

Douglas G. Fletcher

University of Vermont
33 Colchester Ave.
Burlington, VT 05405
Office: (802) 656 9863
E-mail: douglas.fletcher@uvm.edu

2690 Snipe Ireland Rd
Richmond, VT 05477

Home: (802) 233 8432

Education

Ph.D. Mechanical and Aerospace Engineering, University of Virginia, 1989
Dissertation: Spatially Resolved Flowfield Measurements in a Nonreacting Scramjet Combustor Using Laser-Induced Iodine Fluorescence
Advisor: James C. McDaniel

M.S. Mechanical Engineering, University of Virginia, 1984
Advisor: J. Taylor Beard

B.S. Engineering, University of Vermont, 1979

Employment

- 01/07-present Professor, Mechanical Engineering (secondary: Professor, Materials Science)
University of Vermont, Burlington, VT
Developed a unique 30 kW ICP Torch Facility with laser and emission spectroscopic diagnostics. Served as head of ME program until 2008, and twice served as graduate program coordinator. Advising graduate students, managing external grants, and teaching in the ME program.
- 07/04-12/06 Professor, Head of Aeronautics & Aerospace Department
von Karman Institute for Fluid Dynamics, Rhode-St-Genèse, Belgium
Was responsible for Department administration and management of technical staff operating four major wind tunnels and a number of instructional tunnels. Taught courses, supervised four PhD theses, generated & managed ~300k euro annual in research contracts (mainly ESA).
- 10/00-06/04 Professor, Aeronautics & Aerospace Department
von Karman Institute for Fluid Dynamics, Rhode-St-Genèse, Belgium
Implemented laser diagnostics for the study of inductively coupled plasma flows and impulsive hypersonic flows. Obtained funding to construct and equip a new optical laboratory for this activity. Taught courses in fluid dynamics and statistical thermodynamics.
- 11/94-9/00 Research Scientist & Group Leader, Reacting Flow Environments Branch
NASA Ames Research Center, Moffett Field, CA
Led effort to characterize the large-scale arcjet facilities using optical diagnostics. Developed a stream enthalpy measurement capability based on two-photon LIF of the dissociated species.
- 4/89-10/94 Research Scientist, Experimental Fluid Dynamics Branch
NASA Ames Research Center, Moffett Field, CA
Developed and demonstrated a laser-spectroscopic instrument to measure temperature, density, pressure, and their fluctuations in unseeded, turbulent airflows. Developed and demonstrated a new approach for two-photon excitation of atomic oxygen using an excimer laser.
- 4/95-6/95 Lecturer, Department of Mechanical Engineering, Stanford University, Stanford, CA
Graduate course: Special Topics in Laser Diagnostics.
- 10/88-3/89 Research Associate, Aerospace Research Laboratory, University of Virginia, Charlottesville, VA
Measured distributions of pressure, temperature, and two velocity components in a nonreacting scramjet combustor using laser-induced iodine fluorescence (LIIF). This data set was chosen by the JANNAF Scramjet Combustor Modelling Workshop as a benchmark for evaluating CFD models of supersonic mixing flows.

Professional Activities

American Institute of Aeronautics and Astronautics, Associate Fellow
Optical Society of America, Senior Member
Reviewer: Optics Letters, AIAA Journal, Applied Optics, Journal of Thermophysics and Heat Transfer, Journal of the American Ceramic Society, Shock Waves Journal, Journal of Spacecraft and Rockets
NATO Science and Technology Organization:
Applied Vehicle Technology Panel Fluid Physics Guest Member
AVT Panel 18: *Technologies for Propelled Hypersonic Flight*, Member 2000-03
AVT Panel 136: *Critical Aerothermodynamics for Hypersonic Flight*, Member 2006-09
AVT Specialists Meeting 199: *Catalytic Gas Surface Interactions*, Chair 2011-13
European Space Agency Radiation Work Group, Member

Honors/Awards

University of Vermont:

Mortar Board - Scholastic Honor Society
Tau Beta Pi - Engineering Honor Society

University of Virginia:

Sigma Xi - Scientific Research Society, Member
Pi Tau Sigma - Mechanical Engineering Honor Society
Sigma Gamma Tau - Aerospace Engineering Honor Society

NASA Ames Research Center:

Superior Achievement Awards - 1990, 1995, 1996, 1997, 1998
Director's Discretionary Fund Grants - 1994, 1997
Spotlight Award - 1994

University of Vermont:

Faculty Award for Excellence in Research, 2016

Performance at UVM since 2007

Designed and built an internationally recognized plasma facility combining laser-spectroscopic measurements with high-temperature material testing. Facility became operational in mid-2010 and has been visited by the NASA Chief Technologist, NASA Branch Chiefs and Project Managers, and the Chief Scientist of Lockheed.

Awarded over **\$6 M** as PI in external grant funding from agencies including AFOSR, NASA, and ONR. Ten out of eleven of these large grant awards were in open competition with no cost-share. Three large grants were led by UVM with sub-awards to U. Wisconsin-Madison, Iowa State U., U. Michigan, and SRI International. Developed an income-expense account to accommodate material testing for external customers.

Supervised three PhD theses and nine MS theses. Currently supervising two MS students in the ME program. Supervised three post-doctoral associates, one of whom converted to a research faculty position to take over work funded by Lockheed.

Since 2007 authored or co-authored fifteen journal publications. Six articles on recent work are in preparation. Authored or co-authored thirty-six refereed conference papers, available as proceedings, on measurements of gas-surface and plasma-pyrolysis interactions in the same period. This period includes facility construction (2008-10), and one complete facility disassembly, move, and reassembly in a new location (2017-18).

Organized and chaired a NATO Science and Technology Organization Specialists Meeting on Catalytic Gas Surface Interactions for the Applied Vehicle Technology Panel at the von Karman Institute in September, 2012 (proceedings published on line by STO).

Developed and taught five new courses at UVM: ME 239 Propulsion, ME 240 Compressible Flow, ME 242 Statistical Thermodynamics, ME 346 Atmospheric Entry, and ME 395 Laser Diagnostics. Taught ME 040 Thermodynamics (7 times) and ME 123 Thermo-Fluids Lab (3 times). Developed three new experiments for the thermal-fluids laboratory (ME 123) and mentored nine senior projects.

Served as ME Program Head (2007-08) and served as Graduate Program Coordinator twice (2009-11 and 2014-15). CEMS representative to the Financial and Physical Planning Committee of the Faculty Senate (2009-2017). Faculty Senator since 2010. Member of the Faculty Senate Executive Council (2012-15). Served on the CEMS Facilities Committee, Curriculum Committee and Standards Committee.

Information about the von Karman Institute

The von Karman Institute (VKI) was founded as a non-profit institution in 1956 as a joint post-war investment in research under the auspices of NATO with significant initial financial support from the US. Eventually, most NATO countries joined in supporting the VKI, and some of their best graduate students were able to attend tuition-free with a modest fellowship for an intensive, one-year Diploma Course specializing in fluid mechanics that involved writing a thesis. Until about the early 1980's, the relatively constant level of NATO annual financial support was sufficient to meet the full funding of the VKI. In subsequent years, some countries withdrew funding, and the faculty began writing external grant funding proposals and negotiating research contracts with (mainly) European Industry for a wide range of fluid dynamics problems. At that time, the Institute had evolved into three stable departments: Aeronautics and Aerospace (AR); Turbomachinery and Propulsion (TU), and Environmental and Applied Fluid Dynamics (EA). Up to 2000, leadership of the Institute alternated between american and european Directors, who both led the Institute and met with the supervisory NATO committee annually to request permission to continue for one more year. By this time, the institute was well-known internationally for hosting and publishing proceedings of the VKI Lecture Series.

When I joined the faculty in 2000, the funding situation had evolved to the point where NATO annual support, which included a substantial annual contribution from the US (through AFOSR), met only 50% of the annual operating expenses. NATO representatives were well aware of this situation. Nevertheless, they required that VKI continue to educate 35 students from their countries each year in the Diploma course. The annual educational cost was now greater than the NATO contribution. By 2006, each department was responsible for one-third of the 1.5 million euro annual research income that was required to balance the operating budget from external contracts. As the AR Department Head, I was responsible for 60% of our annual research funding. In that same year, which was also the 50th anniversary of VKI, the US was forced to withdraw from funding VKI by the AFOSR mechanism for legal reasons, and has ceased participation. This is unfortunate, as VKI provided excellent hands-on experience with an extensive collection of wind-tunnel facilities, with frequent one-on-one mentoring of students by faculty.

References

Iain D. Boyd, Professor & Director
Nonequilibrium Gas & Plasma Dynamics Lab
University of Michigan
1320 Beal Ave.
Ann Arbor MI 48109-2140
(734) 615-3281
FAX: (734) 763-0578
email: iainboyd@umich.edu

Michael J. Wright, Senior Scientist & EDL Systems Deputy Lead
Space Technology Division
NASA Ames Research Center
Mail Stop 230-2
Moffett Field, CA 94035 77843-3123
(650)-604-4210
FAX: (650) 604-0350
email: michael.j.wright@nasa.gov

George A. Raiche, Chief
Thermophysics Facilities Branch
NASA Ames Research Center
Mail Stop 229-4
Moffett Field CA 94035
(650) 604-1983
FAX: (650) 604-5244
email: george.a.raiche@nasa.gov

Jochen Marschall, Science Program Officer
Heising-Simons Foundation
400 Main St., Suite 200
Los Altos, CA 94022
(650) 887-0277
email: jochenmarschall516@gmail.com

Journal Articles

1. J. M. Meyers, W. P. Owens, and D. G. Fletcher, "Study of Nitrogen Atom Recombination on Hi-Nicalon SiC Fibers Using Laser Induced Fluorescence", submitted to *J. American Ceramic Society*, October, 2019.
2. J. M. Meyers, W. P. Owens, and D. G. Fletcher, "Study of Oxygen Atom Recombination Hi-Nicalon SiC Fiber Using Laser Induced Fluorescence", submitted to *J. American Ceramic Society*, October, 2019.
3. S. Chen, I. D. Boyd, N. C. Martin, and D. G. Fletcher, "Modeling of Gas Phase Kinetics for Pyrolyzing Ablators", *J. Thermophysics & Heat Transfer*, pp.1-10, DOI 10.2514/1.T5615, 2019.
4. J. M. Meyers and D. G. Fletcher, "Nitrogen Surface Catalyzed Recombination Efficiency from Two-Photon Laser Induced Fluorescence Measurements", *J. Thermophysics & Heat Transfer*, on-line, July, 2018, <https://doi.org/10.2514/1.T5455>
5. D. G. Fletcher and J. M. Meyers, "Surface Catalyzed Reaction Efficiencies in Oxygen Plasmas from Laser-Induced Fluorescence Measurements", *J. Thermophysics & Heat Transfer*, Vol. 31, No. 2, pp. 410-420, May, 2017.
6. J. M. Meyers, S. Paris, and D. G. Fletcher, "Characterization of CO₂ Flow in a Hypersonic Impulse Facility Using DLAS *Experiments in Fluids*, Vol. 57, No. 2, February, 2016. DOI 10.1007/s00348-015-2112-6
7. W. P. Owens, D. Merkel, F. Sansoz and D. G. Fletcher, "Fracture Behavior of Woven Silicon Carbide Fibers Exposed to High-Temperature Nitrogen and Oxygen Plasmas", *J. American Ceramic Society*, Vol. 98, No. 12, pp. 4003-4009, December, 2015.
8. D. Hurley, D. Huston and D. Fletcher, "Remote Monitoring of Harsh Environments Using Acoustic Emission", *J. Engineering Mechanics*, Vol. 139, No. 3, pp. 286-295, May, 2012
9. L. Zhang, D. Pejakovic, J. Marschall, M. Dougherty, and D. G. Fletcher, "Laboratory Investigation of Active Nitridation of Graphite by Atomic Nitrogen", *J. Thermophysics & Heat Transfer*, Vol. 26, No. 1, January, 2012.
10. J. M. Meyers and D. G. Fletcher, "Diode Laser Absorption Sensor Design and Qualification for CO₂ Hypersonic Flows", *J. Thermophysics & Heat Transfer*, Vol. 25, No. 2, pp. 193-200, April, 2011.
11. J. Marschall and D. G. Fletcher, "High-enthalpy test environments, flow modeling, and *in situ* diagnostics for characterizing ultra-high temperature ceramics", *J. European Ceramic Society*, Vol. 30, No. 11, pp. 2323-2336, August, 2010.
12. M. Playez, D. G. Fletcher, J. Marschall, W. G. Fahrenholtz, G. E. Hilmas, and S. Zhu, "Optical Emission Spectroscopy During Plasmatron Testing of ZrB₂-SiC Ultra-High Temperature Ceramic Composites", *J. Thermophysics & Heat Transfer*, Vol. 23, No. 2, pp. 279-285, April, 2009.
13. J. Marschall, D. A. Pejakovic, W. G. Fahrenholtz, G. E. Hilmas, S. Zhu, J. Ridge, D. G. Fletcher, C. O. Asma, J. Thoemel, "Oxidation of ZrB₂-SiC Ultrahigh-Temperature Ceramic Composites in Dissociated Air", *J. Thermophysics & Heat Transfer*, Vol. 23, No. 2, pp. 267-278, April, 2009.
14. A. Orsini, P. Rini, V. Taviani, D. Fletcher, E. Kustova, E. Nagnibeda, "State-to-State Simulation of Nonequilibrium Nitrogen Stagnation-Line Flows: Fluid Dynamics and Vibrational Kinetics", *J. Thermophysics & Heat Transfer*, Vol. 22, No. 3, pp. 390-398, July, 2008.
15. M. Playez and D. G. Fletcher, "Spectroscopic Analysis of Titan Atmospheric Plasmas", *J. Thermophysics & Heat Transfer*, Vol. 22, No. 2, pp. 150-156, April, 2008.
16. V. I. Zvegintsev, A. M. Kharitonov, V. F. Chirkashenko, S. V. Chibisov, D. Fletcher, S. Paris, "Characteristics of a hyperboloid-flare configuration at high Reynolds numbers", *Thermophysics & Aeromechanics*, Vol. 13, No. 4, pp. 489-497, December, 2006
17. D. G. Fletcher, "Arcjet Flow Properties Determined from Laser-Induced Fluorescence of Atomic Nitrogen", *Applied Optics*, Vol. 38, No. 9, pp. 1850-1858, March, 1999.
18. C. S. Park, M. E. Newfield, D. G. Fletcher, and T. Gökçen, "Spectroscopic Measurements of Shock-Layer Flows in an Arcjet Facility", *Journal of Thermophysics and Heat Transfer*, Vol. 13, No. 1, pp. 60-67, January-March, 1999.

19. C. S. Park, M. E. Newfield, D. G. Fletcher, T. Gökçen, and S. P. Sharma, "Spectroscopic Emission Measurements within the Blunt Body Shock Layer in an Arc-Jet Flow", *Journal of Thermophysics and Heat Transfer*, Vol. 12, No. 2, pp. 190-197, April-June, 1998.
20. T. Gökçen, C. S. Park, M. E. Newfield, and D. G. Fletcher, "Computational Simulation of Emission Spectra from Shock-Layer Flows in an Arcjet Facility", *Journal of Thermophysics and Heat Transfer*, Vol. 12, No. 2, pp. 180-189, April-June, 1998.
21. D. G. Fletcher and J. C. McDaniel, "Collisional Shift and Broadening of Iodine Spectral Lines in Air Near 543 nm", *Journal of Quantitative Spectroscopy and Radiative Transfer*, Vol. 54, No. 5, pp. 837-850, November, 1995.
22. D. R. Eklund, D. G. Fletcher, R. J. Hartfield, G. B. Northam, and C. L. Dancy, "A Comparative Computational/Experimental Investigation of Mach 2 Flow Over a Rearward-Facing Step", *Computers & Fluids*, Vol. 24, No. 5, pp. 593-608, May, 1995.
23. D. G. Fletcher, "Two-Photon Excitation of Atomic Oxygen Using a Raman-Shifted, ArF-Excimer Laser", *Applied Physics B*, Vol. 60, No. 1, pp. 61-66, January, 1995.
24. D. R. Eklund, D. G. Fletcher, J. C. McDaniel, R. J. Hartfield, G. B. Northam, C. L. Dancy, and J. A. Wang, "A Detailed Investigation of Staged Normal Injection Behind a Rearward-Facing Step into Mach 2 Flow", *AIAA Journal*, Vol. 32, No. 5, pp. 907-916, May, 1994.
25. D. G. Fletcher and R. L. McKenzie, "Single-Pulse Measurements of Density and Temperature in a Turbulent, Supersonic Flow Using UV Laser Spectroscopy", *Optics Letters*, Vol. 17, No. 22, pp. 1614-1616, Nov., 1992.
26. G. Laufer, R. L. McKenzie, and D. G. Fletcher, "A Method for Measuring Temperatures and Densities in Hypersonic Wind Tunnel Air Flows Using Laser-Induced O₂ Fluorescence", *Applied Optics*, Vol. 29, No. 33, pp. 4873-4883, November, 1990.
27. D. G. Fletcher and J. C. McDaniel, "Laser-Induced Iodine Fluorescence Technique for Quantitative Measurement in a Nonreacting Supersonic Combustor", *AIAA Journal*, Vol. 27, No. 5, pp. 575-580, May, 1989.
28. D. G. Fletcher and J. C. McDaniel, "Temperature Measurement in a Compressible Flowfield Using Laser-Induced Iodine Fluorescence", *Optics Letters*, Vol. 12, No. 1, pp. 16-18, January, 1987.
29. J. T. Beard, D. P. Childs, L. W. Fletcher, T. E. Joost, J. H. Arthur and D. G. Fletcher, "Cooling tobacco in warehouses to kill cigarette beetles, Part III: Passive solar and ventilation cooling system development", *Tobacco Science*, Vol. 30, pp. 1-10, 1986.

Contributions to Books

- D. G. Fletcher, "Fundamentals of Hypersonic Flow: Aerothermodynamics", in Critical Technologies for Hypersonic Vehicle Development, D. G. Fletcher and D. Gaitonde, editors RTO Educational Notes, Neuilly-sur-Seine, in press.
- D. G. Fletcher, J.-M. Charbonnier, and T. Magin, Editors, Physico-Chemical Models for High-Enthalpy and Plasma Flows, VKI Lecture Series 2002-07, von Karman Institute, Rhode-St-Genève, 2003.
- T. Arts, H. Boerigter, J.-M. Buchlin, M. Carbonaro, G. Degrez, R. Denos, D. Fletcher, D. Olivari, M. L. Riethmuller, R. A. Van den Braembussche, Measurement Techniques in Fluid Dynamics: An Introduction, von Karman Institute, Rhode-St-Genève, 2002.
- D. G. Fletcher, "Measurement Requirements for Improved Modeling of Arcjet Facility Flows" in Measurement Techniques for High Enthalpy and Plasma Flows, RTO Educational Notes 8, Neuilly-sur-Seine, pp. 3A1-3A27, 2000.
- D. G. Fletcher, "Nonintrusive Diagnostic Strategies for Arcjet Stream Characterization" in Measurement Techniques for High Enthalpy and Plasma Flows, RTO Educational Notes 8, Neuilly-sur-Seine, pp. 3B1-3B37, 2000.
- D. G. Fletcher (Chairman and Editor), "Catalytic Gas Surface Interactions, AVT Specialist's Meeting AVT-199/RSM-0029, (NATO Countries + Japan, Switzerland, Russia), available online at <http://www.cso.nato.int>

Conference Papers: Refereed, Available in Proceedings

1. P. Jagun, R. Herrmann-Stanzel, N. C. Martin, J. M. Meyers, and D. G. Fletcher, "Steady-State Experimental Evaluation of Pyrolysis Gas and Plasma Interactions", AIAA 2019-2069, 2019 AIAA Scitech Forum, San Diego, CA, January, 2019.
2. R. Herrmann-Stanzel, J. M. Meyers, and D. G. Fletcher, "Energy Accommodation from NO Recombination in Air Plasma", AIAA 2019-2067, 2019 AIAA Scitech Forum, San Diego, CA, January, 2019.
3. S. Chen, I. D. Boyd, N. C. Martin, and D. G. Fletcher, "Modeling of Gas Phase Chemical Kinetics for Pyrolyzing Ablators", AIAA 2018-3274, 2018 Joint Thermophysics and Heat Transfer Conference, Atlanta, GA, June, 2018.
4. N. C. Martin, L. J. Hantsche, R. Herrmann-Stanzel, J. M. Meyers, and D. G. Fletcher, "Investigation of Pyrolysis Gas and Plasma Reactions", AIAA 2018-1842, 2018 AIAA SciTech Forum, Kissimmee, FL, January, 2018.
5. N. C. Martin, J. M. Meyers, D. G. Fletcher, D. Dang and I. D. Boyd, "Investigation of Pyrolyzing Ablators Using a Gas Injection Probe", 55th AIAA Aerospace Sciences Meeting, Grapevine, TX, January, 2017.
6. R. Herrmann-Stanzel, L. Allen, J. M. Meyers, and D. G. Fletcher, "Spatially Resolved Measurements of Simulated Pyrolysis Gases", AIAA 2017-0436, 55th AIAA Aerospace Sciences Meeting, Grapevine, TX, January, 2017.
7. C. C. Tillson, J. M. Meyers, and D. G. Fletcher, "Spectrally Resolved Emission Measurements from Pyrolyzing Ablators in an Inductively Coupled Plasma Facility", AIAA 2017-0435, 55th AIAA Aerospace Sciences Meeting, Grapevine, TX, January, 2017.
8. L. D. Allen, J. M. Meyers, and D. G. Fletcher, "Characterization of NO Production over Metallic Surfaces in Air Plasmas Using Laser-Induced Fluorescence", AIAA 2016-3380, 47th AIAA Plasmadynamics and Lasers Conference, Washington, DC, June, 2016.
9. C. C. Tillson, J. Uhl, J. M. Meyers, and D. G. Fletcher, "Investigation of Pyrolysis Gas Chemistry in an Inductively Coupled Plasma Facility", AIAA 2016-3235, 46th AIAA Thermophysics Meeting, Washington, DC, June, 2016.
10. W. P. Owens, J. M. Meyers, and D. G. Fletcher, "Surface Reaction and Oxidation Effects on Flexible Thermal Protection Materials", TP15-0402, CAMX - The Composites and Advanced Materials Expo, Dallas, TX, October, 2015.
11. J. M. Meyers and D. G. Fletcher, "Planar Two-Photon LIF Measurements of Atomic Species in a High-Temperature Inductively Coupled Plasma Environment", AIAA 2015-2959, 46th AIAA Thermophysics Meeting, June, 2015.
12. A. J. Lutz and D. G. Fletcher, "Investigation of Non-Equilibrium Nitrogen Plasmas", AIAA 2015-2959, 46th AIAA Plasmadynamics and Lasers Conference, June, 2015.
13. J. M. Meyers, W. P. Owens and D. G. Fletcher, "Surface Catalyzed Reaction Efficiencies in Nitrogen and Oxygen Plasmas from Laser-Induced Fluorescence Measurements", AIAA 2013-3139, 44th AIAA Thermophysics Meeting, San Diego, CA, June, 2013.
14. J. M. Meyers, W. P. Owens and D. G. Fletcher, "Surface Catalyzed Reaction Efficiencies in Air Plasmas from Laser-Induced Fluorescence Measurements", AIAA 2013-3140, 44th AIAA Thermophysics Meeting, San Diego, CA, June, 2013.
15. W. P. Owens, J. M. Meyers and D. G. Fletcher, "Surface Catalysis and Oxidation of Flexible Thermal Protection Materials in Air Plasmas", AIAA 2013-1341, 44th AIAA Thermophysics Meeting, San Diego, CA, June, 2013.
16. A. J. Lutz, W. P. Owens, J. M. Meyers and D. G. Fletcher, "Experimental Analysis of Carbon Nitridation and Oxidation Efficiency with Laser-Induced Fluorescence", AIAA 2013-0924, 51st AIAA Aerospace Sciences Meeting, Grapevine, TX, January, 2013.
17. J. M. Meyers, W. P. Owens and D. G. Fletcher, "Detection of Surface Catalyzed Reaction Products", NATO STO AVT Specialist's Meeting RSM-0029, von Karman Institute, Rhode-St-Genese, Belgium, September, 2012.

18. W. P. Owens, J. M. Meyers, A. J. Lutz, S. Smith and D. G. Fletcher, "Direct Assessment of Surface Catalyzed Reaction Efficiencies", NATO STO AVT Specialist's Meeting RSM-0029, von Karman Institute, Rhode-St-Genese, Belgium September, 2012.
19. W. P. Owens, J. M. Meyers, and D. G. Fletcher, "Flexible TPS Surface Catalysis Testing in a 30 kW ICP Torch Facility, AIAA 2012-3095, 43rd AIAA Thermophysics Conference, New Orleans, LA, June, 2012.
20. J. M. Meyers, W. P. Owens and D. G. Fletcher, "Near-Surface CO₂ Detection in an Inductively Coupled Plasma Facility Using Diode Laser Absorption", AIAA 2011-1326, 42nd AIAA Thermophysics Conference, Honolulu, HI, June, 2011.
21. J. Uhl, W. P. Owens, M. Dougherty, A. J. Lutz, J. M. Meyers, and D. G. Fletcher, "Pyrolysis Simulation in an ICP Torch Facility", AIAA 2011-3618, 42nd AIAA Thermophysics Meeting, Honolulu, HI, June, 2011.
22. D. A. Hurley, D. R. Huston, W. Owens and D. G. Fletcher, "Thermal Protection System Monitoring Using Acoustic Emission", Paper No. 7983-135, SPIE Smart Structures Conference, San Diego, March, 2011
23. A. Lutz, M. Dougherty, J. Uhl, W. Owens, J. M. Meyer, J. Marschall and D. G. Fletcher, "Investigation of CN Production from Carbon Materials in Nitrogen Plasmas", AIAA 2011-0901, 49th AIAA Aerospace Sciences Meeting, Orlando, FL, January, 2011.
24. M. Dougherty, A.J. Lutz, W. Owens, J. Uhl, J. M. Meyers and D. G. Fletcher, "Investigations of Surface Catalyzed Recombination Reactions in the Mars Atmosphere", AIAA 2011-1326, 49th AIAA Aerospace Sciences Meeting, Orlando, FL, January, 2011.
25. W. P. Owens, J. Uhl, A. J. Lutz, M. Dougherty, J. M. Meyers and D. G. Fletcher, "Development of a 30 kW Inductively Coupled Plasma Torch Facility for Aerospace Material Testing", AIAA 2010-4322, 10th AIAA/ASME Joint Thermophysics and Heat Transfer Conference, June, 2010.
26. J. M. Meyers, W. P. Owens, M. J. Dougherty, A. J. Lutz, J. Uhl, and D. G. Fletcher, "Laser-Spectroscopic Investigation of Surface Catalyzed Reactions for Mars Exploration Vehicles", AIAA 2010-4915, 27th AIAA Aerodynamic Measurement Technology and Ground Testing Conference, June, 2010.
27. D. G. Fletcher, J. Thomel, O. Chazot and J. Marschall, "Realization of a Gas-Surface Interaction Test Case for Model Validation", AIAA 2010-1249, 49th AIAA Aerospace Sciences Meeting, January, 2010.
28. L. Zhang, D. Pejakovic, J. Marschall, and D. G. Fletcher, "Laboratory Investigation of Active Graphite Nitridation by Atomic Nitrogen", AIAA 2009-4251, 41st AIAA Thermophysics Conference, San Antonio, TX, June, 2009.
29. J. M. Meyers, S. Paris, and D. G. Fletcher, "Diode Laser Absorption Measurements of Free Stream Hypervelocity CO₂ Flows at 1.6 μm , AIAA 2009-4326, 41st AIAA Thermophysics Conference, San Antonio, TX, June, 2009.
30. A. Orsini, P. Rini, V. Taviani, D. G. Fletcher, E. V. Kustova and E. A. Nagnibeda, "Detailed Vibrational-Chemical Kinetics and Transport Properties in a Non-Equilibrium Stagnation Line Flow", AIP Conference Proceedings **1084**, pp. 849-854, January, 2008.
31. C. Thompson, D. G. Fletcher, and D. Bose, "Analysis of Spectrally Resolved Shock-Layer Emission for Lunar Trajectory Conditions", AIAA 2008-3813, 40th AIAA Thermophysics Conference, Seattle, WA, June, 2008.
32. B. Vancrayenest and D. G. Fletcher, "Ablation of Carbonaceous Heatshields: Spectroscopic Emission Survey in a Subsonic ICP Flow", AIAA 2008-3911, 40th AIAA Thermophysics Conference, Seattle, WA, June, 2008.
33. J. M. Meyers, S. Paris, and D. G. Fletcher, "Development of Diode Laser Absorption Instrument for Free Stream Measurements in Hypervelocity CO₂ Flows", AIAA 2008-4138, 26th Aerodynamic Measurement Technology and Ground Testing Conference, Seattle, WA, June, 2008.
34. M. Playez and D. G. Fletcher, "Free Stream Test Condition Determination in ICP Wind Tunnels Using the TALIF Measurement Technique, AIAA 2008-4254, 40th AIAA Thermophysics Conference, Seattle, WA, June, 2008.
35. S. Tirtey, H. Bolnot, H. Bottini, S. Paris, D. G. Fletcher, and O. Chazot, "In-Flight Hypersonic Roughness Induced Transition Experiment", AIAA 2008-0250, 46th AIAA Aerospace Sciences Meeting, Reno, NV, January, 2008.

36. J. Thoemel, S. Tirtey, S. Birjmohan, D. G. Fletcher, and O. Chazot, "Development of an In-Flight Catalysis Experiment within the EXPERT Program", AIAA 2008-0637, 46th AIAA Aerospace Sciences Meeting, Reno, NV, January, 2008.
37. H. Bottini, F. Jivraj, A. Strub, S. Paris, D. G. Fletcher, and C. O. Asma, "Inducer-Induced Transition in Hypersonic Boundary Layers, AIAA 2007-0537, 45th AIAA Aerospace Sciences Meeting, Reno, NV, January, 2007
38. M. Playez and D. G. Fletcher, "Titan Atmosphere Plasma Radiation Measurement", 2nd International Workshop on Radiation of High Temperature Gases in Atmospheric Entry, ESA Special Publication 629, Rome, Italy, November, 2006
39. S. Tirtey, L. Walpot, O. Chazot, and D. G. Fletcher, "Experimental Characterization of Hypersonic Boundary Layer in Flight and in Wind-Tunnel Conditions", AIAA 2006-7940, 14th AIAA/AHI Space Planes and Hypersonic Systems and Technologies Conference, Canberra, Australia, August, 2006.
40. D. G. Fletcher, M. Playez, and B. Vancrayenest, "Spectroscopic Investigation of Mars Atmosphere Photochemistry", 2nd International Workshop on Radiation of High Temperature Gases in Atmospheric Entry, ESA Special Publication 629, Rome, Italy, November, 2006
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Other Publications

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2. M. J. Dougherty and D. G. Fletcher, "Development of a Computational Tool for Inductively Coupled Plasma Flow over Test Samples", *Bulletin of the American Physical Society*, Vol. 57, November, 2012.
3. D. G. Fletcher, "Statistical Thermodynamics for Application to High Enthalpy, Hypersonic Flows", VKI Course Note 157, von Karman Institute, Rhode-St-Genève, 2003.

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12. J. C. McDaniel, L. K. Nicholson, and D. G. Fletcher, "Nonintrusive Pressure Measurement in a Laval Nozzle", *Bulletin of the American Physical Society*, Vol. 30, No. 10, Nov. 1985.
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Recent Invited Presentations

1. D. G. Fletcher, "Laser Spectroscopic Measurements of Gas-Surface Reaction Rates for Atmospheric Entry Applications", AIAA Aviation 2018, June 25, 2018
2. D. G. Fletcher, "Determination of Surface Reaction Rates from Laser-Induced Fluorescence Measurements of Species", 2018 AIAA SciTech Forum, Kissimmee FL, January, 2018
3. D. G. Fletcher, "Testing Advanced High-Temperature Materials in High Enthalpy Environments: Part 2", Workshop on Methods of Materials Screening for High Speed Aerospace Applications, Chantilly, VA, June 22, 2015.
4. D. G. Fletcher, "Gas-Surface Interaction Measurements in an Inductively Coupled Plasma Torch Using Laser-Induced Fluorescence", Aerospace Engineering Seminar Series, Texas A& M University, February 19, 2015.
5. D. G. Fletcher, "Testing Advanced High-Temperature Materials in High Enthalpy Environments", Technical Interchange Meeting on Ground Testing for Materials Screening (AFRL, ONR, ARO), Tullahoma, TN, November 19, 2014.
6. D. G. Fletcher, "Measurements of Surface Catalyzed Recombination Efficiencies by Laser-Induced Fluorescence", 38th Conference on Composites, Materials and Structures, Cocoa Beach, January 27, 2014.