

# Program ISTTT20

16-jul-13

## Tutorials

9:00 10:30 **Scheduled service management**

([Avi Ceder](#), *University of Auckland*, New Zealand)

The known scheduled transport service to be covered in the tutorial relates naturally to public transport (transit) service. The transit-operation planning process commonly includes four basic activities, usually performed in sequence: (1) network route design, (2) timetable development, (3) vehicle scheduling, and (4) crew scheduling. Activities (2) and (3) will be dealt with in the tutorial. Specifically, the tutorial will review and discuss, with examples and one exercise, the following themes:

- Design of frequencies and headways of service (data collection techniques; analyzing passenger load and running time data; four methods for frequency and headway determination; cost-effectiveness criteria).
- Construction of alternative timetables (current practice; mapping alternative timetables; timetables with evenly spaced headways; timetables leading to even passenger loads).
- Developing vehicle scheduling (experience with an optimization scheduling method; graphical and optimal method for an interactive system; fixed and variable schedules; minimum fleet size; deadheading considerations).

The tutorial will also include a discussion about what can and cannot be automated because some of the scheduling processes are extremely cumbersome and time consuming to undertake manually. It will be shown that in addition to the potential for more efficient schedules, the automated and interactive systems enable services to be more controllable and more responsive.

10:30 12:00 **Traffic control & management**

([Nathan H. Gartner](#), *University of Massachusetts Lowell*, USA)

This tutorial will present an overview of modern methods of traffic management, traffic control strategies and traffic control systems technology.

Main topics to be addressed:

1. Transportation systems management (TSM).
2. Traffic control systems technology.
3. Control concepts for: (a) single intersections; (b) arterial streets; (c) networks.
4. Control models: (a) delay-based models; (b) progression models; (c) adaptive control systems; (d) multi-level control strategies; (e) control system performance – analysis of complexity.
5. Freeway management control concepts: (a) ramp metering; (b) integrated systems; (c) incident management; (d) role of the transportation management center (TMC).
6. Traveler information systems.
7. Intelligent Transportation Systems (ITS) plans and programs.

12:00 12:45 Lunch

12:45 14:15 **Choice Modelling**

([Michel Bierlaire](#), *Ecole Polytechnique Fédérale de Lausanne*, Switzerland)

Discrete choice models, derived from utility theory, are widely used to model transportation demand. Their popularity is due to their disaggregate nature, and their ability to capture heterogeneity in the population. The tutorial will cover two versions of these models that allow a more advanced representation of the heterogeneity of behavior. First, mixture models, which include random parameters. Second, latent variable models, which allow to capture subjective aspects such as attitudes and perceptions. The tutorial will provide an introduction to these concepts, and present case studies to illustrate them.

14:15 15:45 *Traffic flow theory*  
([Ludovic Leclercq](#), University of Lyon, France)

This tutorial will provide a first overview of the basis on traffic flow theory. First, traffic representation will be discussed at a local scale in three different coordinate systems (Eulerian, Lagrangian and T coordinates). We will show that it exists a function (the Moskowitz's surface) that can fully describe the traffic behavior on one link. When looking this function from different perspectives, we can derive all the traffic variables and the three different formulations of the equilibrium (first order) model: macroscopic, microscopic (car-following) and mesoscopic. Second, we will focus on numerical issues when solving this model. Appropriate numerical schemes for all the coordinates systems will be presented. We will resort on variational theory to exhibit the connections between the different formulations of the model (continuous and discrete).

15:45 17:15 *Transportation planning*  
([Michiel Bliemer](#), University of Sydney Business School, Australia)

Transportation planning models are widely used by national, regional and local governments to forecast medium to long term effects of infrastructure investments and transit services on network conditions, such as traffic delays, O2 emissions, etc. For example, what effect does expanding motorways with an extra lane have on congestion levels? What is the impact of road pricing on emissions? How many more people will use public transport when the fare is ecreased? These planning models aim to forecast travel behaviour (e.g., trip choice, destination choice, departure time choice, mode choice, route choice), which results in travel demand that can be simulated in order to obtain traffic flows on transportation networks. As such, these transportation planning models borrow from travel behaviour theory (in particular choice models) and traffic flow theory. The goal of this tutorial is to provide a quick overview of the different components in transport planning, using some state-of-the-practice and state-of-the-art methods, illustrated with applications.

## Masterclasses

09:00 12:00 "Modelling for Transport Policy" ([KiM Netherlands Institute for Transport Policy Analysis](#))

13:30 17:00 "The Future of Traffic Management" ([Traffic Quest](#))

17:30 20:30 **Welcome Reception**

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9:00 9:15 Welcome Dr. ir. Serge Hoogendoorn

9:15 9:45 Opening

9:45 10:00 Break

### Transport Planning in Network Design I

#### Chair:

10:00 10:25 On joint railway and housing development

*Xiaosu Ma and Hong Lo.*

10:25 10:50 A Supporting Station Model for Reliable Infrastructure Location Design under Interdependent Disruptions

*Xiaopeng Li, Yanfeng Ouyang and Fan Peng.*

### Pricing I

#### Chair:

10:50 11:15 Computational precision of traffic equilibria sensitivities in automatic network design and road pricing

*Michael Patriksson, Hillel Bar-Gera and Fredrik Hellman.*

11:15 11:40 Day-to-Day Price and Flow Dynamics of Tradable Mobility Credits

*Hongbo Ye and Hai Yang. Continuous*

11:40 13:45 **Lunch break**

[Poster presentations](#)

### Network Fundamental Diagram

#### Chair:

13:45 14:10 Urban Network Gridlock: Characteristics, Dynamics and Control

*Hani Mahmassani, Meead Saberi and Ali Zockaie K.*

14:10 14:35 Estimating MFDs in Simple Networks with Route Choice

*Ludovic Leclercq and Nikolas Geroliminis.*

14:35 15:00 On the distribution of urban road space for multimodal congested networks

*Nan Zheng and Nikolas Geroliminis.*

15:00 15:25 Break

### Transport Planning in Network Design II

#### Chair:

15:25 15:50 On the Estimation of Temporal Mileage Rates

*Richard Wilson.*

15:50 16:15 On Activity-Based Network Design Problems

*Jee Eun Kang, Joseph Chow and Will Recker.*

### Public

#### Transport

#### Chair:

16:15 16:40 Continuous Approximation for Skip-Stop Operation in Rail Transit

*Maxime Freyss, Ricardo Giesen and Juan Carlos Munoz.*

16:40 17:05 Generation and Calibration of Transit Hyperpaths

*Jan Dirk Schmoecker, Hiroshi Shimamoto and Fumitaka Kurauchi.*

## Meetings

17:15	17:45	Traffic Flow Theory Committee (TRB) meeting Committee of the Transportation Research Board ( <a href="http://www.tft.pdx.edu/">http://www.tft.pdx.edu/</a> ) holds it midyear meeting. The meeting is public. During the meeting their winner of the Greenshields price will be announced
17:15	18:15	Meeting IACThe International Advisory Committee of ISTTT will meet. This meeting is only for members of the IAC.
17:45	18:15	Simsub (TRB) meeting The Simulation subcommittee of the Traffic Flow Theory Committe of the Transportation Reseach Board ( <a href="http://www.tft.pdx.edu/">http://www.tft.pdx.edu/</a> ) holds it midyear meeting. The meeting is public.

18:00 23:00 Barbecue Breakers Beach House

## Poster Presentations

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A model for simulating urban goods transport and logistics: the integrated choice of ho.re.ca. activity decision-making and final business consumers

*Francesco Russo and Antonio Comi*

Optimal Parking Pricing in General Networks with Provision of Occupancy Information

*Sean Qian and Ram Rajagopal*

Microscopic Calibration and Validation of Car-Following Models – A Systematic Approach

*Martin Treiber and Arne Kesting*

A Continuum Modeling Approach for Network Vulnerability Analysis at Regional Scale

*H.W. Ho, Agachai Sumalee, William H.K. Lam and W.Y. Szeto*

Adaptive Learning Algorithms for Traffic Games with Naive Users

*Genaro Jr Peque, Toshihiko Miyagi and Junya Fukumoto*

Examining factors of walking disutility for microscopic pedestrian model – A virtual reality approach

*Takamasa Iryo, Miho Asano, Shinta Odani and Shogo Izumi*

Dynamic Congestion and Tolls with Mobile Source Emission

*Terry Friesz, Ke Han, Hongcheng Liu and Tao Yao*

q-Generalized logit route choice and network equilibrium model

*Sho-Ichiro Nakayama*

Equilibrium in capacitated network equilibrium models with queueing delays, queue-storage and blocking back

*Mike Smith, Wei Huang and Francesco Viti*

A Process Model for Route Choice in Risky Traffic Networks

*Hengliang Tian and Song Gao*

The Uncertainty of Drivers' Gap Selection and its Impact on the Fundamental Diagram

*Xinkai Wu and Henry Liu*

A Bi-level formulation for the combined dynamic equilibrium based traffic signal control problem

*Satish Ukkusuri, Kien Doan and Abdul Aziz*

Traffic updating mechanisms for stochastic lattice-free dynamics

*Alexandros Sopasakis*

Modeling Dynamics of Dilemma Zones by Formulating Dynamical Contributing Factors with Video-observed Trajectory Data

*Zhixia Li and Heng Wei*

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**Assignment I**

**Chair:**

9:00	9:25	Boundedly Rational User Equilibria (BRUE): mathematical formulation and solution sets. <i>Xuan Di, Henry X. Liu, Jong-Shi Pang and Jeff X. Ban.</i>
9:25	9:50	The evening commute with cars and transit: Duality results and user equilibrium for the combined morning and evening peaks <i>Eric Gonzales and Carlos Daganzo.</i>
9:50	10:15	Modelling route choice behaviour in a tolled road network with a time surplus maximisation bi-objective user equilibrium model <i>Judith Y T Wang and Matthias Ehrgott.</i>
10:15	10:35	Break

**Pricing II**

**Chair:**

10:40	11:30	Differentiated Congestion Pricing of Urban Transportation Networks with Vehicle-Tracking Technologies <i>Mahmood Zangui, Yafeng Yin, Siriphong Lawphongpanich and Shigang Chen.</i>
11:05	11:55	A hybrid implementation mechanism of tradable network permits system which obviates path enumeration: an auction mechanism with day-to-day capacity control <i>Kentaro Wada and Takashi Akamatsu.</i>
11:55	13:00	Lunch break

**Longitudinal Traffic Flow modelling**

**Chair:**

13:15	13:50	The variational formulation of a non-equilibrium traffic flow model: theory and implications <i>Jia Li and Michael Zhang.</i>
13:50	14:25	Longitudinal Driving Behavior in case of Emergency Situations: An Empirically Underpinned Theoretical Framework <i>Raymond Hoogendoorn, Bart van Arem and Karel Brookhuis.</i>
14:25	15:00	A variational formulation for higher order macroscopic traffic flow models of the GSOM family <i>Jean-Patrick Lebacque and Megan Khoshyaran.</i>
15:00	15:15	Break

**Transport Planning in Network Design**

**Chair:**

15:15	15:55	Sensitivity-based uncertainty analysis of a combined travel demand model <i>Chao Yang, Chen Anthony, Xiangdong Xu and S.C. Wong.</i>
15:55	16:35	A transportation programming model considering project interdependency and regional balance. <i>Kuancheng Huang and Yi-Ming Kuo.</i>

**Route Choice Modelling**

16:35	17:00	Dynamic User Equilibrium in Public Transport Networks with Passenger Congestion and Hyperpaths <i>Valentina Trozzi, Guido Gentile, Michael Bell and Ioannis Kaparias.</i>
17:00	17:25	Rationing and Pricing Strategies for Congestion Mitigation: Behavioral Theory, Econometric Model, and Application in Beijing. <i>Shanjiang Zhu, Longyuan Du and Lei Zhang.</i>

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**Traffic Control**

**Chair:**

9:00	9:25	Vehicle Index Estimation for Signalized Intersections Using Sample Travel Times <i>Peng Hao, Dong Guo, Xuegang Ban, Qiang Ji and Zhanbo Sun.</i>
9:25	9:50	Modelling supported driving as an optimal control cycle: Framework and model characteristics <i>Meng Wang, Martin Treiber, Winnie Daamen, Serge P. Hoogendoorn and Bart van Arem.</i>
9:50	10:15	Linear-Quadratic Model Predictive Control for Urban Traffic Networks <i>Tung Le, Hai L. Vu, Yoni Nazarathy, Bao Vo and Serge Hoogendoorn.</i>
10:15	10:30	Break

**Operations Research in Transport**

**Chair:**

10:30	11:05	Rolling Horizon Approach for Aircraft Scheduling in the Terminal Control Area of Busy Airports <i>Marcella Samà, Andrea D'Ariano and Dario Pacciarelli.</i>
11:05	11:30	Bicriterion Shortest Path Problem with a General Nonadditive Cost <i>Peng Chen and Yu Nie.</i>
11:30	12:05	A bidding advisory model for combinatorial auctions in freight transportation markets with less-than-truckload (LTL) schemes <i>Rodrigo Mesa-Arango and Satish Ukkusuri.</i>
12:05	13:10	Lunch break

**Assignment II**

**Chair:**

13:10	13:35	A Bayesian approach to traffic estimation in stochastic user equilibrium networks <i>Chong Wei and Yasuo Asakura.</i>
13:35	14:00	
14:00	14:25	A path-size weibit stochastic user equilibrium model <i>Songyot Kitthamkesorn and Chen Anthony.</i>
		Adaptive vehicle routing for risk-averse travellers <i>Lin Xiao and Hong Lo.</i>
14:25	15:10	Break

**Lateral Traffic Flow Modeling**

**Chair:**

15:10	15:35	A multi-commodity Lighthill-Whitham-Richards model of lane-changing traffic flow <i>Wen-Long Jin.</i>
15:35	16:10	Key variables of merging behavior: empirical comparison between two sites and assessment of gap acceptance theory. <i>Florian Marczak, Winnie Daamen and Christine Buisson.</i>
16:10	16:35	Freeway On-Ramp Bottleneck Activation, Capacity, and the Fundamental Relationship <i>Seoungbum Kim and Benjamin Coifman.</i>
17:00	21:00	Farewell Reception