

## Home

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## Lab

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# Timothy B. Smith

## Education

- 1999-2002 • **Doctor of Philosophy** in Aerospace Engineering, University of Michigan. Thesis: *Deconvolution of ion velocity distributions from laser-induced fluorescence spectra of xenon electrostatic thruster plumes*. Advisors: Professors Alec D. Gallimore and R. Paul Drake.
- 1996-1998 • **Master of Science** in Aerospace Engineering, University of Michigan.
- 1996-1998 • **Master of Science** in Nuclear Engineering, University of Michigan.
- 1990-1995 • **Master of Science** in Ocean Engineering, George Washington University.
- 1979-1987 • **Bachelor of Science** in Aerospace Engineering, University Of Virginia.

## Experience

- 2003-present • **Research Fellow**, University of Michigan, Ann Arbor, MI. Developing laser-induced fluorescence diagnostics for boron nitride (Hall thruster discharge chamber) and carbon (ion engine grid) erosion experiments.
- 1997-2002 • **Graduate Student Research Assistant**, University of Michigan, Ann Arbor, MI. Designed and implemented optical diagnostic experiments (laser-induced fluorescence and optical emission spectrography) for electric propulsion (Hall thruster and ion engine) and laser plasma physics research. Developed novel method for deconvolving velocity distributions from xenon LIF spectra.
- 1996-2000 • **Graduate Student Instructor**, University of Michigan, Ann Arbor, MI. Assisted in teaching undergraduate courses in engineering surveying, dynamics, aircraft and spacecraft performance. Ran problem and laboratory sessions, gave review lectures, and graded assignments and exams.
- 1989-1996 • **Naval Architect**, Carderock Division, Naval Surface Warfare Center, Bethesda, MD. Planned, prepared, performed and reported cavitation, wake survey, flow visualization and hull resistance experiments. Provided instrumentation and data-collection support for full scale trials. Carried out computational analyses of propeller flows, steady and unsteady forces. Designed and oversaw the manufacture of hardware for model and full scale experiments. Exemplary Performance Awards, 1993-1996. SECRET clearance.
- 1987-1989 • **Design Draftsman**, Douglas Aircraft, Long Beach, CA. Prepared layouts, design and detail drawings of electrical installations and associated mechanical packaging for the C-17 airlifter. Prepared CADD and ink-on-mylar drawings to ANSI Y14.5m, company and military standards.

## Experience (continued)

- 1986-1987 • **Laboratory Instrument Maker**, University Of Virginia, Charlottesville, VA. Ran small research machine shop. Designed and fabricated mechanical and electro-mechanical parts and devices to close tolerances from rough sketches and oral descriptions. Maintained, repaired and calibrated research tools ranging from forceps to recording ECGs.
- 1984-1986 • **Aircraft Machinist**, USAF Military Airlift Command, McGuire AFB, NJ. Fabricated, reworked, disassembled and reassembled parts for aircraft, ground equipment and fabrication tools. Operated machine tools to close tolerances. Experience in set up, inspection, heat treatment, and building simple jigs and fixtures. SECRET clearance.

## Awards & honors

- 2002 • Rackham Predoctoral Fellowship, first alternate.  
2003 • Michigan Teaching Fellow.

## Professional & honor societies

- Tau Beta Pi
- Sigma Gamma Tau
- AIAA
- American Society for Engineering Education (ASEE)
- Electric Rocket Propulsion Society

## Journal publications

- B.E. Gilchrist, S.G. Bilén, E. Choinière, A.D. Gallimore and T.B. Smith, "Analysis of Chamber Simulations of Long Collecting Probes in High-Speed, Dense Plasmas," *IEEE Transactions on Plasma Science*, Vol. 30, No. 5, October 2002, 2023-2034.
- G.J. Williams Jr., T.B. Smith, F.S. Gulczinski III, and A. D. Gallimore, "Correlating Laser-Induced Fluorescence and Molecular Beam Mass Spectrometry Ion Energy Distributions," *Journal of Propulsion and Power*, Vol. 18, No. 2, March-April 2002, 489-491.
- G.J. Williams Jr., T.B. Smith, M.T. Domonkos, A. D. Gallimore, and R.P. Drake, "Laser-Induced Fluorescence Characterization of Ions Emitted from Hollow Cathodes," *IEEE Transactions on Plasma Science*, Vol. 28, No. 5, October 2000, 1664-1675.
- G.J. Williams Jr., T.B. Smith, F.S. Gulczinski III, B.B. Beal, A. D. Gallimore, and R.P. Drake, "Laser-Induced Fluorescence Measurement of Ion Velocities in the Plume of a Hall Effect Thruster," *Physics of Plasmas*, submitted June 2000.
- R.P. Drake, J.J. Carroll III, T.B. Smith, P. Keiter, S.G. Glendinning, O. Hurricane, K. Estabrook, D.D. Ryutov, B.A. Remington, R.J. Wallace, E. Michael, and R. McCray, "Laser Experiments to Simulate Supernova Remnants," *Physics of Plasmas*, Vol. 7, No.5, May 2000, 2142-8.

## Journal publications (continued)

- R.P. Drake, S.G. Glendinning, K. Estabrook, B.A. Remington, R. McCray, R.J. Wallace, L.J. Suter, T.B. Smith, J.J. Carroll III, R.A. London, and E. Liang, "Observation of Forward Shocks and Stagnated Ejecta Driven by High-Energy-Density Plasma Flow," *Physical Review Letters*, Vol. 81, No.10, 7 September 1998, 2068-71.

## Conference papers and presentations

- T.B. Smith, D.A. Herman, A.D. Gallimore and R.P. Drake, "Deconvolution of Axial Velocity Distributions from Hall Thruster LIF Spectra," IEPC-01-0019, *27th International Electric Propulsion Conference*, Pasadena, CA, 15-19 October 2001.
- G.J. Williams Jr., T.B. Smith, and A.D. Gallimore, "30 cm Ion Thruster Discharge Cathode Erosion," IEPC-01-306, *27th International Electric Propulsion Conference*, Pasadena, CA, 15-19 October 2001.
- G.J. Williams Jr., T.B. Smith, and A.D. Gallimore, "FMT-2 Discharge Cathode Erosion Rate Measurements via Laser Induced Fluorescence," AIAA-00-3663, *36th Joint Propulsion Conference*, Huntsville, AL, 16-19 July 2000.
- T.B. Smith, G.J. Williams Jr., Y. Hidaka, K.H. Glick, and A.D. Gallimore, "Spectroscopic Characterization of FMT-2 Discharge Ionization Processes," ICOPS-00-4A08, *27th IEEE International Conference on Plasma Science*, New Orleans, LA, 4-7 June 2000.
- T. B. Smith, G.J. Williams Jr., A. D. Gallimore, and R. P. Drake, "Deconvolution of Velocity Distributions from Hall Thruster LIF Spectra," *41st Annual Meeting of the Division of Plasma Physics*, American Physical Society, Seattle, WA, November 1999.
- G.J. Williams Jr., T.B. Smith, T.A. Patrick, and A.D. Gallimore, "Characterization of the FMT-2 Discharge Cathode Plume," IEPC-99-104, *26th International Electric Propulsion Conference*, Kitakyushu, Japan, October 1999.
- G.J. Williams Jr., T.B. Smith, M.T. Domonkos, K.J. Shand, A.D. Gallimore and R.P. Drake, "Laser Induced Fluorescence Characterization of Ions Emitted from Hollow Cathodes," AIAA-99-2862, *35th Joint Propulsion Conference*, Los Angeles, CA, June 1999.
- G.J. Williams Jr., T.B. Smith, F.S. Gulczinski III, and A.D. Gallimore, "Laser Induced Fluorescence Measurement of the Ion Energy Distribution in the Plume of a Hall Thruster," AIAA-99-2424, *35th Joint Propulsion Conference*, Los Angeles, CA, June 1999.
- R.P. Drake, T.B. Smith, J.J. Carroll III, I.Y. Yan, S.G. Glendinning, K. Estabrook, D.D. Ryutov, B.A. Remington, R.J. Wallace, and R. McCray, "Progress Toward the Laboratory Simulation of Young Supernova Remnants," *2nd International Workshop on Laboratory Astrophysics with Intense Lasers*, Tucson, AZ, March 1998.
- J.W. Bailar, K.-H. Kim, K.D. Remmers and T.B. Smith, "Cavitation Performance of Two Contrarotating Propeller Designs for a High Speed Ship," *Second International Symposium on Cavitation*, Tokyo, April 5-7, 1994.
- T.B. Smith and K.D. Remmers, "Propeller Erosion Reduction with an Asymmetric Preswirl Stator," *23rd American Towing Tank Conference*, New Orleans, June 11-12, 1992.