

Mechanical Engineering Department Seminar

3:35pm, March 30, 2016

1130 Mechanical Engineering

111 Church Street SE, Minneapolis, MN

Numerical Simulation of Various Ocean Renewable Energy Systems

MooHyun Kim

Professor; Texas A&M University



The importance of clean renewable energy has been underscored to secure new energy sources while protecting environments. Especially, wind energy is appealing since it is economically competitive, technologically proven, infinitely renewable, and does not make any waste or carbon emission. Especially, floating offshore wind turbines (FOWT), although they are considered to be more difficult to design than fixed offshore wind turbines, have many advantages. In general, they are less restricted by governmental regulation and residents' opposition, exposed to higher-quality wind, and less sensitive to space/size/noise/visual/foundation restrictions. In this regard, if the technology is fully developed, floating offshore wind turbines are expected to be more popular to generate considerable amount of clean renewable energy at competitive prices compared to other energy sources. Recently, Multiple Unit Floating Offshore Wind Turbine (MUFOWT) is also suggested as a feasible and interesting concept. MUFOWT enables many wind-turbines to be installed on one floater. MUFOWT may save installation and mooring-line cost. It can also be used for a multi-source multi-purpose energy station including other ocean renewable energy sources, such as waves and currents. When designing such a system, a global performance simulation computer program including fully coupled dynamics among blades and towers, control units, floater, and mooring system (also wave energy converters if any) is needed and the numerical model should be verified by comparing with well-designed experiments. Several examples of such comparative study will be presented.

Bio: Dr. Kim received his doctoral degree from MIT in 1989. He is a Professor in the Ocean/Civil Engineering Department of Texas A&M University. He has been a faculty member at TAMU for 26 years and published more than 125 journal papers and 150 conference papers, produced 18 doctoral students and 17 postdoctoral students, and 31 master students so far. Dr. Kim is currently Editor-in-Chief of an international journal "Ocean Systems Engineering" and Editor of a book. He has conducted more than 85 research projects as PI and was consultant for more than 20 companies.