



Robert Frederick

Professor & Center Director

Department of Mechanical and Aerospace
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BIO:

Dr. Robert Frederick is currently a Professor of Mechanical and Aerospace Engineering and the Director of the UAHuntsville Propulsion Research Center. During his 21 years at UAH, he has overseen over 6.0 million dollars of funded research in innovative propulsion concepts for solid DACS systems, solid propellant combustion, combustion stability of liquid injectors, hybrid fuel combustion, and aerospace vehicle design. His research has experimentally revealed important combustion phenomena in the area of solid, liquid, and hybrid propellants.

Dr. Frederick pioneered an international, team-based design laboratory that integrates students and industry mentors from engineering, liberal arts, and business disciplines. These projects have included multidisciplinary design and assessment of tactical missiles, launch vehicles, uppers stage rockets, unmanned aerial vehicles, and gun launched projectiles. Dr. Frederick developed an aerospace propulsion laboratory that provided hands on experiences in air breathing and rocket propulsion for undergraduate students.

Dr. Frederick is an Associate Fellow of the AIAA and member of the American Society of Engineering Educators. He is as a national organizer of propulsion education sessions for ASEE, the past national chairman of the AIAA Hybrid Rocket Technical Committee, an instructor for a National Short Course entitled "Advanced Solid Rocket Propulsion," and the past U.S. representative to a NATO Advisory Group on solid propellant burning rate measurements, and the National Institute of Rocket Propulsion Systems.

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RELEVANT PUBLICATIONS:

1. Byrd, R., and Frederick, R.A., Jr. "Instability Characteristics of a Gaseous-Oxygen/Methane Pentad Injector," *AIAA Journal of Propulsion and Power*, Vol. 26, No. 4, 2010, pp. 698-695.
2. Cavitt, R., Frederick, R.A., Jr., and Bazarov, V.G., "Laboratory-Scale Survey of Pentad Injector Stability Characteristics," *AIAA Journal of Propulsion and Power*, Vol. 24, No. 3, pp. 534-540, 2008.
3. Brown, S.P and Frederick, R.A., Jr., "Laboratory-Scale Thermal Stability Experiments on RP-1 and RP-2," *AIAA Journal of Propulsion and Power*, Vol. No. 2, pp. 206-212, 2008.
4. Shelton, J.D., Frederick, R.A., Jr., and Wilhite, A.W. "Launch Vehicle Propulsion Design with Multiple Selection Criteria," *AIAA Journal of Spacecraft and Rockets*, Vol. 43, No. 4, pp. 893-902, 2006.
5. Frederick, R.A., Jr., Whitehead, J., Knox, R., and Moser, M.D., "Regression Rates Study of Mixed Hybrid Propellants," *AIAA Journal of Propulsion and Power*, Vol. 23, No. 1, pp. 175-180, 2006.
6. NASA Marshall Spaceflight Center, "Advanced Fuels and Plasma Interactions," RP-1 Thermal Stability Task, Grant NCC8-200, July 9, 2003 to August 9, 2005; Co-Principal Investigator with C. Hawk, et al; \$673,000.
7. Norman, R., and Frederick, R.A. "Integrating Technical Editing Students in a Multidisciplinary Engineering Project." *Technical Communication Quarterly* Vol. 9, No. 2, pp. 163-89, 2000.