2012-2013

Graduate Seminar Series

The Department of
Mechanical Engineering – Engineering Mechanics

Proudly Presents

Professor Ezra Bar-Ziv

Mechanical Engineering – Engineering Mechanics

Michigan Technological University

Dr. Bar-Ziv obtained his B.Sc. degree in Physics and Chemistry from the Hebrew University, then joined Nuclear Research Center (NRCN), Israel, during which he received his Ph.D. from the Weizmann Institute of Science in 1975. At NRCN he managed large projects on energy and materials, including substantial industrial work on coal combustion. Dr. Bar-Ziv moved to Ben-Gurion University (BGU) on 1998 as a Professor and founded the Laboratory for Clean Combustion, where he carried out extensive industrial research on coal combustion and thermal processes of various wastes. Dr. Bar-Ziv founded E.B. Clean Energy for the development of biomass and MSW torrefaction technology for the power industry. On 2011 he moved as a Professor to Michigan Tech to establish a program on biomass torrefaction and its applications to the power industry. Dr. Bar-Ziv is areas of research are: combustion and gasification of coal; biomass torrefaction; combustion and pyrolysis of thermoplastics; and clean coal combustion in utility boilers.

Thursday, Nov. 18, 2012 **4:00 – 5:00 p.m.** **Room 112, ME-EM Bldg.**

Biocoal: A Drop-In Fuel in Coal-fired Power Plants

Biomass torrefaction to produce biocoal gained interest as it solves hindrances encountered when using raw biomass for power generation. Biocoal is a premium drop-in fuel in pulverized-coal boilers aimed at the reduction of greenhouse gas and other emissions. Biomass torrefaction produces a material with properties similar to coal. Because these properties can be controlled and reproduced, biocoal can be utilized as a "drop-in" fuel replacement for coal. Coal's efficiencies and energy generation capabilities are well documented as well as its high level of greenhouse gas and other emissions. Biocoal offers many of the benefits of coal and also: (1) significant reduction of emissions (NO_x, SO_x, particles, mercury, CO_2), (2) uses low-cost equipment, and (3) a low-cost source of renewable energy. We will present an integrated-synergistic approach that will: (1) produce the most suitable biocoal for the specific boiler; and (2) carry out comprehensive analysis and evaluation of the performance of the entire coal-fired power plants, including the combustion chamber, the steam generation elements, auxiliary and supporting equipment, and emissions. The selection of the suitable biocoal properties and the reliable analysis of the power plant performance prior to firing will reduce significantly the risks involved in fuel change in the power plant by using biocoal.

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