

## BIOGRAPHICAL SKETCH

### James C. Hermanson

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University of Washington  
Seattle, WA 98195

#### Education

University of Washington, Seattle, WA B.S., Aeronautics and Astronautics Graduated Magna Cum Laude	1977
California Institute of Technology, Pasadena, CA M.S., Aeronautics	1980
California Institute of Technology, Pasadena, CA Ph.D., Aeronautics	1985
Universität Göttingen, Göttingen, Germany Postdoctoral Research Fellow	7/85-12/85

#### Experience

University of Washington, Seattle, WA Associate Professor (2002-2008), Professor (2008-), Associate Chair (2009-2010), Chair (2010-present)	8/02-present
Worcester Polytechnic Institute, Worcester MA Assistant Professor (1995-1997), Associate Professor (1997-2002), Professor (2002)	3/95-7/02
University of Connecticut Department of Mechanical Engineering, Storrs, CT Visiting Associate Professor	1/93-6/93
United Technologies Research Center, East Hartford, CT Research Scientist	7/88-3/95
University of Washington Applied Physics Laboratory, Seattle, WA Senior Engineer/Research Assistant Professor	2/86-7/88
Boeing Aerospace Company, Seattle, WA Engineer	7/77-7/79

#### Current Research Interests

Fluid mechanics (multi-phase flow, heat transfer, compressible flow), combustion (flame structure, flame stability, exhaust emissions, alternative-fuels combustion).

#### Honors and Awards

Best Paper Award, *18th Microgravity Science and Space Processing Symposium*  
(42<sup>nd</sup> AIAA Aerospace Sciences Meeting), January 2004.  
Boeing Chair Professor, UW, 2002.  
ASME Curriculum Innovation Award - Honorable Mention, 2001  
Russell M. Searle Instructorship (*Teacher of the Year*), ME/WPI, 2001  
ASME Fellow, 2000.  
AIAA Associate Fellow, 1999.  
George I. Alden Chair in Engineering, WPI, 1999.

## Selected Recent Publications

1. Liao, Y.-H. and Hermanson, J.C., "Turbulent Structure and Dynamics of Swirled, Strongly Pulsed Jet Diffusion Flames," *Combustion Science and Technology* **185** (11), 1602-1623, 2013.
2. Narendranath, A.D., Kimball, J., Hermanson, J.C. and Allen, J.S., "Manifestation of Instability Mechanisms in Liquid Films," *Journal of Heat Transfer-Transactions of the ASME* **134** (8), 2012.
3. Kim, Y.J. and Hermanson, J.C., "Disruption of Volatile and Non-volatile Droplets under Locally Supersonic Conditions," *AIAA Journal* **50** (8), 1754-1765, 2012.
4. Kim, Y.J. and Hermanson, J.C., "Breakup and Vaporization of Droplets under Locally Supersonic Conditions," *Phys. Fluids* **24** (7), 076102, 2012.
5. Kimball, J.T., Hermanson, J.C., and Allen, J.S., "Experimental Investigation of Convective Structure Evolution and Heat Transfer in Quasi-Steady Evaporating Liquid Films", *Phys. Fluids* **24**, 052102, 2012.
6. Fregeau, M., Hermanson, J.C., Stocker, D.P., and Hegde, U.G., "Turbulent Structure Dynamics of Buoyant and Non-buoyant Pulsed Jet Diffusion Flames," *Combustion Science and Technology*, **183**, 309 – 330, 2010.
7. Fregeau, M. and Hermanson, J.C., "NO<sub>x</sub>/CO Emissions of Strongly-Pulsed Jet Diffusion Flames," *Combustion Science and Technology*, **181**, 536-554, 2009.
8. Kimball, J.T., Bailey, M.F., and Hermanson, J.C., "Ultrasonic measurement of condensate film thickness," *Journal of the Acoustical Society of America* **124** (4), EL196-202, 2008.
9. Som, S.M., Kimball, J.T., Hermanson, J.C., and Allen, J.S., "Stability and Heat Transfer Analysis of Unsteady Condensing and Evaporating Films," *International Journal of Heat and Mass Transfer* **50**, 1927-1937, 2007.

## Recent Research Efforts

- "Advanced Bio-Derived Aviation Fuel Combustion: Particulate Emissions, NO<sub>x</sub> and Flame Stability," PI: J.C. Kramlich (UE ME); Co-I's J.C. Hermanson, A. Mescher (ME) and P.C. Malte (ME). Sponsor: WA State Joint Center for Aerospace Innovation and Technology). Total funding to date: \$166,600. Period: February 2013-June 2014.

Experimental testing under this program is focused on establishing the flame stability and emission associated with the use of bio-derived aviation fuels. The project is conducted in collaboration with several Washington State biofuels companies and with Pacific Northwest National Laboratory.

- "Stability, Cellular Structure, and Heat Transfer of Evaporating Films in Normal- and Reduced Gravity," PI: J.C. Hermanson (UW), Co-I J.S. Allen (MTU). Sponsor: NASA (NRA NNX09AL02G). Funding: \$237,240 (UW). Period: July 2009-June 2014.

The University of Washington conducted comprehensive laboratory experiments that revealed the evolution of the convective structure in quasi-steady and transient evaporating thin films, and the corresponding impact on heat transfer. The experiment was flown in zero-gravity at NASA Johnson Space Center in May, 2012.

- "Collaborative Research: Droplet disruption and vaporization in supersonic flow," PI: J.C. Hermanson (UW), Co-I: G. Tryggvason, (Worcester Polytechnic Institute). Sponsor: National Science Foundation. Funding: \$85,000. Period: September 2009-August 2011.

Droplets under locally-supersonic conditions were studied in a draw-down wind tunnel. The effects of liquid superheating on droplet dynamics, disruption and vaporization were determined by direct and laser-induced fluorescence imaging.