**Dr. Poupak Mehrani – Interdisciplinary Candidate**

**Chemical & Biological Engineering University of Ottawa**

***Seminar: “Applications of Gas-Solid Fluidized Beds in Polymerization***

***and Clean Energy Processes”***

**November 27 – 10.10 am – 11.00 am – WB215**

Fluidized beds including those of gas-phase are widely employed in industries as diverse as petrochemical, pharmaceuticals, agriculture, chemicals, mineral processing, power generation, and many other solids handling and processing industries. The increase in industrial applications of fluidized beds is largely due to the inherent advantages of this technology, namely providing high degree of mixing, heat transfer and mass transfer. Although a large amount of research is devoted to this technology but still theoretical and experimental research is necessary to design better and more efficient units especially with the expansion of the range of their use as new processes are evolved. This talk will highlight a number of research topics in relation to the areas of polymerization and clean energy where fluidized beds are employed. In petrochemical industry fluidized bed reactors are adopted for gas-phase ethylene polymerization to produce polyethylene. In such processes electrostatic charges are generated, resulting in the adhesion of polyethylene and catalyst particles to the reactor wall. This in turn causes long shut down periods for reactor clean-up and significant economic losses. At the University of Ottawa, a comprehensive experimental program has been established to better understand this occurrence underlying mechanisms. A new online charge measurement technique has been developed that allows the quantification of the degree of fluidized bed fouling. This method has been implemented in a pilot-scale atmospheric and a high-pressure (up to 25 atm) fluidization facility (designed and built in-house). In relation to the clean energy area, numerous applications of fluidized beds are found including being employed for CO2 capture as well as conversion of renewable energy sources such as biomass through gasification and fast pyrolysis. Research is currently underway at the University of Ottawa in relation to these processes. The adverse environmental effects of CO2 emissions represent a growing problem as the utilization of fossil fuels such as coal is increasing and can be expected to do so for the future. Therefore, technologies associated with CO2 capture and storage are found to be essential to reduce these emissions. One of the capture technologies that has received increased interest and is currently being investigated is the oxy-fuel coal combustion. In such process CO2 is captured from within the process itself where it can then be directly sent for storage or further usage. Research in relation to this technology involves the investigation of the fluidized bed reactor hydrodynamics for scale up of such process. Specifically, a high-pressure application of the technology is being examined which also includes the recovery of energy for steam generation within the reactor.

**Biography**

Dr. Poupak Mehrani is an Associate Professor in the Chemical and Biological Engineering Department of the University of Ottawa. She received her BASc in Chemical Engineering from the University of British Columbia where she also became a member of UBC Fluidization Research Centre. She then pursued her PhD in the same department under the supervision of Professor John Grace and studied electrostatic charge generation in gas-solid fluidized beds. Following graduation, she worked for SNC-Lavalin oil and gas division in Calgary, prior to joining University of Ottawa Chemical and Biological Engineering Department in 2006. Dr. Mehrani research interests are in multiphase reactor engineering with a focus in gas-solid fluidization. Her current research involves experimental and modeling works related to gas-solid fluidized bed reactor fouling due to electrostatics, biomass gasification and fast pyrolysis using bubbling fluidized bed reactors, CO2 capture process for post combustion and in-situ for pre-combustion/gasification using fluidized beds, as well as high-pressure fluidized bed oxy-fuel coal combustion.