

Jacob Leachman



Jacob Leachman is an Assistant Professor in the School of Mechanical and Materials Engineering at Washington State University (WSU). He initiated the Hydrogen Properties for Energy Research (HYPER) laboratory at WSU in 2010 with the mission to advance the Technology Readiness Level (TRL) of hydrogen systems, specifically at cryogenic temperatures. Relevant advancements from the HYPER laboratory include:

- 1) Design, construction, and operation of the Genii Unmanned Aerial System (UAS) designed for liquid hydrogen flight: <http://wsuuas.tumblr.com/>. This crowd-sourced student team effort culminated in two provisional patent applications for liquid hydrogen storage vessels that are being transferred to our industrial partner Insitu.
- 2) Design and soon to be construction of a Cryogenic Thermal Compression (CTC) system for dispensing pressurized hydrogen from fueling stations storing liquid hydrogen; winning the 2014 Hydrogen Student Design Contest: <http://www.hydrogencontest.org/2014.asp>.
- 3) Proof of concept experiments for endothermic parahydrogen-orthohydrogen conversion for vapor cooled shielding of liquid oxygen tanks and primary cooling via vortex tubes in small-modular hydrogen liquefiers.
- 4) Reference quality cryogenic property measurements and equation of state modeling for fluid mixtures containing hydrogen.

These efforts are culminating in a crowd-sourced entry in the H2refuel prize challenge. More information on current projects is available at: <http://hydrogen.wsu.edu>.

Dr. Leachman received a B.S. degree in Mechanical Engineering from the University of Idaho in 2005 and a M.S. degree in 2007. His master's thesis has been adopted as the foundation for hydrogen fueling standards and custody exchange, in addition to winning the Western Association of Graduate Schools Distinguished Thesis Award for 2008. He completed his Ph.D. in the Cryogenic Engineering Laboratory at the University of Wisconsin-Madison in 2010 on the visco-plastic flow of hydrogenic materials for the fueling of fusion energy machines. He has conducted guest research in the Physical and Chemical Properties of Fluids Group at the National Institute of Standards and Technology (NIST), and the Pellet Fueling of Fusion Plasmas Group at Oak Ridge National Laboratory (ORNL). His HYPER laboratory has funded collaborations with the National Aeronautics and Space Administration (NASA), US-ITER, the Department of Energy (DOE), the Department of Commerce/NIST, as well as companies in the aerospace and clean energy technology sectors of Washington State. He is a co-founder of Protium Innovations LLC.