



BAMI Seminar – April 2016

Siu Hoong Lee, PhD Student, Monash University

Friday 1st April 2016, 12.30PM to 1.30PM

Room G03, BioPRIA, 15 Alliance Lane (Building 59), Clayton Campus

Moderator: Associate Professor Andrew Hoadley, Monash University

Abstract:

Biorefineries stemming from pulp and paper mills (PPMs) and other processes have been noted to offer improved economic and environmental performances. In such as industrial cluster, biomass from PPMs is processed into biofuel and bioproducts through different biorefinery technologies. Given the highly integrated material and energy networks, it is not uncommon for the industrial cluster to be operated by multiple enterprises. This gives rise to an eco-industrial park (EIP), where each enterprise acts as an independent stakeholder. Here, the actions of each enterprise are driven by rational self-interest, capable of influencing the outcome of the EIP scheme. Thus, competition emerges to report the best EIP scheme, leading to a multiple decision making (MDM) problem.

It is the objective of this work to resolve this MDM problem through mathematical optimisation and game theory analysis. An EIP cases study based on a PPM with biorefineries is used to illustrate the proposed approach. Firstly, an optimisation model is formulated which reports the overall economic and environmental payoff of the EIP. Next, the individual enterprise payoffs are analysed through two different game strategies; cooperative game and Stackelberg game. In cooperative game, enterprises hold equal power in the EIP and coordinate together to decide which strategy (or scheme) is the optimal. In Stackelberg game, the different power relationships among enterprises are explored. This can be achieved by profit distribution to minimise the monopoly of any one enterprise on the EIP. Preliminary sensitivity analysis of the optimisation model has noted that utility pricing influences the selection of biorefinery technology.

Presentation and Q&A session will be from 12.30PM – 1.00PM. Lunch will be served at 1.00PM.

Enquires: BAMI Student Chapter coordinators Lionel Longe or Uthpala Garusinghe.