

**Robert A. Frederick, Jr.**  
**UAH Propulsion Research Center**



Dr. Robert Frederick is currently an Associate Professor of Mechanical and Aerospace Engineering and the Associate Director of the UAH Propulsion Research Center. Dr. Frederick received his Ph.D. in Aeronautics and Astronautics from Purdue University in 1988. His professional experience includes positions at Allison Turbine Engines, the Air Force Rocket Propulsion Laboratory, and Sverdrup Technology, AEDC Group. In 1991, he joined the UAH Department of Mechanical and Aerospace Engineering. During his 16 years at UAH, he has overseen over 2.6 million dollars externally funded research in solid propellant combustion, hybrid fuel combustion, thermal stability of hydrocarbon fuels, and characterization of rocket plume emissions. His research has experimentally revealed important combustion phenomena in the area of solid propellants. As an educator, Dr. Frederick pioneered a team-based design laboratory that integrates students and industry mentors from engineering, liberal arts, and business disciplines. These projects included tactical missiles, launch vehicles, upper stage rockets, unmanned aerial vehicles, and gun launched projectiles. Dr. Frederick also developed an aerospace propulsion laboratory that provides hands on experience in air breathing and rocket propulsion for undergraduate students. Dr. Frederick is an AIAA Associate Fellow and member of the ASEE. He has served the professional community as an organizer of four regional AIAA/AHS conferences on aerospace system design, a national organizer of propulsion education sessions for ASEE, the national chairman of the AIAA Hybrid Rocket Technical Committee, and the U.S. representative to a NATO Advisory Group on solid propellant burning rate measurements.



## **Example Publications R. A. Frederick**

Kohga, M., Frederick, R.A, Jr., and Moser, M.D., "Ultrasonic Properties of Propellant Ingredients," *AIAA Journal of Propulsion and Power*, *AIAA Journal of Propulsion and Power*, Vol. 20, No.1, 2004.

Greiner, B., Frederick, R.A., Jr., and Moser, M.D., "Combustion Effects of C<sub>60</sub> Soot in AN Propellants," *AIAA Journal of Propulsion and Power*, Vol. 19, No.4, July-August 2003.

Rasmussen, B., and Frederick, R.A., Jr. "A Nonlinear Model of Composite Solid Propellant Combustion," *AIAA Journal of Propulsion and Power*, Vol. 18, No. 5, September-October 2002, pp. 1086-1092.

Norman, Rose, and Frederick. Robert A. "Integrating Technical Editing Students in a Multidisciplinary Engineering Project." *Technical Communication Quarterly* 9.2 (spring 2000): 163-89

Di Salvo, R., Dauch, F, Frederick, R. A. Jr., and Moser M. D, "Direct Ultrasonic Measurement of Solid Propellant Ballistics," *the Review of Scientific Instruments*, Vol. 70, No. 11, November, 1999, pp. 4416-4421.

Sims, J.D. and Frederick, R.A., "Preliminary Design of a Hybrid Propulsion System for a Multi-Mission Missile System," March-April *AIAA Journal of Spacecraft and Rockets*, 1997.

Frederick, R.A., Nichols, J.S., and Rogerson, J., "Slag Accumulation Measurements in a Strategic Solid Rocket Motor," *Journal of Image Processing and Flow Visualization*, Vol. 3, No. 2, pp.165-176, 1996.

Frederick, R.A., "Measuring the Regression of a Burning Solid Propellant," *Review of Scientific Instruments*, Vol. 67, No. 8, August 1996.

Frederick, R.A and Greiner, B.E., "Laboratory-Scale Hybrid Rocket Motor Uncertainty Analysis," *AIAA Journal of Propulsion and Power*, Vol. 12, No. 3, May-June 1996.

Frederick, R.A., Jr. and Komai, I., "Propellant Design Relationships for Throttled Gas Generators," *AIAA Journal of Propulsion and Power*, Vol. 12, No. 3, May-June 1996.

Frederick, R.A., Jr., Williams, B.M., and Bean, S.B., "Predicting and Analyzing X-Rays to Measure Propellant Crack Propagation Speed," *AIAA Journal of Propulsion and Power*, Vol. 12, No. 2, March-April 1996.

Frederick, R.A., Jr., Blevins, J.A., and Coleman, H.C., "An Investigation of Microwave Attenuation Measurements in a Laboratory Scale Rocket Motor Plume," *AIAA Journal of Spacecraft and Rockets*, Vol. 32, No. 5, September-October 1995, pp. 923-925.