



École des Ponts

ParisTech



**Post doctoral position : 15-18 months
at City Mobility Transport Lab (Ecole des Ponts)**

Research theme : “Traffic modeling”
Expected Candidate Profile : **Ph D in traffic assignment modeling.**

Application deadline : extended november 25th, 2018 (initially nov 9th).

City, Mobility and Transport Laboratory : presentation

Created in 2003, our [multidisciplinary research lab](#) addresses issues and trends on transport, mobility and cities. LVMT is a joint lab resulting from the partnership between an engineering school –[École des Ponts ParisTech](#) (ENPC), a research institute - Institute on Technology, Transport and development ([IFSTTAR](#)), and Université Paris-Est Marne-la-Vallée ([UPEM](#)). It is an interdisciplinary laboratory dedicated to the holistic understanding of territorial systems, their population as a society and their mobility. Its research projects associate Human and Social Sciences (geography, sociology and economics) to Engineering Sciences (traffic physics, behavioral and economic modeling, complex system modeling and simulation).

More information : www.lvmt.fr

Post doc offer

Research context : the Academic and Research Chair on the “Socioeconomic Analysis of Urban Passenger Transit” is a 10-year partnership linking ENPC and Ile de France Mobilité, the Mobility Organizing Authority in the Ile-de-France region. The Chair’s most salient activity pertains to traffic assignment modeling: the “CapTA” model of Capacitated Traffic Assignment is developed along a three-layer framework as follows. From bottom up, there are:

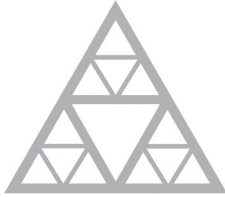
- (i) the “run model” of a vehicle trajectory along its service route, with emphasis on passenger flows and in-vehicle crowding and comfort;
- (ii) the “line model” involves one or several transit routes sharing a common infrastructure: it combines platform waiting for boarding, on the passenger side, to the issue of track occupation, on the vehicle side, together with the “run models” of these routes.
- (iii) The “network model” involves the full set of transit routes serving the urban area: this layer deals with the issues of passenger route choice on every origin-destination pair, flow loading on the network and traffic equilibrium.

Scientific supervisors : Fabien.leurent@enpc.fr and alexis.poulhes@enpc.fr

Post doc tasks

LVMT UMR T 9403

ENPC, IFSTTAR, UPEM, Immeuble Bienvenue, 6 et 8 av. Blaise Pascal, Cité Descartes Champs-sur-Marne, 77455 Marne-la-Vallée cedex 2
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The scientific stake is to refine the representation of space in the CapTA framework. This concerns the heterogeneity of passenger distribution along cars in a train, as well as that along a particular station platform for boarding and alighting. Furthermore, the two spatial distributions interact in the dwelling of the train at the platform, leading to the “critical door” issue in the formation of the dwell time, which drives the line capacity. In this setting, the research issues are to develop the physical representation, the simulation framework and the computation scheme.

The candidate will work in close association with PhD Fabien Leurent, Chair director as well as project supervisor and also with M.Sc Alexis Poulhès, research engineer who developed the CapTA simulation software.

Tentative work plan

- 1/ Bibliographical review of spatial detail in transit assignment models, and qualitative presentation of the research stakes: 2 months
- 2/ Spatial detail of a train and its treatment in the Run model: physical analysis and computer model: about 2 months
- 3/ Spatial detail of a platform and its treatment in the Line model: physical analysis and computer model: about 2 months
- 4/ Interfacing the two models of train and platform respectively, to model the traffic phenomena of passenger alighting, boarding, waiting and positioning: about 3 months
- 5/ Spatial model of a station, linking platforms to station pedestrian facilities and access-egress nodes: model: about 3 months
- 6/ Preparation of papers: about 3 months.

Research outputs

- At least one paper in a peer-reviewed international journal about the scientific contributions of the position.
- Several technical reports.

Candidate profile

The ideal candidate holds a PhD in traffic assignment modeling.

Skills required

- strong research interest in both traffic physics and simulation algorithms at the network scale.
- strong computing and programming skills.
- awareness on spatial issues and individual behaviors of trip-making along a transit path.
- English proficiency ; French proficiency will be appreciated
- Team working ability.

To apply

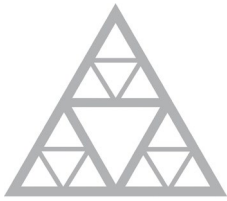
- Application letter, resume, references to be sent to fabien.leurent@enpc.fr and alexis.poulhes@enpc.fr
- Application deadline : sunday, november 25th, 2018

Conditions

- 15 to 18 months working contract (hosted by Ecole des Ponts)
- Work place : LVMT, Bienvenüe building at Cité Descartes, Champs-sur-Marne
- **Starting date : as soon as possible (no later than january 2019)**
- Wages depending upon experience : starting 1950€ / month « net ».

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Bibliography on the CapTA model

Leurent, F., Chandakas, E., Christoforou, Z. (2015) A Transit Bottleneck Model for Waiting Passengers and its Implications for Traffic Assignment, MT-ITS Conference.

Leurent F, Chandakas E, Poulhès A (2014) A traffic assignment model for passenger transit on a capacitated network: Bi-layer framework, line sub-models and large-scale application, Transport. Res. Part C, Vol. 47/1: 3-27.

Leurent F., Pivano C. and Poulhès, A. (2017) On passenger traffic along a transit line: a stochastic model of station waiting and in-vehicle crowding under distributed headways. Transportation Research Procedia. 27: 1219-1226. <http://authors.elsevier.com/sd/article/S2352146517309730>

Poulhès, A., Pivano C. and Leurent F. (2017) Hybrid Modeling of Passenger and Vehicle Traffic along a Transit Line: a sub-model ready for inclusion in a model of traffic assignment to a capacitated transit network. Transportation Research Procedia. 27:164-171.