

GEORGE FRANCIS PINDER

Title

Director, Research Center for Groundwater Remediation Design
Professor of Engineering
Professor of Mathematics and Statistics
Professor of Computer Science
University of Vermont
Burlington, Vermont, 05405

Citizenship

United States
Canada

Degrees

Ph.D., University of Illinois, June 1968
B.Sc. (Honors), University of Western Ontario, June 1965

Professional Record

- March 2001-present Professor of Computer Science
- July 1993-present Director, Research Center for Groundwater Remediation Design
- July 1992-June 1996 Dean, Division of Engineering, Mathematics and Business Administration
- July 1989-June 1996 Dean, College of Engineering and Mathematics, University of Vermont, Burlington, Vermont 05405
- July 1989-present Professor of Civil and Environmental Engineering
- July 1990-present Professor of Mathematics and Statistics

- July 1980-June 1989 Chairman, Department of Civil Engineering, Princeton University, Princeton, New Jersey 08544
- Sept. 1977-July 1980 Professor of Civil Engineering, Princeton University, Director, Water Resources Program
- Sept. 1972-Sept.1977 Associate Professor of Civil Engineering, Princeton University, Director, Water Resources Program
- Dec. 1968-Sept. 1972 Research Hydrologist, U.S. Geological Survey, Water Resources Division, Atlantic Coast Region, Arlington, Virginia
- June 1968-Dec. 1968 Nova Scotia Department of Mines, Nova Scotia, Canada

Professional Societies¹

Society of Sigma Xi,
 Phi Kappa Phi
 American Society of Civil Engineers
 Society of Petroleum Engineers of AIME
 American Geophysical Union
 Society for Industrial and Applied Mathematics
 American Institute of Hydrology

Professional Activities

Appointments to Editorial Boards

- (1) Applied Mathematics Modelling
- (2) Applied Numerical Mathematics
- (3) Communications in Applied Analysis
- (4) International Journal of Computational and Numerical Analysis and Applications
- (5) International Journal of Pure and Applied Mathematics

Editor-in-Chief

- (1) Numerical Methods for Partial Differential Equations

¹Societies in which membership has been awarded.

Founding Editor

- (1) Advances in Water Resources
- (2) Numerical Methods for Partial Differential Equations

Professional Boards

Board of Advisors, Wessex Institute of Technology, Ashurst, England
External Advisory Committee, Water: Systems, Science and Society, Tufts University

Awards

RCA Professor of Energy Resources, 1975-1989 (Princeton University)
Horton Award, presented by the American Geophysical Union for an outstanding paper on hydrology (1969)
O.E. Meinzer Award, presented by the Geological Society of America for an outstanding contribution to the field of hydrogeology (1975)
The Eminent Scientists Award medal for 'Recognition for ...outstanding contributions in the field of water resources' (1992)
University of Vermont University Scholar '...in recognition of contributions to research and scholarship' (1993).
Fellow American Geophysical Union (1993)
Julian Hinds Medal of the American Society of Civil Engineers for advancing '... engineering in the field of planning, development, and management of water resources '(2002).
Fellow of Wessex Institute (2004)
University of Vermont College Distinguished Professor (2005)
Elected Member of Vermont Academy of Science and Engineering (2007)
Hydrology Days Award (2009)
Elected Member of National Academy of Engineering (2010)
American Society of Civil Engineers Distinguished Member Medal (2012)
Honorary Diplomat of American Society of Civil Engineers (2012).
2016 EWRI Lifetime Achievement Award (2016)
University of Vermont University Professor (2017)

Leadership Positions

President, Hydrology Section of American Geophysical Union.

President, International Society for Computational Methods in Engineering.

Chairman, Groundwater Management Committee, American Society of Civil Engineers

Chairman, Groundwater Council, Environmental and Water Resources Institute, American Society of Civil Engineers.

Chairman, Peer Committee, National Academy, Section 11, Earth Resources Engineering.

Chairman, Section 11, Earth Resources Engineering, National Academy of Engineering.

Doctoral Theses Supervised

1. James W. Mercer "Finite element approach to the modeling of hydrothermal systems" 1973.
2. Kevin O'Neill "The transient three-dimensional transport of liquid and heat in fractured porous media" October, 1977.
3. Nader M. Safai "Simulation of saturated and unsaturated deformable porous media" October, 1977.
4. Clifford I. Voss "Finite element simulation of multiphase geothermal reservoirs" May 1978.
5. Allen M. Shapiro "Fractured porous media: equation development and parameter identification" 1981.
6. Linda M. Abriola "Mathematical modeling of the multiphase migration of organic compounds in a porous medium" September, 1983.
7. Myron, B. Allen III "Collocation techniques for modelling compositional flows in porous media" June, 1983.
8. Michael A. Celia "Collocation on deformed finite elements and alternating direction methods" September, 1983.

9. Roger H. Page “Solving differential and numerical models of systems with uncertain material parameters: Applications to convection-dispersion equations” 1983.
10. David E. Dougherty “On equivalent porous medium modeling of transport in fractured porous reservoirs” June 1985.
11. Mary C. Hill “An investigation of hydraulic conductivity estimation in a ground-water flow study of northern Long Valley, New Jersey” 1985.
12. Bernard Joos “The least squares collocation method for solving partial differential equations” June 1986.
13. David P. Ahlfeld “Designing contaminated groundwater remediation systems using numerical simulation and nonlinear optimization” January, 1987.
14. Lin A. Ferrand “An experimental investigation of the capillary pressure-saturation relation in two- and three- fluid porous media” June, 1988.
15. Lawrence Bentley “The Eulerian-Lagrangian least squares collocation method for solving the transport equation” October, 1990.
16. Stuart A. Stothoff “A boundary integral technique for modeling two-phase flow in porous media” June, 1991.
17. Joseph Guarnaccia “A collocation-based parallel algorithm to solve multiphase flow and multicomponent transport problems” February, 1992.
18. George P. Karatzas “Globally optimal groundwater management combining the outer approximation method with numerical simulation” June, 1993
19. Tullio Tucciarelli “Solving the groundwater quality management problem: a global approach” November, 1993
20. William A. McGrath “Sampling network design to delineate groundwater contaminant plumes” October, 1997
21. Graciela Herrera de Olivares “Cost effective groundwater quality sampling network design” May, 1998

22. Stephen H. Brill “The solution of two dimensional partial differential equations via Hermite collocation with block red-black Gauss Seidel preconditioner”, May 1998
23. Alexander A. Spiliotopoulos “Solution of groundwater management problems using concave and biconcave minimization techniques”, July, 1999
24. Metin M. Ozbek “Risk-based remedial design: utilizing expert opinion on groundwater-driven health risk”, May 2000
25. Karen L. Ricciardi, “Optimal groundwater remediation design subject to uncertainty,” May, 2002
26. Maria P. Papadopoulou, “Enhanced methodology for the solution of groundwater management problems,” October, 2002
27. Yingqi Zhang, “Optimal design of groundwater-quality monitoring networks,” May 2002.
28. Melissa M. McKay, “Computationally Based Investigation of Alcohol Assisted Bioremediation,” May 2004.
29. Xinyu Wei, “Long-term Monitoring Network Design Evaluation Using and Intermediate-Scale Groundwater Facility,” May, 2006
30. Zoi Dokou, “Optimal Search Strategy for the Definition of a DNAPL Source,” February, 2008.
31. James L. Ross, “Approximate Reasoning in Hydrogeological Modeling,” May, 2008.
32. Hua Chen, “Investigation of Contaminant Transport in Tidally-Influenced Aquifers: Experiment and Analysis,” May 2010.
33. Christina Syrrakou, “Numerical Modeling and Experimental Investigations of the Local Hydrology of a Pervious Concrete Site,” May 2014
34. Ganesh Oka, “A Cellular Automata Based Model of Upscaling the Impact of Bacterial Growth Attached to Soil Particles on the Intrinsic Permeability of the Soil: Theory and Simulations” 2014

Masters Dissertations Supervised

1. Noemi de la Puente “An analysis of the removal of trichloroethylene from soils using surfactants” October, 1986.
2. J. Mark Nielson “A study of the spatial variability of microscopic solute transport in dispersive flows using fiber optic sensors, 1988.
3. J. Christopher Bianchi “Velocity measurements of low Reynolds number tube flow using fiber-optic technology” May, 1993.
4. David T. Piccirilli “Using the collocation method with splines under tension and upstream weighting to solve the one-dimensional convection-diffusion equation. May, 1994
5. Aaron H. Mandell “Development of a three-dimensional aquifer flow and transport model for the identification of well pollution sources” May 2000
6. Lester, George. “Evaluation of Pulsed Pumping in Porous Media Containing Sharp Material Interfaces, Using Laboratory Experiments and Modeling, ” October, 2013

Papers in Refereed Publications

1. with J.D. Bredehoeft (1968) “Application of the digital computer for aquifer evaluation,” *Water Resources Research*, 4 (5), 1060-1193.
2. with J.F. Jones (1969) “Determination of the groundwater component of peak discharge from the chemistry of total runoff,” *Water Resources Research*, 5 (2), 438-445.
3. with J.D. Bredehoeft and H.H. Cooper, Jr. (1969) “Determination of aquifer diffusivity from aquifer response to fluctuations in river stage,” *Water Resources Research*, 5 (4), 850-855.
4. with P. Trescott (1970) “Air pump for small diameter piezometers,” *Ground Water*, 8 (3), 10-15.
5. with P. Trescott and J.F. Jones (1970) “Digital model of alluvial aquifer,” *Journal Hydraul. Div., American Society of Civil Engineers*, HY5, 1115-1128.

6. with J.D. Bredehoeft (1970) "Digital analysis of areal flow in multiaquifer groundwater systems: a quasi three-dimensional model," *Water Resources Research*, 6 (3), 883-888.
7. with H.H. Cooper, Jr. (1970) "A numerical technique for calculating the transient position of the saltwater front," *Water Resources Research*, 6 (3), 875-882.
8. with S.P. Sauer (1971) "Numerical simulation of flood-wave modification due to bank-storage effects," *Water Resources Research*, 7 (1), 63-70.
9. with J.D. Bredehoeft (1971) "Application of transport equations to flowing groundwater systems," *Proceedings of the Symposium of Underground Waste Management and Environmental Implications*, AAPG Memoir, (18), 191-201.
10. with E.O. Frind (1972) "Application of Galerkin's procedure to aquifer analysis," *Water Resources Research*, 8 (1), 108-120.
11. with J.D. Bredehoeft (1973) "Mass transport in flowing groundwater," *Water Resources Research*, 9 (1), 194-209.
12. with E.O. Frind and S.S. Papadopoulos (1973) "Functional coefficients in the analysis of groundwater flow," *Water Resources Research*, 9 (1), 222-226.
13. with E.O. Frind (1973) "Galerkin solution of the inverse problem for aquifer transmissivity," *Water Resources Research*, 9 (5), 1397-1410.
14. (1973) "A Galerkin-finite element simulation of groundwater contamination on Long Island, New York," *Water Resources Research*, 9 (6), 1657-1669.
15. (1974) "Progress in simulation of contaminant transport in porous media," *American Water Resources Association*, 19, 223-239.
16. with W.G. Gray (1974) "Galerkin approximation of the time derivative in the finite element analysis of groundwater flow," *Water Resources Research*, 10 (4), 821-828.
17. with J. W. Mercer, Jr. (1975) "Galerkin finite-element simulation of a geothermal reservoir," *Geothermics*, 2 (3-4), 81-89.

18. with G. Segol and W.G. Gray (1975) "A Galerkin finite-element technique for calculating the transient position of the saltwater front," *Water Resources Research*, 11 (2), 343-354
19. with J.W. Mercer and T.G. Donaldson (1975) "A Galerkin finite-element analysis of the hydrothermal system at Wairakei, New Zealand," *Journal of Geophysical Research*, 80 (17), 2608-2621.
20. with W.G. Gray (1976) "An analysis of the numerical solution of the transport equation," *Water Resources Research*, 12 (3), 547-555.
21. with G. Segol (1976) "Transient simulation of salt-water intrusion in Southeastern Florida," *Water Resources Research*, 12 (1), 65-70.
22. with W.G. Gray (1976) "Is there a difference in the finite element method?," *Water Resources Research*, 12 (1), 105-107.
23. with W.G. Gray (1976) "On the relationship between the finite element and finite difference methods," *Int. J. Numerical Methods in Engineering*, 10, 893-923.
24. with M. van Genuchten and E.O. Frind (1977) "Simulation of two-dimensional contaminant transport with isoparametric Hermitean finite elements," *Water Resources Research*, 13 (2), 451-456.
25. with D.H. Tang (1977) "Simulation of groundwater flow and mass transport under uncertainty," *Advances in Water Resources*, 1 (1), 25-30.
26. with H. Rubin (1977) "Approximate analysis of upconing," *Advances in Water Resources*, 1 (2), 97-101.
27. with P.S. Huyakorn (1978) "A new finite element technique for the solution of two-phase flow through porous media," *Advances in Water Resources*, 1 (5), 285-298.
28. with P.S. Huyakorn, C.R. Faust, and J.W. Mercer (1978) "Finite element simulation of two-phase flows in porous media," In K.C. Park and D.K. Garling (Eds.), *Computational Techniques for Interface Problems*, ASME publication AMD, 30, 19-44.

29. with C.I. Voss (1978) "Block iterative finite element preprocessed scheme for simulation of large non-linear problems," *Int. J. Numerical Methods in Engineering*, 12, 1543-1558.
30. with J. Bear (1978) "On the equations describing porous medium deformation in multiphase flow," *American Society of Civil Engineers, Mechanics Division, EM4*, 881-894.
31. with N.M. Safai (1979) "Vertical and horizontal land deformation in a desaturating porous medium," *Advances in Water Resources*, 2 (1), 19-25.
32. with E.O. Frind (1979) "A collocation finite element method for potential problems in irregular domains," *Int. J. Numerical Methods in Engineering*, 14, 681-701.
33. with D.H. Tang (1979) "A direct solution to the inverse problem in groundwater flow," *Advances in Water Resources*, 2 (2), 97-101.
34. with D.H. Tang (1979) "Analysis of mass transport with uncertain physical parameters," *Water Resources Research*, 15 (5), 1147-1155.
35. with A. Shapiro (1979) "A new collocation method for the solution of the convection-dominated transport equation," *Water Resources Research*, 15 (5), 1177-1182.
36. with R.H. Page (1979) "Groundwater utilization, South Fork of Long Island," *Clearwaters*, 9(4), 11-14.
37. with N.M. Safai (1980) "Vertical and horizontal land deformation due to fluid withdrawal," *Int. J. Numerical and Analytical Methods in Geomechanics*, 4, 131-142.
38. with A. Shapiro (1981) "Analysis of an upstream weighted collocation approximation to the transport equation," *Jour. Comp. Phys.*, 39, 46-71.
39. with L. Hayes and M. Celia (1981) "Alternating-direction collocation for rectangular regions," *Computer Methods in Applied Mechanics and Engineering*, 27, 265-277.
40. with M. Celia and W.G. Gray (1981) "Velocity calculation from randomly located hydraulic heads," *Groundwater*, 19,(3), 262-264.

41. with K. O'Neill (1981) "A derivation of the equations for transport of liquid and heat in three dimensions in a fractured porous medium," *Advances in Water Resources*, 4 (4), 150-164.
42. with V.V. Nguyen and J.F. Botha (1981) "Phenomenological interpretation of the thermo-dynamics of stream-water systems using catastrophe theory," *J. Non-Equilibrium Thermodynamics*, 6, 285-294.
43. with A. Shapiro (1982) "Physics of flow in geothermal systems," *Geological Society of America, Special paper 189*, 25-30.
44. with O.L. Franke and E.P. Patten (1982) "An electric-analog simulation of elliptic partial differential equations using finite element theory," *Mathematics and Computers in Simulation XXIV*. 65-71.
45. with V.V. Nguyen, W.G. Gray, J.F. Botha, and D.A. Crerar (1982) "A theoretical investigation on the transport of chemicals in reactive porous media," *Water Resources Research* 18 (4), 1149-1156.
46. with M.B. Allen (1983) "Collocation simulation of multiphase porous-medium flow," *Soc. Petrol. Eng. Jour.*, 23 (1), 135-142.
47. with D.E. Dougherty (1983) "A brief note on upwind collocation," *Int. J. Numerical Methods Fluids*, 3 (3), 307-313.
48. with V.V. Nguyen (1983) "Geothermal reservoir simulation using nonequilibrium thermodynamics," *Soc. Petrol. Eng. Jour.*, 23 (4), 602-612.
49. with V.V. Nguyen, W.G. Gray, and J.F. Botha (1983) "Numerical simulation of uranium insitu mining," *Chem. Engrg. Sci.*, 38 (11), 1855-1862.
50. (1984) "Groundwater contaminant transport modeling" *Environ. Sci. Technol.*, 18 (4) 108-114.
51. with D.K. Babu (1984) "Analytical integration formulae, isoparametric finite elements" *Int. J. Numerical Methods in Engineering*, 20, 1153-1166.
52. with M.F.N. Mohsen (1984) "Analytical solution of the transport equation using a polynomial initial condition for verification of numerical simulators," *Int. J. Numerical Methods Fluids*, 4, 701-707.

53. with D.K. Babu (1984) "A finite element-finite difference alternating direction algorithm for three-dimensional groundwater transport," *Advances in Water Resources*, 7 (3), 116-119.
54. with M.F.N. Mohsen (1984) "Orthogonal collocation with 'adaptive' finite elements," *Int. J. Numerical Methods in Engineering*, 20, 1901-1910.
55. with S.K. Gupta and C.R. Cole (1984) "A finite-element three-dimensional groundwater (FE3DGW) model for a multiaquifer system," *Water Resources Research*, 20 (5), 553-564.
56. with V. Nguyen (1984) "Direct calculation of aquifer parameters in slug test analysis," *Groundwater Hydraulics*, American Geophysical Union, *Water Resources Monograph* 9, 222-239.
57. with M.A. Celia (1985) "An analysis of alternating-direction methods for parabolic equations," *Numerical Methods for Partial Differential Equations*, 1 (1), 57-70.
58. with L.M. Abriola (1985) "A multiphase approach to the modeling of porous media contamination by organic compounds, 1, equations development," *Water Resources Research*, 21 (1), 11-18.
59. with L.M. Abriola (1985) "A multiphase approach to the modeling of porous media contamination by organic compounds, 2, numerical simulation," *Water Resources Research*, 21, (1), 19-26.
60. with I. Kinnmark (1985) "On the diffuse and dispersive effect of displaced integration points in finite element analysis," *Int. J. Numerical Methods in Engineering*, 21, 361-365.
61. with M.B. Allen (1985) "The convergence of upstream collocation in the Buckley-Leverett Problem," *Soc. Petrol Eng. Journal*, June Vol. 279, 363-370.
62. with Z.J. Kabala and P.C.D. Milly (1985) "Analysis of well-aquifer response to a slug test," *Water Resources Research*, 22 (9), 1433-1436.
63. with M.F.N. Mohsen (1986) "Collocation with 'adaptive' finite elements in Buckley-Leverett Problem," *International Journal for Numerical Methods in Engineering*, 23, 121-131.

64. with L.M. Abriola (1986) "On the simulation of non-aqueous phase organic compounds in the subsurface," *Water Resources Research*, 22 (9), 1095-1195.
65. with L.A. Ferrand and P.C.D. Milly (1986) "Dual-gamma attenuation for the determination of porous medium saturation with respect to three fluids," *Water Resource Research*, 22 (12), 1657-1664.
66. with D. Ahlfeld and J.M. Mulvey (1986) "Designing optimal strategies for contaminated groundwater remediation," *Advances in Water Resources*, 9 (2), 77-84.
67. with T. V. Hromadka and B. Joos (1987) "Approximating a linear operator equation using a generalized Fourier series: development," *Engineering Analysis*, 4 (4), 82.
68. with T. V. Hromadka and C.C. Yen (1987) "Approximating a linear operator equation using a generalized Fourier series: applications," *Engineering Analysis*, 4 (4), 214-220.
69. with D. Ahlfeld and J.M. Mulvey (1987) "Combining physical containment with optimal withdrawal for contaminated groundwater remediation," *Advances in Water Resources*, 10, (4), 200-204.
70. with M.A. Celia and L.R. Ahuja (1987) "Orthogonal collocation and alternating-direction procedures for unsaturated flow problems," *Adv. Water Resources*, 10, 178-187
71. with D.P. Ahlfeld, J.M. Mulvey, and E.F. Wood (1988) "Contaminated groundwater remediation design using simulation, optimization, and sensitivity theory: 1. Model. development," *Water Resources Research*, 24(3), 431-441.
72. with D.P. Ahlfeld, and J.M. Mulvey (1988) "Contaminated groundwater remediation design using simulation, optimization, and sensitivity theory: 2. Analysis of field site," *Water Resources Research*, 24(3), 443-452.
73. with J.P. Laible (1989) "Least squares collocation solution of differential equations on irregularly shaped domains using orthogonal meshes," *Numerical Methods for Partial Differential Equations*, 5 (4), 347-361.

74. with L.A. Ferrand, P.C.D. Milly (1989) "Experimental determination of three-fluid saturation profiles in porous media," *Journal of Contaminant Hydrology*, 4, 373-395.
75. with L.R. Bentley and I. Herrera (1989) "Solution of the advective-dispersive transport equation using a least squares collocation, Eulerian-Lagrangian method," *Numerical Methods for Partial Differential Equations*, 5, 227-240.
76. with K. Sato, T. Fukuhara (1990) "An approach to fully coupled heat and moisture transfer analysis in saturated-unsaturated porous media during surface evaporation," *Proc. of Japan Society of Civil Engineering*, No. 423, Vol. II-14, November 111-120.
77. with M.A. Celia (1990) "Generalized alternating-direction collocation methods for parabolic equations II. Transport equations with application to seawater intrusion problems," *Numerical Methods for Partial Differential Equations*, 6, No.3, 215-230.
78. with M.A. Celia (1990) "Generalized alternating-direction collocation methods for parabolic equations III. Nonrectangular Domains," *Numerical Methods for Partial Differential Equations*, 6, No.3, 231-244..
79. with L.A. Ferrand, P.C.D. Milly and R.P. Turrin (1990) "A comparison of capillary pressure-saturation relations for drainage in two- and three-fluid porous media," *Adv. Water Resources*, 1990, 13, No. 2, 54-63.
80. with M.A. Celia (1990) "Generalized alternating-direction collocation methods for parabolic equations I. Spatially varying coefficients," *Numerical Methods for Partial Differential Equations*, 6, No.3, 193-214.
81. with L.R. Bentley and A. Aldama (1990) "Fourier analysis of the Eulerian-Lagrangian least squares collocation method," *Int. J. Numerical Methods in Fluids*, 11, 427-444.
82. with M.A. Celia (1990) "Generalized alternating-direction collocation methods for parabolic equations III. Nonrectangular Domains," *Numerical Methods for Partial Differential Equations*, 6, No.3, 231-244.
83. with D.P. Ahlfeld, (1992) "A Fast and accurate method for solving subsurface contaminant transport problems with a single uncertain parameter," *Advances in Water Resources*, 15, No. 2, , 143-149.

84. with T. Tucciarelli (1991) "Optimal data acquisition strategy for the development of a transport model for groundwater remediation" *Water Resources Research*, 27, No. 4, 577-588.
85. with L. R. Bentley (1992) "A least squares method for solving the mixed form of the groundwater flow equations," *Numerical Methods in Fluids*, 14, 729-751.
86. with J. M. Nielsen, T.J. Kulp, and S.M. Angel (1991) "Investigation of dispersion in porous media using fiber-optic technology," *Water Resources Research*, 27, No. 10, 2743-2749.
87. with S.A. Stothoff (1992) "A boundary integral technique for multiple-front simulation of incompressible, immiscible flow in porous media," *Water Resources Research*, 28, No. 8, 2067-2076.
88. with L.R. Bentley (1992) "Eulerian-Lagrangian solution of the vertically averaged groundwater transport equation," *Water Resources Research*, 28, No. 11, 3011-3020.
89. with D. G. Zeitoun (1993) "An optimal control least squares method for solving coupled flow-transport systems," *Water Resources Research*, 29, No. 2, 217-228.
90. with J. P. Laible (1993) "Solution of the shallow water equations by least squares collocation," *Water Resources Research*, 29, No. 2, 445-456.
91. with G. P. Karatzas (1993) "Groundwater management using numerical simulation and the outer approximation method for global optimization," *Water Resources Research*, 29, No. 10, 3371-3378.
92. with P.T. Imhoff and P.R. Jaffe (1994) "An experimental study of complete dissolution of a nonaqueous phase liquid in saturated porous media," *Water Resources Research*, 30, No 2, 307-320.
93. with D.G. Zeitoun and J.P. Laible (1995) "A weighted least squares method for first-order hyperbolic system," *International Journal for Numerical Methods in Fluids*, 20, 191-212.

94. with D.P. Ahlfeld and R.H. Page (1995) "Optimal ground-water remediation methods applied to a superfund site: From formulation to implementation," *Ground Water*, 33, No. 1.
95. with D.P. Ahlfeld and R.H. Page (1995) "Cleanup solution-conflict resolution," *Civil Engineering*, 59-61.
96. with G.P. Karatzas (1996) "The solution of groundwater quality management problems with a nonconvex feasible region using a cutting plane optimization technique," *Water Resources Research*, 32, 4, 1091-1100.
97. with D.G. Zeitoun and J.P. Laible (1997) "An iterative penalty method for the least squares solution of boundary value problems," *Numerical Methods for Partial Differential Equations*, 257-282.
98. with J.G. Guarnaccia, (1997) "NAPL: Simulator Documentation," National Risk Management Research Laboratory, U. S. Environmental Protection Agency, EPA/600/SR-97/102, pp8.
99. with T. Tucciarelli and G.P. Karatzas (1998) "A primal method for the solution of the groundwater quality management problem," *Journal of Operations Research*,. 46, No. 4, 463-473.
100. with G.P. Karatzas and D. P. Ahlfeld (1999) "Computer facilitated ground-water remediation design," *Technology*, 6, No. 4-6, 453-475.
101. with D. P. Ahlfeld, G.P. Sabadell, R.A. Marryott, and R.H. Harris (2000) "Allocating remedial costs at Superfund sites with co-mingled ground water contaminant plumes," *International Journal of Environmental Forensics*, 1, No. 1, 87-105.
102. with S.H. Brill (2001) "Eigenvalue analysis of a block red-black Gauss-Seidel preconditioner applied to the Hermite collocation discretization of Poisson's equation," *Numerical Methods for Partial Differential Equations*, 17(3), 204-228.
103. with S.H. Brill (2001) "Analysis of a block red-black preconditioner applied to the Hermite collocation discretization of a model parabolic equation," *Numerical Methods for Partial Differential Equations*, 17(6), pp 584-606.

104. with S.H. Brill (2002) "Parallel implementation of the bi-CGSTAB method with block red-black Gauss-Seidel preconditioner applied to the Hermite collocation discretization of partial differential equations" *Parallel Computing*, Vol. 28, pp 399-414.
105. with L. Wu and H. Wang (2003) "A nonconventional Eulerian-Lagrangian single-node collocation method with Hermite polynomials for unsteady-state advection-diffusion equations," *Numerical Methods for Partial Differential Equations*, Vol. 19, No. 3, pp 271-283.
106. with W.A. McGrath, (2003) "Search strategy for groundwater contaminant plume delineation," *Water Resour. Res.*, Vol. 39, No. 10.
107. with M. P. Papadopoulou and G.P. Karatzas, (2003) "Enhancement of the outer approximation method for the solution of concentration-constrained optimal-design groundwater-remediation problems" *Water Resour. Res.*, Vol. 39, No. 7, p. SBH 5-1 to 5-8.
108. with Yingqi Zhang, (2003) "Latin-hypercube sample-selection strategies for correlated random hydraulic-conductivity fields," *Water Resour. Res.* Vol. 39, No. 8, p. SBH 11-1 to SBH 11-11.
109. with A.A. Spiliotopoulos and G.P. Karatzas, (2004) "A multiperiod approach to the solution of groundwater management problems using an outer approximation method," *Journal of European Operations Research*, Vol. 157, pp 514-525.
110. with F. Fedele, M. McKay, (2004) "A single-degree of freedom Hermite collocation for advection-diffusion equations" *Int. J. for Numerical Methods in Fluids*, Vol. 44, pp 1337-1354.
111. with K. Ricciardi, (2005) "Comparison of the lognormal and beta-distribution functions to describe the uncertainty in permeability," *Journal of Hydrology*, V 313, pp. 248-256.
112. with Y.Zhang and G.S. Herrera, (2005) "Least-cost design of groundwater-quality monitoring networks," *Water Resources Research*, Vol. 41, W08412, doi:10.1029/2005WR003936.
113. with Herrera, G. S. (2005) "Space-time optimization of groundwater quality sampling networks", *Water Resour. Res.*, 41, W12407.1-W12407.15.

114. with M. M. Ozbek, (2006) “Non-probabilistic Uncertainty in Subsurface Hydrology and its Applications: an Overview,” *Water, Air and Soil Pollution: Focus* (2006), 6, pp. 35-46.
115. with M.P. Papadopoulou and G.P. Karatzas, (2007) “Flexible time-varying optimization methodology for the solution of groundwater management problems” *European Journal of Operational Research*, 180/2, pp 770-785.
116. with K.L. Ricciardi and G.P. Karatzas, (2007) “Efficient groundwater remediation system design subject to uncertainty using robust optimization,” *Jour. Water Resour. Planning and Management*, ASCE.
117. with J. Ross and M. Ozbek, (2007) “Hydraulic conductivity estimation via fuzzy analysis,” *Math Geol* DOI 10.1007/s11004-007-9123-7, pp. 16.
118. with J. Ross and M. Ozbek, (2008) “Kalman filter updating of possibilistic hydraulic conductivity,” *J. of Hydrology*, 354, pp. 149-159.
119. with Mathon, B.R. and Ozbek, M.M., (2008). “Transmissivity and storage coefficient estimation by coupling the Cooper-Jacob method and modified fuzzy least-squares regression”. *Journal of Hydrology* 353(3-4), 267-274 (2008).
120. with J. Ross and M. Ozbek, (2009) “Aleatoric and Epistemic Uncertainty in Groundwater Flow and Transport Simulation” *Water Resources Research*, 45, W00B15, doi:10.1029/2007WR006799.
121. with B.R. Mathon and M. Ozbek, (2010) “Dempster-Shafer Theory Applied to Uncertainty Surrounding Permeability” *Mathematical Geosciences*, Volume 42, Issue 3 293-307.
122. with Z. Dokou, (2009) “Optimal Search Strategy for a DNAPL Source,” *Journal of Hydrology*, doi: 1016/j.jhydrol.
123. with Z. Dokou, (2011) “Extension and Field Application of an Integrated DNAPL Source Identification Algorithm that Utilizes Stochastic Modeling and a Kalman Filter” *Journal of Hydrology*, 398 (3-4) 277-291.
124. with H. Chen, (2011) “Investigation of Contaminant Transport in Tidally-influenced Aquifers: Experimental Results,” *Transport in Porous Media*, DOI 10.1007/s11242-011-9771-4.

125. with H. Chen, (2011) "Investigation of Contaminant Transport in Tidally-influenced Aquifers: Theoretical Analysis," *Transport in Porous Media*. DOI: 10.1007/s11242-011-9772-3.
126. with C. Syrrakou, J. Fitch, and W. Ahearn (2013), "A Counterintuitive Groundwater Level Response to Surface Infiltration," *World Environmental and Water Resources Congress 2013*: pp. 391-400.
127. with C. Syrrakou, (2014) "Experimentally Determined Evaporation Rates in Pervious Concrete Systems," *Journal of Irrigation and Drainage Engineering*., *J. Irrig. Drain Eng.*, 140(1), 04013003
128. with J.A. Montague, (2015), "Potential of Hydraulically Induced Fractures to Communicate with Existing Wellbores," *Water Resources Research*, DOI: 10.1002/2014WR016771.
129. with M. Peraki, E Ghazanfari and T. L. Harrington, (2016), "Electrodialysis: An application for the environmental protection in shale-gas extraction," *Separation and Purification Technology*, online Jan. 29, 2016.
130. with G. Lester, (2016) "Transport of solute from a fine-grained unit to a coarse-grained host under pulsed-pumping fluid dynamics: an experimental investigation." *Transport in Porous Media*, (673), Article DOI: 10.1007/s11242-016-0673-3.
131. with G.K Oka, (2017) "Multiscale Model for Assessing Effect of Bacterial Growth on Intrinsic Permeability of Soil: Model Description," *Transport in Porous Media* (in press).
132. with G.K. Oka (2017) "Multiscale Model for Assessing Effect of Bacterial Growth on Intrinsic Permeability of Soil: Column Experiment Simulation," *Transport in Porous Media* (in press).

Reports

1. (1968) "Hydrogeology of the Lower Musquodoboit River Valley, Nova Scotia: Province of Nova Scotia, Department of Mines Report, 68 (2)
2. (1970) "An iterative digital model for aquifer evaluation," U.S. Geological Survey Open File Report.

3. (1975) "Numerical simulation of salt-water intrusion in coastal aquifers. Part I," Water Resources Program Report, Princeton University, Princeton, NJ.
4. with S.J. Bender and W.G. Gray (1975) "A comparison of numerical approximations to the one-dimensional convective-diffusive equation," Water Resources Program Report, Princeton University, Princeton, NJ.
5. with P.C. Trescott and S.P. Larson (1975) "Finite-difference model for aquifer simulation in two dimensions with results of numerical experiments," U.S. Geological Survey Open File Report.
6. with G. McCracken, C. Voss and M. Unga (1976) "Block iterative Galerkin finite element package for numerical solution of spatial transient nonlinear partial differential equations with one and two-dimensional variables," Water Resources Program Report, Princeton University, Princeton, NJ.
7. with R. Page and A. Shapiro (1978) "Simulation of the impact of groundwater utilization on the South Fork of Long Island, New York," Water Resources Program Report 78-WR-16, Princeton University, Princeton, NJ, (plus appendices)
8. with M. Th. van Genuchten (1978) "Numerical solution of the two-dimensional saturated-unsaturated flow equation," Water Resources Program Report 78-WR-10, Princeton University, Princeton University, Princeton, NJ.
9. with M. Th. van Genuchten (1978) "Mass transport in saturated-unsaturated media: II. Two-dimensional solutions," Water Resources Program Report 78-WR-12, Princeton University, Princeton, NJ.
10. with W.P. Saikin and H. Rubin (1979) "The formulation and semi-analytic solution of the basic equations related to the flow of water steam mixtures in subsurface reservoirs," Water Resources Program Report 79-WR-7, Princeton University, Princeton, NJ.
11. (1979) "State-of-the-Art Review of Geothermal Reservoir Modelling," LBL-9093, GSRMP-5, UC-66a, Earth Sciences Division Lawrence Berkeley Laboratory Publication.

12. with C.I. Voss (1981) "A finite element model for aquifer evaluation," Department of Water Resources Engineering Report 7911, Royal Institute of Technology, Stockholm, Sweden.
13. (1981) "Groundwater contamination, Part A: mass transport," BSCES-ASCE Lecture Series.
14. with M.B. Allen (1981) "Collocation simulation of multiphase porous-medium flow," Water Resources Program Report 81-WR-6, Princeton University, Princeton, NJ.
15. with V.V. Nguyen, W.G. Gray, and J.F. Botha (1981) "Numerical simulation of uranium insitu mining," Water Resources Program Report 81-WR-10, Princeton University, Princeton, NJ.
16. with V.V. Nguyen (1981) "Is dispersive transport in porous media scale-dependent?," Water Resources Program Report 81-WR-12, Princeton University, Princeton, NJ.
17. with V.V. Nguyen (1981) "A new single-well methodology for aquifer parameter identification," Water Resources Program Report 81-WR-1, Princeton University, Princeton, NJ.
18. with V.V. Nguyen (1981) "Geothermal reservoir simulation using non-equilibrium thermodynamics," Water Resources Program Report 81-WR-2, Princeton University, Princeton, NJ.
19. with V.V. Nguyen, W.G. Gray, J.F. Botha, and D.A. Crerar (1981) "An analytical investigation of the transport of chemicals in reactive porous media," Water Resources Program Report 81-WR-5, Princeton University, Princeton, NJ.
20. (1982) "Modelling fractured reservoirs, fluid flow and heat transfer." In Fractures in Geothermal Reservoirs, Geothermal Resources Council Special Report No. 12, 29-36.
21. with D.K. Babu and M.C. Hill (1982) "Three-dimensional groundwater flow," Water Resources Program Report 82-WR-7, Princeton University, Princeton, NJ.

22. (1985) "A review of the numerical simulation of subsurface flow and transport and a recommendation for additional research," In Plan for Research, Policy and Education, Center for Environmental Management, Tufts University, Medford, MA.
23. with J. M. Mulvey (1986) "A new algorithm for optimal groundwater clean-up using analytical derivatives," Report EES-86-11, Engineering Management Systems Program, Department of Civil Engineering and Operations Research, Princeton University.
24. with D. K. Babu and A. Niemi (1987) "Chemical transport by three-dimensional groundwater flows," Report 84-WR-3, Water Resources Program, Department of Civil Engineering and Operations Research, Princeton University.
25. with D.P. Ahlfeld (1987) "A Groundwater monitoring network design algorithm," Report 87-WR-4, Water Resources Program, Department of Civil Engineering and Operations Research, Princeton University.
26. (1991) "Investigation into the dissolution of DNAPL in the subsurface," U.S. Environmental Protection Agency, Research and Development, Report RD-675, 21 R-10005.
27. with J.F. Guarnaccia, P.T. Imhoff, B.C. Missildine, M. Oostrom, M.A Celia, J.H. Dane and P.R. Jaffe (1992) "Multiphase chemical transport in porous media," Environmental Research Brief, EPA 600/S-92/002, pp19.
28. with J.F. Guarnaccia (1995) "NAPL: A mathematical model for the study of NAPL contamination in granular soils, equation development and simulator documentation", RCGRD Publication No. 95-22.
29. with M.M. Ozbek and R.H. Harris (2003) "Water Quality Health Risk Analysis and Fuzzy Logic," RCGRD Publication No. 12-03-1, pp 17.
30. with Z. Dokou, M. McKay and J. Doris (2003) "On Strategies for Effective Soil Vapor Extraction in an Industrial Setting," RCGRD Publication No. 6-03-2, pp 14.

Full Papers in Conference Proceedings

1. with J.D. Bredehoeft (1972) "The application of transport equations in a flowing groundwater system," Twenty-fourth International Geological Congress, Montreal, Canada.
2. with A.S. Cakmak and W.G. Gray (1973) "Galerkin approximation of the time derivative in the finite element analysis," Proceedings of the Summer Computer Simulation Conference, Montreal, Canada.
3. with J.D. Bredehoeft (1974) "Groundwater chemistry and the transport equations," Proceedings of the International Symposium on Mathematical Models in Hydrology, International Association Scientific Hydrologists.
4. (1973) "Simulation of groundwater contamination using a Galerkin-finite element technique," Proceedings of the International Conference on Numerical Methods in Fluid Dynamics, University of Southampton, Pentech Press, Ltd.
5. with J.W. Mercer (1974) "Finite element analysis of hydrothermal systems," Finite Element Methods in Flow Problems, University of Alabama Press.
6. with E.O. Frind (1974) "Finite elements in the solution of the inverse problems in groundwater flow," Finite Element Methods in Flow Problems, University of Alabama Press.
7. with J.W. Mercer and C. Faust (1974) "Geothermal reservoir simulation," Proceedings of the Conference on Research for the Development of Geothermal Resources.
8. with J.W. Mercer (1975) "A finite-element model of two-dimensional, single phase heat transport in a porous medium," U.S. Geological Survey Open File Report, 75-574.
9. with K. O'Neill and W. Gray (1976) "Simulation of heat transport in fractured, single-phase geothermal reservoirs," Proceedings of the Second Workshop on Geothermal Reservoir Engineering, Stanford University.
10. with N. Safai (1977) "Simulation of saturated-unsaturated deformable porous media," Proceedings of the Third Workshop on Geothermal Reservoir Engineering, Stanford Geothermal Program Report, SGP-TR-25, 118-191.

11. with L.A. Swain (1977) "A Galerkin finite-element simulation of the effects of artificial recharge on flow and chemical quality in an alluvial aquifer," Proceedings of the International Conference on Applied Numerical Modelling, University of Southampton, England, 297-308.
12. with P.S. Huyakorn (1977) "Solution of two-phase flow using a new finite-element technique," Proceedings of the International Conference on Applied Numerical Modelling, University of Southampton, England, 375-390.
13. with M. Th. van Genuchten and W.P. Saikin (1977) "Modelling of leachate and soil interactions in an aquifer," In Management of Gas and Leachate in Landfills, EPA-600/9-77-026.
14. with P.S. Huyakorn (1977) "A pressure-enthalpy finite element model for simulating hydrothermal reservoirs," Advances in Computer Methods for Partial Differential Equations II, IMACS, 284-293.
15. with C. I. Voss (1977) "A block interactive-preprocessed technique for efficient finite element simulation of large non-linear problems," Advances in Computer Methods for Partial Differential Equations II, IMACS, 170-177.
16. with R. H. Page (1977) "Finite element simulation of saltwater intrusion on the South Fork of Long Island," Proceedings of the International Conference on Finite Elements in Water Resources, Pentech Press, 2.51-2.70.
17. with M. Celia and E.O. Frind (1978) "Collocation finite element solution of the field equation," Proceedings of the 15th Annual Meeting Society of Engineering Science, Inc., R.L. Sierakowski (Ed.), University of Florida, 547-549.
18. with E.O. Frind and M. Celia (1978) "Groundwater flow simulation using collocation finite elements," In Finite Elements in Water Resources II, Pentech Press, 171-186.
19. with C.I. Voss (1978) "The Achilles' Heel of geothermal reservoir simulators," Proceedings of the Fourth Workshop on Geothermal Reservoir Engineering, P. Kruger and H.J. Ramey, Jr. (Eds.)
20. with C.I. Voss (1978) "A practical finite element simulation model for geothermal reservoirs," Second International Conference on Applied Numerical Modelling, Madrid Polytechnical University, Spain.

21. with H.J. Ramey, Jr., A. Shapiro and L. Abriola (1979) "Block response to reinjection in a fractured geothermal reservoir," Proceedings of the Fifth Workshop on Geothermal Reservoir Engineering. SGP-TR-40, Stanford University, 189-196.
22. with M.A. Celia and L.J. Hayes (1980) "Alternating direction collocation solution to the transport equation," In Finite Elements in Water Resources III, The University of Mississippi, 3.36-3-3.48.
23. with V.V. Nguyen (1980) "Is geothermal simulation a 'catastrophe?'," Proceedings of the Sixth SGP Workshop on Geothermal Reservoir Engineering, Stanford University.
24. with A.M. Shapiro (1981) "Simulation of flow in fractured porous media," Proceeding of the Seventh Workshop on Geothermal Reservoir Engineering, Stanford, 157-160.
25. with A.M. Shapiro (1982) "Solution of immiscible displacement in porous media using the collocation finite element method," In Finite Elements in Water Resources IV, Springer-Verlag, 9.61-9.70.
26. with M.A. Celia (1982) "Transport simulation using three dimensional alternating direction collocation," In Finite Elements in Water Resources IV, Springer-Verlag, 14.9-14.20.
27. with D.H. Tang (1982) "Solution of an inverse problem in groundwater flow using uncertain data," In Computational Methods and Experimental Measurements, Springer-Verlag, 53-63.
28. with M.B. Allen (1982) "The convergence of upstream collocation in the Buckley-Leverett Problem," Soc. of Petroleum Engineers of AIMESPE.
29. with D.E. Dougherty (1982) "Towards a two-equation method for geothermal simulation of fractured porous reservoirs," Proceedings of the Eighth Workshop on Geothermal Reservoir Engineering, Stanford University.
30. with E.O. Frind (1982) "The principal direction technique for solution of the advection dispersion equation," Tenth IMACS World Congress on System Simulation and Scientific Computation, Montreal, Canada, 295-299.

31. with D.K. Babu (1982) "A three dimensional hybrid finite element - finite difference scheme for groundwater simulation," Tenth IMACS World Congress on System Simulation and Scientific Computation, Montreal, 292-294.
32. (1982) "Groundwater hydrology – research needs for the next decade," Proceedings of the AEEP/NSF Conference, December 1&2, Arlington, Virginia, 128-129.
33. with D.K. Babu (1984) "A finite element-finite difference alternating direction algorithm for three dimensional ground-water transport," In Finite Elements in Water Resources V. Springer-Verlag, 165-174.
34. with L. Abriola (1985) "Two dimensional numerical simulation of subsurface contamination by organic compounds – a multiphase approach," Proceedings of the Specialty Conference, sponsored by the Water Resources Planning and Management Division and the Buffalo Section of the American Society of Civil Engineers, Buffalo, NY. In Computer Applications in Water Resources, 275-284.
35. (1986) "Analysis and uncertainty – the transport problem," Proceedings, 15th Biennial Conference on Ground Water 1985, California Water Resource Center, Davis California, 23-27.
36. with L.J. Morse-Fortier (1986) "Teaching numerical mathematics using interactive computer graphics," 1986 University AEP Conference, San Diego, V-191–V-195.
37. with D.D. Ahlfeld and J.M. Mulvey (1986) "Combining physical containment with optimal withdrawal for contaminated groundwater remediation," In Finite Elements in Water Resources VI, Springer-Verlag, 205-214.
38. with B. Joos (1986) "Least squares collocation method for groundwater flow." In Finite Elements in Water Resources VI, Springer-Verlag, 385-394.
39. with M.A. Celia (1986) "An alternating-direction collocation solution for the unsaturated flow equation," In Finite Elements in Water Resources VI, Springer-Verlag, 395-410.

40. with P.T. Imhoff and P.R. Jaffe (1990) "Dissolution of organic liquids in groundwater," Proceedings of the 1990 ASCE National Conference on Environmental Engineering, Washington, July, 1990, C.R. O'Melia (Ed.), ASCE, N.Y.,290-297.
41. (1990) "An historical perspective on subsurface flow and transport modelling," Proceedings First USA/USSR Joint Conference on Environmental Hydrology and Hydrogeology, Leningrad, USSR, June, 1990, Proceedings published 1991, 144-153.
42. with L.R. Bentley (1990) "Least squares and the vertically averaged flow equations," Computational Methods in Subsurface Hydrology, Computational Mechanics Publications, Springer-Verlag, 76-82.
43. with J.F. Guarnaccia (1990) "A collocation based parallel algorithm to Solve immiscible two phase flow in porous media," Computational Methods in Subsurface Hydrology, Computational Mechancis Publications, Springer-Verlag, 205-210.
44. with Tucciarelli (1990) "The quasi-linearity assumption in groundwater and groundwater Quality management problems," Computational Methods in Subsurface Hydrology, Computational Mechancis Publications, Springer-Verlag, 537-544.
45. with J.P. Laible and D.G. Zeitoun (1992) "On automated weight selection for a least squares model of the shallow water equations," Computational Methods in Water Resources, Computational Mechanics Publications, Elsevier Applied Science, 1, 307-314.
46. with D.G. Zeitoun (1992) "A least squares approach for solving remediation problems of contaminated aquifers," Computational Methods in Water Resources, Computational Mechanics Publications,Elsevier Applied Science, 1, 329-336.
47. with G.P. Karatzas (1992) "Combination of groundwater simulation with an outer approximation method for global optimization," Computational Methods in Water Resources, Computational Mechanics Publications, Elsevier Applied Science, 1, 337-352.

48. with J.F. Guarnaccia (1992) "A new Two-phase flow and transport model with interphase mass exchange." Computational Methods in Water Resources, Computational Mechanics Publications, Elsevier Applied Science, Vol. 2, 281-296.
49. with R.M. Cohen and J. Feld (1992) "DNAPL migration from the Love Canal landfill, Niagara Falls, New York," Proceedings of the International Conference on Subsurface Contamination by Immiscible Fluids, Calgary, Canada, 18-20 April, 1990, Subsurface Contamination by Immiscible Fluids, Weyer (ed.) Balkema, Rotterdam, 393-400.
50. with S.W. Stothoff and C.S. Hull (1993) "Animation of groundwater flow and contaminant transport," In Hydrologic Investigations and Monitoring, Groundwater Modeling, eds. Eckstein, Y. and Zaporozec, A., Water Environment Federation, 345-350.
51. with J. Guarnaccia (1994) "Domain-decomposition-collocation algorithm for solution of the multiphase flow equations," Basal World CFD User Days 1994, Second World Conference in Applied Computational Dynamics, Conference Proceedings 9th Annual Conference of the International Hightech-Forum Basal, 20.2-6.
52. with G.P. Karatzas and T. Tucciarelli (1994) "Groundwater quality management using numerical simulation and a primal optimization technique," Proceedings X International Conference on Computational Methods in Water Resources, Heidelberg, Germany, 849-858.
53. with G.P. Karatzas (1994) "Groundwater quality management using a 3-D numerical simulator and a cutting plane optimization method," Proceedings X International Conference on Computational Methods in Water Resources, Heidelberg, Germany, 841-848.
54. with W.A. McGrath (1994) "Delineating a contaminant plume boundary," Proceedings X International Conference on Computational Methods in Water Resources, Heidelberg, Germany, 317-324.
55. with Joseph F. Guarnaccia (1995) "Dense non-aqueous phase liquids," Proceedings of the Scope Workshop on Groundwater Contamination in China, 52-59.

56. with M.M.Ozbek. (1995) "Design of groundwater contamination remediation using fuzzy sets and systems," Fuzzy Logic'95, 10-1/10-15 Burlingame, CA, November 1995.
57. with G.P. Karatzas (1996) "A least-cost design for groundwater contamination remediation," Proceedings Coastal Environment: Environmental Problems in Coastal Regions, Rio, Brazil, 3-11.
58. with W.A. McGrath (1996) "Sampling network design for delineating groundwater contaminant plumes," Proceedings Computational Methods in Water Resources, Cancun, Mexico, 185-192.
59. with G.P. Karatzas (1996) "Combination of pumping wells and drains for an optimal groundwater remediation design," Proceedings Computational Methods in Water Resources, Cancun, Mexico, 367-373.
60. with G.P. Karatzas (1996) "The Effects of Different Types of Constraints on the Optimal Solution of a Groundwater Management Problem," Ist International Conference "The Impact of Industry on Groundwater Resources", Cernobbio, Italy, 41-44.
61. with S.H. Brill (1997) "A block red-black SOR method for a two-dimensional parabolic equation using Hermite collocation," in The Mathematics of Finite Elements and Applications, Highlights, 1996, J.R. Whiteman, Ed. 347-360.
62. (1997) "Venimus, vidimus, vicimus," in Groundwater: an Endangered Resource, M. Forrest, J.R. Holly Jr. and A. Alsaffar, XXVII IAHR Congress, ASCE, 1-14.
63. with G.P. Karatzas (1997) "Determination of the most cost-effective technology for subsurface remediation," Proceedings of the Annual Water Resources Planning and Management Conference, Merritt, D.H. ed., ASCE, 406-407.
64. with G.P. Karatzas (1997) "Optimal groundwater remediation design in an uncertain physical environment," Proceedings of the Water Pollution 97 Conference, Bled Slovenia, 231-237.
65. with G.S. Herrera (1998) "Cost-effective groundwater quality sampling network design," Proceedings of the Proceedings Computational Methods in Water Resources, Crete, Greece, 51-58.

66. with A.A. Spiliotopoulos and G.P. Karatzas (1998) "Optimal Design of Groundwater Remediation Systems with Treatment Plant Considerations," Proceedings Computational Methods in Water Resources, Crete, Greece, 75-90.
67. with M.M. Ozbek (1998) "A fuzzy logic approach to health risk based design of groundwater remediation," Proceedings Computational Methods in Water Resources, Crete, Greece, 115-122.
68. with G. S. Herrera and W. A. McGrath (1998) "Computer-aided risk assessment in problems of groundwater contamination," Proceedings of the First International Conference on Computer Simulation in Risk Analysis and Hazard Mitigation. Eds: Rubio, J. L., Brebbia, C. A., and Uso, J. L., WIT Press, Computational Mechanics Publications, Southampton, U.K., 51-60.
69. with J. F. Guarnaccia, (2000) "Dense Non-aqueous Phase Liquids," in Groundwater Contamination and Its Control in China, Tsinghua University Press, 54-58.
70. with G.P. Karatzas and D.P. Ahlfeld (2000) "Groundwater Flow and Transport Models: A Field Application," in Groundwater Contamination and Its Control in China, Tsinghua University Press, 59-63.
71. with Herrera and G, J Guarnaccia (2000) "A methodology for the design of space-time groundwater quality sampling networks," in Computational Methods in Water Resources XIII, Calgary, 579-585.
72. with M.M.Ozbek (2000) "Risk based remedial design: Modeling and implementation of expert insight," in Computational Methods in Water Resources, XIII, Calgary, Canada, 525-531.
73. with K.L. Ricciardi (2000) "Risk based groundwater remediation design using a tunneling optimization algorithm," in Computational Methods in Water Resources, XIII, Calgary, Canada, 519-523.
74. with A.A Spiliotopoulos and G.P. Karatzas (2000) "A biconcave-decomposition method for the optimal design of pump-and-treat remediation systems including the treatment plant," in Computational Methods in Water Resources, XIII, Calgary, Canada, 547-554.

75. with Y. Zhang (2000) "A latin-hypercube method for evaluation of hydraulic conductivity random fields," in Computational Methods in Water Resources, XIII, Calgary, Canada, 779-784.
76. with G.S. Herrera and J. Guarnaccia (2000) "Development of a Methodology for the Design of Groundwater Quality Sampling Networks" Proceedings First World Conference on Groundwater, Fort Alegra, Brazil, CD ROM.
77. with G.S. Herrera, J. Guarnaccia, and R. Simuta-Champo (2001) "Design of Efficient Space-Time Groundwater Quality Sampling Networks," Proceedings of the 2001 International Symposium on Environmental Hydraulics, ISEH, CD ROM.
78. with L. Wu (2001) "Single-degree freedom collocation method using Hermite polynomials," Proceedings of an AMS-IMS-SIAM Joint Summer Research Conference on Fluid Flow and Transport in Porous Media: Mathematical and Numerical Treatment, 489-500.
79. with Y. Zhang (2002) "Seed effects in the generation of hydraulic conductivity random fields," Proceedings, 2002 Conference on Water Resources Planning and Management, EWRI, ASCE, CD ROM
with Y. Zhang (2002) "Seed effects in the generation of hydraulic conductivity random fields," Proceedings, 2002 Conference on Water Resources Planning and Management, EWRI, ASCE, CD ROM.
80. with M. McKay, F. Fedele, J. Guarnaccia, and L. Wu (2002) "Multiphase groundwater flow and transport using a new localized collocation method (LOCOM)," in Computational Methods in Water Resources, XIV, Delft, The Netherlands, 241-248.
81. with J. Fedele, and J.P. Laible (2002), "Localized-adjoint-finite-element-method for sub-grid stabilization of convection-dominated transport on a triangular mesh," in Computational Methods in Water Resources, XIV, Delft, The Netherlands, 389-396.
82. with M.M. Ozbek (2002) "A fuzzy-Petri net formalization of expert information for groundwater risk management," in Computational Methods in Water Resources, XIV, Delft, The Netherlands, 779-786.

83. with K. Ricciardi and G.P. Karatzas (2002) “The modified tunneling method applied to groundwater remediation,” in *Computational Methods in Water Resources*, XIV, Delft, The Netherlands, 1411-1418.
84. with Y.Zhang (2002), “Design of optimal groundwater-quality monitoring networks via computer assisted analysis,” in *Computational Methods in Water Resources*, XIV, Delft, The Netherlands, 1419-1425.
85. with M. P. Papadopoulou and G.P. Karatzas (2002) “A dynamic approach to groundwater remediation design,” in *Computational Methods in Water Resources*, XIV, Delft, The Netherlands, 1451-1458.
86. “Teaching groundwater flow and transport modeling,” (2002) in *Computational Methods in Water Resources*, XIV, Delft, The Netherlands, 1779-1786.
87. with M.M. Ozbek (2004) “A new perspective on modeling groundwater contaminant-driven health risk with subjective information” *Proceedings of the XV International Conference Computational Methods in Water Resources*, Chapel Hill, North Carolina, 1227-1229.
88. with M.P. Papadopoulou, G.P. Karatzas, and G.F. Pinder “Economic parameters’ effects in the optimal design of a groundwater remediation system” in *Proceedings of the XV International Conference Computational Methods in Water Resources*, Chapel Hill, North Carolina, 1181-1191.
89. “An overview of the use of mathematical simulation and operations research methods in groundwater contaminant hydrology,” (2006) *Protection and Restoration of the Environment VIII*, Chania, Crete, Greece, July 3-7, KN6.
90. with Z. Dokou (2006) “Least cost search algorithm for the identification of a DNAPL source,” *Proceedings of the XVI International Conference Computational Methods in Water Resources*, Copenhagen, Denmark, on CD.
91. with B.R. Druschel and M. Ozbek, (2006) “Application of Depster-Shafer theory to hydraulic conductivity,” *Proceedings of the XVI International Conference Computational Methods in Water Resources*, Copenhagen, Denmark, on CD.

92. with J.R. Ross and M. Ozbek (2006) "Fuzzy Kalman Filtering of hydraulic conductivity," Proceedings of the XVI International Conference Computational Methods in Water Resources, Copenhagen, Denmark, on CD.
93. with M.M. Ozbek, and G.Y. Bussod (2006) "Subsurface characterization using geophysical data fusion," Proceedings of the XVI International Conference Computational Methods in Water Resources, Copenhagen, Denmark, on CD.
94. 2007, "Groundwater Goes Computational: My Role," Pioneers in Groundwater Lecture, World Environmental and Water Resources Congress, ASCE, Tampa Florida, on CD.
95. with J.F. Guarnaccia (2011) "Retrospective evaluation of an implemented coputer-optimized groundwater-remediation design," Environmental Hydraulics, CRC Press, on CD.

Books

1. with W.G. Gray (1977) The finite element method in the simulation of surface and subsurface hydrology, Academic Press.
2. with L. Lapidus (1982) Numerical solution of partial differential equations in science and engineering, John Wiley and Sons.
3. with J.F. Botha (1983) Fundamental concepts in the numerical solution of differential equations, John Wiley and Sons.
4. with P.S. Huyakorn (1983) Computational methods in subsurface flow, Academic Press.
5. with E.F. Wood, R.A. Ferrara and W.G. (1984) Groundwater contamination from hazardous wastes, Prentice Hall, Englewood Cliffs, N.J.
6. with Th. V. Hromadka II, Ch.-Ch. Yen (1987) The best approximation method: An introduction (Lecture Notes in Engineering), Springer-Verlag.
7. with M. Allen and I. Herrera (1988) Numerical modeling in science and engineering, John Wiley.

8. (2002), Groundwater modeling using geographical information systems John Wiley and Sons.
9. with M. A. Celia, (2006) Subsurface hydrology , John Wiley and Sons.
10. with W.G Gray, (2008) Essentials of multiphase flow and transport in porous media, John Wiley and Sons
11. with I. Herrera, (2011) Mathematical modeling in science and engineering: an axiomatic approach, John Wiley and Sons.
12. (2017) Numerical methods for solving partial differential equations: a comprehensive introduction for scientists and engineers, John Wiley and Sons, in press.

Chapters in Books

1. (1970) A digital model for aquifer evaluation, U.S. Geological Survey Techniques of Water Resources Investigation, Book 7, Chapter C1, p.1-18.
2. with D.H. Tang (1980) A new algorithm for the numerical solution of nonlinear parabolic partial differential equations. In J.T. Oden (Ed.), Computational Methods in Nonlinear Mechanics, Chapter 222.
3. with D.H. Tang (1981) Deterministic groundwater hydrology. In G.J. Halasi-Kun (Ed.) Pollution and Water Resources, 8 (3), Columbia University Seminar Series, Pergamon Press, 167-198.
4. (1982) Groundwater hydrology, McGraw-Hill Encyclopedia of Science and Technology, 6, 395-397.
5. with M.A. Celia (1984) Collocation solution of the transport equation using a locally enhanced alternating direction formulation, Unification of Finite Element Methods, Elsevier Science Publishers, Chapter 13, 303-320.
6. with E.F. Wood, R.A. Ferrara, and W.G. Gray (1984) Groundwater contamination from hazardous wastes, Prentice Hall.
7. (1987) Finite element handbook, porous media, Chapter 3.3, H. Kardestuncer, ed., 3.195-3.216.

8. with L.R. Bentley (1992) Eulerian-Lagrangian least squares collocation in multi-spatial dimensions, in *Computational Methods in Geosciences*, W.E. Fitzgibbon and M.F. Wheeler, eds. SIAM.
9. (1988) An overview of groundwater modelling, in *groundwater flow and quality modelling* E. Custodio, A Gurgui, and J.P. Lobo Ferreira, eds., NATO ASI Series, D. Reidel Publishing Company, p. 119-150.
10. with P.S. Huyakorn and E.A. Sudicky (1993) Simulation of flow and transport in fractured porous media, in *flow and contaminant transport in fractured rock*, J. Bear, C-F Tsang and G. deMarsily, eds. Academic Press, Inc., Chapter 8, 395-435.
11. with J.F. Guarnaccia (1994) Simulation of dense non-aqueous phase fluid flow in porous media using collocation finite elements, *The Mathematics of Finite Elements and Applications*, J.R. Whiteman, ed, 243-254.
12. with J. Guarnaccia (1998) "On the importance of dimensionality in the simulation of dense non-aqueous liquid migration in the subsurface," in "Soil and Aquifer Pollution - Non-Aqueous Phase Liquids - Contamination and Reclamation," Chapter 14, Rubin, H., Narkis, N. and Carberry, J. (Eds.), Springer-Verlag, Heidelberg New York, p. 209-219.
13. with S. Sorek (1999) "Survey of computer codes and case histories, seawater intrusion in coastal aquifers : concepts, methods, and practices," *Theory and Applications of Transport in Porous Media*, V. 15, J. Bear, A.H.-D Cheng, S. Sorek, D. Ouazar and I. Herrera (eds.) Kluwer Academic Publications . 399-458.
14. (2003) "Groundwater Hydrology," *McGraw-Hill Encyclopedia of Science and Technology*.
15. (2011) "Groundwater Hydrology in Groundwater Quantity and Quality Management," M. A. Mustafa and S.W. Taylor (eds), 2011
16. (2012) "Toward a Sustainable Water Future: Visions for 2050," Grayman, W.M., Loucks, D.P.and Saito, L., (eds.) American Society of Civil Engineers, Reston, VA.277-287.

Books Edited

17. with W.G. Gray and C.A. Brebbia, (Eds.) (1977) Finite Elements in Water Resources I, Pentech Press.
18. with C.A. Brebbia and W.G. Gray (Eds.) (1978) Finite Elements in Water Resources II, Pentech Press.
19. with S.Y. Wang, C.A. Brebbia, C.V. Alonso, and W.G. Gray (Eds.) (1980) Finite Elements in Water Resources III, The University of Mississippi.
20. with K.P. Holz, U. Meissner, W. Zielke, C.A. Brebbia, and W.G. Gray (Eds.) (1982) Finite Elements in Water Resources IV, Springer-Verlag.
21. (1983) Flow through porous media, Computational Mechanics, Ashurst Lodge, London.
22. with J.P. Liable, C.A. Brebbia and W.G. Gray (Eds.) (1984) Finite Elements in Water Resources V, Springer-Verlag.
23. with A. Sa da Costa, A. Melo Baptista, W.G. Gray, and C.A. Brebbia (Eds.) (1986) Finite Elements in Water Resources VI, Springer-Verlag.
24. with M.Celia, L. Ferrand, W.G. Gray, and C. A Brebbia (Eds.) (1988) Computational Methods in Water Resources VII, Elsevier.
25. with G. Gambolati, A. Rinaldo, C.A. Brebbia, W.G. Gray (Eds.) (1990) Computational Methods in Subsurface Hydrology, Computational Mechanics Publications, Springer-Verlag.
26. with T.F. Russell, R.E. Ewing, C.A. Brebbia, W.G. Gray (Eds.) (1992) Computational Methods in Water Resources IX, Vol 1: Numerical Methods in Eater Resources, Computational Mechanics Publications and Elsevier Applied Science.
27. with A. Peters, G. Wittum, B. Herrling, U. Meissner, C. Brebbia, W. Gray, and G.F. Pinder (Eds.) (1994) Computational Methods in Water Resources X, Volume 1 and Volume 2, Kluwer Academic Publishers, Dordecht.
28. with A.A. Aldama, J. Aparicio, C.A. Brebbia, W.G. Gray, I. Herrera (eds) (1996) Volume 1 and 2, Computational Methods in Subsurface Flow and Transport Problems, Computational Mechanics Publications, Southampton.

29. with V.N. Burganos, G.P. Karatzas, A.C. Payatakes, C.A. Brebbia, and W.G. Gray (eds) (1998) Volume 1 and 2, Computational Methods in Subsurface Flow and Transport, Computational Mechanics Publications, Southampton.
30. with L.R. Bentley, J.F. Sykes, C.A. Brebbia, and W.G. Gray (eds) (2000) Volume 1 and 2, Computational Methods in Water Resources, A.A. Balkema publishers, Rotterdam.
31. with S.M. Hassanizadeh, R.J. Schotting, and W.G. Gray (eds) (2002) Volume 1 and 2, Computational Methods in Water Resources, Elsevier, Amsterdam.
32. with C.T. Miller, M.W. Farthing, and W.G. Gray (eds), (2004) Proceedings of the XV International Conference Computational Methods in Water Resources, Chapel Hill, North Carolina, Elsevier .

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