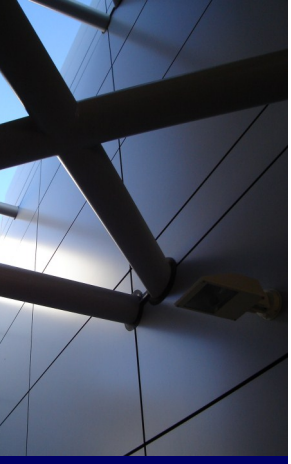

COLLOQUIUM
MECHANICAL ENGINEERING

The Department of Mechanical Engineering presents:

Dr. JoAnn Lighty

Chair and Professor of Chemical Engineering,
University of Utah

Friday, February 18, 2011
11:10AM-12:00PM
Bourns Hall A265

Revisiting Soot Oxidation

Abstract:
Soot emissions of are importance for global warming and adverse human health effects, in addition to ambient air quality and visibility. While there are many studies focused on soot formation, our work is investigating the role of OH* and O2 in soot oxidation. The presentation will discuss the mechanisms of soot oxidation with a focus on O2, which is important in gas turbines and engines due to higher O2 concentrations. Current results will be reported for ethylene gas and a surrogate jet fuel, m-xylene and dodecane where a two-stage burner has been used to focus on oxidation. Soot is formed in the first burner and oxidized in a second burner such that formation is separated from oxidation. A scanning mobility particle sizer, where mobility particle diameter is determined as a function of height above burner, has been used to determine oxidation and the rates will be compared with current mechanisms. In addition, HR-TEM has been used to investigate the differences between fuels and soot at different heights. Future work, which will investigate the role of fragmentation and high pressure will also be presented.

Bio: JoAnn Lighty is presently Chair and Professor of Chemical Engineering at the University of Utah. Her research is in the area of combustion, specifically fine particles and other air pollution issues, and soot formation and oxidation. She is also working on a process design and economic evaluation of chemical looping for carbon capture in coal combustion. Dr. Lighty joined the University of Utah in 1988.

From 1995-2004, Dr. Lighty served as Associate Dean for the College of Engineering and was involved with outreach to K-12 students, developing an event for Girl Scouts; a high school girls summer camp; and Elementary Engineering Week where approximately 2500 4th-6th graders come to campus over a week. She was on the board of MESA/STEP from 1995-2004 and was secretary. Dr. Lighty was appointed by the Governor of the State of Utah to serve on the Board of Trustees for the Academy of Math, Engineering, and Science (AMES) in 2002 and served until 2005. In addition, Dr. Lighty led the College through the ABET EC 2000 accreditation in 2003. She was also the founding director of the Institute for Combustion and Energy Studies (now Institute for Clean and Secure Energy).

Dr. Lighty has served on various committees for the US EPA, National Research Council, and several engineering programs. Recently, she was elected to the grade of Fellow of AIChE and was able to spend six months at the University of Cambridge as a By-Fellow of Churchill College.