JOHN B. BELL

Mail Stop 50A-1148
Lawrence Berkeley National Laboratory
Berkeley, CA 94720
JBBell@lbl.gov
510-486-5391

EDUCATION

Cornell University Ph.D. in Mathematics, 1979.

Cornell University M.S. in Mathematics, 1977.

Massachusetts Institute of Technology B.S. in Mathematics, 1975.

WORK EXPERIENCE

Lawrence Berkeley National Laboratory. March 1996 - present.
Group Leader of the Center for Computational Sciences and Engineering.

Lawrence Livermore National Laboratory. November 1993 - March 1996.
Director of the Center for Computational Sciences and Engineering.

Lawrence Livermore National Laboratory. July 1986 - October 1993.
Group Leader of the Applied Mathematics Group. (Staff scientist until August 1988).

Exxon Production Research Company. March 1982 - June 1986.
Research Specialist and Group Leader of the Applied Mathematics Group in the Long Range Research Division.

Naval Surface Weapons Center. September 1979 - March 1982.
Research Mathematician in the Mathematical Analysis Branch.

PROFESSIONAL SERVICE

Chair, AMS von Neumann Symposium, July 2011.
Member, NAS Combustion Infrastructure Study, December 2008 – December 2011.
Member, SIAM Financial Management Committee, January 2008 – present.
Chair, SIAM Activity Group in Computational Science and Engineering, Jan.1, 2007 - Dec. 31, 2008.
Managing editor, Comm. in Applied Mathematics and Computational Science, June 1, 2005 - present.
Co-Chair, SIAM Annual Meeting, July 2004.
Editor, SIAM Review, July 1994 - December 1997.
Editor, Journal of Computational Physics, April 1990 - September 1991.
Chairman, 1988 Gordon Research Conference on Modeling of Flow in Permeable Media.
Vice-chairman, 1986 Gordon Research Conference on Modeling of Flow in Permeable Media.

RECENT AWARDS AND HONORS

Fellow, Society of Industrial and Applied Mathematics, April 2009.
Sidney Fernbach Award, Nov. 2005.
SIAM/ACM Prize in Computational Science and Engineering, July 2003.

PUBLICATIONS

1. W. Zhang, L. Howell, A. Almgren, A. Burrows, and J. Bell "CASTRO: A New Compressible Astrophysical Solver. II. Gray Radiation Hydrodynamics", submitted for publication.

2. A.S. Almgren, A.J. Aspden, J. B. Bell, and M. L. Minion, "On the Use of Higher-Order Projection Methods for Incompressible Turbulent Flow", submitted for publication.

3. A. Donev, A. de la Fuente, J. B. Bell, and A. L. Garcia, "Enhancement of Diffusive Transport by Nonequilibrium Thermal Fluctuations", accepted for publication in J. Stat. Mech.

4. A. Donev, A. de la Fuente, J. B. Bell, and A. L. Garcia, "Diffusive Transport by Thermal Velocity Fluctuations", Physical Review Letters, 106, 204501 (2011).

5. M. Zingale, A. Nonaka, A. S. Almgren, J. B. Bell, C. M. Malone, and S. E. Woosley, "The Convective Phase Preceding Type Ia Supernovae", submitted for publication.

6. M. Day, S. Tachibana, J. Bell, M. Lijewski, V. Beckner and R. Cheng, "A combined computational and experimental characterization of lean premixed turbulent low swirl laboratory flames. I. Methane flames.", submitted for publication.

7. G. S. H. Pau, J. B. Bell, A. S. Almgren, K. M. Fagnan and M. J. Lijewski, "An Adaptive Mesh Refinement Algorithm for Compressible Two-Phase Flow In Porous Media", submitted for publication.

8. A. Nonaka, S. May, A. S. Almgren, and J. B. Bell, "A Three-Dimensional, Unsplit Godunov Method for Scalar Conservation Laws", accepted for publication in SIAM Journal on Scientific Computing.

9. K. Balakrishnan, A. Kuhl, J. Bell, and V. Beckner , "An Empirical Model for the Ignition of Aluminum Particle Clouds Behind Blast Waves", 23^rd International Colloquium on the Dynamics of Explosions and Reactive Systems, July 24–29, 2011.

10. K. Balakrishnan, A. Kuhl, J. Bell, and V. Beckner , "Ignition of Aluminum Particle Clouds Behind Reflected Shock Waves", 23^rd International Colloquium on the Dynamics of Explosions and Reactive Systems, July 24–29, 2011.

11. A. Kuhl and J. Bell, "Spherical Combustion Clouds in Explosions", 23^rd International Colloquium on the Dynamics of Explosions and Reactive Systems, July 24–29, 2011.

12. S. May, A. Nonaka, A. S. Almgren, and J. B. Bell, "An Unsplit, Higher Order Godunov Method Using Quadratic Reconstruction for Advection in Two Dimensions", accepted for publication in Communications in Applied Mathematics and Computational Science.

13. A. J. Aspden, M. S. Day, and J. B. Bell, "Turbulence-flame interaction in lean premixed hydrogen", accepted for publication in the Journal of Fluid Mechanics.

14. A. J. Aspden, J. B. Bell, and S. E. Woosley, "Turbulent Oxygen Flames in Type Ia Supernovae", Astrophysical Journal, 730, 144-151, (2011).

15. C. M. Malone, A. Nonaka, A. S. Almgren, J. B. Bell, and M. Zingale, "Multidimensional Modeling of Type I X-ray Bursts. I. Two-Dimensional Convection Prior to the Outburst of a pure ^{4}He Accretor", Astrophysical Journal, 728, 118, Feb. 2011.

16. J. Nordhaus, A. Burrows, A. Almgren, and J. Bell, ""Dimension as a Key to the Neutrino Mechanism of Core-Collapse Supernova Explosions," Astrophysical Journal, 720, 694, Sept. 2010.

17. J. B. Bell, M. S. Day, X. Gao, M. J. Lijewski, "Simulation of Nitrogen Emissions in a Low Swirl Burner," SciDAC 2010, Chattanooga, Tennessee, July 2010.

18. A. Almgren, J. Bell, D. Kasen, M. Lijewski, A. Nonaka, P. Nugent, C. Rendleman, R. Thomas, M. Zingale, "MAESTRO, CASTRO and SEDONA – Petascale Codes for Astrophysical Applications," SciDAC 2010, Chattanooga, Tennessee, July 2010.

19. H. Ma, M. Zingale, S. E. Woosley, A. J. Aspden, J. B. Bell, A. S. Almgren, A. Nonaka, and S. Dong, "Type Ia Supernovae: Advances in Large Scale Simulation," SciDAC 2010, J. of Physics: Conference Series, Chattanooga, Tennessee, July 2010.

20. A. S. Almgren, V.E. Beckner, J.B. Bell, M.S. Day, L.H. Howell, C.C. Joggerst, M.J. Lijewski, A. Nonaka, M. Singer, M. Zingale, "CASTRO: A New Compressible Astrophysical Solver. I. Hydrodynamics and Self-Gravity", Astrophysical Journal, 715, 1221-1238, 2010.

21. A. Nonaka, A.S. Almgren, J. B. Bell, M. J. Lijewski, C. M. Malone, and M. Zingale, "MAESTRO: An Adaptive Low Mach Number Hydrodynamics Algorithm for Stellar Flows", Astrophysical Journal Supplement Series, 188, 358-383, 2010.

22. G. S. H. Pau, J. B. Bell, K. Pruess, A. S. Almgren, M. J. Lijewski, K. Zhang, "High resolution simulation and characterization of density-driven flow in CO2 storage in saline aquifers", Advances in Water Resources, 33(4), 443-455, 2010.

23. A. Donev, J. B. Bell, A. L. Garcia, and B. J. Alder, "A hybrid particle-continuum method for hydrodynamics of complex fluids", SIAM J. Multiscale Modeling and Simulation, 8(3), 871-911, 2010.

24. A. J. Aspden, M. S. Day, and J. B. Bell, "Characterization of Low Lewis Number Flames", Proceedings of the Combustion Institute, 33, 1463-1471, 2011.

25. A. J. Aspden, M. S. Day, and J. B. Bell, "Lewis Number Effects in Distributed Flames", Proceedings of the Combustion Institute, 33, 1473-1480, 2011.

26. M. S. Day, J. B. Bell, X. Gao and P. Glarborg "Numerical Simulation of Nitrogen Oxide Formation in Lean Premixed Turbulent Flames", Proceedings of the Combustion Institute, 33, 1591-1599, 2011.

27. A. L. Kuhl, J. B. Bell, V. E. Beckner, and H. Reichenbach, "Gas Dynamic Model of Turbulent Combustion in TNT Explosions", Proceedings of the Combustion Institute, 33, 2177-2185, 2011.

28. M. S. Day, X. Gao, and J. B. Bell, "Properties of Lean Turbulent Methane-Air Flames with Significant Hydrogen Addition", Proceedings of the Combustion Institute, 33, 1601-1608, 2011.

29. A. J. Aspden, J. B. Bell, and S. E. Woosley, "Distributed Flames in Type Ia Supernovae", Astrophysical Journal, 710, 1654-1663, February 2010.

30. A. L. Kuhl, H. Reichenbach, J. B. Bell and V. E. Beckner, "Reactive Blast Wave from Composite Charges", Proceedings of the 14^th Detonation Symposium, April, 2010.

31. A. L. Kuhl, J. B. Bell and V. E. Beckner, "Heterogeneous continuum model of aluminum particle combustion in explosions,", Combustion, Explosion and Shock Waves, Vol. 46(4), 2010.

32. P.-T. Bremer, G. Weber, J. Tierny, V. Pascucci, M. Day and J. Bell, "A Topological Framework for the Interactive Exploration of Large Scale Turbulent Combustion", Proceedings of the 5th IEEE International Conference on e-Science p. 247-254 (2009).

33. A. Donev, E. Vanden-Eijnden, A. Garcia, and J.B. Bell, "On the Accuracy of Explicit Finite-Volume Schemes for Fluctuating Hydrodynamics", Communications in Applied Mathematics and Computational Science, 5, 149-197, 2010.

34. N. Vasudeo, T. Echekki, M. Day, and J. Bell, "The regime diagram for premixed flame kernel-vortex interactions - revisited", Physics of Fluids, Vol. 22, Issue 4, 2010.

35. C. C. Joggerst, A. Almgren, J. Bell, Alexander Heger, Daniel Whalen, and S. E. Woosley, "Primordial Core-Collapse Supernovae and the Chemical Abundances of Metal-Poor Stars," Astrophysical Journal, 709, 11-26, January 2010.

36. G. S. H. Pau, A. S. Almgren, J. B. Bell, and M. J. Lijewski, "A Parallel Second-Order Adaptive Mesh Algorithm for Incompressible Flow in Porous Media", Phil. Trans. R. Soc. A 367, 4633-4654, 2009.

37. M. Zingale, A. S. Almgren, J. B. Bell, A. Nonaka, and S. E. Woosley, "Low Mach Number Modeling of Type Ia Supernovae. IV. White Dwarf Convection", Astrophysical Journal, 704, 196-210, 2009.

38. M. S. Day, J. B. Bell, R. K. Cheng, S. Tachibana, V. E. Beckner, and M. J. Lijewski, "Cellular burning in lean premixed turbulent hydrogen-air flames: coupling experimental and computational analysis at the laboratory scale", SciDAC 2009, J. of Physics: Conference Series, San Diego, California, July 2009.

39. S.E. Woosley, A.S. Almgren, A.J. Aspden, J.B. Bell, D. Kasen, A.R. Kerstein, H. Ma, A. Nonaka and M. Zingale, "Type Ia Supernovae: Advances in Large Scale Simulation ", SciDAC 2009, J. of Physics: Conference Series, San Diego, California, July 2009.

40. A. S. Almgren, J. B. Bell, A. Nonaka, M. Zingale, "A New Low Mach Number Approach in Astrophysics", Computers in Science and Engineering, vol. 11, no. 2, pp. 24-33, March/April 2009.

41. M. Day, J. Bell, P.-T. Bremer, V. Pascucci, V. Beckner, M. Lijewski, "Turbulence effects on cellular burning structures in lean premixed hydrogen flames", Combustion and Flame, 156, 1035-1045, 2009.

42. S. E. Woosley, D. Kasen, H. Ma, G. Glatzmaier, A. J. Aspden, J. B. Bell, M. S. Day, A. R. Kerstein, V. Sankaran, F. Ropke, "Type Ia Supernovae", Proceedings of Science, 10th Symposium on Nuclei in the Cosmos, July 27 - August 1 2008, Mackinac Island, Michigan, USA.

43. J. B. Bell, R. K. Cheng, M. S. Day, V. E. Beckner, M. J. Lijewski, "Interaction of Turbulence and Chemistry in a Low Swirl Burner", SciDAC 2008, J. of Physics: Conference Series, Seattle Washington, July 2008.

44. M. Zingale, A. S. Almgren, J. B. Bell, C. M. Malone, A. Nonaka, "Astrophysical Applications of the MAESTRO Code", SciDAC 2008, J. of Physics: Conference Series, Seattle Washington, July 2008.

45. S. E. Woosley, A. J. Aspden, J. B. Bell, A. R. Kerstein,V. Sankaran, "Numerical simulation of low Mach number reacting flows", SciDAC 2008, J. of Physics: Conference Series, Seattle Washington, July 2008.

46. J. F. Grcar, J. B. Bell, M. S. Day, "The Soret Effect in Naturally Propagating, Premixed, Lean, Hydrogen-Air Flames", Proc. Combust. Inst., 32, 1173–1180, 2008.

47. J. B. Bell, A. L. Garcia, S. A. Williams, "Computational fluctuating fluid dynamics", ESAIM: Mathematical Modelling and Numerical Analysis, 44 1085-1105 (2010).

48. A. J. Aspden, J. B. Bell, M. S. Day, S. E. Woosley, M. Zingale, "Turbulence-Flame Interactions in Type Ia Supernovae", Astrophysical Journal, 689, pp. 1173-1185, 2008.

49. D. E.A. van Odyck, J. Bell, F. Monmont and N. Nikiforakis, "The mathematical structure of multiphase thermal models of flow in porous media", Proceedings of the Royal Society A, 465:523-549, 2009.

50. A. J. Aspden, N. Nikiforakis, S. B. Dalziel, and J.B.Bell, "Characterising Implicit LES Methods", Comm. Appl. Math. and Comp. Sci., 3, 1-3-126, 2008.

51. A. S. Almgren, J. B. Bell, A. Nonaka and M. Zingale, "Low Mach Number Modeling of Type Ia Supernovae. III. Reactions", Astrophysical Journal, 684, 449-470, 2008.

52. J. Bell, A. Aspden, M. Day, M. Lijewski, "Numerical simulation of low Mach number reacting flows", SciDAC 2007, J. of Physics: Conference Series, Boston, Massachusetts, July 2007. LBNL Report No. LBNL-63088.

53. S.E. Woosley, A.S. Almgren, J.B. Bell, G. Glatzmaier, D. Kasen, A.R. Kerstein, H. Ma, P. Nugent, F. Ropke, V. Sankaran and M. Zingale, "Type Ia Supernovae ", SciDAC 2007, J. of Physics: Conference Series, Boston, Massachusetts, July 2007.

54. A.S. Almgren, J.B. Bell, and M. Zingale, "MAESTRO: A Low Mach Number Stellar Hydrodynamics Code ", SciDAC 2007, J. of Physics: Conference Series, Boston, Massachusetts, July 2007.

55. M. Day, I. Shepherd, J. Bell, J. Grcar and M. Lijewski, "Displacement speeds in turbulent premixed flame simulations", Proc. ECCOMAS-CFD 2007.

56. J. B. Bell, M. S. Day, J. F. Grcar and M. J. Lijewski, "A Computational Study of Equivalence Ratio Effects in Turbulent, Premixed Methane-Air Flames", LBNL Report LBNL-59246, Proc. ECCOMAS-CFD 2006.

57. J. Bell, M. Day, A. Almgren, M. Lijewski, C. Rendleman, R. Cheng, I. Shepherd, "Simulation of Lean Premixed Turbulent Combustion", SciDAC 2006, J. of Physics: Conference Series, (William Tang, Ed.), Denver, Colorado, 46, 1-15, 2006.

58. S. Williams, J.B. Bell, and A. Garcia, "Algorithm Refinement for Fluctuating Hydrodynamics", SIAM Multiscale Modeling and Simulation, 6, 1256-1280, 2008.

59. J.B. Bell, A. Garcia, and S. Williams, "Numerical Methods for the Stochastic Landau-Lifshitz Navier-Stokes Equations", Physical Review E Phys. Rev. E, 76, 016708 (2007).

60. M. Day and J. Bell, "Simulation of premixed turbulent flames", SciDAC 2006, J. of Physics: Conference Series, (William Tang, Ed.), Denver, Colorado, 46, 43-47, 2006.

61. J. B. Bell, R. K. Cheng, M. S. Day and I. G. Shepherd, "Numerical Simulation of Lewis Number Effects on Lean Premixed Turbulent Flames", LBNL Report LBNL-59247, Proc. Combust. Inst., Vol. 31, 1309-1317, 2007.

62. J. B. Bell, M. S. Day, J. F. Grcar, M. J. Lijewski, J. F. Driscoll and S. F. Filatyev, "Numerical Simulation of a Laboratory-Scale Turbulent Slot Flame", LBNL Report LBNL-59245, Proc. Combust. Inst., Vol. 31, 1299-1307, 2007.

63. J. B. Bell, M. S. Day, J. F. Grcar, and M. J. Lijewski, "Active Control for Statistically Stationary Turbulent Premixed Flame Simulations", Communications in Applied Mathematics and Computational Science, Vol. 1, 29-51, 2006.

64. J. B. Bell, J. Foo, and A. L. Garcia, "Algorithm Refinement for the Stochastic Burgers' Equation", J. Comput. Phys., Vol. 223, 451-468, 2007.

65. A. S. Almgren, J. B. Bell, C. A. Rendleman, and M. Zingale, "Low Mach Number Modeling of Type Ia Supernovae: II. Energy Evolution", Astrophysical Journal, Vol. 649, 929-938, 2006.

66. A. S. Almgren, J. B. Bell, C. A. Rendleman, and M. Zingale, "Low Mach Number Modeling of Type Ia Supernovae: I. Hydrodynamics," LBNL Report LBNL-58673 Pt.I, Astrophysical Journal, Feb. 1, 2006, Vol. 637, pp. 922-936.

67. J. B. Bell, M. S. Day, I. G. Shepherd, M. Johnson R. K. Cheng, V. E. Beckner, M. J. Lijewski, J. F. Grcar, "Numerical Simulation of a Laboratory-Scale Turbulent V-Flame", Proc. Natl. Acad. Sci. USA, 102(29), 10006-10011, 2005.

68. M. Zingale, S. E. Woosley, C.A. Rendleman, M. S. Day, and J. B. Bell, "Three-dimensional Numerical Simulations of Rayleigh-Taylor Unstable Flames in Type Ia Supernovae", Astrophysical Journal, 632, 1021, 2005.

69. J. B. Bell, M. S. Day, V. E. Beckner, C. A. Rendleman, A. L. Kuhl and P. Neuwald, "Numerical simulation of combustion of PETN/TNT products with air in closed chambers", 20 International Colloquium on the Dynamics of Explosions and Reactive Systems, July 31-August 1, 2005.

70. J. F. Grcar, M. S. Day, J. B. Bell, "A Taxonomy of Integral Reaction Path Analysis", LBNL Report LBNL-56772, in press - Combust. Theory Modelling.

71. J. B. Bell, M. S. Day, and J. F. Grcar, M. J. Lijewski, "Stochastic Algorithms for the Analysis of Numerical Flame Simulations", J. Comput. Phys., 202, 262-280, 2004.

72. J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, and M. A. Zingale, "Direct Numerical Simulations of Type Ia Supernovae Flames II: The Rayleigh-Taylor Instability", Astrophysical Journal, 608, 883-906, 2004.

    J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, and M. A. Zingale, "Direct Numerical Simulations of Type Ia Supernovae Flames I: The Landau-Darrieus Instability", Astrophysical Journal, 606, 1029-1038, 2004.

73. J. B. Bell, M. S. Day, C. A. Rendleman, S. E. Woosley, and M. A. Zingale, "Adaptive low Mach number simulations of nuclear flames", J. Comp. Phys., 195, 677-694, 2004 .

74. J. B. Bell, M. S. Day, A. S. Almgren, R. K. Cheng and I. G. Shepherd, "Numerical Simulation of Premixed Turbulent Methane Combustion", Proceedings of the Second MIT Conference on Computational Fluid and Solid Mechanics, June 17-20, 2003.

75. J. B. Bell, M. S. Day, J. F. Grcar, M. J. Lijewski, M. Johnson, R. K. Cheng, I. G. Shepherd, "Numerical Simulation of a Premixed Turbulent V-Flame", 19th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 27-August 1, 2003.

76. J. F. Grcar, M. S. Day and J. B. Bell, "Conditional and opposed reaction path diagrams for the analysis of fluid-chemistry interactions", 19th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 27-August 1, 2003.

77. J. B. Bell, M. S. Day and A. L. Kuhl, "Numerical simulations of shock-induced mixing and combustion", 19th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 27-August 1, 2003.

78. J. B. Bell, M. S. Day, J. F. Grcar, M. J. Lijewski, "Analysis of carbon chemistry in numerical simulations of vortex flame interactions", 19th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 27-August 1, 2003.

79. N. Sullivan, A. D. Jensen, P. Glarborg, M. S. Day, J. F. Grcar, J. B. Bell, C. J. Pope and R. J. Kee "Ammonia Conversion and NOx Formation in Laminar Coflowing Nonpremixed Methane-Air Flames", LBNL Report LBNL-49347, Combustion and Flame, 131(3):285-298 (2002).

80. J. B. Bell, M. S. Day, J. F. Grcar, W. G. Bessler, C. Shultz, P. Glarborg and A. D. Jensen "Detailed Modeling and Laser-Induced Fluorescence Imaging of Nitric Oxide in an NH3-seeded non-premixed methane/air flame", LBNL Report LBNL-49333, *Proceedings of the Combustion Institute*, **29**, 2002.

81. J. B. Bell, M. S. Day, J. F. Grcar and M. J. Lijewski "Numerical Simulation of Premixed Turbulent Methane Combustion", LBNL Report LBNL-49331, *Proceedings of the Combustion Institute*, 29, 2002.

82. J. B. Bell, M. S. Day, A. S. Almgren, M. J. Lijewski and C. A. Rendleman, "A Parallel Adaptive Projection Method for Low Mach Number Flows,", International Journal for Numerical Methods in Fluids, 40:209-216, 2002.

83. J. B. Bell, M. S. Day, A. S. Almgren, M. J. Lijewski and C. A. Rendleman, "Adaptive numerical simulation of turbulent premixed combustion,", *Proceedings of the First MIT Conference on Computational Fluid and Solid Mechanics,* June 11-15, 2001.

84. J. B. Bell, M. S. Day, J. F. Grcar, and A. E., Lutz, "Turbulent combustion of spherical fuel-rich hydrogen pockets," 18th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 29-August 3, 2001.

85. J. B. Bell, M. S. Day, V. E. Beckner, A. L. Kuhl, P. Neuwald and H. Reichenbach, "Simulations of shock-induced mixing and combustion of an acetylene cloud in a chamber," 18th International Colloquium on the Dynamics of Explosions and Reactive Systems, July 29-August 3, 2001.

86. J. Bell, A. Chorin and W. Crutchfield, "Stochastic optimal prediction with application to Averaged Euler Equations," *Proc. 7th Nat. Conf. Comput. Fluid Mech.*, (C.A. Lin, Ed.), Pingtung, Taiwan, pp. 1-13, 2000.

87. M. S. Day and J. B. Bell, "Numerical Simulation of Laminar Reacting Flows with Complex Chemistry" *Combust. Theory Modelling*, **4**(4), pp. 535-56, 2000.

88. J. B. Bell, N. J. Brown, M. S. Day, M. Frenklach, J. F. Grcar and S. R. Tonse, "The Effect of Stoichiometry on Vortex Flame Interactions", *Proceedings of the Combustion Institute*, **28**, 2000.

89. J. B. Bell, N. J. Brown, M. S. Day, M. Frenklach, J. F. Grcar, R. M. Propp and S. R. Tonse, "Scaling and Efficiency of PRISM in Adaptive Simulations of Turbulent Premixed Flames," *Proceedings of the Combustion Institute*, **28**, 2000.

90. Ann S. Almgren, John B. Bell, William Y. Crutchfield, "Approximate Projection Methods: Part I. Inviscid Analysis," *SIAM J. Sci. Comput.*, **22**:4, pp. 1139-59, 2000.

91. A. L. Garcia, J. B. Bell, W. Y. Crutchfield, B. J. Alder, "Adaptive Mesh and Algorithm Refinement", *J. Comput. Phys.*, **154**, pp. 134-55, 1999.

92. C.A. Rendleman, V.E. Beckner, M. Lijewski, W.Y. Crutchfield, J.B. Bell, "Parallelization of Structured, Hierarchical Adaptive Mesh Refinement Algorithms," *Comput. and Visual. in Science*, Vol. 3, 2000.

93. G. I. Barenblatt, J. B. Bell, W. Y. Crutchfield, "The thermal explosion revisited", *Proceedings of the National Academy*, **95**, November 1998, pp.13384-13386

94. David E. Stevens, John B. Bell, Ann S. Almgren, Vince E. Beckner, Charles A. Rendleman, "Small Scale Processes and Entrainment in a Stratocumulus Marine Boundary Layer," *J. Atmos. Sci.*, **57**:4, pp. 567-581, Feb. 2000.

95. R.B. Pember, L.H. Howell, J.B. Bell, P. Colella, W.Y. Crutchfield, W.A. Fiveland, and J.P. Jessee, "An Adaptive Projection Method for Unsteady, Low-Mach Number Combustion," *Comb. Sci. Tech.*, **140**, pp. 123-68, 1998.

96. Ann S. Almgren, John B. Bell, Phillip Colella, Louis H. Howell, Michael L. Welcome, "A Conservative Adaptive Projection Method for the Variable Density Incompressible Navier-Stokes Equations," *J. Comp. Phys.*, **142**, pp. 1-46, 1998.

97. E.G. Puckett, Ann S. Almgren, John B. Bell, Daniel L. Marcus, William J. Rider, "A High-Order Projection Method for Tracking Fluid Interfaces in Variable Density Incompressible Flows," *J. Comp. Phys.*, **130**, pp. 269-282, 1997.

98. Ann S. Almgren, John B. Bell, Phillip Colella, Tyler Marthaler "A Cartesian Grid Projection Method for the Incompressible Euler Equations in Complex Geometries", *SIAM J. Sci. Comput.*, **18:5**, Sept. 1997.

99. Ann S. Almgren, John B. Bell, Phillip Colella, Tyler Marthaler "A Cell-Centered Cartesian Grid Projection Method for the Incompressible Euler Equations in Complex Geometries", *Proceedings of the AIAA 12th Computational Fluid Dynamics Conference*, June 19-22, 1995, San Diego, CA.

100. Richard B. Pember, Ann S. Almgren, John B. Bell, Phillip Colella, Louis Howell, Mindy Lai, "A Higher-Order Projection Method for the Simulation of Unsteady Turbulent Nonpremixed Combustion in an Industrial Burner," *Transport Phenomena in Combustion*, Taylor and Francis, publ., July 1996.

101. R.B. Pember, P. Colella, L.H. Howell, A.S. Almgren, J.B. Bell, W. Y. Crutchfield, V.E. Beckner, K.C. Kaufman, W.A. Fiveland, J.P. Jessee, "The Modeling of a Laboratory Natural Gas-Fired Furnace with a Higher-Order Projection Method for Unsteady Combustion," Technical Report UCRL-JE-123244, LLNL, February 1996. Twenty-sixth International Symposium on Combustion,Naples, Italy, July 28 - August 2, 1996.

102. Mark M. Sussman, Ann S. Almgren, John B. Bell, Phillip Colella, Louis H. Howell, Michael Welcome, "An Adaptive Level Set Approach for Incompressible Two-Phase Flows," *J. Comp. Phys.*, **148**, pp. 81-124, 1999.

103. Mark M. Sussman, Ann S. Almgren, John B. Bell, Phillip Colella, Louis H. Howell, Michael Welcome, "An Adaptive Level Set Approach for Incompressible Two-Phase Flows," *Proceedings of the ASME Fluids Engineering Summer Meeting: Forum on Advances in Numerical Modeling of Free Surface and Interface Fluid Dynamics*, San Diego, CA, July 7-11, 1996.

104. Richard B. Pember, Ann S. Almgren, William Y. Crutchfield, Louis H. Howell, John B. Bell, Phillip Colella, and Vincent E. Beckner, "An Embedded Boundary Method for the Modeling of Unsteady Combustion in an Industrial Gas-Fired Furnace," Technical Report UCRL-JC-122177, LLNL; in Proceedings of the 1995 Fall Meeting of the Western States Section of the Combustion Institute, Stanford University. October 30-31, 1995.

105. Ann S. Almgren, John B. Bell, Phillip Colella, Louis H. Howell, Michael Welcome, "A High-Resolution Adaptive Projection Method for Regional Atmospheric Modeling," Proceedings of the NGEMCOM Conference sponsored by the U.S. EPA, August 7-9, 1995, Bay City, MI.

106. Ann S. Almgren, John B. Bell, Louis H. Howell, Phillip Colella, "An Adaptive Projection Method for the Incompressible Navier-Stokes Equations," *Proceedings of the IMACS 14th World Conference*, July 11-15, 1994, Atlanta, GA.

107. Ann S. Almgren, John B. Bell, Phillip Colella, Louis H. Howell, "An Adaptive Projection Method for the Incompressible Euler Equations," *Proceedings of the AIAA 11th Computational Fluid Dynamics Conference*, July 6-9, 1993, Orlando, FL.

108. Ann S. Almgren, John B. Bell, William G. Szymczak, "A Numerical Method for the Incompressible Navier-Stokes Equations Based on an Approximate Projection," *SIAM J. Sci. Comput.*,**17:2**, March 1996.

109. D.L. Marcus, R.B. Pember, J.B. Bell, V.E. Beckner, D. Simkins, M.L. Welcome, "Multidimensional numerical simulation of a pulse combustor," AIAA 94-2315, *Proceedings of the 25th AIAA Fluid Dynamics Conference,* Colorado Springs, CO, June 20-23, 1994.

110. J.A. Greenough, V. Beckner, R. B. Pember, W. Y. Crutchfield, J.B. Bell, and P. Colella, "An Adaptive Multifluid Interface-Capturing Method for Compressible Flow in Complex Geometries", UCRL-JC-118609, April, 1995, Proceedings of the 12th AIAA CFD Conference, San Diego, CA, June 19-22, 1995.

111. J.A. Greenough, J.B. Bell, P. Colella, and E.G. Puckett, "A Numerical Study of Shock-Induced Mixing of a Helium Cylinder: Comparison with Experiment", *Proceedings of the 20th International Symposium on Shock Waves.*

112. E. Steinthorsson, D. Modiano, W. Y. Crutchfield, J. B. Bell, and P. Colella, "An adaptive semi-implicit scheme for simulations of unsteady viscous compressible flow," *Proceedings of the 12th AIAA CFD Conference*, San Diego, CA, June 19-22, 1995.

113. D.L. Marcus, R.B. Pember, J.B. Bell "Induction time effects in pulse combustors," AIAA 95-0875, *33rd Aerospace Sciences Meeting*, Reno, NV, Jan. 9-12, 1995.

114. L. H. Howell and J. B. Bell, "An Adaptive-Mesh Projection Method for Viscous Incompressible Flow," *SIAM J. Sci. Comput.*, 18, No. 4, pp. 996-1013, July 1997.

115. J. Bell, M. Berger, J. Saltzman, M. Welcome, "Three Dimensional Adaptive Mesh Refinement for Hyperbolic Conservation Laws," *SIAM J. Sci. Stat. Comput.*, January 1994.

116. J. B. Bell, J. M. Solomon, and W. G. Szymczak, "A Projection Method for Viscous Incompressible Flow on Quadrilateral Grids," *AIAA J.*, 32:1961–1969, 1994.

117. W.Y. Crutchfield and J.B. Bell, "Instabilities of the Skyrme Model," *J. Comp. Phys.*, **110**, pp. 234-241, 1994.

118. R. B. Pember, J. B. Bell, P. Colella, W. Y. Crutchfield, and M. L. Welcome, "An adaptive Cartesian grid method for for unsteady compressible flow in complex geometries," *J. Comp. Phys.*, 120:2, pp 278-304, 1995.

119. M. Lai, J. B. Bell and P. Colella, "A Projection Method for Combustion in the Zero Mach Number Limit," *Proceedings of the 11th AIAA CFD Conference*, Orlando, Florida, July 1993.

120. R. B. Pember, J. B. Bell, P. Colella, W. Y. Crutchfield, and M. L. Welcome, "Adaptive Cartesian grid methods for representing geometry in inviscid compressible flow," *Proceedings of the 11th AIAA CFD Conference*, Orlando, Florida, July 1993.

121. J. A. Greenough and J. B. Bell, "Direct Simulation of a Shock-Induced Mixing Layer," *Proceedings of the 4th International Workshop on Physics of Compressible Turbulent Mixing*, Cambridge, England, March 1993.

122. R. I. Klein, J. B. Bell, R. B. Pember, T. Kelleher, "Three Dimensional Hydrodynamic Calculations with Adaptive Mesh Refinement of the Evolution of Rayleigh Taylor and Richtmyer Meshkov Instabilities in Converging Geometry: Multi-Mode Perturbations," *Proceedings of the 4th International Workshop on Physics of Compressible Turbulent Mixing*, Cambridge, England, March 1993.

123. J.B. Bell and D.L. Marcus,"Vorticity Intensification and Transition to Turbulence in the Three-Dimensional Euler Equations," *Comm. Math. Phys.*, 147:371-394, 1992.

124. D. L. Marcus and J. B. Bell, "The Structure and Evolution of the Vorticity and Temperature Fields in Thermals," *Theor. and Comp. Fluid Dynamics*, 3:327-344, 1992.

125. A. L. Kuhl, J. B. Bell, R. E. Ferguson, K.-Y. Chien and J. P. Collins, "Evolution of Reactants Volume in Turbulent Jets," *Twenty-Fourth Symposium (International) on Combustion*, published by the Combustion Institute, 77-82, 1992.

126. J. B. Bell and D. L. Marcus, "A Second-Order Projection Method for Variable Density Flows," *J. Comp. Phys.*, 101:334-348,1992.

127. D.L. Marcus, E.G. Puckett, J.B. Bell, and J. Saltzman, "Numerical Simulation of Accelerated Interfaces," *Proceedings of the 3rd International Workshop on the Physics of Compressible Turbulent Mixing*, R. Dautray, editor, pp. 63–81, Royaumont, France, 1991.

128. J. Bell, P. Colella, and L. Howell, "An efficient second-order projection method for viscous incompressible flow," *Proceedings of the 10th AIAA Computational Fluid Dynamics Conference*, Honolulu, June 24-26, 1991.

129. J. Bell, P. Colella, and M. Welcome, "Conservative Front-Tracking for Inviscid Compressible Flow," *Proceedings of the 10th AIAA Computational Fluid Dynamics Conference*, Honolulu, June 24-26, 1991.

130. D. L. Marcus and J. B. Bell, "Numerical simulation of a viscous vortex ring interaction with a density interface," *Phys. Fluids A*, 6(4), 1994, 1505-1515.

131. I. I. Glass, J. Kaca, D. L. Zhang, H. M. Glaz, J. B. Bell, J. A. Trangenstein, and J. P. Collins, "Diffraction of Planar Shock Waves over Half-Diamond and Semicircular Cylinders: An Experimental and Numerical Comparison," *Proceedings of the 17th International Symposium on Shock Waves and Shock Tubes*, July 17-21, 1989, Lehigh University.

132. J. B. Bell, J. M. Solomon and W. G. Szymczak, "A Second-order Projection Method for the Incompressible Navier-Stokes Equations on Quadrilateral Grids," *Proceedings of the AIAA 9th Computational Fluid Dynamics Conference*, Buffalo, New York, June 14-16, 1989.

133. J. B. Bell, P. Colella, J. A. Trangenstein and M. Welcome, "Adaptive Mesh Refinement on Moving Quadrilateral Grids," *Proceedings of the AIAA 9th Computational Fluid Dynamics Conference*, Buffalo, New York, June 14-16, 1989.

134. J. B. Bell, H. M. Glaz, J. M. Solomon and W. G. Szymczak, "Application of a Second-order Projection Method to the Study of Shear Layers," *Proceedings of the 11th International Conference on Numerical Methods in Fluid Dynamics*, Williamsburg, Va., June 27-July 1, 1988.

135. J. B. Bell, P. Colella, J. A. Trangenstein and M. Welcome, "Godunov Methods and Adaptive Algorithms for Unsteady Fluids Dynamics," *Proceedings of the 11th International Conference on Numerical Methods in Fluid Dynamics*, Williamsburg, Va., June 27-July 1, 1988.

136. J. B. Bell, P. Colella, and H. M. Glaz, "A Second-Order Projection Method for the Incompressible Navier-Stokes Equations," *J. Comp. Phys.*, Vol. 85, p. 257-283.

137. J. B. Bell, P. Colella and J. A. Trangenstein, "Higher-Order Godunov Methods for Systems of Hyperbolic Conservation Laws", UCRL-97258, August 1987, *J. Comp. Phys.*, Vol. 82, p. 362-397.

138. J. B. Bell, C. N. Dawson and G. R. Shubin, "An Unsplit Higher Order Godunov Method for Scalar Conservation Laws in Multiple Dimensions", *J. Comp. Phys.*, Vol. 74, No. 1, p. 362-397, 1988.

139. J. B. Bell, P. Colella, J. Trangenstein, and M. Welcome, "Adaptive Methods for High Mach Number Reacting Flow", AIAA paper 87-1168-CP, *Proceedings of the AIAA 8th Computational Fluid Dynamics Conference*, Honolulu, Hawaii, June 9-11, 1987, p. 717-725.

140. J. B. Bell, P. Colella, and H. M. Glaz, "A Second-Order Projection Method for Viscous, Incompressible Flow", AIAA paper 87-1776-CP, *Proceedings of the AIAA 8th Computational Fluid Dynamics Conference*, Honolulu, Hawaii, June 9-11, 1987, p. 789-794.

141. W. G. Szymczak, J. M. Solomon, A. E. Berger, J. B. Bell and J. E. Osborn, "Numerical Solutions for Laminar Flow Over a Backward-Facing Step", *6th IMACS International Symposium on Computer Methods for PDEs*, Bethlehem, PA, June 23-26, 1987.

142. W. G. Szymczak, J. M. Solomon, A. E. Berger and J. B. Bell, "Multiple Discrete Solutions of the Incompressible Steady-State Navier-Stokes Equations", UCRL-86765, June, 1987, *Numerische Mathematik*.

143. J. A. Trangenstein and J. B. Bell, "Mathematical Structure of Compositional Reservoir Simulation", *SIAM J. Sci. Stat. Comput.*, Vol. 10, p. 817-845.

144. J. A. Trangenstein and J. B. Bell, "Mathematical Structure of Black-Oil Reservoir Simulation", *SIAM J. Appl. Math.*, Vol. 49, p. 749-783.

145. G. R. Shubin and J. B. Bell, "A Modified Equation Approach to Constructing Fourth Order Schemes for Acoustic Wave Propagation", *SIAM J. Sci. Stat. Comput.*, Vol. 8, No. 2, pp 135-151, 1987.

146. J. B. Bell, J. A. Trangenstein, and G. R. Shubin, "Conservation Laws of Mixed Type Describing Three-Phase Flow in Porous Media", *SIAM J. Appl. Math.*, Vol. 46, No. 6, pp. 1000-1017, 1986.

147. J. B. Bell, G. R. Shubin, and J. A. Trangenstein, "A Method for Reducing Numerical Dispersion in Two-Phase Black-Oil Reservoir Simulation", *J. Comp. Phys.*, Vol. 65, No. 1, pp. 71-106, 1986.

148. J. B. Bell and G. R. Shubin, "Higher Order Godunov Methods for Reducing Numerical Dispersion in Reservoir Simulation", SPE Paper 3514, *Proceedings of the Eighth SPE Symposium on Reservoir Simulation*, Dallas, TX, Feb. 10-13, 1985.

149. G. R. Shubin and J. B. Bell, "An Analysis of the Grid Orientation Effect in Numerical Simulation of Miscible Displacement", *Computer Methods in Applied Mechanics and Engineering*, Vol. 47, No. 1-2, Dec. 1984, pp. 47-71.

150. J. B. Bell, G. R. Shubin and M. F. Wheeler, "Analysis of a New Method for Computing the Flow of Miscible Fluids in a Porous Media", *SIAM J. Numer. Anal.*, Dec. 1985.

151. J. B. Bell and G. R. Shubin, "An Adaptive Grid Finite Difference Method for Conservation Laws", *J. Comp. Phys.*, 52:3, Dec. 1983, pp. 569-591.

152. A. Stephens, J. Bell, J. Solomon, and L. Hackerman, "A Discrete Galerkin formulation for the Incompressible Navier-Stokes Equations", *J. Comp. Phys.*, 53:1, Jan. 1984, pp. 152-172.

153. G. R. Shubin, A. B. Stephens and J. B. Bell, "Three Dimensional Grid Generation Using Biharmonics", *Numerical Grid Generation*, Joe F. Thompson, editor, Elsevier, New York, 1982, pp. 761-774.

154. J. B. Bell, G.R. Shubin and J. M. Solomon, "Fully Implicit Shock Tracking", *J. Comp. Phys.*, 48:2, Nov. 1982, pp. 222-245.

155. J. B. Bell, G. R. Shubin and A. B. Stephens, "A Segmentation Approach to Grid Generation Using Biharmonics", *J. Comp. Phys.*, 47:3, Oct. 1982, pp. 463-472.

156. J. B. Bell, R. L. Bell and J. A. Hill, "Inverse Solution of the Heat Equation for Reducing Wind-Tunnel Data From Thin-Skin Models", *Proceedings of the 2nd Aerothermal Workshop*, Williamsburg, Virginia, March 1982.

157. J. Bell and L. Payne, "On the numerical solution of the backward heat equation", *Proceedings of the Stefan Banach Institute*.

158. J. Bell, "The Noncharacteristic Cauchy Problem for a Class of Equations with Time Dependence, Part I: Problems in One Space Dimension and Part II: Problems in Several Space Dimensions", *SIAM J. Math. Anal.*, 12:5, Sept. 1981, pp. 759-797.

159. K. Aziz, J. Bell and M. Schneider, "Existence and Uniqueness for a Mixed Problem in a Rectangle", *Math. Methods in Applied Sciences*.

160. K.-Y. Chien, A. Berger, W. Ragsdale and J. Bell, "Free Molecular Flow over a Spinning Cylinder with Heat Transfer", *Proceedings of the 11th International Symposium on Rarefied Gas Dynamics*, Cannes, July 3-8, 1978.

161. J. Solomon, M. Ciment, R. Ferguson and J. Bell, "Inviscid Flowfield Calculations for Re-entry Vehicles with Control Surfaces", *AIAA Journal*, Vol. 15, No. 12, Dec. 1977.

162. S. Leventhal, A. Keel, G. Heiche and J. Bell, "An Electrostatic System for Measuring Roll Position on a Supersonic Vehicle, Part I: Theoretical Analysis and Experimental Results", *Proceedings of the AIAA 1977 Guidance and Control Conference*, Hollywood, Florida, August 1977.