Jacob (Jake) Leachman

Curriculum Vitae

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Education Background:

-University of Wisconsin-Madison, Ph.D. Mechanical Engineering (In Progress)
Dissertation Title, Thermophysical Properties and Modeling of Hydrogen Isotope Pellet Production for the Fueling of Fusion Plasma.
Major Professors, John Pfotenhauer, Greg Nellis
-University of Wisconsin-Madison, Ph.D. minor Nuclear/Engineering Physics
-University of Idaho, M.S. Mechanical Engineering, Graduate 05/12/2007,
Masters Thesis, Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen.
Major Professor, Idaho State University Dean Richard T Jacobsen.
-University of Idaho, B.S. Mechanical Engineering, Graduate 12/10/2005

Research Experience:

-*Guest Researcher*, Oak Ridge National Laboratory (ORNL), July 2008-August 2008, experimentation and modeling of pellet production systems for fueling fusion plasma.
-*Guest Researcher*, National Institute of Standards and Technology (NIST), July 2006-August 2006, development of fundamental equations of state for parahydrogen and normal hydrogen.
-*Graduate Research Assistant*, Center for Applied Thermodynamic Studies (CATS), January 2006-May 2006, thermodynamic and transport properties of hydrogen.
-*Undergraduate Research Assistant*, University of Idaho Combustion Lab, July 2004-July 2005, researched non-invasive leak testing of pyrotechnic initiator cartridges.

Technical Presentations:

"Modeling Deuterium Solidification in a Twin-Screw Extruder" *University of Wisconsin-Madison Solar Energy Laboratory Seminar Series*, April 22nd, 2008.
"Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen." *University of Wisconsin-Madison Solar Energy Laboratory Seminar Series*, October 23rd, 2007.
"Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen." *University of Idaho Masters Thesis Defense*, April 27th, 2007.
"Thermophysical property prediction of Normal Hydrogen and Orthohydrogen using the Quantum Law of Corresponding States." *Presented during the 44th Annual Meeting of the Idaho Academy of Sciences*, April 21st, 2007, Idaho Falls, ID.
"Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen." *University of Idaho Graduate Student Expo*, April 10th, 2007.
"Current Status of Transport Properties of Hydrogen." *Presented during the 16th Symposium on Thermophysical Properties*, July 31, 2006, Boulder, CO.
"Thermophysical Properties of Hydrogen as an Energy Carrier." *Presented during the 43rd Annual Meeting of the Idaho Academy of Sciences*, March 14, 2006, Moscow, ID.

Publications:

(In Progress)

J.W. Leachman, E.W. Lemmon, "Fundamental Equations of State for Paradeuterium, Normal Deuterium, and Orthodeuterium." *Internation Journal of Thermophysics* (To be submitted to 17th Symposium on Thermophysical Properties June 2009).

J.W. Leachman, J.M. Pfotenhauer, G.F. Nellis, "Design of an Apparatus for the measurement of thermal conductivity, convection during solidification, and viscous dissipation of frozen cryogens." (To be submitted to 2009 Cryogenics Engineering Conference).

(In Review)

J.W. Leachman, J.M. Pfotenhauer, G.F. Nellis, "Model of a Twin-Screw Extruder Operating with a Gifford-McMahon Cryocooler for the Solidification of Deuterium" *Proceedings of the 15th International Cryocooler Conference*, (In Review).

J.W. Leachman, R.T Jacobsen, E.C. Lemmon, S.G. Penoncello, "Fundamental Equations of State for Parahydrogen, Normal Hydrogen, and Orthohydrogen." *Journal of Physical and Chemical Reference Data*, (In Review).

E.W. Lemmon, M.L. Huber, J.W. Leachman, "Revised Standardized Equation of State for Hydrogen Gas Densities for Fuel Consumption Applications." *Journal of Research at NIST*, (In Review).

(Published)

V. Utgikar, R.T Jacobsen, J.W. Leachman, "The future of hydrogen research in Idaho." *Journal of the Idaho Academy of Sciences*, May, 2008.

J.W. Leachman, R.T Jacobsen, S.G. Penoncello, M.L. Huber, "Current Status of Transport Properties of Hydrogen." *International Journal of Thermophysics*, 28:773-795, 2007.

R.T Jacobsen, J.W. Leachman, S.G. Penoncello, E.W. Lemmon, "Current Status of Thermodynamic Properties of Hydrogen." *International Journal of Thermophysics*, 28:758-772, 2007.

R.T Jacobsen, J.W. Leachman, "A Review of the Status of the Thermophysical Properties of Hydrogen Including Thermodynamic Properties and Transport Properties." *Report to National Institute of Standards and Technology* on Order NO. RA 1341-05-SE-6352, June 2006.

J.W. Leachman, R.T Jacobsen, "Thermophysical Properties of Hydrogen as an Energy Carrier." Abstract appeared in the *Journal of the Idaho Academy of Sciences*, June 2006.

Professional Committees:

-*College of Engineering Recruitment and Retention Committee,* University of Idaho, November 2005-Present (12 total members on committee, 1 of 2 students).

Honors and Awards:

- *Western Association of Graduate Schools/University Manuscripts International Distinguished Thesis Award*, March 8, 2007 (Only recipient).WAGS consists of 85 member institutions in the Western US and Canada.
- *Outstanding Presentation*, University of Idaho Graduate Student Expo, April 10, 2007 (1 of 4 recipients).
- *Master of Ceremony*, University of Idaho College of Engineering Graduation Commencement, May 13, 2006 (out of class of 192).
- *Most Outstanding Senior*, Awarded by the Faculty of the University of Idaho Mechanical Engineering Department, May 13, 2006 (out of class of 67, one of three recipients).
- *Richard B. Stewart Thermodynamics Scholarship*, for Graduate students conducting research in thermodynamic or transport properties of fluids. Recipient May 2006-May 2007.
- *Full Scholarship to University of Idaho Football team,* Fall 2001-Spring 2005. Forced to go on Medical Scholarship after suffering career ending lower back injury Spring 2003.
- *Trail Blazer Award for Innovative Leadership Service*, University of Idaho Residence Halls, Golden Joes Ceremony April 2005.
- *University of Idaho Bronze Pin recipient*, acknowledging leadership in, dedication to and support of the University of Idaho Residence halls over a several year period, Golden Joes Ceremony April 2005.
- *Residence Hall Man of the Year*, University of Idaho 2003-2004.
- *Most Outstanding Senior*, Lewiston Senior High School 2001 (out of class of 304, one of two recipients).

Leadership and Student Organizations:

- *Engineering Hall President*, University of Idaho 2004-2005, Led the Engineering Hall to the following victories: Hall of the Year 2004-2005, Hall Participation Points Champions 2004-2005, Spring Fling Champions 2005, 1st place in Co-ed division of Homecoming Competition 2004, and 1st place in House Pride decoration 2004.
- *Formula SAE Team Captain*, University of Idaho 2004-2005, Duties included: Cooling System and Aerodynamics/Body Chief Engineer, in charge of meeting facilitation.
- *Engineering Hall Vice President*, University of Idaho 2003-2004. Duties included: Neely/Engineering Hall Communications officer, attendance at weekly Engineering Hall meetings, weekly Food Service Committee meetings.
- *American Society of Mechanical Engineering*, (ASME) student member 2004-Present.
- *American Institute of Aeronautics and Astronautics*, (AIAA) student member 2004-Present.

Teaching Experience:

- ***Graduate Teaching Assistant***, University of Idaho, ME 417 *Turbomachinery*, Professor Fred Gunnerson, Spring 2007, *14* students enrolled.
- ***Graduate Teaching Assistant***, University of Idaho, ME 412 *Gas Dynamics*, Dr. John Crepeau, Spring 2007, *20* students enrolled.
- ***Guest Lecture Appearance***, University of Idaho, MUSC 139 *Aural Skills I*, Professor Daniel Bukvich, Fall 2006, 73 students enrolled.

  November 17, 2006 Creative Problem Solving

- ***Graduate Teaching Assistant***, University of Idaho, ME 504/404-CHE 504/404 *Special Topics: Hydrogen*, Fall 2006, 20 students enrolled.
- ***Substitute Lecture Appearances***, University of Idaho, ME 422 *Applied Thermodynamics*, Professor Steve Penoncello, Fall 2006, 12 students enrolled.

  October 18, 2006 Exergy Analysis of Steam Turbine Power Plant II
  October 16, 2006 Exergy Analysis of Steam Turbine Power Plant I

- ***Guest Lecture Appearances***, University of Idaho, ME 504/404-CHE 504/404 *Special Topics: Hydrogen*, Dr. Vivek Utgikar and Professor Richard Jacobsen, Fall 2006, 20 students enrolled.

  October 16, 2006 Hydrogen Transport Properties
  October 9, 2006 REFPROP Properties Software

- ***Graduate Teaching Assistant***, University of Idaho, ME 412 *Gas Dynamics*, Dr. John Crepeau, Spring 2006, 34 students enrolled.
- ***Substitute Lecture Appearances***, University of Idaho, ENGR 320 *Thermodynamics*, Dr. Karl Rink, Spring 2006, 48 students enrolled.

  April 19, 2006 Introduction to Psychrometrics II
  April 17, 2006 Introduction to Psychrometrics I
  March 1, 2006 First Law Applications

- ***Undergraduate Teaching Assistant***, University of Idaho, ME 410 *Principles of Lean Manufacturing*, Summer 2005, 26 students enrolled.
- ***Classroom Design Engineer***, Enriched Learning Environment, May 2005-December 2005.
- ***Peer Tutor***, mathematics, physics and engineering, *University of Idaho Student Services and Athletics*, January 2004-May 2005.
- ***Camp Counselor***, *Juniors in Engineering, Mathematics and Sciences (JEMS)*, July 2004, 24 high school juniors enrolled.
- ***7th Grade Football Coach***, Sacajawea Junior High School, Defensive Coordinator and Lineman Coach, Fall 2003.
- ***Undergraduate Teaching Assistant,*** University of Idaho, ME 123 *Introduction to Mechanical Engineering Design*, Fall 2003, 72 students enrolled.