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| **Yixin Zhang**  PhD Program  (started Winter 2014, In Progress) | Project Title: Understanding Processability of Oil Sands Ores using Multivariate Analysis and Data Mining Techniques  Supervisor: Dr. Zhenghe Xu  Co-supervisor: Dr. Qing Zhao  Project Description: Hot water based bitumen production process from mineable oil sands is extremely complex in nature and high sensitive to variability of oil sands ores. Understanding ore processability and developing a sensible marker for ore processability has been proven to be a very challenging task. In addition to processing variables such as temperature, hydrodynamics, process water chemistry and chemical additives, ore characteristics, such as bitumen content, connate water content, fines content and more importantly types of fines plays a decisive role in determining the processability of oil sands ores.    It is therefore extremely valuable to analyze the processability of oil sands ore using statistical modelling approaches. In this research, a symbolic regression methodology via genetic programming is applied to help understand oil sands ore processability, such as identifying sensible markers of ore processability. The problem is analyzed by introducing three input variables for simplicity. The model is expressed analytically using a combination of input variables (oil sands ore characteristics and operation conditions) and a given set of math operators and constants and provides a convincing prediction for the response variables (bitumen recovery). The results show an excellent agreement with experiments, highlighting the applicability of the Symbolic Regression (SR) method in identifying a mathematical model to describe the mechanisms involved in oil sands processability. |