

APPLIED MATHEMATICS COLLOQUIUM

Date: Wednesday, January 27, 2016

Time: 2:30 – 3:30 p.m.

Location: Middlesex College Room 204

Optimal Trading and Shipping of Agricultural Commodities

Dr. Nicolas Merener

Universidad Torcuato Di Tella,
Buenos Aires, Argentina

Abstract:

We develop and implement a model for a profit maximizing firm that provides an intermediation service between commodity producers and commodity end-users distributed over a realistic spatial network. Producers and end-users trade with the firm through contracts for delivery of grain during the marketing season. The firm begins the marketing season with a portfolio of prearranged purchase and sale contracts with upstream and downstream counterparts. The firm aims to maximize profits while satisfying all previous commitments, possibly through the execution of new transactions. Under realistic constraints for capacities, network structure and shipping costs, we identify the optimal trading, storing and shipping policy for the firm as the solution of a profit-maximizing optimization problem, encoded as a minimum cost flow problem in a time-expanded network that captures both geography and time. We perform numerical examples and show significant efficiency gains derived from the joint planning of logistics and trading.