

7 Publications

7.1 Program Overview

Dick, W. A., and M. T. Heath, "Whole System Simulation of Solid Propellant Rockets," 38th AIAA/ASME/SAE/ASEE JPC Conference and Exhibit, Indianapolis, IN, 2002-4345, 8-10 July 2002.

7.2 Combustion and Energetic Materials

Bdzil, J. B., T. Aslam, R. Catanach, L. Hill, and M. Short, "DSD Front Models: Nonideal Explosive Detonation," Proceedings of the 12th International Detonation Symposium, 2002.

Buckmaster, J., M. Campbell, T. L. Jackson, and L. Massa, "Three-Dimensional Heterogeneous Propellant Combustion," Western States Section of the Combustion Institute, UCSD, La Jolla, CA, March 2002.

Buckmaster, J., M. Chen, T. L. Jackson, and L. Massa, "Numerical Modeling of Three-Dimensional Heterogeneous Propellant Combustion," 40th AIAA Aerospace Sciences Meeting and Exhibit, Reno, NV, 2002-0780, January 2002.

Buckmaster, J., M. Chen, T. L. Jackson, and S. Kochevets, "Propellant Morphology and Homogenization: Tools for Modeling Heterogeneous Propellant Combustion," Western States Section of the Combustion Institute, UCSD, La Jolla, CA, March 2002.

Ceperley, D., M. Dewing, and C. Pierleoni, "The Coupled Electronic-Ionic Monte Carlo Simulation Method, in Bridging Time Scales: Molecular Simulations for the Next Decade," eds. P. Nielaba, M. Mareschal and G. Ciccotti, Springer-Verlag, 2002.

Chen, M., J. Buckmaster, T. L. Jackson, and L. Massa, "Homogenization Issues in the Combustion of Heterogeneous Solid Propellants," 38th JANNAF Combustion Meeting, Destin, FL, April 2002.

Chen, M., J. Buckmaster, T. L. Jackson, and L. Massa, "Homogenization Issues and the Combustion of Heterogeneous Solid Propellants," Proceedings of the Combustion Institute, 29, 2923-2929, 2002.

Chorpening, B. T., and M. Q. Brewster, "Emission Imaging of AP/HTPB Propellant Sandwich Combustion," Comb. Sci. Tech., 173, 39-60, 2002.

Fitzgerald, R. P., and M. Q. Brewster, "Flame and Burning Surface Structure of AP/HTPB Laminate Propellants," 38th JANNAF Combustion Subcommittee Meeting, Destin, FL, April 2002.

Fitzgerald, R. P., and M. Q. Brewster, "Flame and Surface Structure Interactions of Laminate AP Propellants: An Investigation of Lateral Boundary Conditions," 3rd Joint Meeting of the U.S. Sections of the Combustion Institute, Chicago, IL, March 2003.

Fitzgerald, R. P., and M. Q. Brewster, "Flame and Surface Structure of Laminate Propellants with Coarse and Fine Ammonium Perchlorate," to appear in Combustion and Flame, 2003.

Fitzgerald, R. P., and M. Q. Brewster, "Validation of Composite Propellant Combustion Modeling Using Laminate Propellants," 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, AL, 2003-4628, July 2003.

Fitzgerald, R. P., P. Genevieve, and M. Q. Brewster, "Flame and Burning Surface Structure of Laminate Propellants with Coarse and Fine Ammonium Perchlorate," 41st AIAA Aerospace Sciences Meeting, Reno, NV, 2003-1161, January 2003.

- Genevieve, P., and M. Q. Brewster, "Modeling Combustion in Laminate Propellants with Fine Ammonium Perchlorate," 40th AIAA Aerospace Sciences Meeting, Reno, NV, 2002-0781, January 2002.
- Jackson, T. L., and J. Buckmaster, "Heterogeneous Propellant Combustion," AIAA Journal, 40, 1122-1130, 2002.
- Knott, G. M., and M. Q. Brewster, "Modeling the Combustion of Propellant Sandwiches," Comb. Sci. Tech., 173, 61-90, 2002.
- Liu, Y., and M. Short, "Premixed Edge-flame Oscillations in a Rectangular Channel with Side-wall Mass Injection," Combust. Theory Modell., 6, 607-623, 2002.
- Massa, L., T. L. Jackson, and J. Buckmaster, "New Kinetics for a Model of Heterogeneous Propellant Combustion," submitted 2003.
- Massa, L., T. L. Jackson, and J. Buckmaster, "Using Heterogeneous Propellant Burning Simulations as Subgrid Components of Rocket Simulations," submitted 2003.
- Massa, L., T. L. Jackson, and M. Short, "Numerical Solution of Three-dimensional Heterogeneous Solid Propellants," Combust. Theor. Modell., 7, 579-602, 2003.
- Massa, L., T. L. Jackson, J. Buckmaster, "New Kinetics for a Model of Heterogeneous Propellant Combustion," submitted 2003.
- Massa, L., T. L. Jackson, J. Buckmaster, "Using Heterogeneous Propellant Burning Simulations as Subgrid Components of Rocket Simulations," submitted 2003.
- Massa, L., T. L. Jackson, J. Buckmaster, and M. Campbell, "The Three-dimensional Combustion of Heterogeneous Propellants," 38th JANNAF Combustion Meeting, Destin, FL, April 2002.
- Massa, L., T. L. Jackson, J. Buckmaster, and M. Campbell, "Three-dimensional Heterogeneous Propellant Combustion," Proceedings of the Combustion Institute, 29, 2975-2983, 2002.
- Mattson, W. D., "The Complex Behavior of Nitrogen under Pressure: Ab Initio Simulation of the Properties of Structures and Shock Waves," PhD thesis, available at <http://www.physics.uiuc.edu/research/ElectronicStructure/PAPERS/mattson-thesis/Thesis-Final.pdf>, 2003.
- Saarloos, B., and M. Q. Brewster, "Unsteady Pressure Combustion Response of AP Composite Propellants," 40th AIAA Aerospace Sciences Meeting, Reno, NV, 2002-0782, January 2002.
- Saarloos, B., and M. Q. Brewster, "Unsteady Solid Propellant Combustion Response Using a Piston Burner," 41st AIAA Aerospace Sciences Meeting, Reno, NV, 2003-0121, January 2003.
- Saarloos, B., and M. Q. Brewster, "Unsteady Solid Propellant Pressure Combustion Response Using a Piston Burner," to appear in J. of Propulsion and Power, 2003.
- Short, M., and Y. Liu, "Edge-flame Oscillations for Unity Lewis Numbers in a Non-Premixed Counterflow," Combust. Theor. Modell., submitted 2002.
- Short, M., and Y. Liu, "Instability and Extinction of Premixed Flames in Counterflows and Thin Channels," to appear in Phys. Fluids, 2003.
- Srinivasan, A., M. Mascagni, and D. Ceperley, "Testing Parallel Random Number Generators," Parallel Computing 29, 69, 2003.
- Tang, K. C., and M. Q. Brewster, "Modeling Combustion of Hydrazinium Nitroformate," 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN, 2002-4166, 7-10 July 2002.

- Tang, K. C., and M. Q. Brewster, "Modeling Combustion of Hydrazinium Nitroformate," 29th International Symposium on Combustion, The Combustion Institute, Sapporo, Japan, 21-26 July 2002, Proceedings of the Combustion Institute, 29, 2897-2904, 2002.
- Wang, X., T. L. Jackson, and L. Massa, "Numerical Simulation of Aluminized Propellants by a Level Set Method," 39th AIAA/ASME/SAE/ASEE JPC Conference and Exhibit, Huntsville, AL, 2003-5285, July 2003.
- Wang, X., T. L. Jackson, and L. Massa, "Numerical Simulation of Heterogeneous Propellant Combustion by a Level Set Method," submitted 2003.
- Weber, J. W., and M. Q. Brewster, "Radiant Ignition of Solid Propellants," 38th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN, 2002-3752, 7-10 July 2002.
- Weber, J. W., K. C. Tang, and M. Q. Brewster, "Ignition of Composite Solid Propellants: Model Development, Experiments, and Validation," 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Huntsville, AL, 2003-4629, 20-23 July 2003.
- Zhou, X., T. L. Jackson, and J. Buckmaster, "A Numerical Study of Periodic Sandwich Propellants with Oxygenated Binders," *Combust. Theory Modelling*, 7, 435-448, 2003.
- Zhou, X., T. L. Jackson, and J. Buckmaster, "Oscillations in Propellant Flames with Edges," *Combustion and Flame*, 133, 157-168, 2003.
- Zhou, X., T. L. Jackson, and J. Buckmaster, "Oscillations in Propellant Flames with Edges," 38th AIAA/ASME/SAE/ASEE JPC Conference and Exhibit, Indianapolis, IN, 2002-3591, July 2002.

7.3 Computer Science

- Campbell, M., X. Jiao, L. Kale, O. Lawlor, and E. de Sturler, "Parallel Multi-Physics Integration Frameworks for Virtual Rocket Science," 7th US National Congress on Computational Mechanics, July 2003.
- de Sturler, E., and J. Liesen, "Block-Diagonal Preconditioners for Indefinite Linear Algebraic Systems, Part I: Theory," submitted to *SIAM J. Scientific Computing*, also available as tech. report UIUCDCS-R-2002-2279.
- de Sturler, E., and J. Liesen, "Block-Diagonal and Constraint Preconditioners for Nonsymmetric Indefinite Linear Systems. Part I: Theory," Tech. Report 36-2003, Department of Mathematics, TU, Berlin, Germany, September 2003.
- Huang, C., O. Lawlor, and L. V. Kale, "Adaptive MPI," to appear in LCPC, 2003.
- Jiao, X., and M. T. Heath, "Accurate, Conservative Data Transfer between Nonmatching Meshes in Multiphysics Simulations," 7th US National Congress on Computational Mechanics, July 2003.
- Jiao, X., and M. T. Heath, "Common Refinement of Nonmatching Meshes for Accurate and Conservative Data Transfer," SIAM Conference on Computational Science and Engineering, San Diego, CA, February 2003.
- Jiao, X., and M. T. Heath, "Common-Refinement Based Data Transfer between Nonmatching Meshes in Multiphysics Simulations," submitted to *International Journal for Numerical Methods in Engineering*, 2003.
- Jiao, X., and M. T. Heath, "Overlaying Surface Meshes, Part I: Algorithms," submitted to *International Journal of Computational Geometry and Applications*, 2003.

- Jiao, X., and M. T. Heath, "Overlaying Surface Meshes, Part II: Robustness and Experimental Results," submitted to International Journal of Computational Geometry and Applications, 2003.
- Jiao, X., M. T. Campbell, and M. T. Heath, "Rocom: An Object-Oriented, Data Centric Software Integration Framework for Multiphysics Simulations," 17th Annual ACM International Conference on Supercomputing, San Francisco, CA, June 2003.
- Lawlor, O. S., and L.V. Kale, "A Voxel-Based Parallel Collision Detection Algorithm," Proceedings of the International Conference in Supercomputing, New York, ACM Press, 285-293, 2002.
- Lawlor, O., and L. V. Kale, "Supporting Dynamic Parallel Object Arrays," Concurrency and Computation: Practice and Experience, John Wiley and Sons, 15:371-393, 2003.
- Lee, J., "Supporting I/O for Remote Visualization of High-Performance Scientific Simulations," Ph.D. thesis, Dept. of Computer Science, University of Illinois at Urbana-Champaign, 2003.
- Lee, J., M. Winslett, X. Ma, and S. Yu, "Declustering Large Multidimensional Data Sets for Range Queries over Heterogeneous Disks," Proceedings of the International Conference on Scientific and Statistical Database Management, 2003.
- Lee, J., M. Winslett, X. Ma, and S. Yu, "Enhancing Data Migration Performance via Parallel Data Compression," Proceedings of the International Parallel and Distributed Processing Symposium, 2002.
- Lee, J., X. Ma, M. Winslett, and S. Yu, "Active Buffering Plus Compressed Migration: An Integrated Solution to Parallel Simulations' Data Transport Needs," Proceedings of the International Conference on Supercomputing, 2002.
- Ma, X., "Hiding Periodic I/O Costs in Parallel Applications," Ph.D. thesis, Dept. of Computer Science, University of Illinois at Urbana-Champaign, 2003.
- Ma, X., J. Lee, M. Winslett, and S. Yu, "High-Level Buffering for Hiding Periodic Output Cost in Scientific Simulations," submitted for journal publication, 2003.
- Ma, X., M. Winslett, J. Lee, and S. Yu, "Faster Collective Output through Active Buffering," Proceedings of the International Parallel and Distributed Processing Symposium, 2002.
- Ma, X., M. Winslett, J. Lee, and S. Yu, "Improving MPI-IO Output Performance with Active Buffering Plus Threads," Proceedings of the International Parallel and Distributed Processing Symposium, 2003.
- Ma, X., M. Winslett, J. Norris, X. Jiao, and R. Fiedler, "GODIVA: Lightweight Data Management for Scientific Visualization," submitted for conference publication, 2003.
- Ma, X., X. Jiao, M. Campbell, and M. Winslett, "Flexible and Efficient Parallel I/O for Large-Scale Multi-Component Simulations," Proceedings of the Workshop on Parallel and Distributed Scientific and Engineering Computing with Applications (in conjunction with the International Parallel and Distributed Processing Symposium), 2003.
- Sheffer, A., and E. de Sturler, "Smoothing an Overlay Grid to Minimize Linear Distortion in Texture Mapping," ACM Transaction on Graphics, 21, 4, October 2002.
- Yu, R., E. de Sturler, and D. D. Johnson, "A Block Iterative Solver for Complex Non-Hermitian Systems Applied to Large-Scale Electronic-Structure Calculations," Tech. Report No. UIUCDCS-R-2002-2299 and UILU-ENG-2002-1742, October 2002.
- Yu, S., M. Winslett, J. Lee, and X. Ma, "Automatic and Portable Performance Modeling for Parallel I/O: A Machine-Learning Approach," SIGMETRICS Performance Evaluation Review (special issue on the Workshop on Mathematical Performance Modeling and Analysis), 30, 3, 3-5, 2002.

7.4 Fluid Dynamics

- Adrian, R. J., "Information and the Study of Turbulence and Complex Flow," *JSME J. Ser. B*, 45, 2-8, 2002.
- Adrian, R. J., and Z. C. Liu, "Observation of Vortex Packets in Direct Numerical Simulation of Fully Turbulent Channel Flow," *J. Vis.*, 5, 9-19, 2002.
- Adrian, R. J., D. F. G. Durao, M. V. Heitor, M. Maeda, C. Tropea, and J. H. Whitelaw, "Laser Techniques for Fluid Mechanics," Selected Papers from the 10th International Symposium Lisbon, Portugal, 10-13 July 2000, Springer, Berlin, 2002.
- Balachandar, S., and J. Ferry, "A Simplified Two-fluid Model Based on the Equilibrium Closure for a Dilute Dispersion of Small Particles," submitted to *IJMF*.
- Balakumar, B. J., and R. J. Adrian, "Particle Image Velocimetry Measurement in the Exhaust of a Solid Rocket Motor," *Experiments in Fluids*, 2003 (in press).
- Balakumar, B. J., "PIV Measurements in a Solid Rocket Motor Exhaust Plume," Master's thesis, University of Illinois, Urbana-Champaign, 2002.
- Blazek, J., "Comparison of Two Conservative Coupling Algorithms for Structured-Unstructured Grid Interfaces," *AIAA Paper* 2003-3536, 2003.
- Blazek, J., "Flow Simulation in Solid Rocket Motors Using Advanced CFD," *AIAA Paper* 2003-5111, 2003.
- Christensen, K. T., and R. J. Adrian, "Measurement of Instantaneous Eulerian Acceleration Fields by Particle Image Velocimetry: Method and Accuracy," *Exp. Fluids*, 33, 759-769, 2002.
- Christensen, K. T., and R. J. Adrian, "The Velocity and Acceleration Signatures of Small-scale Vortices in Turbulent Channel Flow," *J. Turbulence*, 3, 2002.
- Das, A., and R. D. Moser, "Optimal Large Eddy Simulation of Forced Burger's Equation," *Phys. of Fluids*, 14, 4344, 2002.
- Deng, Z., R. J. Adrian, and C. D. Tomkins, "Sensitivity of Turbulence in Transpired Channel to Injection Velocity Small-scale Nonuniformity," *AIAA Journal*, 40, 11, 2241-6, 2002.
- Deng, Z., R. J. Adrian, and C. D. Tomkins, "Structure of Turbulence in Channel Flow with a Fully Transpired Wall," 39th AIAA Aerospace Sciences Meeting and Exhibit, Nevada, 2001-1019, 8-11 January 2001.
- Deng, Zhiqun, "Structure of Turbulence in a Fully Transpired Channel," PhD Thesis, University of Illinois, Urbana-Champaign, 2003.
- Fernandes, R. L. J., and R. J. Adrian, "Scaling of Velocity and Temperature Fluctuations in Turbulent Thermal Convection," *Exp. Thermal and Fluid Science*, 26, 355-360, 2002.
- Ferry, J., and S. Balachandar, "Equilibrium Expansion for the Eulerian Velocity of Small Particles," *Powder Technology*, 125, 2-3, 2002.
- Ferry, J., S. L. Rani, and S. Balachandar, "A Locally Implicit Improvement of the Equilibrium Eulerian Method," *IJMF*, 29, 6, 2003.
- Fiedler, R., M. S. Breitenfeld, X. Jiao, A. Haselbacher, P. Geubelle, D. Guoy, and M. Brandyberry, "Simulations of Slumping Propellant and Flexing Inhibitors in Solid Rocket Motors," 39th

AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN, 2002-4341, 7-10 July 2002.

Haselbacher, A., and O. Vasilyev, "Commutative Discrete Filtering on Unstructured Grids Based on Least-Squares Techniques," *Journal of Computational Physics*, 187, 197-211, 2003.

Haselbacher, A., R. D. Moser, and P. Zandonade, "Toward Optimal LES on Unstructured Grids," invited presentation at 7th US National Congress on Computational Mechanics, Albuquerque, NM, 28-30 July 2003.

Haselbacher, A., R. D. Moser, G. Constantinescu, and K. Mahesh, "Toward Optimal LES on Unstructured Meshes," *Proceedings of Summer Program 2002*, Center for Turbulence Research, Stanford University, 129-140, 2002 .

Hommema, S. E., and R. J. Adrian, "Packet Structure of Surface Eddies in the Atmospheric Boundary Layer," *Boundary-Layer Met.*, 106, 1,147-170, 2003.

Hommema, S. E., and R. J. Adrian, "Similarity of Apparently Random Structure in the Outer Region of Wall Turbulence," *Exp. Fluids*, 33, 5-12, 2002.

Najjar, F. M., A. Haselbacher, J. P. Ferry, B. Wasistho, S. Balachandar, and R. D. Moser, "Large-Scale Multiphase Large-Eddy Simulation of Flows in Solid-Rocket Motors," 16th AIAA CFD Conference, Orlando, FL, 2003-3700, 23-26 June 2003.

Najjar, F. M., J. Ferry, B. Wasistho, and S. Balachandar, "Full-Physics Large-Scale Multiphase Large Eddy Simulations of Flow Inside Solid Rocket Motors," AIAA 2002-4343, 2002.

Plourde, F., F. M. Najjar, J. Vetel, B. Wasistho, K. S. Doan, and S. Balachandar, "Numerical Simulations of Wall and Shear-layer Instabilities in a Cold Flow Setup," 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference, Huntsville, AL, 2003-4674, 20-23 July 2003.

Wasistho, B., A. Haselbacher, F. M. Najjar, D. Tafti, S. Balachandar, and R. D. Moser, "Direct and Large-Eddy Simulations of Compressible Wall-Injection Flows in Laminar, Transitional, and Turbulent Regimes," 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN, 2002-4344, 7-10 July 2002.

Wasistho, B., and K. D. Squires, "Prediction of the Turbulent Separated Flow over a Ramp," in revision process for AIAA Journal.

Wasistho, B., S. Balachandar, and R. D. Moser, "Numerical Prediction of Compressible Wall Injection Flows in Laminar, Transition and Turbulent Regimes," in revision process for *Journal of Spacecraft and Rockets*, AIAA.

7.5 Structures and Materials

Abedi, R., S.-H. Chung, J. Erickson, R. Haber, J. Sullivan, and L. Yin, "Spacetime Meshing with Adaptive Coarsening and Refinement," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.

Abedi, R., Y. Fan, M. Hawker, L. Yin, and R. B. Haber, "A Spacetime Discontinuous Galerkin Finite Element Method for Wave Propagation and Scattering in Solids," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.

Acharya, A., J. L. Bassani, and A. J. Beaudoin, "Geometrically-Necessary Dislocations, Hardening, and a Simple Gradient Theory of Crystal Plasticity," *Scripta Materialia*, 48, 167-172, 2003.

- Albe, K., K. Nordlund, and R. S. Averback, "Modeling the Metal-semiconductor Interaction: Analytical Bond-order Potential for Platinum-Carbon," *Phys. Rev. B.*, 6519, 5124, 2002.
- Albe, K., K. Nordlund, J. Nord, and A. Kuronen, "Modeling of Compound Semiconductors: Analytical Bond-order Potential for Ga, As and GaAs" *Phys. Rev. B.*, 035205, 66, 2002.
- Araki, Y., and K. D. Hjelmstad, "Rate-dependent Projection Operators for Frictional Contact Constraints," *International Journal for Numerical Methods in Engineering*, 57, 923-954, 2003.
- Bellur-Ramaswami, R. S., R. Haber, N. A. Sobh, and D. A. Tortorelli, "Modelling and Process Optimization for Functionally Graded Materials," in review.
- Buehler, M. J., H. Gao, and Y. Huang, "Atomistic and Continuum Studies of a Suddenly Stopping Supersonic Crack," *Computational Materials Science* (in press).
- Chen, B., Y. Huang, C. Liu, P. D. Wu, and S. R. MacEwen, "A Dilatational Plasticity Theory for Viscoplastic Materials," *Mechanics of Materials* (in press).
- Chen, B., Y. Huang, H. Gao, and P. D. Wu, "Shear Crack Propagation along Weak Planes in Solids: A Finite Deformation Analysis Incorporating the Linear Harmonic Potential," *International Journal of Solids and Structures* (in press).
- Christon, M. and Haber, R. (eds.), 7th U.S. National Congress on Computational Mechanics: Conference Proceedings (CD-ROM), Biennial Congress of the U.S. Association for Computational Mechanics, ISBN: 0-9743254-0-6, Omnipress, Madison, WI, 2003.
- Erickson, J., R. Haber, J. Palaniappan, J. Sullivan, and S. Thite, "Efficient Spacetime Meshing with Nonlocal Cone Constraints," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Guo, G., W. Yang, and Y. Huang, "Intersonic Crack Growth under Time-dependent Loading," *International Journal of Solids and Structures*, 40, 2757-2765, 2003.
- Guo, G., W. Yang, and Y. Huang, "Supersonic Crack Growth in a Solid of Upturn Stress-strain Relation under Anti-plane Shear," *Journal of the Mechanics and Physics of Solids* (in press).
- Guo, G., W. Yang, Y. Huang, and A. J. Rosakis, "Sudden Deceleration or Acceleration of an Intersonic Shear Crack," *Journal of the Mechanics and Physics of Solids*, 51, 311-331, 2003.
- Haber, R., "Spacetime Discontinuous Galerkin Methods for Hyperbolic Problems in Solid and Fluid Mechanics," Plenary lecture, Euro Conference on Numerical Methods and Computational Mechanics 2002, Miskolc, Hungary, 97-106, 15-19 July 2002.
- Haber, R. B., and L. Yin, "Hyperelastodynamics, Hamilton's Principle, and Spacetime Discontinuous Galerkin Methods," Minisymposium in honor of 65th birthday of Professor J. Tinsley Oden, on "Advances in Computational Mechanics," *Proceedings of 14th U.S. National Congress on Theoretical and Applied Mechanics*, Blacksburg, VA, 310-311, 23-28 June 2002.
- Haber, R. B., B. Petracovici, R. Abedi, and R. Jerrard, "A Spacetime Discontinuous Galerkin Method for Elastodynamics with Element-level Momentum Balance," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Haber, R. B., J. Palaniappan, and R. L. Jerrard, "Spacetime Discontinuous Galerkin Method with Compact Limiter for Nonlinear Conservation Laws," *Proceedings of SIAM Conf. on Mathematical and Computational Issues in the Geosciences*, Austin, TX, 74, 17-20 March 2003.
- Haber, R. B., R. Moser, J. Palaniappan, K. Jegdic, R. Jerrard, and Y. Ko, "A Robust Flux Definition in Spacetime Discontinuous Galerkin Methods for Nonlinear Conservation Laws," *SIAM 50th Anniversary and Annual Meeting*, Philadelphia, PA, 8-12 July 2002.

- Hjelmstad, K. D., and E. Taciroglu, "Mixed Variational Methods for Finite Element Analysis of Geometrically Nonlinear, Inelastic Bernoulli-Euler Beams," *Communications in Numerical Methods in Engineering*, 2003 (in press).
- Huang, Y., and H. Gao, "Intersonic Crack Propagation. Part II: Suddenly Stopping Crack," *Journal of Applied Mechanics (ASME Transactions)*, 69, 76-80, 2002.
- Jegdic, K., R. Jerrard, and R. B. Haber, "Analysis of a Spacetime Discontinuous Galerkin Method for Systems of Conservation Laws," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Kale, L., R. Haber, J. Booth, S. Thite, and J. Palaniappan, "An Efficient Parallel Implementation of the Spacetime Discontinuous Galerkin Method using CHARM++," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Kim, J. Y., N. R. Aluru, and D. A. Tortorelli, "Improved Multilevel Newton Solvers for Fully Coupled Multiphysics Problems," *International Journal for Numerical Methods in Engineering*, 58, 463-480, 2003.
- Kok, S., M. S. Bharathi, A. J. Beaudoin, C. Fressengeas, G. Ananthakrishna, L. P. Kubin, and M. Lebyodkin, "Spatial Coupling in Jerky Flow using Polycrystal Plasticity," *Acta Materialia*, 51, 3651-3662, 2003.
- Kok, S., A. J. Beaudoin, and D. A. Tortorelli, "A Polycrystal Plasticity Model Based on the Mechanical Threshold," *International Journal of Plasticity*, 18, 715-741, 2002.
- Kok, S., A. J. Beaudoin, and D. A. Tortorelli, "On the Development of Stage IV Hardening Using a Model Based on the Mechanical Threshold," *Acta Materialia*, 50, 1653-1657, 2002.
- Kok, S., A. J. Beaudoin, D. A. Tortorelli, and M. Lebyodkin, "A Finite Element Model for the Portevin-Le Chatelier Effect Based on Polycrystal Plasticity," *Modelling Simul. Mater. Sci. Eng.*, 10, 745-763, 2002.
- Krasnochekov, P., K. Albe, and R. S. Averback, "Simulations of the Inert Gas Condensation Processes," *Zeitschrift for Metallkunde* (in press) (invited article for H. Gleiter Festschrift).
- Kubair, D. V., P. H. Geubelle, and Y. Huang, "Analysis of a Rate-dependent Cohesive Model for Dynamic Crack Propagation," *Engineering Fracture Mechanics*, 50, 685-704, 2003.
- Kubair, D. V., P. H. Geubelle, and Y. Huang, "Intersonic Crack Propagation in Homogeneous Media under Shear-dominated Loading: Theoretical Analysis," *Journal of the Mechanics and Physics of Solids*, 50, 1547-1564, 2002.
- Li, Y., D. J. Siegel, J. B. Adams, and X.-Y. Liu, "Embedded-atom-method Tantalum Potential Developed by the Force-matching Method," *Physical Review B* 67, 125101, 2003.
- Liang, Y., and P. Sofronis, "Micromechanics and Numerical Modelling of the Hydrogen-particle-matrix Interactions in Nickel-base Alloys," *Modelling and Simulation in Materials Science and Engng*, 11, 523-551, 2003.
- Liang, Y., and P. Sofronis, "Toward a Phenomenological Description of Hydrogen-induced Decohesion at Particle/matrix Interfaces," *Journal of the Mechanics and Physics of Solids*, 51, 1509-1531, 2003.
- Liang, Y., P. Sofronis, and N. Aravas, "On the Effect of Hydrogen on Plastic Instabilities in Metals," *Acta Materialia*, 51, 2717-2730, 2003.
- Liang, Y., P. Sofronis, and R. H. Dodds, Jr., "Interaction of Hydrogen with Crack Tip Plasticity: Effects of Constraint on Void Growth," to appear in *Materials Science and Engng A*.

- Liu, B., X. Qiu, Y. Huang, K. C. Hwang, M. Li, and C. Liu, "The Size Effect on Void Growth in Ductile Materials," *Journal of the Mechanics and Physics of Solids*, 51, 1171-1187, 2003.
- Mayr, S. G., Y. Ashkenazy, K. Albe, and R. S. Averback, "Mechanisms of Radiation-induced Viscous Flow: Role of Point Defects," *Phys. Rev. Letts.*, 2003.
- Mishin, Y., P. Sofronis, and J. L. Bassani, "Thermodynamic and Kinetic Aspects of Interfacial Decohesion," *Acta Materialia*, 50, 3609-3622, 2002.
- Namazifard, A., and I. D. Parsons, "A Distributed Memory Parallel Implementation of the Multigrid Method," submitted to the *International Journal for Numerical Methods in Engineering*.
- Namazifard, A., X. Jiao, J. Blazek and K. D. Hjelmstad, "An Efficient Implicit Coupling Scheme for Parallel Multi-Physics Simulations with Application to Solid Rocket Motors," 7th U.S. National Congress on Computational Mechanics, Albuquerque, NM, 27-31 July 2003.
- Norato, J. A., R. B. Haber, M. P. Bendsøe, and D. A. Tortorelli, "A Geometry Projection Method for Shape Optimization with Design-dependent Boundary Loads," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Norato, J., R. Haber, D. Tortorelli, and M. Bendsøe, "A Geometry Projection Method for Shape Optimization," to appear in *Int. J. Num. Methods Engrg.*
- Palaniappan, J., R. B. Haber, and R. Jerrard, "Spacetime Discontinuous Galerkin Method for Systems of Nonlinear Conservation Laws," *Proceedings of Seventh U. S. National Congress on Comp. Mechs.*, Albuquerque, NM, 28-30 July 2003.
- Palaniappan, J., R. B. Haber, and R. L. Jerrard, "A Spacetime Discontinuous Galerkin Method for Scalar Conservation Laws," to appear in *Computer Methods in Applied Mechanics and Engineering* (invited paper).
- Pothisiri, T., and K. D. Hjelmstad, "Structural Damage Detection and Assessment from Modal Response," *ASCE Journal of Engineering Mechanics*, 129, 2, 135-145, 2003.
- Rosakis, A. J., and Y. Huang, "Intersonic Debonding," in *Comprehensive Structural Integrity Handbook* (eds. B. Karahaloo, R. Ritchie, and I. Milne), Elsevier Science, 8, Interfacial and Nanoscale Fracture (volume eds., W. Gerberich and W. Yang), chap 8.4, 137-179, 2003.
- Samudrala, O., Y. Huang, and A. J. Rosaki, "Subsonic and Intersonic Shear Rupture of Weak Planes with a Velocity Weakening Cohesive Zone," *Journal of Geophysical Research-Solid Earth*, 107 (B8), article number 2170, 2002.
- Samudrala, O., Y. Huang, and A. J. Rosakis, "Subsonic and Intersonic Mode II Crack Propagation with a Rate Dependent Cohesive Zone," *Journal of the Mechanics and Physics of Solids*, 50, 1231-1268, 2002.
- Sofronis, P., and I. M. Robertson, "Experiments and Models for Hydrogen Embrittlement Mechanisms," *Proceedings of an International Symposium sponsored by the Institute for Structural and Engineering Materials, Nagoya, Japan*, 24 June 2003.
- Sofronis, P., and I. M. Robertson, "Transmission Electron Microscopy Observations and Micromechanical/continuum Models for the Effects of Hydrogen on the Mechanical Behavior of Metals," *Philosophical Magazine A*, 82, 3405-3413, 2002.
- Sofronis, P., I. M. Robertson, Y. Liang, D. F. Teter, and N. Aravas, "Recent Advances in the Study of Hydrogen Embrittlement at the University of Illinois," *Proceedings of the International Conference on Hydrogen Effects on Material Behavior and Corrosion Deformation Interactions held at Jackson Lake Lodge, Moran, WY*, 23-26 September 2002

- Subramanian, S., and P. Sofronis, "Calculation of a Constitutive Potential for Isostatic Powder Compaction," *International Journal of Mechanical Sciences*, **44**, 2239-2262, 2002.
- Tacioglu, E., I. D. Parsons, A. Acharya, and A. Namazifard, "Arbitrary Lagrangian-Eulerian Method for Analysis of Regressing Solid Domains and Interface Tracking," submitted to the *International Journal for Numerical Methods in Engineering*.
- Thiagarajan, G., K. J. Hsia, and Y. Huang, "Finite Element Implementation of Virtual Internal Bond Model for Crack Behavior Simulation," *Engineering Fracture Mechanics* (in press).
- Üngör, A., A. Sheffer, R. Haber, and S. Teng, "Layer Based Solutions for Constrained Space-time Meshing," *Applied Numerical Mathematics*, **46**, 425-443, 2003.
- Vainchtein, A., P. A. Klein, H. Gao, and Y. Huang, "A Strain-gradient Virtual-Internal-Bond Model," *Modeling and Simulation-based Life Cycle Engineering* (eds. K. P. Chong, S. Saigal, S. Thynell, and H. S. Morgan), Spon Press, London, 31-46, 2002.
- Xu, L. R., Y. Huang, and A. J. Rosakis, "Dynamic Crack Deflection and Penetration at Interfaces in Homogeneous Materials: Experimental Studies and Model Predictions," *Journal of the Mechanics and Physics of Solids*, **51**, 461-486, 2003.
- Yin, L., and R. B. Haber, "Elastodynamic Spacetime Discontinuous Galerkin Method with Application to Crack-tip Wave Scattering," *Proceedings of the Fifth World Congress on Computational Mechanics (WCCM V)*, 7-12 July 2002, Vienna, Austria (eds. H. A. Mang, F. G. Rammerstorfer, J. Eberhardsteiner), Vienna University of Technology, Austria, ISBN 3-9501554-0-6, Paper-ID: 81346, 2002.
- Zhang, P., P. A. Klein, Y. Huang, H. Gao, and P. D. Wu, "Numerical Simulation of Cohesive Fracture by the Virtual-internal-bond Model," *Computer Modeling in Engineering and Sciences*, **3**, 263-278, 2002.
- Zhang, P., Y. Huang, P. H. Geubelle, P. A. Klein, and K. C. Hwang, "The Elastic Modulus of Single-wall Carbon Nanotubes: A Continuum Analysis Incorporating Interatomic Potentials," *International Journal of Solids and Structures*, **39**, 3893-3906, 2002.
- Zhong, Y., Y. Ashkenazy, K. Albe, and R. S. Averback, "Ion Irradiation Induced Smoothing of Metal Surfaces," (in press).

7.6 System Integration

- Fiedler, R., M. S. Breitenfeld, X. Jiao, A. Haselbacher, P. Geubelle, D. Guoy, and M. Brandyberry, "Simulations of Slumping Propellant and Flexing Inhibitors in Solid Rocket Motors," 39th AIAA/ASME/SAE/ASEE Joint Propulsion Conference and Exhibit, Indianapolis, IN, 2002-4341, 7-10 July 2002.
- Hwang, C., L. Massa, R. Fiedler, and P. Geubelle, "Simulation of Convective Burning and Dynamic Fracture in Solid Propellants," AIAA, 2002-4342, 2002.
- Hwang, C., R. Fiedler, A. Acharya, and P. H. Geubelle, "Simulation of Fluid-structure Interaction and Dynamic Fracture Events in Solid Propellant Rockets," submitted to *International Journal for Numerical Methods in Engineering*.