March 26th, 2018
KAP 414
2:00 P.M. – 3:00 P.M.

Professor Minyi Huang

(Carleton University, Ottowa, Canada)

"Mean Field Games: Basic Theory and Generalizations"

Abstract: This talk starts with an introduction to mean field game (MFG) theory for dynamic decision problems with large-populations of non-cooperative agents. Based on ideas from statistical physics, the theory was created to overcome the curse of dimensionality so that each agent makes decision based on its local information and some macroscopic quantity computable offline. In the literature there exist two fundamental approaches, called the direct approach and the fixed point approach for obtaining the MFG limiting equation system: an optimal control (such as HJB) equation and a mean field dynamics (such as FPK) equation.
The basic theory has significant generalizations to deal with major players, social optimization, leadership and information structures, etc. Model tractability issues will be outlined in terms of closed-form solutions and structured solutions. Finally we demonstrate the difference of the two fundamental approaches in a linear quadratic setting based on a notion called asymptotic solvability.