C. T. Kelley
Curriculum Vitae

Address

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Education

Purdue University, 1973-1976, Ph.D., Mathematics.
Vanderbilt University, 1969-1973, B.A., Mathematics.

Employment

N.C. State University, Raleigh, North Carolina, 2002-present, Drexel Professor.
N.C. State University, Raleigh, North Carolina, 1988-present, Professor.
N.C. State University, Raleigh, North Carolina, 1983-1988, Associate Professor.
N.C. State University, Raleigh, North Carolina, 1978-1983, Assistant Professor.
Mathematics Research Center, Madison, Wisconsin, 1977-1978, Assistant Scientist.
Purdue University, West Lafayette, Indiana, Spring 1977, Half-time Instructor.
Purdue University, West Lafayette, Indiana, 1973-1976, Teaching Assistant.

Research Interests

Numerical methods for nonlinear equations, linear equations, integral and differential equations.
Numerical optimization.
Applications to groundwater flow, semiconductor modeling, and radiative transfer.
Parallel computing.

Professional Societies

Society for Industrial and Applied Mathematics.
SIAM Activity Group on Geosciences.
SIAM Activity Group on Optimization.
Mathematical Programming Society.
Sigma Xi.

Professional Activities

- **Editorial Boards**
  - SIAM Journal on Optimization (1989 – present).
    Editor-in-chief 2000 – present.
  - SIAM Book Series on Fundamentals of Algorithms (2003 – present)
  - Advances in Water Resources (2000 – present).
  - Optimization and Engineering (1999 – present).
  - Pacific Journal on Optimization (2004 – present).
  - SIAM Journal on Numerical Analysis (1998 – 2003).
  - SIAM-MPS Book Series on Optimization (1999 – 2003).
  - Journal of Optimization Methods and Software (1991 – 1996).
- **Offices in Professional Societies**
  - Member: SIAM Council (2002 - present)
  - Vice Chair: SIAM Activity Group on Optimization (1992 – 1997).
  - Chair: SIAM Activity Group on Optimization Prize Award Committee, (1992, 1995).
- **Organization of Conferences**
  - Co-Chair, Oranizing Committee: 2005 SIAM Annual Meeting, New Orleans, LA, July 11–15, 2005.
  - Member, Program and Steering Committees, Mathematical Programming Society 2004 Conference on Continuous Optimization, RPI, Troy, NY, Aug 2 – Aug 4, 2004.
  - Member, Organizing Committee: 8th Copper Mountain Conference on Iterative Methods, March 28 – April 2, 2004.
  - Member, Organizing Committee: Workshop on Solution Methods for Large Scale Nonlinear Problems, Pleasanton, CA. August 6–8, 2003.
  - Member, Organizing Committee: SAMSI Environmental Program, SAMSI, RTP, NC, Spring 2003.
  - Chair, Organizing Committee: SAMSI Workshop on Simulation and Optimization, SAMSI, RTP, NC, April 28-30, 2003.
  - Member, Organizing Committee: 7th Copper Mountain Conference on Iterative Methods, March 24–29, 2002.
  - Member, Organizing Committee: 6th Copper Mountain Conference on Iterative Methods, April 2–8, 2000.
  - Co-Chair: Organizing committee for 1999 SIAM Conference on Optimization, May 1999.
  - Co-Chair: Organizing committee for 1997 SIAM-SEAS meeting, Raleigh, NC, April 4-5, 1997.
  - Member, Organizing Committee: 1995 SIAM National Meeting, October 23–26, 1995, Charlotte, NC
  - Co-Organizer: Workshop on Krylov Subspace Methods and Applications, Raleigh, NC, March 17–18, 1995. Jointly organized with I. C. F. Ipsen.
  - Member: Organizing Committee, Twelfth Parallel Circus, North Carolina Supercomputing Center, Research Triangle Park, North Carolina, October 30–31, 1992.
  - Chair, Organizing Committee: Conference on Numerical Optimization Methods in Differential Equations and Control, Raleigh, 7/15/91 – 7/17/91.

- **Organization of Minisymposia and Special Sessions**
  - Organizer: Minisymposium on *Applications of Sampling Methods*, 2005 SIAM Conference on Optimization, Stockholm, Sweden, May 15–18, 2005.
  - Organizer: Session on *Applications*, Mathematical Programming Society 2004 Conference on Continuous Optimization, RPI, Troy, NY, Aug 2 – Aug 4, 2004.
  - Organizer: Minisymposium on *Theory and Applications of Sampling Methods in Optimization*, SIAM Annual Meeting, Montreal, CA, June 20, 2003.
  - Co-Organizer: Sessions on nonlinear solvers, 2002 Copper Mountain Conference on Iterative Methods, March 24–29, 2002.
  - Co-Organizer: Two Minisymposia on *Evolving Approaches for Modeling Porous Medium Dynamics* and *Optimization and Subsurface Flow and Transport*, Sixth SIAM Conference on Mathematical and Computational Issues in the Geosciences, Boulder, C0, June 11–14, 2001.
  - Organizer: Two sessions on optimization applications, International Symposium on Mathematical Programming, Atlanta, GA, August, 2000.
  - Organizer: Minisymposium on Derivative Free Optimization, 1999 SIAM Conference on Optimization, Atlanta, GA, May 11, 1999.
  - Organizer: Minisymposium on Large-Scale Computations in Groundwater Simulation, 1999 SIAM Conference on Mathematical and Computational Issues in the Geosciences, March 1999.
  - Organizer: Four sessions on Novel Applications, International Symposium on Mathematical Programming, Lausanne, Switzerland, August, 1997.
  - Co-Organizer: Minisymposium on Nasty Nonsmooth Nonlinear Optimization SIAM Annual Meeting, Stanford University, July 17, 1997.
  - Organizer: Mininisymposium on Trust Region Methods for Problems with Simple Bounds, SIAM Optimization Meeting, Victoria, Canada, May 1996.
  - Organizer: Minisymposium on Applications of Optimization, 1995 SIAM National Meeting, Charlotte, NC, October, 1995.
  - Co-Organizer: Minisymposium on Industrial Application of Optimization Methods, Third International Conference on Industrial and Applied Mathematics, Hamburg, July, 1995. Jointly organized with E. W. Sachs.
  - Organizer: Minisymposium on Integral Equations and Compact Fixed Point Problems, SIAM Annual Meeting, Philadelphia, PA, July 16, 1993.
  - Organizer: Special Session on Numerical Optimization, AMS Meeting, Knoxville, TN, March 26–27, 1993.
  - Organizer: Minisymposium on Optimization in Control and Differential Equations, SIAM Conference on Optimization, Chicago, Illinois, May 12, 1992.
  - Co-organizer: Minisymposium on Nonlinear Equations and Optimization in Infinite Dimensional Spaces, International Conference on Industrial and Applied Mathematics, Washington, D. C., July 12, 1991. Jointly organized with E. W. Sachs.
  - Organizer: Minisymposium on Infinite Dimensional Problems, First International Conference on Industrial and Applied Mathematics, Minisymposium no. 56, Paris, July 3, 1987.
  - Co-organizer: Minisymposium on Quasi-Newton Methods in Infinite Dimensional Spaces, SIAM 1986 National Meeting, Boston, 7/24/86. Jointly organized with E. W. Sachs.
- **Other Professional Activities**
  - Member: North Carolina Supercomputing Center Allocation Committee (1992–present).
  - Reviewer for several funding agencies and professional journals.
  - Panel memember for Department of Energy and National Science Foundation programs.
  - Reviewer for Mathematics Reviews.

Ph. D. Students (all from North Carolina State University)

- K. R. Kavanagh, "Nonsmooth Nonlinearities in Applications from Hydrology", 2003.
  Present Address: Clarkson University, Potsdam, NY.
- T. S. Coffey, "Temporal and Pseudo-temporal Numerical Integration Methods, 2002.
  Present Address: Sandia National Laboratory, Albuquerque, NM.
- J. M. Gablonsky, "Modifications of the DIRECT Algorithm", 2001.
  Present Address: The Boeing Company, Seattle, WA.
- E. W. Jenkins, "The Application of Two-Level Domain Decomposition Preconditioners to Problems in Hydrology", 2000.
  Present Address: TICAM, Univeristy of Texas at Austin.
- T. D. Choi, "Bound-Constrained Optimization", 1999.
  Present address: Safety Insurance Company, MA
- M. D. Tocci, "Numerical Methods for Variably Saturated Flow and Transport Models", 1998.
  Present address: The Mathworks, Natick, MA.
- J. M. Banoczi, "Multilevel Methods for Conductive-Radiative Heat Transfer", 1997.
  Present address: US Department of Defense, Fort Meade, MD.
- Z. Xue, "Mesh Independence of GMRES for Integral Equations", 1995.
  Present address: Nomura Enterprise Inc., Chantilly, VA.
- P. Gilmore, "An Algorithm for Optimizing Functions with Multiple Minima" 1993.
  Present address: Fluence Technology, Beaverton, OR.
- D. M. Hwang, "Convergence of Broyden's Method in Banach Spaces", 1991.
  Present address: IBM, Research Triangle Park, NC.
- L. Mukundan, "Convergence Analysis for the Harmonic Balance Method", 1991.
  Present address: Mathematics Department, Ferris State Univ., Big Rapids, MI.
- J. I. Northrup, "Pointwise Quasi-Newton Methods and Integral Equations", 1988.
  Present address: TRW, Reston, VA.

Current Ph. D. Students

- D. E. Finkel, in progress, "Analysis of the DIRECT Algorithm".
- M. Lasater, "Fast Algorithms for the Wigner-Poisson Equations", in progress.
- J. P. Reese, in progress.
- K. Dickson, in progress

Undergraduate Research Students

- R. W. Darwin, "Optimization of Subsurface Remediation Systems", 2002–present.
- O. J. Eslinger, "Optimization of Automotive Valve Train Components with Implicit Filtering", 1998–9.
  Present Address: TICAM, University of Texas, Austin.
- H. A. Patrick, "Implicit Filtering for Constrained Optimization Problems in the Natural Gas Pipeline Industry", 1999–2001.
  Present Address: Computer Science Department, Georgia Tech.

Recent Research Grants, Principal Investigator.

"Dynamical Complexity Theory of Clocked Quantum-Dot Cellular Automata Circuits", (with R. J. Trew), US Army Research Office, W911NF-04-1-0276, 8/1/04 – 7/31/07, $435,846.

"Iterative Methods for Nonlinear Equations", National Science Foundation, DMS-0404537, 8/15/04 – 7/31/07. $192,999.

"Workshop on Simulation and Optimization of Porous Media", US Army Research Office, DAAD19-03-1-0115 6/1/03 – 5/31/04. $9,986.

"Nonlinear Solvers for Subsurface Flow Problems", US Army Research Office, #DAAD19-02-1-391, 9/1/02–8/31/05, $207,190.

"Proposal for Defense University Research Instrumentation Program", (with Gremaud and Li), US Army Research Office, #DAAD19-02-1-0111, 05/10/02–05/09/03. $95,443.

"Scientific Computing Research Environments for the Mathematical Sciences (SCREMS)" (with Campbell, Meyer, Ipsen), National Science Foundation, #DMS-0209695, 6/1/02–5/31/05. $57,789.

"The Science and Technology of Nano/Molecular Electronics: Theory, Simulation, and Experimental Characterization", US Army Research Office, subcontract to Stevens Institute, 6/01/01–05/31/06. $425,000.

"ITR/AP: Collaborative Research: Sampling Methods for Optimization and Control of Subsurface Flows", National Science Foundation, #DMS-0112542, 10/1/01 – 9/30/04. $166,666.

Nonlinear Equations and Optimization, National Science Foundation, #DMS-0070641, 8/01/00 – 7/31/03, $185,000

Nonlinear Solvers for Subsurface Flow Problems, US Army Research Office, #DAAD19-99-1-0186, May 1, 1999 to April 30, 2002. $200,669.

Joint NCSU-Boeing Academic-Industrial Research Project, (with S. L. Campbell, C. D. Meyer, and I. C. F. Ipsen), National Science Foundation, DMS-9714811, June 1, 1998 to May 31, 2001. $293,988.

Numerical Methods for Groundwater Flow, Cray Research Grant Program, January 1, 1998 to December 31, 1999. $16,000.

Nonlinear Equations and Bound Constrained Optimization, National Science Foundation, DMS-9700569, July 15, 1997 to Dec 31, 2000. $240,000.

Temporal Integration for Groundwater Flow, Cray Research Grant Program, January 1, 1997 to December 31, 1997. $8,000.

Simulating Flow and Transport Phenomena in Heterogeneous Multiphase Systems, (with C. T. Miller and North Carolina Supercomputing Center) US Army Waterways Experiment Station, contract #DACA39-95-K-0098. October 1, 1995 to September 30, 1998. $242,661.

Research Grants, Principal Investigator, before 1997.

Iterative Methods for Equations and Optimization, National Science Foundation, DMS-9321938, June 1, 1994 to November 30, 1997. $175,000.

Multilevel Algorithms for Constrained Optimal Control Problems, (with E. W. Sachs of Universität Trier, Germany), North Atlantic Treaty Organization, CRG 920067, April 3, 1992 to April 2, 1997. (150,000 Belgian Francs) $4,400.

Newton-like Methods for Richards' Equation, Cray, 4/1/95 – 3/31/96, $8,000

Workshop on Krylov Subspace Methods and Applications, (with Ilse Ipsen) NSF, 8/1/94 – 7/31/95, #DMS-9415578, $3,500. ARO, 1/1/95 – 12/31/95, #33564-MA-CF, $5,000.

Scientific Computation: Graduate Level Courses, Computers and Fellowships, (with Michael I. Shearer and Michael F. Singer), National Science Foundation, ASC-9024616, Feb 15, 1992 to July 31, 1993. $99,850.

Optimization Problems in Function Spaces, joint funding by the National Science Foundation, DMS-9024622, and the Air Force Office of Scientific Research, FQ8671-9101094, June 1, 1991 to May 31, 1993(AFOSR), 1994(NSF). $138,864.

Conference on Numerical Optimization Methods in Differential Equations and Control, National Science Foundation, DMS-9017572, April 15, 1991 to March 31, 1992. $6,000.

Conference on Numerical Optimization Methods in Differential Equations and Control, Army Research Office, DAAL03-91-0072, March 1, 1991 to December 31, 1991. $8,000.

Optimization Problems in Function Spaces, joint funding by the National Science Foundation, DMS-8900410, and the Air Force Office of Scientific Research, AFOSR–ISSA-890044, June 1, 1989 to May 31, 1991. $88,039.

An RF Performance Sensitivity and Process Yield Model for MIMIC CAD Applications, (with R. J. Trew), U. S. Army grant DAAL0189K0906, May 1, 1989 to August 30, 1991. $198,014.

Two Processor Alliant FX/4 System, (with R. J. Plemmons, M. Shearer, and S. J. Wright), Defense University Research Instrumentation Program, AFOSR-89-0124, January 1, 1989 to December 31 1989. $100,000.

Pointwise Quasi-Newton Methods, National Science Foundation U.S.-Federal Republic of Germany Cooperative Science Program, INT-8800560, July 1, 1988 to December 31, 1992. $8,800.

Quasi-Newton Methods for Infinite Dimensional Problems, joint funding by the National Science Foundation, DMS-8601139, and the Air Force Office of Scientific Research, AFOSR-ISSA-86-0074, June 1, 1986 to May 31, 1989. $137,522.

Iterative Methods for Singular Problems, National Science Foundation, DMS-8500944, July 1, 1985 to June 30, 1986. $16,500.

Supplement to DMS-8300841 for workstation equipment, National Science Foundation, June 1, 1984 to May 31, 1985. $9,000.

The Convergence Behavior of Iterative Methods for Singular and Nearly Singular Nonlinear Problems, (with D.W. Decker), National Science Foundation, DMS-8300841, June 1, 1983 to May 31, 1985. $72,403.

Radiative Transfer in Inhomogeneous Slabs, National Science Foundation, MCS-7901659-A01, June 1, 1981 to May 31, 1983. $20,513.

Solvability of H-equations by Iteration, National Science Foundation, MCS-7901659, June 1, 1979 to May 31, 1981. $14,048.

Books

1. C. T. Kelley, *Solving Nonlinear Equations with Newton's Method*, number 1 in Fundamentals of Algorithms, SIAM, Philadelphia, 2003.

2. C. T. Kelley, *Iterative Methods for Optimization*, number 18 in Frontiers in Applied Mathematics, SIAM, Philadelphia, 1999.

3. C. T. Kelley, *Iterative Methods for Linear and Nonlinear Equations*, number 16 in Frontiers in Applied Mathematics, SIAM, Philadelphia, 1995.

Journal Publications

1. C. T. Kelley and B. M. Pettitt, *A fast algorithm for the Ornstein-Zernike equations*, J. Comp. Phys., 197 (2004), pp. 491–591.

2. K. R. Fowler, C. T. Kelley, C. T. Miller, C. E. Kees, R. W. Darwin, J. P. Reese, M. W. Farthing, and M. S. C. Reed, *Solution of a well-field design problem with implicit filtering*, Optimization and Engineering, 5 (2004), pp. 207–234.

3. T. Coffey, C. T. Kelley, and D. E. Keyes, *Pseudo-transient continuation and differential-algebraic equations*, SIAM J. Sci. Comp., 25 (2003), pp. 553–569.

4. M. W. Farthing, C. E. Kees, T. Coffey, C. T. Kelley, and C. T. Miller, *Efficient steady-state solution techniques for variably saturated groundwater flow*, Advances in Water Resources, 26 (2003), pp. 833–849.

5. C. E. Kees, C. T. Miller, E. W. Jenkins, and C. T. Kelley, *Versatile two-level Schwarz preconditioners for multiphase flow*, Comp. Geo, 7 (2003), pp. 91–114.

6. T. S. Coffey, R. J. McMullan, C. T. Kelley, and D. S. McRae, *Globally convergent algorithms for nonsmooth nonlinear equations in computational fluid dynamics*, J. Comp. Appl. Math., 152 (2003), pp. 69–81.

7. C. T. Kelley and E. W. Sachs, *Truncated Newton methods for optimization with inaccurate functions and gradients*, J. Optim. Theory Appl., 116 (2003), pp. 83–98.

8. J. F. Kanney, C. T. Miller, and C. T. Kelley, *Convergence of iterative split operator approaches for approximating nonlinear reactive transport problems*, Advances in Water Resources, 26 (2003), pp. 247–261.

9. A. S. Mayer, C. T. Kelley, and C. T. Miller, *Optimal design for problems involving flow and transport phenomena in saturated subsurface systems*, Advances in Water Resources, 12 (2002), pp. 1233–1256.

10. A. Battermann, J. M. Gablonsky, A. Patrick, C. T. Kelley, T. Coffey, K. Kavanagh, and C. T. Miller, *Solution of a groundwater control problem with implicit filtering*, Optimization and Engineering, 3 (2002), pp. 189–199.

11. R. Carter, J. M. Gablonsky, A. Patrick, C. T. Kelley, and O. J. Eslinger, *Algorithms for noisy problems in gas transmission pipeline optimization*, Optimization and Engineering, 2 (2001), pp. 139–157.

12. J. M. Gablonsky and C. T. Kelley, *A locally-biased form of the DIRECT algorithm*, Journal of Global Optimization, 21 (2001), pp. 27–37.

13. E. W. Jenkins, C. T. Kelley, C. T. Miller, and C. E. Kees, *An aggregation-based domain decomposition preconditioner for groundwater flow*, SIAM J. Sci. Comp., 23 (2001), pp. 430–441.

14. P. A. Gremaud, C. T. Kelley, T. A. Royal, and K. A. Coffey, *On a powder consolidation problem*, SIAM J. Appl. Math., 62 (2001), pp. 1–20.

15. T. D. Choi, O. J. Eslinger, C. T. Kelley, J. W. David, and M. Etheridge, *Optimization of automotive valve train components with implicit filtering*, Optimization and Engineering, 1 (2000), pp. 9–28.

16. T. D. Choi and C. T. Kelley, *Superlinear convergence and implicit filtering*, SIAM J. Optim., 10 (2000), pp. 1149–1162.

17. W. R. Ferng and C. T. Kelley, *Mesh independence of matrix-free methods for path following*, SIAM J. Sci. Comp., 21 (2000), pp. 1835–1850.

18. C. T. Miller, G. A. Williams, and C. T. Kelley, *Transformation approaches for simulating flow in variably saturated porous media*, Water Resources Research, 36 (2000), pp. 923–934.

19. C. T. Kelley, *Detection and remediation of stagnation in the Nelder-Mead algorithm using a sufficient decrease condition*, SIAM J. Optim., 10 (1999), pp. 43–55.

20. C. T. Kelley and E. W. Sachs, *A trust region method for parabolic boundary control problems*, SIAM J. Optim., 9 (1999), pp. 1064–1081.

21. T. D. Choi and C. T. Kelley, *Estimates for the Nash-Sofer preconditioner for the reduced Hessian for some elliptic variational inequalities*, SIAM J. Optim., 9 (1999), pp. 327–341.

22. J. M. Banoczi and C. T. Kelley, *A fast multilevel algorithm for the solution of nonlinear systems of conductive-radiative heat transfer equations in two space dimensions*, SIAM J. Sci. Comp., 20 (1999), pp. 1214–1228.

23. M. D. Tocci, C. T. Kelley, C. T. Miller, and C. E. Kees, *Inexact Newton methods and the method of lines for solving Richards' equation in two space dimensions*, Computational Geosciences, 2 (1998), pp. 291–310.

24. C. T. Miller, G. A. Williams, C. T. Kelley, and M. D. Tocci, *Robust solution of Richards' equation for non-uniform porous media*, Water Resources Research, 34 (1998), pp. 2599–2610.

25. C. T. Kelley and D. E. Keyes, *Convergence analysis of pseudo-transient continuation*, SIAM J. Numer. Anal., 35 (1998), pp. 508–523.

26. J. M. Banoczi and C. T. Kelley, *A fast multilevel algorithm for the solution of nonlinear systems of conductive-radiative heat transfer equations*, SIAM J. Sci. Comp., 19 (1998), pp. 266–279.

27. C. T. Kelley, C. T. Miller, and M. D. Tocci, *Termination of Newton/chord iterations and the method of lines*, SIAM J. Sci. Comp., 19 (1998), pp. 280–290.

28. C. T. Kelley and E. W. Sachs, *Local convergence of the symmetric rank-one iteration*, Computational Optimization and Applications, 9 (1998), pp. 43–63.

29. M. D. Tocci, C. T. Kelley, and C. T. Miller, *Accurate and economical solution of the pressure head form of Richards' equation by the method of lines*, Advances in Water Resources, 20 (1997), pp. 1–14.

30. S. L. Campbell, I. C. F. Ipsen, C. T. Kelley, and C. D. Meyer, *GMRES and the minimal polynomial*, BIT, 36 (1996), pp. 664–675.

31. C. T. Kelley, *Existence and uniqueness of solutions of nonlinear systems of conductive-radiative heat transfer equations*, Trans. Th. Stat. Phys., 25 (1996), pp. 249–260.

32. S. L. Campbell, I. C. F. Ipsen, C. T. Kelley, C. D. Meyer, and Z. Q. Xue, *Convergence estimates for solution of integral equations with GMRES*, Journal of Integral Equations and Applications, 8 (1996), pp. 19–34.

33. C. T. Kelley and Z. Q. Xue, *GMRES and integral operators*, SIAM J. Sci. Comp., 17 (1996), pp. 217–226.

34. C. T. Kelley and E. W. Sachs, *Solution of optimal control problems by a pointwise projected Newton method*, SIAM J. Control and Optimization, 33 (1995), pp. 1731–1757.

35. P. Gilmore and C. T. Kelley, *An implicit filtering algorithm for optimization of functions with many local minima*, SIAM J. Optim., 5 (1995), pp. 269–285.

36. C. T. Kelley, *A fast multilevel algorithm for integral equations*, SIAM J. Numer. Anal., 32 (1995), pp. 501–513.

37. C. T. Kelley, *Multilevel source iteration accelerators for the linear transport equation in slab geometry*, Trans. Th. Stat. Phys., 24 (1995), pp. 679–708.

38. S. Ito, C. T. Kelley, and E. W. Sachs, *Inexact primal-dual interior point iteration for linear programs in function spaces*, Computational Optimization and Applications, 4 (1995), pp. 189–202.

39. C. T. Kelley and E. W. Sachs, *Multilevel algorithms for constrained compact fixed point problems*, SIAM J. Sci. Comp., 15 (1994), pp. 645–667.

40. C. T. Kelley and Z. Q. Xue, *Inexact Newton methods for singular problems*, Optimization Methods and Software, 2 (1993), pp. 249–267.

41. C. T. Kelley and J. I. Northrup, *A fast multi-level method for the fixed point form of matrix H-equations*, Trans. Th. Stat. Phys., 22 (1993), pp. 533–547.

42. B. D. Ganapol, C. T. Kelley, and G. C. Pomraning, *Asymptotically exact boundary conditions for the P-N equations*, Nuclear Science and Engineering, 114 (1993), pp. 12–19.

43. C. T. Kelley and E. W. Sachs, *Pointwise Broyden methods*, SIAM J. Optim., 3 (1993), pp. 423–441.

44. C. T. Kelley and L. Mukundan, *Convergence analysis for the harmonic balance method*, Journal of Nonlinear Analysis, Theory Methods and Applications, 20 (1993), pp. 365–380.

45. C. T. Kelley, *Adaptive integral equation methods in transport theory*, Nuclear Science and Engineering, 112 (1992), pp. 361–368.

46. M. Heinkenschloss, C. T. Kelley, and H. T. Tran, *Fast algorithms for nonsmooth compact fixed point problems*, SIAM J. Numer. Anal., 29 (1992), pp. 1769–1792.

47. D. M. Hwang and C. T. Kelley, *Convergence of Broyden's method in Banach spaces*, SIAM J. Optim., 2 (1992), pp. 505–532.

48. D. Stoneking, G. Bilbro, R. Trew, P. Gilmore, and C. T. Kelley, *Yield optimization using a GaAs process simulator coupled to a physical device model*, IEEE Transactions on Microwave Theory and Techniques, 40 (1992), pp. 1353–1363.

49. C. T. Kelley and E. W. Sachs, *Mesh independence of the gradient projection method for optimal control problems*, SIAM J. Control and Optimization, 30 (1992), pp. 477–493.

50. C. T. Kelley and E. W. Sachs, *Mesh independence of Newton-like methods for infinite dimensional problems*, Journal of Integral Equations and Applications, 3 (1991), pp. 549–573.

51. C. T. Kelley, E. W. Sachs, and B. Watson, *A pointwise quasi-Newton method for unconstrained optimal control problems, II*, J. Optim. Theory Appl., 71 (1991), pp. 535–547.

52. C. T. Kelley and S. J. Wright, *Sequential quadratic programming for certain parameter identification problems*, Math. Programming ser. A, 51 (1991), pp. 281–305.

53. C. T. Kelley and E. W. Sachs, *Fast algorithms for compact fixed point problems with inexact*

function evaluations, SIAM J. Sci. Statist. Comp., 12 (1991), pp. 725–742.

54. C. T. Kelley and E. W. Sachs, *A new proof of superlinear convergence for Broyden's method in Hilbert space*, SIAM J. Optim., 1 (1991), pp. 146–150.

55. C. T. Kelley and J. Rulla, *Solution of the time discretized Stefan problem by Newton's method*, Journal of Nonlinear Analysis, Theory Methods and Applications, 14 (1990), pp. 851–872.

56. C. T. Kelley and E. W. Sachs, *Approximate quasi-Newton methods*, Mathematical Programming, ser. B, 48 (1990), pp. 41–70.

57. D. L. Woolard, J.-L. Pelourad, R. J. Trew, M. A. Littlejohn, and C. T. Kelley, *Hydrodynamic hot electron transport simulation based on the Monte Carlo method*, Solid-State Electronics, 32 (1989), pp. 1347–1351.

58. C. T. Kelley, *A fast two-grid method for matrix H-equations*, Trans. Th. Stat. Phys., 18 (1989), pp. 185–204.

59. C. T. Kelley and E. W. Sachs, *A pointwise quasi-Newton method for unconstrained optimal control problems*, Numer. Math., 55 (1989), pp. 159–176.

60. C. T. Kelley and J. I. Northrup, *A pointwise quasi-Newton method for integral equations*, SIAM J. Numer. Anal., 25 (1988), pp. 1138–1155.

61. C. T. Kelley, *The F_N method in finite slabs with a polynomial basis*, Trans. Th. Stat. Phys., 17 (1988), pp. 295–303.

62. T. G. Clapp, C. T. Kelley, and A. C. Eberhardt, *Development and validation of a method for approximation of road surface texture-induced contact pressure in tire/pavement interaction*, Tire Science and Technology, 16 (1988), pp. 2–17.

63. C. T. Kelley and E. W. Sachs, *Quasi-Newton methods and unconstrained optimal control problems*, SIAM J. Control and Optimization, 25 (1987), pp. 1503–1517.

64. C. T. Kelley and E. W. Sachs, *A quasi-Newton method for elliptic boundary value problems*, SIAM J. Numer. Anal., 24 (1987), pp. 516–531.

65. C. T. Kelley, *Convergence of the F_N method for multi-group transport*, Trans. Th. Stat. Phys., 15 (1986), pp. 821–828.

66. C. T. Kelley, *A Shamanskii-like acceleration scheme for nonlinear equations at singular roots*, Math. Comp., 47 (1986), pp. 609–623.

67. S. L. Hollis and C. T. Kelley, *Vector algorithms for H-equations arising in radiative transfer through inhomogeneous media*, Trans. Th. Stat. Phys., 15 (1986), pp. 33–48.

68. C. T. Kelley and T. W. Mullikin, *Why does the F_N-method work?*, Trans. Th. Stat. Phys., 14 (1985), pp. 513–526.

69. C. T. Kelley and E. W. Sachs, *Broyden's method for approximate solution of nonlinear integral equations*, J. Integral Eqs., 9 (1985), pp. 25–44.

70. D. W. Decker and C. T. Kelley, *Broyden's method for a class of problems having singular Jacobian at the root*, SIAM J. Numer. Anal., 22 (1985), pp. 566–574.

71. D. W. Decker and C. T. Kelley, *Expanded convergence domains for Newton's method at nearly singular roots*, SIAM J. Sci. Stat. Comp., 6 (1985), pp. 951–966.

72. C. T. Kelley, *Applications of the F_N method to transport calculations*, Trans. Th. Stat. Phys., 13 (1984), pp. 85–96.

73. C. T. Kelley, *Convergence of the F_N method for exponential atmospheres*, Trans. Th. Stat. Phys.,

12 (1983), pp. 183–194.

74. C. T. Kelley and R. Suresh, *A new acceleration method for Newton's method at singular points*, SIAM J. Numer. Anal., 20 (1983), pp. 1001–1009.

75. D. W. Decker and C. T. Kelley, *Sublinear convergence of the chord method at singular points*, Numer. Math., 42 (1983), pp. 147–154.

76. D. W. Decker, H. B. Keller, and C. T. Kelley, *Convergence rates for Newton's method at singular points*, SIAM J. Numer. Anal., 20 (1983), pp. 296–314.

77. C. T. Kelley, *Energy dependent radiative transfer in inhomogeneous slabs*, J. Integral Eqs., 5 (1983), pp. 33–48.

78. C. T. Kelley, *Approximate methods for the solution of the Chandrasekhar H-equation*, J. Math. Phys., 23 (1982), pp. 2097–2100.

79. C. T. Kelley, *Approximation of solutions to some quadratic integral equations in transport theory*, J. Integral Eqs., 4 (1982), pp. 221–237.

80. C. T. Kelley and T. W. Mullikin, *Collocation methods for some singular integral equations in linear transport theory*, J. Integral Eqs., 4 (1982), pp. 77–88.

81. D. W. Decker and C. T. Kelley, *Convergence acceleration for Newton's method at singular points*, SIAM J. Numer. Anal., 19 (1982), pp. 219–229.

82. C. T. Kelley, *Approximate methods for exit distribution problems in inhomogeneous slabs*, Progress in Nuclear Energy, 8 (1981), pp. 227–234.

83. C. T. Kelley, *Multi-group neutron transport in inhomogeneous slabs*, J. Integral Eqs., 3 (1981), pp. 261–275.

84. C. E. Siewert, C. T. Kelley, and R. D. M. Garcia, *An analytical expression for the H-matrix relevant to Rayleigh scattering*, J. Math. Anal. Appl., 84 (1981), pp. 509–518.

85. C. T. Kelley, *A note on the approximation of functions of several variables by sums of functions of one variable*, J. Approx. Th., 33 (1981), pp. 179–189.

86. C. T. Kelley, *Solution of the Chandrasekhar H-equation by Newton's method*, J. Math. Phys., 21 (1980), pp. 1625–1628.

87. C. E. Siewert and C. T. Kelley, *An analytical solution to a matrix Riemann-Hilbert problem*, ZAMP, 31 (1980), pp. 344–351.

88. D. W. Decker and C. T. Kelley, *Newton's method at singular points II*, SIAM J. Numer. Anal., 17 (1980), pp. 465–471.

89. D. W. Decker and C. T. Kelley, *Newton's method at singular points I*, SIAM J. Numer. Anal., 17 (1980), pp. 66–70.

90. C. T. Kelley, *The Chandrasekhar H-equation for radiative transfer through inhomogeneous media*, J. Integral Eqs., 2 (1980), pp. 155–170.

91. C. T. Kelley, *A comparison of iteration schemes for Chandrasekhar H-equations in multigroup neutron transport*, J. Math. Phys., 21 (1980), pp. 408–409.

92. M. A. Berger and C. T. Kelley, *A variational equivalent to diagonal scaling*, J. Math. Anal. Appl., 72 (1979), pp. 291–304.

93. C. T. Kelley, *Solution of H-equations by iteration*, SIAM J. Math. Anal., 10 (1979), pp. 844–849.

94. C. T. Kelley, *Operator-valued Chandrasekhar H-functions*, J. Math. Anal. Appl., 70 (1979),

pp. 579–588.

95. C. T. Kelley and T. W. Mullikin, *Solution by iteration of H-equations in multigroup neutron transport*, J. Math. Phys., 19 (1978), pp. 500–501.

96. C. T. Kelley, *Analytic continuation of an operator-valued H-function with applications to neutron transport theory*, J. Math. Phys., 19 (1978), pp. 494–499.

97. C. T. Kelley, *Convolution and H-equations for operator-valued functions with applications to neutron transport theory*, J. Math. Phys., 18 (1977), pp. 764–769.

Articles in Conference Proceedings

1. M. S. Lasater, C. T. Kelley, A. Salinger, D. L. Woolard, and P. Zhao, *Parallel solution of the Wigner-Poisson equations for RTDs*, in 2004 International Symposium on Distributed Computing and Applications to Business, Engineering and Science, Q. Qingping, ed., Wuhan, China, 2004, Hubei Science and Technology Press, pp. 672–676.

2. K. R. Fowler, C. T. Kelley, C. E. Kees, and C. T. Miller, *A hydraulic capture application for optimal remeidation design*, in Proceedings of Computational Methods in Water Resources XV, C. T. Miller, , M. W. Farthing, W. G. Gray, and G. F. Pinter, eds., Amsterdam, 2004, Elsevier, pp. 1149–1158.

3. C. T. Kelley, K. R. Fowler, and C. E. Kees, *Simulation of nondifferentiable models for groundwater flow and transport*, in Proceedings of Computational Methods in Water Resources XV, C. T. Miller, , M. W. Farthing, W. G. Gray, and G. F. Pinter, eds., Amsterdam, 2004, Elsevier, pp. 939–952.

4. M. S. Lasater, C. T. Kelley, P. Zhao, and D. L. Woolard, *Numerical tools for the study of instabilities within the positive-differential-resistance regions of tunnelling devices*, in Proceedings of 2003 3nd IEEE Conference on Nanotechnology, San Francisco, CA, August 12–14, 2003, IEEE, 2003, pp. 390–393.

5. C. T. Kelley, *Implicit filtering and nonlinear least squares problems*, in System Modeling and Optimization XX, E. W. Sachs and R. Tichatschke, eds., Dordrecht, 2003, Kluwer Academic Publishers, pp. 71–90.

6. C. T. Kelley, D. L. Woolard, P. Zhao, M. Kerr, and M. S. Lasater, *Parallel-platform based numerical simulation of instabilities in nanoscale tunneling devices*, in Proceedings of 2002 2nd IEEE Conference on Nanotechnology, Washington DC, August 26-28, 2002, IEEE, 2002, pp. 417–421.

7. C. T. Miller, M. W. Farthing, C. E. Kees, and C. T. Kelley, *Higher order, locally conservative, temporal integration methods for multiphase flow in porous media*, in Computational Methods in Water Resources XIV, Vol. 1, S. M. Hassanizadeh, R. J. Schotting, W. G. Gray, and G. F. Pinder, eds., Amsterdam, 2002, Elsevier, pp. 249–256.

8. K. R. Kavanagh, C. T. Kelley, R. C. Berger, J. P. Hallberg, and S. E. Howington, *Nonsmooth nonlinearities and temporal integration of Richards' equation*, in Computational Methods in Water Resources XIV, Vol. 2, S. M. Hassanizadeh, R. J. Schotting, W. G. Gray, and G. F. Pinder, eds., Amsterdam, 2002, Elsevier, pp. 947–954.

9. E. W. Jenkins, R. C. Berger, J. P. Hallberg, S. E. Howington, C. T. Kelley, J. H. Schmidt, A. Stagg, and M. D. Tocci, *A two-level aggregation-based Newton-Krylov-Schwarz method for hydrology*, in Parallel Computational Fluid Dynamics 1999, D. E. Keyes, A. Ecer, J. Periaux, and N. Satofuka, eds., North Holland, 2000, pp. 257–264.

10. S. E. Howington, R. C. Berger, J. P. Hallberg, J. F. Peters, A. K. Stagg, E. W.

Jenkins, and C. T. Kelley. *A model to simulate the interaction between groundwater and surface water*, 1999. Proceedings of the High Performance Computing Users' Group Meeting, Monterrey, CA, June 7–10.

11. D. M. Bortz and C. T. Kelley, *The simplex gradient and noisy optimization problems*, in Computational Methods in Optimal Design and Control, J. T. Borggaard, J. Burns, E. Cliff, and S. Schreck, eds., volume 24 of *Progress in Systems and Control Theory*, Birkhäuser, Boston, 1998, pp. 77–90.

12. C. T. Miller, G. A. Williams, and C. T. Kelley, *Efficient and robust numerical modeling of variably saturated flow in layered porous media*, in XII Conference on Computational Methods in Water Resources, Crete, Greece, V. Burganos, G. Karatzas, A. Payatakes, C. Brebbia, W. Gray, and G. Pinder, eds., volume 1, 1998, pp. 151–158.

13. S. L. Campbell, C. T. Kelley, and K. D. Yeomans, *Consistent initial conditions for unstructured higher index DAEs: A computational study*, in Proceedings of Conference on Computational Engineering in Systems Applications (CESA'96), Lille, France, 1996, pp. 416–421.

14. J. W. David, C. T. Kelley, and C. Y. Cheng. *Use of an implicit filtering algorithm for mechanical system parameter identification*, 1996. SAE Paper 960358, 1996 SAE International Congress and Exposition Conference Proceedings, Modeling of CI and SI Engines, pp. 189–194, Society of Automotive Engineers, Washington, DC.

15. P. Gilmore, C. T. Kelley, C. T. Miller, and G. A. Williams, *Implicit filtering and optimal design problems: Proceedings of the workshop on optimal design and control, Blacksburg VA, April 8–9, 1994*, in Optimal Design and Control, J. Borggaard, J. Burkhardt, M. Gunzburger, and J. Peterson, eds., volume 19 of *Progress in Systems and Control Theory*, Birkhäuser, Boston, 1995, pp. 159–176.

16. S. F. Ashby, C. T. Kelley, P. E. Saylor, and J. S. Scroggs, *Preconditioning via asymptotically-defined domain decomposition*, in Proceedings of the Seventh International Conference on Domain Decomposition Methods in Science and Engineering, D. Keyes and J. Xu, eds., volume 180 of *AMS Contemporary Mathematics*, Providence, 1994, AMS, pp. 139–150.

17. C. T. Miller and C. T. Kelley, *A comparison of strongly convergent solution schemes for sharp front infiltration problems*, in Computational Methods in Water Resources X, Vol. 1, A. Peters, G. Wittum, B. Herrling, U. Meissner, C. Brebbia, W. Gray, and G. Pinder, eds., Kluwer Academic Publishers, 1994, pp. 325–332.

18. C. T. Kelley, *Identification of the support of nonsmoothness*, in Large Scale Optimization: State of the Art, W. W. Hager, D. W. Hearn, and P. Pardalos, eds., Boston, 1994, Kluwer Academic Publishers B.V., pp. 192–205.

19. A. S. Morris, R. J. Trew, C. T. Kelley, and G. J. Hayes, *A non-quasi-static modular model for HBTs*, in Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Devices and Circuits, IEEE, 1993, pp. 440–447.

20. D. L. Woolard, R. J. Trew, M. A. Littlejohn, and C. T. Kelley, *A study of electron transit-time in ballistic diodes using a multi-valley hydrodynamic transport model*, in Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Devices and Circuits, IEEE, 1991, pp. 131–140.

21. D. E. Stoneking, G. L. Bilbro, R. J. Trew, P. Gilmore, and C. T. Kelley, *Yield optimization using a GaAs process simulator coupled to a physical device model*, in Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Devices and Circuits, IEEE, 1991, pp. 374–383.

22. T. A. Winslow, R. J. Trew, P. Gilmore, and C. T. Kelley, *Simulated performance optimization of GaAs MESFET amplifiers*, in Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Devices and Circuits, IEEE, 1991, pp. 393–402.

23. T. A. Winslow, R. J. Trew, P. Gilmore, and C. T. Kelley, *Doping profiles for optimum class B performance of GaAs mesfet amplifiers*, in Proceedings IEEE/Cornell Conference on Advanced Concepts in High Speed Devices and Circuits, IEEE, 1991, pp. 188–197.

24. C. T. Kelley, *Operator prolongation methods for nonlinear equations*, in Computational Solution of Nonlinear Systems of Equations, E. L. Allgower and K. Georg, eds., volume 26 of *AMS Lectures in Applied Mathematics*, American Mathematical Society, Providence, RI, 1990, pp. 359–388.

25. D. M. Hwang and C. T. Kelley, *Sequential quadratic programming for parameter identification problems*, in Proceedings of the IFAC Symposium on Control of Distributed Parameter Systems, A. E. Jai and M. Amouroux, eds., International Federation of Automatic Control, 1989, pp. 105–109.

26. C. T. Kelley and J. I. Northrup, *Pointwise quasi-Newton methods and some applications*, in Distributed Parameter Systems, F. Kappel, K. Kunisch, and W. Schappacher, eds., New York, 1987, Springer-Verlag, pp. 167–180.

27. C. T. Kelley and E. W. Sachs, *Applications of quasi-Newton methods to pseudoparabolic control problems*, in Optimal Control of Partial Differential Equations II - Theory and Applications, May, 1986, Basel, 1987, Birkhäuser.

28. C. T. Kelley, *Algorithm design on microcomputers: Iterative methods for problems with singular Jacobian*, in New Computing Environments: Microcomputers in Large-Scale Computing, A. Wouk, ed., Philadelphia, 1987, SIAM, pp. 13–25.

29. T. G. Clapp, C. T. Kelley, and A. C. Eberhardt, *Analytical determination of normal contact stresses for arbitrary geometries with application to the tire/pavement interaction mechanism*, in Measuring Road Roughness and its Effects on User Cost and Comfort, T. D. Gillespie and M. Sayers, eds., Baltimore, 1985, American Society for Testing and Materials, pp. 162–178.

Articles Awaiting Publication

1. M. S. Lasater, C. T. Kelley, A. Salinger, D. L. Woolard, and P. Zhao. *Enhancement of numerical computations of the Wigner-Poisson equations for application to the simulation of THz-frequency RTD oscillators*. Technical Report CRSC-TR04-XX, North Carolina State University, Center for Research in Scientific Computation, 2004. To appear in Proceedings of Optics East 2004.

Articles Submitted for Publication

1. D. E. Finkel and C. T. Kelley. *An adaptive restart implementation of DIRECT*. Technical Report CRSC-TR04-30, North Carolina State University, Center for Research in Scientific Computation, August 2004.

2. D. E. Finkel and C. T. Kelley. *Convergence analysis of the DIRECT algorithm*. Technical Report CRSC-TR04-28, North Carolina State University, Center for Research in Scientific Computation, July 2004.

3. C. T. Kelley, I. G. Kevrekidis, and L. Qiao. *Newton-Krylov solvers for time-steppers*. Technical Report CRSC-TR04-10, North Carolina State University, Center for Research in Scientific Computation, March, 2004.

4. K. R. Fowler and C. T. Kelley. *Pseudo-transient continuation for nonsmooth nonlinear equations*. Technical Report CRSC-TR03-29, North Carolina State University, Center for Research in Scientific Computation, July, 2003.

Invited Addresses

1. **Continuation algorithms for parameter dependent compact fixed point problems**, November 8, 2004. Duke University, Durham, NC.
2. **Sampling methods for optimization**, October 20, 2004. OR Department, Univeristy of North Carolina, Chapel Hill, NC.
3. **Solution of the Wigner-Poisson equations for RTDs**, September 15, 2004. 2004 International Symposium on Distributed Computing and Applications to Business, Engineering, and Science, Session on Distributed Applications in Engineering, Wuhan, China.
4. **Implicit methods for reactive transport**, July 14, 2004. SIAM 2004 Annual Meeting, Minisymposium on Transitioning Nonlinear, Time-dependent Codes From Explicit to Implicit Formulations.
5. **Continuation algorithms for parameter dependent compact fixed point problems**, July 1, 2004. The Boeing Company, Seattle, WA.
6. **Continuation algorithms for parameter dependent compact fixed point problems**, June 22 2004. Sandia National Laboratory, Livermore CA.
7. **Simulation of nondifferentiable models for groundwater flow and transport**, June 14, 2004. Computational Methods in Water Resources 2004 International Conference, Chapel Hill, North Carolina.
8. **Continuation algorithms for parameter dependent compact fixed point problems**, April 8, 2004. Columbia University, New York, NY.
9. **Pseudo-transient continuation for nonsmooth nonlinear equations**, September 20, 2003. Conference on Perspectives on Nonlinear Equations and Optimization, in honor of Homer Walker's 60th birthday, Worcester, MA.
10. **Design of groundwater remediation systems with sampling methods**, August 18-22, 2003. special session on PDE-Constrained Optimization, 18th International Symposium on Mathematical Programming, Copenhagen, Denmark.
11. **Pseudo-transient continuation for nonsmooth nonlinear equations**, July , 2003. Workshop on Solution Methods for Large Scale Nonlinear Problems, Livermore, CA.
12. **Design of groundwater remediation systems with sampling methods**, April 1, 2003. Numerical Analysis Seminar, Computer Science Department, University of Maryland, College Park, MD.
13. **Pseudo-transient continuation**, May 5 2003. Center for the Advanced Engineering of Fibers and Films, Clemson University, Clemson, SC.
14. **Design of groundwater remediation systems with implicit filtering**, Feb, 2003. Numerical Techniques for Optimization Problems with PDE Constraints, Oberwolfach, Germany.
15. **Design of groundwater remediation systems with implicit filtering**, Jan 21, 2003. The Boeing Company, Seattle, WA.
16. **Sampling methods and implicit filtering**, October 23, 2002. Stevens Institute of Technology, Hoboken, NJ.
17. **Optimal design using sampling methods**, August 19, 2002. Second International Workshop on Optimization and Control with Applications, Tunxi, China.
18. **Temporal integration for subsurface flow problems**, June 28–28, 2002. XIV International Conference on Computational Methods in Water Resources, Session on Mathematical and Numerical Modeling for Subsurface and Surface Problems, Delft, The Netherlands.
19. **Algorithmic decisions in implicit filtering**, June 24, 2002. Department of Statistics, Probability and Operations Research, Delft University of Technology, Delft, The Netherlands.
20. **Optimal design using sampling methods**, May 20-23, 2002. SIAM 7th Conference on Optimization, Toronto, Canada.
21. **Algorithmic decisions in implicit filtering**, May 16–17 2002. Second Workshop on Nonlinear Optimization: Theoretical Aspects of Surrogate Optimization, Center for Mathematics - University of Coimbra, Coimbra, Portugal.
22. **Fast algorithms for the Ornstein-Zernike equations**, April 12 2002. Courant Institute, New York, NY.
23. **Fast algorithms for the Ornstein-Zernike equations**, February 19, 2002. Latsis-Symposium

2002, Iterative Solvers for Large Linear Systems, Switzerland.

24. **Globally convergent algorithms for nonsmooth nonlinear equations in computational fluid dynamics**, October 12, 2001. International Conference on Recent Advances in Computational Mathematics, Matsuyama, Japan.
25. **Theory and applications of implicit filtering**, July 25, 2001. 20th International Federation of Information Processing TC7 Conference on System Modelling and Optimization, Trier, Germany.
26. **Domain decomposition methods for unsaturated flow simulations**, February 8, 2001. Universität Trier, Mathematics Department, Trier, Germany.
27. **Fast algorithms for compact fixed point problems**, January 23, 2001. Texas Institute for Computational and Applied Mathematics, Austin, TX.
28. **Temporal integration for unsaturated flow problems**, January 23, 2001. Center for Subsurface Modeling, University of Texas, Austin, TX.
29. **Implicit filtering and applications**, October 27, 2000. First Sino-Japan Optimization Meeting, Hong Kong, China.
30. **Domain decomposition methods for unsaturated flow simulations**, August 15, 2000. University of Houston, Houston, TX.
31. **An integro-partial-differential-algebraic equation for powder consolodation**, July 27, 2000. Workshop on Solution Methods for Large Scale Nonlinear Problems, Pleasanton, CA.
32. **Implicit filtering and applications**, April 25, 2000. Sandia National Laboratory, Livermore, CA.
33. **Optimization of noisy functions and the implicit filtering algorithm**, March 18, 2000. University of the Philippines, Quezon City, Philippines.
34. **Optimization of noisy functions and the implicit filtering algorithm**, February 21, 2000. Rice University, Houston, TX.
35. **Nonsmooth nonlinearities and 3D groundwater flow simulations**, October 15, 1999. Courant Institute, New York, NY.
36. **Nonlinear solvers and preconditioners in groundwater flow simulations**, October 4 1999. Lawrence Livermore National Laboratory, Livermore, CA.
37. **Nonlinear solvers and preconditioners in groundwater flow simulations**, September 28 1999. Workshop on Parallel Algorithms, U.S. Army Engineer Research and Development Center, Vicksburg MS.
38. **Convergence behavior for Krylov space linear solvers: Examples and applications**, July 6, 1999. Minisymposium on Analysis of Iterative Methods for Linear Equations and Spectrum, International Conference on Industrial and Applied Mathematics, Edinburgh, Scotland.
39. **Implicit filtering: Theory and implementation**, May 26, 1999. City University of Hong Kong, Hong Kong, China.
40. **Nonlinear solvers and preconditioners in groundwater flow simulations**, May 24, 1999. Chinese University of Hong Kong, Hong Kong, China.
41. **Sampling methods that approximate gradients**, May 21, 1999. City University of Hong Kong, Hong Kong, China.
42. **Direct search methods and approximate gradients**, May 10, 1999. Minisymposium on Recent Advances in Direct Search Methods, SIAM Conference on Optimization, Atlanta, GA.
43. **Noisy optimization problems: Applications and methods**, December 20, 1998. International Mathematics Conference and Annual Meeting of the Taiwan Math Society, National Taiwan Normal University, Taipei, Taiwan.
44. **Sampling methods that approximate gradients**, December 21, 1998. National Chiao Tung University, Hsin-Chu, Taiwan.
45. **Multilevel methods for conductive-radiative heat transfer**, November 6, 1998. University of North Carolina Applied Mathematics Seminar.
46. **Sampling methods that approximate gradients**, October 27 1998. Invited Session on Search Algorithms, INFORMS Fall Meeting, Seattle, WA.
47. **Implicit Filtering and Quadratic Models**, February 19, 1998. Approximate Models Workshop, Rice University, Houston, TX.
48. **Convergence Analysis of Pseudo-Transient Continuation**, October 31, 1997. Department of Mathematics Colloquium, Worcester Polytechnic Institute, Worcester, MA.

49. **The Simplex Gradient and Algorithms for Noisy Optimization Problems**, October 3, 1997. AFOSR Workshop on Optimal Design and Control, Crystal City, Maryland.
50. **Detection and Remediation of Stagnation in the Nelder-Mead Algorithm Using a Sufficient Decrease Condition**, April 29, 1997. Graduiertenkolleg Mathematische Optimierung, Universität Trier, Trier, Germany.
51. **Nonlinear Equations: Applications, Algorithms, Software**, Mar 17, 1997. A one day short course given at Sommerschule über Nichtlineare Gleichungssysteme, Hamburg, Germany.
52. **Linear Compact Fixed Point Problems**, July 29, 1996. First of a series of three talks on modern numerical methods for compact fixed point problems, National Chiao Tung University, Hsin-Chu, Taiwan.
53. **Nonlinear Problems**, July 31, 1996. Second of a series of three talks on modern numerical methods for compact fixed point problems, National Chiao Tung University, Hsin-Chu, Taiwan.
54. **Applications**, July 31, 1996. Third of a series of three talks on modern numerical methods for compact fixed point problems, National Chiao Tung University, Hsin-Chu, Taiwan.
55. **Trust Region Methods for Boundary Control Problems**, July, 14–20 1996. International Conference on Control and Estimation of Distributed Parameter Systems, Vorau, Austria.
56. **Design of Automotive Valve Trains with Implicit Filtering**, May 20, 1996. Mininisymposium on Multidisciplinary Design Optimization, SIAM Conference on Optimization, Victoria, BC, Canada.
57. **Solution of the Pressure Head Form of Richards' Equation by the Method of Lines**, September 14, 1995. DOE Workshop on Iterative Methods for Large Scale Nonlinear Problems, Logan, Utah.
58. **Solution of Noisy Paramater ID Problems with Implicit Filtering**, July 17, 1995. IMA Summer program on Large Scale Optimization, IMA, Minneapolis, MN.
59. **Superlinear Convergence of GMRES**, July 3, 1995. Graduiertenkolleg Mathematische Optimierung, Universität Trier, Trier, Germany.
60. **Linear and Nonlinear Solvers for Codes for Flow in Porous Media**, March 29, 1995. Department of Environmental Sciences and Engineering, University of North Carolina, Chapel Hill, NC.
61. **Implicit Filtering and Noisy Optimization Problems**, November 15 1994. ICASE, NASA Langley Research Center, Hampton, VA.
62. **Implicit Filtering and Noisy Optimization Problems**, October 25, 1994. IFIP/WG 2.5: Workshop on Current Issues in Numerical Software, Raleigh, NC.
63. **Implicit filtering and noisy optimal design problems**, August 16, 1994. Minisymposium on Useful Nonstandard Methods: 15th International Symposium on Mathematical Programming, Ann Arbor, Michigan.
64. **Implicit Filtering and Noisy Optimal Design Problems**, April 9, 1994. Workshop on Optimal Design, Blacksburg VA.
65. **Implicit Filtering Methods for Noisy Optimization Problems**, January 26, 1994. University of North Carolina at Wilmington.
66. **Multilevel Source Iteration Accelerators for the Linear Transport Equation in Slab Geometry**, October 28, 1993. Argonne National Laboratory.
67. **Multilevel source iteration accelerators for the linear transport equation in slab geometry**, August 5, 1993. Lawrence Livermore National Laboratory.
68. **Identification of the Support of Nonsmoothness**, February 16, 1993. Conference on Large Scale Optimization, Gainesville, FL.
69. **Multilevel Projected Newton-like Algorithms for Optimal Control Problems**, September 18, 1992. Minisymposium on Numerical Methods in Optimal Control, SIAM Conference on Control and its Applications, Minneapolis, Minnesota.
70. **Iterative Methods for Compact Fixed Point Problems**, July 23, 1992. Minisymposium on Iterative methods for large-scale nonlinear systems, SIAM National Meeting, Los Angeles, California.
71. **Nonlinear Problems in Computer Aided Design for Microwave Devices**, June 15, 1992. Universität Trier, Trier, Germany.
72. **Nondifferentiable Optimization in Competitive Systems**, November 4, 1991. Special session

on nonlinear programming, ORSA/TIMS National Meeting, Anaheim, California.

73. **Fast Algorithms for Compact Fixed Point Problems**, September 10, 1991. 16. Symposium on Operations Research, Universität Trier, Trier, Germany.
74. **Adaptive Multilevel Methods for Compact Fixed Point Problems**, July 9, 1991. Minisymposium on Parallel Computing and Optimization, International Conference on Industrial and Applied Mathematics, Washington, D. C.
75. **Fast Algorithms for Nonsmooth Compact Fixed Point Problems**, June 10, 1991. Universität Trier, Trier, Germany.
76. **Pointwise quasi-Newton Methods for Control**, May 14, 1991. Special session on nonlinear programming, ORSA/TIMS National Meeting, Nashville, Tennessee.
77. **Convergence Properties of Broyden's Method in Infinite Dimensional Spaces**, January 28, 1991. Rice University, Houston, Texas.
78. **Pointwise Quasi-Newton Methods for Optimal Control Problems**, November 7, 1990. Second SIAM Conference on Linear Algebra, Signals, Systems, and Control, Minisymposium on Numerical Aspects of Optimal Control, San Francisco, CA.
79. **Convergence Properties of Broyden's Method in Infinite Dimensional Spaces**, November 2, 1990. Colorado State University, Fort Collins, CO.
80. **Secant methods in Banach Spaces**, October 30, 1990. Special session on nonlinear programming, ORSA/TIMS National Meeting, Philadelphia, PA.
81. **Convergence Properties of Broyden's Method in Infinite Dimensional Spaces**, September 10, 1990. Institute of Statistical Mathematics, Tokyo, Japan.
82. **Convergence Properties of Broyden's Method in Infinite Dimensional Spaces**, September 7, 1990. Kyoto University, Kyoto, Japan.
83. **Convergence Properties of Broyden's Method in Infinite Dimensional Spaces**, September 5, 1990. Kyushu University, Fukuoka, Japan.
84. **Fast Algorithms for Compact Fixed Point Problems**, September 1, 1990. International Symposium on Computational Mathematics, Ehime University, Matsuyama, Japan.
85. **Fast Quasi-Newton Methods for Control**, July 17, 1990. SIAM Annual Meeting, Minisymposium on Numerical Methods in Control, Chicago, IL.
86. **Superlinear Convergence Results for Broyden's Method for Nonlinear Equations in Banach Spaces**, June 1, 1990. Universität Trier, Trier, Germany.
87. **Mesh Independent, Globally Convergent Algorithms for Noninear Equations in Banach Spaces**, October 16, 1989. Special session on nonlinear programming, ORSA/TIMS National Meeting, New York, NY.
88. **Fast Newton-like Methods for Control Problems**, August 28, 1989. DOE Miniconference on Newton-like Methods for Large Scale Nonlinear Systems, Logan, Utah.
89. **Sequential Quadratic Programming for Parameter Identification Problems**, June 26, 1989. 5th IFAC Symposium on Control of Distributed Parameter Systems, Perpignan, France.
90. **Fast Newton-like Methods for Control Problems**, June 22, 1989. International Conference on Numerical Methods in Optimization and Optimal Control, Trier, Germany.
91. **Fast Algorithms for Nonlinear Integral Equations**, June 19, 1989. Universität Trier, Mathematics Department, Trier, Germany.
92. **Fast Algorithms for Integral Equations in Transport Theory**, May 22, 1989. 11th International Conference on Transport Theory, Blacksburg, VA.
93. **Quasi-Newton Methods in Function Spaces**, May 12, 1989. Courant Institute, New York, NY.
94. **Fast Algorithms for Nonlinear Integral Equations**, April 13, 1989. Worcester Polytechnic Institute, Worcester, MA.
95. **Fast Algorithms for Nonlinear Integral Equations**, April 4, 1989. SIAM Conference on Optimization, Minisymposium on Infinite Dimensional Problems, Boston, MA.
96. **Fast Algorithms for Some Boundary Control Problems**, November 11, 1988. Virginia Polytechnic Institute and State University, Blacksburg, VA.
97. **Operator Prolongation Methods for Nonlinear Equations**, July 21, 1988. AMS-SIAM Summer Seminar in Applied Mathematics, Computational Solution of Nonlinear Systems of Equations.
98. **Newton-like Methods in Banach Spaces**, February 9, 1988. Center for Applied Mathematics,

Purdue University.

99. **Newton-like Methods in Banach Spaces**, October 24, 1987. Combined Midwest-Southeast Differential Equations Conference, Vanderbilt University, Nashville, TN.
100. **Pointwise Quasi-Newton Methods for Integral Equations**, June 24, 1987. Workshop on Algorithmic Methods in Optimal Control and Parameter Identification, Universität Trier, Trier, Germany.
101. **The F_N method in Slab Geometries with Polynomial Basis**, March 25, 1987. Tenth International Conference on Transport Theory, La Jolla, CA.
102. **Pointwise Quasi-Newton Methods and Some Applications**, July 11, 1986. International Conference on Control of Distributed Parameter Systems, Vorau, Austria.
103. **Pointwise Quasi-Newton Methods**, March 19, 1986. Southern Methodist University, Dallas, Texas.
104. **Pointwise Quasi-Newton Methods**, March 17, 1986. Rice University, Houston, Texas.
105. **The F_N Method and the Singular Value Decomposition**, June 13, 1985. Ninth International Conference on Transport Theory, 6/13/85, Montecatini Terme, Italy.
106. **Algorithm Design on Microcomputers: Iterative Methods for Problems with Singular Jacobian**, May 21, 1985. ARO Workshop on Microcomputers in Large Scale Scientific Computation, Newark, Delaware.
107. **Applications of the F_N Method to Transport Calculations**, May 1983. Eighth International Conference on Transport Theory, Blacksburg, Virginia.
108. **Newton's Method at Singular Points**, April 18, 1981. Old Dominion University, Norfolk, VA.
109. **Approximate Methods for Exit Distribution Problems in Inhomogeneous Slabs**, May 1981. Seventh International Conference on Transport Theory, Lubbock, Texas.
110. **Newton's Method at Singular Points**, May 15, 1980. Georgia Institute of Technology, Atlanta, GA.
111. **Solution of H-equations by Iteration**, April 1979. Sixth International Conference on Transport Theory, Tuscon, Arizona.