

## JOHN B. BELL

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### 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, SIAM Activity Group in Computational Science and Engineering, January 1, 2007 - present.  
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

Sidney Fernbach Award, Nov. 2005.

SIAM/ACM Prize in Computational Science and Engineering, July 2003.

### PUBLICATIONS

M. Day, J. Bell, P.-T. Bremer, V. Pascucci, V. Beckner, M. Lijewski, "Turbulence effects on cellular burning structures in lean premixed hydrogen flames", submitted for publication.

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.

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.

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.

- J. F. Grcar, J. B. Bell, M. S. Day, "The Soret Effect in Naturally Propagating, Premixed, Lean, Hydrogen-Air Flames", LBNL Report LBNL-669E, Proc. Combust. Inst., 32, to appear.
- J. B. Bell, A. L. Garcia, S. A. Williams, "Computational fluctuating fluid dynamics", submitted for publication.
- A. J. Aspden, J. B. Bell, M. S. Day, S. E. Woosley, M. Zingale, "Turbulence-Flame Interactions in Type Ia Supernovae", to appear, *Astrophysical Journal*.
- 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", submitted for publication, LBNL Report LBNL-71465.
- D. E.A. van Odyck, J. Bell, F. Monmont and N. Nikiforakis, "The mathematical structure of multiphase thermal models of flow in porous media", submitted for publication.
- A. J. Aspden, N. Nikiforakis, S. B. Dalziel, and J.B.Bell, "Characterising Implicit LES Methods", submitted for publication.
- A. S. Almgren, J. B. Bell, A. Nonaka and M. Zingale, "Low Mach Number Modeling of Type Ia Supernovae. III. Reactions", to appear, *Astrophysical Journal*.
- 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.
- 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.
- 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.
- M. Day, I. Shepherd, J. Bell, J. Grcar and M. Lijewski, "Displacement speeds in turbulent premixed flame simulations", Proc. ECCOMAS-CFD 2007.
- 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.
- 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.
- S. Williams, J.B. Bell, and A. Garcia, "Algorithm Refinement for Fluctuating Hydrodynamics", *SIAM Multiscale Modeling and Simulation*, 6, 1256-1280, 2008.
- 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).
- 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.
- 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.
- 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.
- 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.
- J. B. Bell, J. Foo, and A. L. Garcia, "Algorithm Refinement for the Stochastic Burgers' Equation", *J. Comput. Phys.*, Vol. 223, 451-468, 2007.
- 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.
- 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,

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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.

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.

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.

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.

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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.

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.

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.

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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 NO<sub>x</sub> Formation in Laminar Coflowing Nonpremixed Methane-Air Flames", LBNL Report LBNL-49347, Combustion and Flame, 131(3):285-298 (2002).

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 NH<sub>3</sub>-seeded non-premixed methane/air flame", LBNL Report LBNL-49333, *Proceedings of the Combustion Institute*, **29**, 2002.

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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.

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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.

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- 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.
- 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.
- 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.
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- 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.
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- 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.
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- E. Steinhilber, 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.
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- 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.
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- 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.

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