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11:00 am – 12 Noon

Seminar Room 4080 AIR Building

ACTIVITY ROUTING AND SCHEDULING: CALIBRATION AND SCENARI ANALYSIS FOR ACTIVITY-BASED TRAVEL FORECAST MODELS

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Although a normative approach was developed to address the issue of capturing spatial-temporal constraints in a utility-maximization framework for activity-based modeling, two key issues linger. The first is a need for a parameter estimation approach for each household's set of parameters given multiple objectives such that observed arrival times and sequences can both be replicated. An approach was recently proposed and tested using an inverse optimization method. It has been partially applied to calibrate truck activity patterns. The second key issue is overcoming the complexity of the underlying NP-hard problem, particularly to apply the model to analyze different scenarios with numerous repeated runs. The concept of reoptimization -- altering a prior instance solution -- has been shown by researchers to generally be NP-hard as well, but proven that reoptimization heuristics result in tighter worst-case bounds. Two reoptimization heuristics are proposed for a selective extension of the HAPP model (which cannot be solved without heuristics) and tested in a computational experiment involving 100 zones and 500 simulated households. Results suggest that reoptimization algorithms are effective for selective vehicle routing problems, and solutions appear to be within tighter bounds than using a genetic algorithm without prior instance information. These new developments encourage further research to incorporate normative routing models to address routing/scheduling choices in existing activity-based models.

Dr. Chow obtained his Ph.D. at UC Irvine in 2010 under Dr. Amelia Regan. He has been a postdoc at UCI from 2010-2012, working with Dr. Stephen Ritchie on freight forecast modeling and with Dr. Will Recker on the household activity pattern problem. Dr. Chow will be leaving UCI on May 29th and starting as an Assistant Professor at Ryerson University in Toronto, Canada, on June 1st.