal Discretization Errors in Non-Iterative Split-Operator Approaches to Solving Chemical Reaction/-Groundwater Transport Models, *Journal of Contaminant Hydrology*, Vol. 22, No. 1/2, pp. 1–17.
45. Yang, I., C.T. Miller, and L.D. Oliver (1996) Simulation of Correlated and Uncorrelated Packing of Random Size Spheres, *Physical Review E*, Vol. 53, No. 2, pp. 1516–1524.
46. Okuda, I., J.F. McBride, S.N. Gleyzer, and C.T. Miller (1996) Physicochemical Transport Processes Affecting the Removal of Residual DNAPL by Nonionic Surfactant Solutions, *Environmental Science & Technology*, Vol. 30, No. 6, pp. 1852–1860.

47. Barry, D.A., K. Bajracharya, and C.T. Miller (1996) Alternative Split-Operator Approach for Solving Chemical Reaction/Groundwater Transport Models, *Advances in Water Resources*, Vol. 19, No. 5, pp. 261–275.
48. Mayer, A.S., and C.T. Miller (1996) The Influence of Mass Transfer Characteristics and Porous Media Heterogeneity on Nonaqueous Phase Dissolution, *Water Resources Research*, Vol. 32, No. 6, pp. 1551–1567.
49. Imhoff, P.T., and C.T. Miller (1996) Dissolution Fingering During the Solubilization of Nonaqueous Phase Liquids in Saturated Porous Media 1. Model Predictions, *Water Resources Research*, Vol. 32, No. 7, pp. 1919–1928
50. Imhoff, P.T., G.P. Thyrum, and C.T. Miller (1996) Dissolution Fingering During the Solubilization of Nonaqueous Phase Liquids in Saturated Porous Media 2. Experimental Observations, *Water Resources Research*, Vol. 32, No. 7, pp. 1929–1942.
51. Grimberg, S.J., C.T. Miller, and M.D. Aitken (1996) Surfactant-Enhanced Dissolution of Phenanthrene into Water for Laminar Flow Conditions, *Environmental Science & Technology*, Vol. 30, No. 10, pp. 2967–2974.
52. Pedit, J.A., and C.T. Miller (1996) Comment on “A Distributed Reactivity Model for Sorption by Soils and Sediments. 4. Intraparticle Heterogeneity and Phase-Distribution Relationships Under Non-equilibrium Conditions,” *Environmental Science & Technology*, Vol. 30, No. 10, pp. 3128–3129.
53. Tocci, M.D., C.T. Kelley, and C.T. Miller (1997) Accurate and Economical Solution of the Pressure-Head Form of Richards’ Equation by the Method of Lines, *Advances in Water Resources*, Vol. 20, No. 1, pp. 1–14.
54. Imhoff, P.T., A. Frizzell, and C.T. Miller (1997) Evaluation of Thermal Effects on the Dissolution of a Nonaqueous Phase Liquid in Porous Media, *Environmental Science & Technology*, Vol. 31, No. 6, pp. 1615–1622.
55. Barry, D.A., C.T. Miller, P.J. Culligan, and K. Bajracharya (1997) Analysis of Split Operator Methods for Nonlinear and Multispecies Groundwater Chemical Transport Models, *Mathematics and Computers in Simulation*, Vol. 43, pp. 331–341.
56. Pedit, J.A., K.J. Iwamasa, C.T. Miller, and W.H. Glaze (1997) Development and Application of a Gas-Liquid Contactor Model for Simulating Advanced Oxidation Processes, *Environmental Science & Technology*, Vol. 31, No. 10, pp. 2791–2796.
57. Miller, C.T., G. Christakos, P.T. Imhoff, J.F. McBride, J.A. Pedit, and J.A. Trangenstein (1998) Multiphase Flow and Transport Modeling in Heterogeneous Porous Media: Challenges and Approaches, *Advances in Water Resources*, Vol. 21, No. 2, pp. 77–120.
58. Kelley, C.T., C.T. Miller, and M.D. Tocci (1998) Termination of Newton/Chord Iterations and the Method of Lines, *Society for Industrial and Applied Mathematics, SIAM Journal on Scientific Computing*, Vol. 19, No. 1, pp. 280–290.

59. Miller, C.T., G.A. Williams, C.T. Kelley, and M.D. Tocci (1998) Robust Solution of Richards' Equation for Non-Uniform Porous Media, *Water Resources Research*, Vol. 34, No. 10, pp. 2599–2610.
60. Imhoff, P.T., M.H. Arthur, and C.T. Miller (1998) Complete Dissolution of Trichloroethylene in Saturated Porous Media, *Environmental Science & Technology*, Vol. 32, No. 16, pp. 2417–2424.
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545. Crockett, A., P. Schultz, and C.T. Miller (2012) Experimental Investigation of Density-Dependent Flow Behavior, Abstract H23B-1347. American Geophysical Union Fall Meeting, San Francisco, California, 3–7 December 2012.
546. Dye, A.L., J.E. McClure, E. Schaberg, M. Talley, W.G. Gray, and C.T. Miller (2012) Pore-Scale Analysis of Capillary Pressure at Equilibrium in a Two-Fluid-Phase Porous Medium System, Abstract H51G-1426. American Geophysical Union Fall Meeting, San Francisco, California, 3–7 December 2012.
547. McClure, J.E., A.L. Dye, C.T. Miller, and W.G. Gray (2012) Description of Non-Darcy Flow in Anisotropic Porous Media, Abstract H52C-02. American Geophysical Union Fall Meeting, San Francisco, California, 3–7 December 2012.
548. Rybak, I., W.G. Gray, and C.T. Miller (2013) Transition Region Model for Coupling Free Flow and Porous Medium Systems, Society for Industrial and Applied Mathematics, SIAM Conference on the Mathematical and Computational Issues in the Geosciences, Padua, Italy, 17–20 June 2013.

549. McClure, J.E., H. Wang, J.F. Prins, C.T. Miller, and W. Feng (2013) CPU-GPU Algorithms for Multiphase Flow: Desktop to Petascale, SC13, The International Conference for High Performance Computing, Networking, Storage, and Analysis, Denver, Colorado, 17–22 November 2013.
550. Anderson, D.M., R. McLaughlin, C. Miller (2013) Homogenization Approaches for Draining in Layered Porous Media, 66th Annual Meeting of the APS Division of Fluid Dynamics, American Physical Society, Pittsburgh, Pennsylvania, 24–26 November 2013.
551. Bakhtyar, R., C.E. Kees, C.T. Miller, and M.W. Farthing (2013) A Hybrid Level Set/Volume-of-Fluids Approach for Simulation of Nearshore Hydrodynamics, Abstract OS31B-1708. American Geophysical Union Fall Meeting, San Francisco, California, 9–13 December 2013.
552. Carter, B., A.L. Dye, S.C. Hauswirth, J.E. McClure, L. Pyrak-Nolte, W.G. Gray, and C.T. Miller (2013) Analysis of Capillary Pressure in a Two-Fluid-Phase Porous Medium System Using Micro-Model Experiments and Pore-Scale Modeling, Abstract H42D-06. American Geophysical Union Fall Meeting, San Francisco, California, 9–13 December 2013.
553. Dye, A.L., J.E. McClure, W.G. Gray, and C.T. Miller (2013) Capillary Pressure Dynamics in a Two-Fluid-Phase Porous Medium System, Abstract H53M-05. American Geophysical Union Fall Meeting, San Francisco, California, 9–13 December 2013.
554. Hauswirth, S.C., and C.T. Miller (2013) Chemical Oxidation of Complex PAH Mixtures by Base-Activated Sodium Persulfate, Abstract H41H-1349. American Geophysical Union Fall Meeting, San Francisco, California, 9–13 December 2013.
555. Weigand, T.M., M.W. Farthing, C.E. Kees, and C.T. Miller (2013) Evaluation of Proteus as a Tool for the Rapid Development of Models of Hydrologic Systems, Abstract H43E-1509. American Geophysical Union Fall Meeting, San Francisco, California, 9–13 December 2013.
556. Dye, A.L., S.C. Hauswirth, J.E. McClure, L. Pyrak-Nolte, W.G. Gray, and C.T. Miller (2014) Analysis of Capillary Pressure in a Two-Fluid-Phase Porous Medium System Using Micro-Model Experiments and Pore-Scale Modeling, Computational Methods in Water Resources XX International Conference, Stuttgart, Germany, 10–13 June 2014.
557. Dye, A.L., J.E. McClure, W.G. Gray, and C.T. Miller (2014) Interfacial Dynamics in a Two-Fluid-Phase Porous Medium System, Computational Methods in Water Resources XX International Conference, Stuttgart, Germany, 10–13 June 2014.
558. Giffen, D.H., C.T. Kelley, C.T. Miller, W.G. Gray, and P. Schultz (2014) Calibration of a Density-Dependent TCAT Model with the Method of Lines and Implicit Filtering, Computational Methods in Water Resources XX International Conference, Stuttgart, Germany, 10–13 June 2014.

559. Weigand, T.M. A.L. Dye, J.E. McClure, W.G. Gray, and C.T. Miller (2014) Simulation of Two-Phase Flow Based on a Thermodynamically Constrained Averaging Theory Flow Model, Computational Methods in Water Resources XX International Conference, Stuttgart, Germany, 10–13 June 2014.
560. McClure, J.E., A.L. Dye, J.F. Prins, C.T. Miller, and W.G. Gray (2014) Pore-Scale Simulation and Analysis of Two-Fluid Flow in Porous Medium Systems, Gordon Research Conference, Flow & Transport in Permeable Media, Bates College, Lewiston, Maine, 6–11 July 2014.
561. Bakhtyar, R., C.E. Kees, M.W. Farthing, and C.T. Miller (2014) Two-Phase Modeling of Wave Breaking and Wave-Breakwater Interactions, Young Coastal Scientists and Engineers Conference, University of Delaware, 9-11 July 2014.
562. Bakhtyar, R., C.E. Kees, M.W. Farthing, and C.T. Miller (2014) Numerical Simulation of Two-Phase Flow for Wave Propagation/Breaking Near Submerged and Vertical Breakwaters, Abstract OS11A-1264. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
563. Dye, A.L., J.E. McClure, D. Adalsteinsson, W.G. Gray, and C.T. Miller (2014) A Two-Dimensional Lattice Boltzmann Scheme for Analyzing Equilibrium States in a Two-Fluid-Phase Porous Medium System, Abstract H21C-0755. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
564. Hauswirth, S.C., and C.T. Miller (2014) Physicochemical Approaches for the Remediation of Former Manufactured Gas Plant Tars, Abstract H43R-05. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
565. Kees, C., M. Farthing, A. Ahmadi, R. Bakhtyar, and C. Miller (2014) Modeling Multiphase Coastal and Hydraulic Processes in an Interactive Python Environment with the Open Source Porteus Toolkit, Abstract H51K-0748. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
566. McClure, J.E., C.T. Miller, and A.L. Dye (2014) Connecting Pore-Scale Dynamics to Macroscopic Models for Multiphase Flow, Abstract H23B-0883. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
567. Weigand, T.M., A.L. Dye, M.W. Farthing, J.E. McClure, W.G. Gray, and C.T. Miller (2014) Simulation of Two-Phase-Flow Based on a Thermodynamically Constrained Averaging Theory Flow Model, Abstract H13P-07. American Geophysical Union Fall Meeting, San Francisco, California, 15–19 December 2014.
568. Miller, C.T., A.L. Dye, J.E. McClure, and W.G. Gray (2015) Simulation of Multiphase Porous Medium Systems, ITS Research Computing Symposium, University of North Carolina, Chapel Hill, North Carolina, 14 May 2015.
569. Dye, A.L., J.E. McClure, D. Adalsteinsson, and C.T. Miller (2015) A Two-Dimensional Lattice Boltzmann Scheme for Analyzing Equilibrium States in Two-Fluid-Phase Porous

Medium, ITS Research Computing Symposium, University of North Carolina, Chapel Hill, North Carolina, 14 May 2015.

570. Talbot, C., S. Mitran, A. Dye, and C. Miller (2015) Reduced Stochastic Models from Direct Numerical Simulation of Permeable Medium Flow, ITS Research Computing Symposium, University of North Carolina, Chapel Hill, North Carolina, 14 May 2015.
571. Miller, C.T., A.L. Dye, T.M. Weigand, J.E. McClure, and W.G. Gray (2015) Multi-scale Analysis of Two-Fluid-Phase Flow in Porous Medium Systems, 7th International Conference on Porous Media, Padova, Italy, 18–21 May 2015.
572. Dye, A., J. McClure, L. Pyrak-Nolte, W.G. Gray, and C. Miller (2015) Kinematics of Multiphase Flow in Porous Media: Insights from Micro-Models, SIAM Conference on Mathematical and Computational Issues in the Geosciences, Stanford, California, 29 June–2 July 2015.
573. Gray, W., A. Dye, J. McClure, and C. Miller (2015) Physics-Based Models of Multiphase Flow in Porous Media, SIAM Conference on Mathematical and Computational Issues in the Geosciences, Stanford, California, 29 June–2 July 2015.
574. McClure, J.E., A.L. Dye, M.A. Berrill, W.G. Gray, and C.T. Miller (2015) Advancing Models for Multiphase Flow and Transport in Porous Medium Systems, Oak Ridge Leadership Computing Foundation User Meeting, Oak Ridge, Tennessee, 23–25 June 2015.
575. Dye, A.L., J.E. McClure, W.G. Gray, L. Pyrak-Nolte, and C.T. Miller (2015) Visualization of Two-Fluid-Phase Flow Dynamics Using Micro-Models, Abstract H41D-1346. American Geophysical Union Fall Meeting, San Francisco, California, 14–18 December 2015.
576. Hauswirth, S.C., A.L. Dye, C.T. Miller, C. Tapscott, and P.B. Schultz (2015) Experimental Investigation and Pore-Scale Modeling of Non-Newtonian Fluid Flow in Porous Media, Abstract H23I-06. American Geophysical Union Fall Meeting, San Francisco, California, 14–18 December 2015.
577. McClure, J.E., A.L. Dye, C.T. Miller, and W.G. Gray (2015) Connecting Pore Scale Dynamics to Macroscopic Models for Two-Fluid Phase Flow, Abstract H43L-04. American Geophysical Union Fall Meeting, San Francisco, California, 14–18 December 2015.
578. Miller, C.T., W.G. Gray, J.E. McClure, A.L. Dye, T.M. Weigand, S.C. Hauswirth, and P.B. Schultz (2015) Development, Application, and Validation of Thermodynamically Constrained Averaging Theory Models of Porous Medium Systems, Abstract H11J-01. American Geophysical Union Fall Meeting, San Francisco, California, 14–18 December 2015.
579. Weigand, T.M., C.T. Miller, A.L. Dye, W.G. Gray, J.E. McClure, and I. Rybak (2015) Thermodynamically Constrained Averaging Theory (TCAT) Two-Phase Flow Model: Derivation, Closure, and Simulation Results, Abstract H41D-1347. American Geophysical Union Fall Meeting, San Francisco, California, 14–18 December 2015.



580. Miller, C.T., and W.G. Gray (2016) A Hierarchy of Thermodynamically Constrained Averaging Theory Models for Two-Fluid-Phase Flow in Porous Medium Systems, 8th International Conference on Porous Media, Cincinnati, Ohio, 9–12 May 2016.
581. McClure, J.E., A.L. Dye, C.T. Miller, and W.G. Gray (2016) A New Class of Models for Multiphase Flow in Hydrologic Systems, The Eric Wood Symposium on Observations and Modeling of Land Surface Water and Energy Exchanges Across Scales, Princeton, New Jersey, 2–3 June 2016.
582. Dye, A.L., S.C. Hauswirth, C.A. Bowers, and C.T. Miller (2016) Pore-Scale Modeling of Non-Newtonian Fluid Flow in Porous Media. XXI International Conference on Computational Methods in Water Resources, CMWR 2016, Toronto, Canada, 20–24 June 2016.
583. Miller, C.T., J.E. McClure, A.L. Dye, and W.G. Gray (2016) Formulation, Evaluation, and Validation of a Thermodynamically Constrained Averaging Theory Model for Two-Fluid-Phase Flow in Porous Media. XXI International Conference on Computational Methods in Water Resources, CMWR 2016, Toronto, Canada, 20–24 June 2016.
584. Miller, C.T., W.G. Gray, J.E. McClure, and A.L. Dye (2016) A Multiscale Talk. XXI International Conference on Computational Methods in Water Resources, CMWR 2016, Toronto, Canada, 20–24 June 2016.
585. Weigand, T.M., P.B. Schultz, D.H. Giffen, C.T. Kelley, and C.T. Miller (2016) Modeling of Density-Dependent Flow Based on the Thermodynamically Constrained Averaging Theory. XXI International Conference on Computational Methods in Water Resources, CMWR 2016, Toronto, Canada, 20–24 June 2016.
586. Abou Najm, M.R., S.C. Hauswirth, and C.T. Miller (2016) Non-Newtonian Fluids for Pore Structure Characterization of Sand Columns, Abstract H41E-1371. American Geophysical Union Fall Meeting, San Francisco, California, 12–16 December 2016.
587. Hauswirth, S., A.L. Dye, P.B. Schultz, C. Bowers, and C.T. Miller (2016) Lattice Boltzmann Modeling of Non-Newtonian Fluid Flow in Porous Medium Systems, Abstract H41E-1367. American Geophysical Union Fall Meeting, San Francisco, California, 12–16 December 2016.
588. McClure, J.E., R.T. Armstrong, M. Rucker, S. Berg, S. Schlüter, C.T. Miller, and W.G. Gray (2016) The Effect of Topology on Two-Fluid Flow in Porous Media, Abstract H53M-06. American Geophysical Union Fall Meeting, San Francisco, California, 12–16 December 2016.
589. Weigand, T.M., P.B. Schultz, C.T. Kelley, C.T. Miller, and W.G. Gray (2016) Modeling of Density-Dependent Flow Based on the Thermodynamically Constrained Averaging Theory, Abstract H13H-1501. American Geophysical Union Fall Meeting, San Francisco, California, 12–16 December 2016.

590. Miller, C.T., J.E. McClure, and W.G. Gray (2017) Toward the Closure of a New Generation of Multiphase Flow Models, Alliance of Laboratories in Europe for Education, Research and Technology, ALERT Geomaterials Workshop 2017, Aussois, France, 2–4 October 2017.
591. Miller, C.T. (2017) Coupled Processes and Reactive Transport in Porous Media, Workshop on Excellence in Education and Research: An Adaptive and Integrative Approach for Engineering and Petroleum, King Fahd University of Petroleum and Minerals, Dhahran, Kingdom of Saudi Arabia, 15–17 October 2017.
592. Bowers, C.A., P.B. Schultz, C.P. Fowler, J.E. McClure, and C.T. Miller (2017) Experimental Observation of Dispersion Phenomenon for Non-Newtonian Flow in Porous Media, Abstract H43I-1766. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
593. Bruning, K., S. Kalkowski, and C.T. Miller (2017) Microfluidic Evaluation of the Effects of Wettability on Two-Fluid Flow in Porous Media, Abstract H11G-1284. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
594. Fowler, C.P., C.A. Bowers, J.E. McClure, and C.T. Miller (2017) Systems Using the Lattice Boltzmann Method, Abstract H11G-1285. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
595. Hauswirth, S.C., S.M. Sadeghi, I.J. Espinoza, C.C. Cerda, P.B. Schultz, and C.T. Miller (2017) Enhanced *In Situ* Chemical Oxidation Using Surfactants and Shear Thinning Fluids, Abstract H11F-1251. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
596. McClure, J.E., R.T. Armstrong, M.A. Berrill, S. Schlüter, S. Berg, W.G. Gray, and C.T. Miller (2017) Digital Rock Physics and Macroscale Models for Two-Fluid Flow, Abstract H11L-05. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
597. McClure, J.E., C.L. Talbot, R.T. Armstrong, P. Mostaghimi, Y. Yu, and C.T. Miller (2017) Stochastic Models of Macroscale Quantities for the Prediction of the REV Scale for Multiphase Flow Through Porous Media, Abstract H13A-1348. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
598. Miller, C.T., J.E. McClure, and K. Bruning (2017) Lattice-Boltzmann Modeling of Community Challenge Microfluidic Experiments to Evaluate the Effects of Wettability on Two-Fluid Flow in Porous Media, Abstract H14G-04. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
599. Talbot, C.L., J.E. McClure, R.T. Armstrong, P. Mostaghimi, Y. Yu, and C.T. Miller (2017) Reduced Dynamic Models of Macroscale Quantities for the Prediction of Equilibrium System States for Multiphase Porous Medium Systems, Abstract H21G-1568. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.

600. Valdés-Parada, F.J., S. Ostavar, B.D. Wood, and C.T. Miller (2017) A Predictive Parameter Estimation Approach for the Thermodynamically Constrained Averaging Theory Applied to Diffusion in Porous Media, Abstract H33E-1724. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
601. Weigand, T.M., E. Harrison, and C.T. Miller (2017) Evaluation and Validation of a TCAT Model to Describe Non-Dilute Flow and Species Transport in Porous Media, Abstract H11F-1244. American Geophysical Union Fall Meeting, New Orleans, Louisiana, 11–15 December 2017.
602. McClure, J.E., R.T. Armstrong, M.A. Berrill, S. Schlüter, S. Berg, W.G. Gray, and C.T. Miller (2018) New Insights into the Geometric State for Two-Fluid Porous Medium Systems, American Physical Society Meeting, Los Angeles, California, 5–9 March 2018.
603. Fowler, C.P., C.A. Bowers, J.E. McClure, and C.T. Miller (2018) Simulation of Non-Newtonian Fluid Flow Through Porous Media Using Lattice Boltzmann Methods, Society for Industrial and Applied Mathematics, 42nd Southeastern Atlantic SIAM Conference, Chapel Hill, North Carolina, 9–11 March 2018.
604. Weigand, T.M., M.Q. de Luna, M.W. Farthing, C.E. Kees, and C.T. Miller (2018) A Fully Second Order Entropy Viscosity Model for Species Transport in Porous Media, Society for Industrial and Applied Mathematics, 42nd Southeastern Atlantic SIAM Conference, Chapel Hill, North Carolina, 9–11 March 2018.
605. Bruning, K., S. Kalkowski, and C.T. Miller (2018) Microfluidic Evaluation of the Effects of Wettability on Two-Fluid Flow in Porous Media, Abstract 643. International Society for Porous Media, 10th Annual Meeting and Jubilee, New Orleans, Louisiana, 14–17 May 2018.
606. Fowler, C.P., C.A. Bowers, K. Bruning, J.E. McClure, and C.T. Miller (2018) Advancements in Large-Scale Simulation of Microscale Porous Medium Systems Using Lattice Boltzmann Methods, Computational Methods in Water Resources XXII, Saint Maloes, France, 3–7 June 2018.
607. Miller, C.T., J.E. McClure, K. Bruning, and W.G. Gray (2018) Toward a New Generation of Two-Fluid-Phase Flow Models: Theory, Computations, Experiments, and Remaining Challenges, Computational Methods in Water Resources XXII, Saint Maloes, France, 3–7 June 2018.
608. Kingsbury, R., K. Bruning, S. Zhu, S. Flotron, C.T. Miller, and O. Coronell (2018) Towards Understanding the Conductivity-Selectivity-Permeability Tradeoff in Ion Exchange Membranes: Swelling Modulates Water and Salt Transport, North American Membrane Society, 27th Annual Meeting, Lexington, Kentucky, 9–13 June 2018.
609. Miller, C.T., J.E. McClure, C.L. Talbot, and W.G. Gray (2018) Bridging Microscale and Macroscale Descriptions of Two-Fluid Flow in Porous Media Using Theoretical and Large-Scale Computational Approaches, Gordon Research Conference, Flow and Transport in Permeable Media, Newry, Maine, 8–13 July 2018.

## Invited Seminars and Lectures

610. Miller, C.T., Transport and Fate Contaminants in the Subsurface Environment, Department of Geology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 9 January 1986.
611. Miller, C.T., Modeling Aquifer Restoration, Department of Civil Engineering, Virginia Polytechnic Institute and State University, Blacksburg, Virginia, 22 April 1987.
612. Miller, C.T., Groundwater Research at The University of North Carolina at Chapel Hill, North Carolina Water Resources Association, Raleigh, North Carolina, 20 November 1987.
613. Miller, C.T., Modeling Subsurface Flow and Contaminant Transport Processes, Department of Crop Science, North Carolina State University, Raleigh, North Carolina, 14 April 1988.
614. Miller, C.T., Analysis of Interphase Mass-Transfer Processes in Subsurface Systems, Oak Ridge National Laboratory, Oak Ridge, Tennessee, 24 October 1989.
615. Miller, C.T., Modeling Fluid Flow and Solute Transport Processes in Subsurface Environments, Department of Soil Science, North Carolina State University, Raleigh, North Carolina, 24 April 1990.
616. Miller, C.T., Single and Multiphase Fluid Flow and Solute Transport in Subsurface Systems, Department of Crop Science, North Carolina State University, Raleigh, North Carolina, 16 and 18 April 1991.
617. Miller, C.T., An Analysis of Sorption and Desorption Phenomena in Groundwater Systems, Marine Science Program, University of North Carolina-Chapel Hill, Chapel Hill, North Carolina, 11 September 1991.
618. Miller, C.T., An Analysis of Aquifer Restoration in Single and Multiphase Subsurface Systems, Department of Biological and Agricultural Engineering, North Carolina State University, Raleigh, North Carolina, 25 September 1992.
619. Miller, C.T., Numerical Solutions to Richards' Equation, Department of Mathematics, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 23 March 1993.
620. Miller, C.T., Flow and Transport Phenomena in Groundwater Systems, Department of Crop Science, North Carolina State University, Raleigh, North Carolina, 20 and 22 April 1993.
621. Miller, C.T., An Evaluation of Mass Transfer Phenomena for Enhanced Remediation Processes, Water Resources Research Institute, North Carolina State University, Raleigh, North Carolina, 26 October 1993.

622. Miller, C.T., Mass Transfer Phenomena in Heterogeneous Porous Media Systems, Department of Physics, West Virginia University, Morgantown, West Virginia, 11 July 1994.
623. Miller, C.T., Simulating the Fate and Transport of Groundwater Contaminants, Water Resources Engineering Teleconference Series, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 11 October 1994.
624. Miller, C.T., Analysis of Transport Phenomena in Multiphase Porous Media Systems, Marine Science Program, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 15 February 1995.
625. Miller, C.T., Transport and Reaction Phenomena in Heterogeneous Subsurface Systems, Hydrology Program, Duke University, Durham, North Carolina, 19 January 1996.
626. Miller, C.T., Modeling Multiphase Transport Phenomena, Environmental Engineering Science, California Institute of Technology, Pasadena, California, 17 April 1996.
627. Miller, C.T., NAPL Residual Formation and Removal in Porous Media Systems, Department of Mathematics, University of Oslo, Oslo, Norway, 22 October 1996.
628. Miller, C.T., NAPL Dissolution in Heterogeneous Porous Media Systems, Department of Civil and Environmental Engineering, Duke University, Durham, North Carolina, 20 November 1996.
629. Miller, C.T., Modeling Multiphase Transport Phenomena in Porous Media Systems, Department of Mathematics, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 29 September 1997.
630. Miller, C.T., Dissolution Fingering in Porous Media Systems, Department of Environmental Engineering, University of Western Australia, Perth, Western Australia, 15 October 1997.
631. Miller, C.T., Stiff ODE Systems and MOL Applications, Department of Environmental Engineering, University of Western Australia, Perth, Western Australia, 21 October 1997.
632. Miller, C.T., Split-Operator Methods for Modeling Transport and Reaction Equations, Department of Mathematics, North Carolina State University, 3 February 1998.
633. Miller, C.T., Flow and Transport Phenomena in Porous Media Systems, Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico, 9 March 1998.
634. Miller, C.T., NAPL Residual Establishment and Removal in Heterogeneous Porous Media, Department of Civil Engineering and Geological Sciences, University of Notre Dame, Notre Dame, Indiana, 30 April 1998.

635. Miller, C.T., Evolving Models of Multiphase Flow in Porous Media, Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, Maryland, 24 November 1998.
636. Miller, C.T., Transport Phenomena in Multiphase Porous Media Systems, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 14 December 1998.
637. Miller, C.T., Remediation of Groundwater Contaminated with Industrial Solvents, Daniel A. Okun Distinguished Professorship Celebration, Department of Environmental Sciences and Engineering, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina, 23 April 1999.
638. Miller, C.T., Remediation of Groundwater Contaminated by Industrial Solvents, Water Resources Research Institute Seminar Series, Raleigh, North Carolina, 20 September 1999.
639. Miller, C.T., Multiscale Behavior of DNAPLs in Heterogeneous Porous Medium Systems, Department of Mathematics, Duke University, Durham, North Carolina, 17 November 1999.
640. Miller, C.T., Multiphase Transport Phenomena in Multiphase Porous Medium Systems, Department of Civil Engineering and Geological Sciences, University of Notre Dame, Notre Dame, Indiana, 9–10 November 2000.
641. Miller, C.T., Modeling Multiphase Transport Phenomena in Porous Medium Systems, Department of Statistics, North Carolina State University, Raleigh, North Carolina, 7 March 2002.
642. Miller, C.T., Scholarly Journal Publication: Conflicting Agendas for Scholars, Publishers, and Institutions, The Scholarly Communications Working Group, University of North Carolina, Chapel Hill, North Carolina, 14 May 2002.
643. Gray, W.G., and C.T. Miller, A Short Course on Multiphase Transport Phenomena (22-hr of lecture), Institute for Water, University of Stuttgart, Stuttgart, Germany, 21–23 October 2002.
644. Miller, C.T., NAPL Dissolution Fingering in Porous Medium Systems, Faculty of Architecture, Civil and Environmental Engineering, Swiss Federal Institute of Technology, Lausanne, Switzerland, 25 October 2002.
645. Miller, C.T., Research Interests, Large-Scale Computer Models for Environmental Systems Seminar Series, Statistical and Applied Mathematical Sciences Institute, Research Triangle Park, North Carolina, 15 January 2003.
646. Miller, C.T., DNAPL Dynamics, Entrapment, and Removal in Heterogeneous Porous Medium Systems, Department of Civil Engineering, University of Texas, Austin, Texas, 20 March 2003.

647. Miller, C.T., Environmental Modeling: Recent Results and Current Focus, Carolina Environmental Program, University of North Carolina, Chapel Hill, North Carolina, 8 July 2003.
648. Miller, C.T., DNAPL Dynamics, Entrapment, and Removal in Heterogeneous Porous Medium Systems, Institute for Water, University of Stuttgart, Stuttgart, Germany, 10 July 2003.
649. Miller, C.T., DNAPL Dynamics, Entrapment, and Removal in Heterogeneous Porous Medium Systems, North Carolina Department of Environment, Health, and Natural Resources, Raleigh, North Carolina, 4 September 2003.
650. Miller, C.T., Multiscale Models of Multiphase Porous Medium Systems, Department of Physics and Physical Oceanography, University of North Carolina at Wilmington, Wilmington, North Carolina, 5 March 2004.
651. Miller, C.T., Computational Science Education and Research, Department of Mathematical Sciences, Appalachian State University, Boone, North Carolina, 18 March 2004.
652. Miller, C.T., Modeling Multiscale, Multiphase Transport Phenomena in Porous Medium Systems, IIHR—Hydroscience and Engineering, University of Iowa, Iowa City, Iowa, 23 April 2004.
653. Miller, C.T., Recent Advances in the Development of Adaptive Solutions to Richards' Equation, Department of Geography and Environmental Engineering, Johns Hopkins University, Baltimore, Maryland, 27 April 2004.
654. Miller, C.T., A Brine-Barrier Technology to Remediate DNAPL-Contaminated Subsurface Systems, Department of Soil Science, North Carolina State University, Raleigh, North Carolina, 13 October 2004.
655. Miller, C.T., Enhanced Remediation of DNAPL-Contaminated Subsurface Systems, National Institutes of Health, National Institute of Environmental Health Sciences, Superfund Basic Research Program, Risk-e-Learning DNAPL Seminar Series, Web-based seminar delivered simultaneously to 160 international locations, 26 October 2005.
656. Miller, C.T., Multiscale Modeling of Transport Phenomena in Multiphase Porous Medium Systems, Department of Mathematics, University of Pittsburgh, Pittsburgh, Pennsylvania, 21 April 2006.
657. Miller, C.T., Summer School in Geophysical Porous Media: Multidisciplinary Science from Nano to Global Scale, Roles: Organizing Committee, Lecturer, Project Leader, and Project Participant, Purdue University, West Lafayette, Indiana, 17–28 July 2006.
658. Miller, C.T., Enhanced Remediation of Multiphase Systems, Department of Geological and Environmental Sciences, Stanford University, Stanford, California, 25 October 2006.

659. Miller, C.T., Local Discontinuous Approximations of Richards' Equation, Department of Mathematics, North Carolina State University, Raleigh, North Carolina, 5 December 2006.
660. Miller, C.T., DNAPL Dynamics, Entrapment, and Removal in Heterogeneous Porous Medium Systems—Dover Field Test Results, North Carolina Department of Environment, Health, and Natural Resources, Raleigh, North Carolina, 15 February 2007.
661. Gray, W.G., and C.T. Miller, A Short Course on Thermodynamically Constrained Averaging Theory (16 hr of lecture), Institute for Water, University of Stuttgart, Stuttgart, Germany, 3–7 March 2008.
662. Miller, C.T., and W.G. Gray, A Short Course on Multiscale Modeling of Porous Medium Systems (20 hr of lecture), Institute for Water, University of Stuttgart, Stuttgart, Germany, 7–11 March 2011.
663. Miller, C.T., Modeling Two-Fluid-Phase Flow in Porous Medium Systems: A Multiscale Approach, Department of Geological Sciences, University of North Carolina, Chapel Hill, North Carolina, 15 January 2015.
664. Miller, C.T., J.E. McClure, C.P. Fowler, and W.G. Gray (2018) Microscale Simulation of Porous Medium Systems for Closure, Evaluation, and Validation of TCAT Models, US Army Engineer Research and Development Center, Vicksburg, Mississippi, 19 April 2018.