

Mechanical Engineering Colloquium

Spring 2011 Semester

1pm Wednesday March 23

Room 224 Mechanical Engineering Center

Prof. Lixing Zhou

Engineering Mechanics – Tsinghua University, China

“Some Recent Advances in Modeling of Turbulent Dispersed Multiphase Flows and Turbulent Combustion”

Background:

Turbulent dispersed multiphase flows, including gas/liquid -particle/droplet/bubble flows, also single and two-phase combustion are widely encountered in power, chemical and metallurgical, aeronautical and astronautical, and transportation engineering. CFD modeling of such processes is of vital importance for understanding the physical phenomena and engineering design and development. Although in recent years remarkable strides have been made in modeling of high Reynolds-number complex flows, the mathematical models adopted in the present commercial software remain to be improved. We developed a series of two-phase turbulence models and turbulence-chemistry models, different from those proposed by other investigators and those used in commercial software. For more than 20 years, we proposed and developed unified second-order moment (USM) (two-phase Reynolds stress)two-phase turbulence models, and second-order moment turbulent combustion and pollutant formation models. These models are verified by measurements and are reported in periodic journals and international symposiums as invited lectures for several times, hence they are recognized by our international colleagues. We developed our own 2-D and 3-D computer codes based on these models. These computer codes are applied in developing innovative combustors/furnaces; cement kilns, cyclone separators, hydrocyclones, etc.

Dr. Lixing Zhou got his Ph.D. degree from the Leningrad Polytechnic University, former USSR in 1961. He previously served as the Chairman of Multiphase Fluid Dynamics Division, the Chinese Society of Theoretical and Applied Mechanics, a member of the Board of Directors, the Chinese Section of the Combustion Institute, the Governing Board of the International Conference on Multiphase Flow, and is presently as members of scientific committee of many international symposiums on multiphase flow and combustion. His main research fields are multiphase turbulent flows and combustion. He published one monograph in English, 5 monographs in Chinese, and more than 300 technical papers. He won the China National Awards of Natural Science in 2007, Science and Technology Progress Awards of First Degree from the Ministry of Education and the Ministry of Electricity, PRC in 1995 and China National Awards of Excellent Scientific Books of First Degree in 1992.