

Joseph M. Powers

Department of Aerospace and Mechanical Engineering
Department of Mathematics (concurrent)
372 Fitzpatrick Hall of Engineering
University of Notre Dame
Notre Dame, Indiana 46556-5637
USA

powers@nd.edu, <http://www.nd.edu/~powers>, 574-631-5978

Education

1983 B.S., Mechanical Engineering, University of Illinois at Urbana-Champaign,
1985 M.S., Mechanical Engineering, University of Illinois at Urbana-Champaign,
1988 Ph.D., Mechanical Engineering, University of Illinois at Urbana-Champaign.

Appointments

2009 Visiting Scientist, Chinese Academy of Sciences,
2008- Professor, Dept. Aerospace and Mechanical Eng., Univ. Notre Dame,
2008- Concurrent Professor, Dept. Mathematics, Univ. Notre Dame,
2006-2008 Concurrent Associate Professor, Dept. Mathematics, Univ. Notre Dame,
2006-07 Kaneb Faculty Fellow, University of Notre Dame,
2005 Visiting Scientist, Argonne National Laboratory,
1998-2003 Special Programs Guest, Los Alamos National Laboratory,
1995-2008 Associate Professor, Dept. Aerospace and Mechanical Eng., Univ. Notre Dame,
1995 AFOSR Summer Faculty Research Associate, Wright Lab., Eglin AFB, Florida,
1990-91 NASA-ASEE Summer Faculty Fellow, NASA Lewis Research Center,
1989-95 Assistant Professor, Dept. Aerospace and Mechanical Eng., Univ. Notre Dame,
1988-89 Visiting Assistant Professor, University of Illinois at Urbana-Champaign.

Honors, Awards, and Service

AIAA Associate Fellow, NASA Innovative Technology Award, International Pyrotechnics Society Bursary Award, Ruth and Joel Spira Award for Excellence in Teaching, Kaneb Faculty Fellow, Faculty Award, Amoco-College of Engineering Outstanding Teacher of the Year Award, Provost Review Committee, Academic Council, First Year of Study Review Committee, Bookstore Advisory Committee, College Council, Engineering Dean Review Committee, Committee on Appointments and Promotion, Department Chair Review Committee, University of Illinois Bronze Tablet Award, Wapella High School Valedictorian, Member APS, SIAM, ASME, Combustion Institute, Tau Beta Pi, Pi Tau Sigma; Associate Editor, *Journal of Propulsion and Power*; Member, AIAA Propellants and Combustion Technical Committee, AIAA Committee on Standards in Computational Fluid Dynamics; Conference Organizer, Propellants and Combustion AIAA Aerospace Sciences Meeting, Second International Workshop on Model Reduction in Reacting Flow.

Ph.D. Students

M. J. Grismer (1994); K. A. Gonthier (1996); A. M. Smith (1997); S. Singh (2003); G. P. Brooks (2003); A. K. Henrick (2008); A. N. Al-Khateeb (2010).

Selected Publications

- Al-Khateeb, A. N., Powers, J. M., and Paolucci, S., 2010, "On the Necessary Grid Resolution for Verified Calculation of Premixed Laminar Flames," *Communications in Computational Physics*, Vol. 8, No. 2, pp. 304-326.
- Al-Khateeb, A. N., Powers, J. M., Paolucci, S., Sommesse, A. J., Diller, J. A., Hauenstein, J. D., and Mengers, J. D., 2009, "One-Dimensional Slow Invariant Manifolds for Spatially Homogeneous Reactive Systems," *Journal of Chemical Physics*, Vol. 131, No. 2, 024118.
- Powers, J. M., and Paolucci, S., 2008, "Uniqueness of Chemical Equilibria in Ideal Mixtures of Ideal Gases," *American Journal of Physics*, Vol. 76, No. 9, pp. 848-855.
- Cochran, M. T., and Powers, J. M., 2008, "Computation of Compaction in Compressible Granular Material," *Mechanics Research Communications*, Vol. 35, Nos. 1-2, pp. 96-103
- Powers, J. M., 2006, "Review of Multiscale Modeling of Detonation," *Journal of Propulsion and Power*, Vol. 22, No. 6, pp. 1217-1229.
- Henrick, A. K., Aslam, T. D., and Powers, J. M., 2006, "Simulations of Pulsating One-Dimensional Detonations with True Fifth Order Accuracy," *Journal of Computational Physics*, Vol. 213, No. 1, pp. 311-329.
- Powers, J. M., and Aslam, T. D., 2006, "Exact Solution for Two-Dimensional Compressible Reactive Flow for Verification of Numerical Algorithms," *AIAA Journal*, Vol. 44, No. 2, pp. 337-344.
- Powers, J. M., and Paolucci, S., 2005, "Accurate Spatial Resolution Estimates for Reactive Supersonic Flow with Detailed Chemistry," *AIAA Journal*, Vol. 43, No. 5, pp. 1088-1099.
- Henrick, A. K., Aslam, T. D., and Powers, J. M., 2005, "Mapped Weighted Essentially Non-Oscillatory Schemes: Achieving Optimal Order Near Critical Points," *Journal of Computational Physics*, Vol. 207, No. 2, pp. 542-567.
- Powers, J. M., 2004, "On the Necessity of Positive Semi-Definite Conductivity and Onsager Reciprocity in Modeling Heat Conduction in Anisotropic Media," *Journal of Heat Transfer*, Vol. 126, No. 5, pp. 670-675.
- Powers, J. M., 2004, "Two-Phase Viscous Modeling of Compaction of Granular Materials," *Physics of Fluids*, Vol. 16, No. 8, pp. 2975-2990.
- Brooks, G. P., and Powers, J. M., 2004, "Standardized Pseudospectral Formulation of the Inviscid Supersonic Blunt Body Problem," *Journal of Computational Physics*, Vol. 197, No. 1, pp. 58-85.
- Brooks, G. P., and Powers, J. M., 2004, "A Karhunen-Loeve Least-Squares Technique for Optimization of Geometry of a Blunt Body in Supersonic Flow," *Journal of Computational Physics*, Vol. 195, No. 1, pp. 387-412.
- Singh, S., Powers, J. M., and Paolucci, S., 2002, "On Slow Manifolds of Chemically Reactive Systems," *Journal of Chemical Physics*, Vol. 117, No. 4, pp. 1482-1496.