

## 1. PERSONAL INFORMATION

Bilal Farooq, Ph.D., Ing. jr.  
Assistant Professor  
Civil Engineering  
Ryerson University  
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## 2. EDUCATION

**École Polytechnique Fédérale de Lausanne, Switzerland**  
Postdoctoral Fellow, Transportation and Mobility Lab, January 2011 – July 2013

**University of Toronto, Canada**  
Doctor of Philosophy, Transportation Engineering, September 2006 – June 2011

**Lahore University of Management Sciences, Pakistan**  
Master in Science, Computer Science, September 2001 – July 2004

**University of Engineering and Technology, Pakistan**  
Bachelor in Science, Engineering, March 1996 – January 2001

## 3. RECOGNITIONS

### 3.A Awards

2017 – **Canada Research Chair in Disruptive Transportation Technologies and Services**

2017 – Award for Best Ph.D. Student-Led Paper, **Honourable Mention, 5<sup>th</sup> International Choice Modelling Conference**. Student: Melvin Wong, Ph.D. student under supervision of Dr. Farooq

2016 – Winner of **2016 MassMotion Academic Pedestrian Modelling Project of the Year**, Oasys Software (<http://www.oasys-software.com/project-of-the-year-2016>)

2016 – Visiting Researcher at Guangdong University of Technology (GUT), Guangzhou, China  
Invitation to the President GUT for a fully funded three months stay to develop new research projects at GUT

2015 – Mentored my students who won in “Urban Autonomous Delivery” Hackathon organized by MIT Media lab, November 2015, Boston (<https://goo.gl/eZre33>)

2013 – Switzerland Representation at Global Young Scientist Summit, January 2013, Singapore

2011 – PhD thesis selected for presentation and inclusion in the proceedings of 90<sup>th</sup> Annual Meeting of Transportation Research Board

2003 – Deans Honor List, Lahore University of Management Sciences, 2001-2003

2000 – Among Top 3 students in the batch, 1996-2000

### 3.B Scholarships and Fellowships

2012 – Natural Sciences and Engineering Research Council (NSERC) of Canada Industrial Research and Development Fellowship, 2012-2013. (Declined)

2011 – Swiss Government Fellowship for International Postdoctoral Research Fellows, 2011-2014.

2010 – International Fellowship, Universiteit Utrecht, Netherlands

2010 – Ontario International Fellowship

2010 – Richard Soberman Fellowship, University of Toronto

2009 – FORTRAN Systems Scholarship

2010 – Doctoral Fellowship, University of Toronto, 2008–2010

2008 – Pakistan International Doctoral Scholarship 2006–2008

2001 – Pakistan Ministry of Sciences and Technology’s IT Scholarship for Master in Computer Science (Declined)

1995 – Shaheen Foundation Scholarship, Pakistan, 1990–1995

#### 4. EMPLOYMENT HISTORY

May 2017 – present	Assistant Professor (tenure track), Civil Engineering, Ryerson University
Aug 2013 – Apr 2017	Assistant Professor (tenure track), Civil, Mining and Geotechnical Engineering, École Polytechnique de Montréal
Jan 2011 – Jul 2013	Course Instructor, Mathematics, École Polytechnique Fédérale de Lausanne, Switzerland
Sep 2008 – Dec 2010	Course Instructor, Civil Engineering, University of Toronto
Sep 2007 – Dec 2007	Course Instructor, Ted Rogers Business School, Ryerson University
Sep 2006 – Dec 2010	Research Assistant, Civil Engineering, University of Toronto
Aug 2005 – Aug 2006	Founder and Chief Architect, xCube Innovations Software
Aug 2005 – Aug 2006	Lecturer, Computer Science, National University of Emerging and Computer Science, Pakistan
Jul 2003 – Jul 2005	Software Engineer and Team Lead, Bentley Systems Inc.
Sep 2001 – Jul 2003	Teaching Assistant, Lahore University of Management Sciences

#### 5. RESEARCH FUNDING HISTORY

##### 5.A Summary (based on approximate exchange rates)

<b>Total Amount</b>	<b>\$4,000,000</b>
Peer-Reviewed External	\$3,400,000
Internal Awards	\$200,000
Research Contracts	\$400,000

##### 5.B Peer-Reviewed External Grants

- Canada Research Chair in Disruptive Transportation Technologies and Services  
2017/11 – 2022/11  
Value: \$500,000  
Principal Investigator  
Source: Natural Sciences and Engineering Research Council (NSERC)
- CarbonCount: A Personal Travel Related Greenhouse Gas Emission Accounting System  
2017/11 - 2019/3  
Value: \$200,000  
Principal Investigator  
Source: Ministry of Environment and Climate Change, Ontario
- Modelling Quality and Attractiveness of Public Transport Networks  
2017/4 - 2020/4  
Value: \$160,000 (30%)  
Co-Principal Investigator  
Source: Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT)
- DataMobile: Open Source Big Data Warehousing Platform for Urban Systems  
2016/4 - 2019/4  
Value: \$300,000 (53%)  
Co-Principal Investigator  
Source: SSHRC Insight Development and Connection
- Development of Immersive Virtual Reality for Travel Behaviour Analysis  
Summer 2016  
Value: \$4,500 (100%)  
Principal Investigator  
Source NSERC USRA for student Zihui Zhong
- Comparative Analysis of Pedestrian Movement and Behaviours in Shanghai and Montréal

- |   |   |
|---|---|
| 2016/5 - 2016/8   | Principal Investigator  |
| Value: \$5,000  | Source: Mitacs Globalink for student Alexandra Beaulieu                           |
| 7. Simulation platform development for reserved car (Uber, Didi) market: A Case study of Shanghai                           |   |
| 2016/1 - 2016/4   | Principal Investigator  |
| Value: \$5,000  | Source: Mitacs Globalink for student Alexis Pibrac                                |
| 8. Advances in Understanding Pedestrian Dynamics for Urban Sustainability   |   |
| 2015/4 - 2020/4   | Principal Investigator  |
| Value: \$135,000  | Source: NSERC Discovery   |
| 9. Understanding the Pedestrian Dynamics for Sustainable Active Mobility - Building a Modern Data Collection Infrastructure |   |
| 2015/4 - 2020/4   | Principal Investigator  |
| Value: \$340,000  | Source: CFI-JREL and Québec   |
| 10. Development of Sensors Network for Large-Scale Mobility Data  |   |
| Summer 2015   | Principal Investigator  |
| Value: \$5,000  | Source: Mitacs Globalink for student Viet Ba                                      |
| 11. Development of Simulation Environment for Mutli-Modal Traffic   |   |
| Summer 2015   | Principal Investigator  |
| Value: \$5,000  | Source: Mitacs Globalink for student Think Phuc                                   |
| 12. Development of User Detection and Tracking System for Adaptive Signal Control   |   |
| 2015/4 - 2018/4   | Co-applicant  |
| Value: \$146,000 (33.33%)   | Source: Fonds Québécois de la Recherche sur la Nature et les Technologies (FQRNT) |
| 13. Pedestrian Behaviour in Public Spaces: Modelling and Simulation using Ubiquitous-Network Data                           |   |
| 2014/4 - 2016/4   | Principal Investigator  |
| Value: \$96,100 (100%)  | Source: FQRNT—Programme établissement de nouveaux chercheurs universitaires       |
| 14. Post-Car World  |   |
| 2013/3 - 2014/3   | Co-investigator   |
| Value: CHF1,000,000 (20%)   | Source: SNSF  |
| 15. Pedestrian Dynamics: Flows and Behavior   |   |
| 2012/3 - 2014/3   | Co-investigator   |
| Value: \$400,000 (50%)  | Source: Swiss National Science Foundation (SNSF)                                  |

### **5.C Internal Grants**

- |  |                            |
|--|----------------------------|
| 1. Ryerson Travel Grant  |                            |
| 2017/11 – 2017/11  | Principal Investigator     |
| Value: \$2,000   | Source: Ryerson University |
| 2. Ryerson Undergraduate Research Intern Programme (peer-reviewed)       |                            |
| 2017/09 – 2018/05  | Principal Investigator     |
| Value: \$3,000   | Source: Ryerson University |
| 3. Start Up Grant  |                            |
| 2017/05  |                            |
| Value: \$100,000 (100%)  | Source: Ryerson University |
| 4. Polytechnique Undergraduate Research Intern Programme (peer-reviewed) |                            |
| 2014/05 – 2017/05  | Principal Investigator     |

- Value: \$20,000 (100%)                      Source: Polytechnique Montréal
5. Prediction of Dynamic Traffic Conditions on Urban Roads Using GPS Traces: A Bayesian Updating Approach (peer-reviewed)  
2014/02 – 2015/02                      Principal Investigator  
Value: \$15,000 (100%)                      Source: Fond Polytechnique
6. Start Up Grant  
2013/09    Principal Investigator  
Value: \$40,000 (100%)                      Source: Polytechnique Montréal

### **5.D Research Contracts**

1. Demand Analysis of New Train Hotel between Montréal and Boston/New York  
2016/5 - 2016/12                      Principal Investigator  
Value: \$35,000 (100%)                      Source: Train de nuit
2. Movement Analysis of Pedestrianized Streets in Gay Village  
2016/5 - 2016/9                      Principal Investigator  
Value: \$15,000 (100%)                      Source: Gay Village Management
3. Study of Pedestrian Flux in train stations (PedFlux)  
2012/4 – 2015/4                      Co-applicant  
Value: CHF 320,000 (50%)                      Source: Swiss Railways (SBB/CFF)

## **6. ACTIVITIES**

### **6.A Student Supervision**

The following tables catalogue Dr. Farooq's complete trainee supervision record in the past five years.

Position	Current Trainees		Former Trainees	
	Sole supervision	Co-supervision	Sole supervision	Co-supervision
Postdoctoral fellows	2	0	0	0
Ph.D. students	3	4	0	4
MASc. students	1	1	3	6
Undergraduate researchers	2	0	10	0
Graduate researchers	2	0	1	3

### **Post-Doctoral Fellows Supervised**

#	Name	Project Title, Program Information, and Activities	Dates
PDF1	Dr. Shadi Djavadian	End-to-End Routing for Connected and Autonomous Vehicles <b>Nominated at Ryerson for the Banting Postdoctoral scholarship</b>	Aug 2017-
PDF2	Dr. Anae Sobhani	Advanced Travel Behavioural Modelling Postdoc, Sole Supervision <i>Starting as Senior Research Fellow at TU Delft in Oct 2017</i>	Nov 2015 – Sep 2017

**Graduate Students Supervised**

#	Name	Project Title, Program Information, and Activities	Start Date
GS1	Mehdi Meshkani	Shared Autonomous Mobility Solutions Ph.D. (Ryerson), Sole Supervision	Jan, 2018 – present
GS2	Lama Al Faseeh	Autonomous Vehicles in Mixed Traffic Conditions Ph.D. (Ryerson), Sole Supervision <b>Awarded: Queen Elizabeth II Graduate Scholarship in Science and Technology</b>	Sep, 2017 – present
GS3	Arash Kalatian	Behavioural Analysis of Autonomous Vehicles and Pedestrian Interactions Ph.D. (Ryerson), Sole Supervision	May, 2017 – present
GS4	Godwin Badu-Marfo	Integrated System for Smart-Phone based Transportation Surveys Ph.D. (Concordia), Co-Supervision with Z. Patterson	Jan, 2017 – present
GS5	Ali Yazdiadeh	Advances in behavioural models using longitudinal trajectory data Ph.D. (Concordia), Co-Supervision with Z. Patterson	Sep, 2016 – present
GS6	Alexandra Beaulieu	Location Choice Modelling using Ubiquitous Wi-Fi Sensors Data MAsc. (Polytechnique), Sole Supervision <b>Awarded: MITACS Globalink Scholarship 2016</b>	Jan, 2016 – Sep, 2017
GS7	Melvin Wong	Hybrid Travel Demand Models using Econometrics and Machine Learning Ph.D. (Ryerson, Polytechnique), Sole Supervision <i>Directly admitted to Ph.D. programme after finishing undergraduate degree.</i> <b>Winner: Autonomous Mobility, MIT Media lab Hackathon 2015</b> <b>Honourable Mention: Best PhD Student-Led Paper at ICMC2017</b>	Sep, 2015 – present
GS8	Tingting Zheng	Demand Analysis of Interurban Bus Service MAsc. (Polytechnique), Co-Supervision with C. Morency	May, 2015 – May, 2017
GS9	Antoine Grapperon	Enriching Smartcard Data with Socio-Demographics using Information Fusion MAsc. (Polytechnique), Co-Supervision with M. Trépanier <b>Awarded: Bourse d'excellence du CIRRELT 2015-2016</b> <b>Winner: Autonomous Mobility, MIT Media lab Hackathon 2015</b> <i>Current Work: Data Scientist at INRO</i>	Jan, 2015 – Jun, 2016
GS10	Guilhem Poucin	Activity Mining in Wi-Fi Logs MAsc. (Polytechnique), Co-Supervision with Z. Patterson <b>Winner: Autonomous Mobility, MIT Media lab Hackathon 2015</b>	Jan, 2015 – Mar, 2017

GS11	Ranwa Al-Mallah	Traffic Management in Connected Vehicles using Vehicular Ad-hoc NETWORK (VANET) Ph.D. (Polytechnique), Co-Supervision with A. Quintero	Sep, 2014 – present
GS12	Alexis Pibrac	Dynamic Estimation of Pedestrian Flow in Public Spaces MAsc. (Polytechnique), Sole Supervision <b>Awarded: MITACS Globalink Scholarship 2016</b> <b>Awarded: Oasys Best Research Project of the Year 2016</b> <i>Current Work: Data Scientist at TeamRise</i>	Sep, 2014 – Jun, 2016
GS13	Rida Shetwi	Building Information Modelling System for Large-Scale Transportation Projects MAsc. (Polytechnique), Sole Supervision <b>Awarded: Libyan International Graduate Studies Scholarship</b> <i>Current Work: Applied for Ph.D. programme</i>	May, 2014 – May, 2016
GS14	Ali Yazdiadeh	Generalized Specification for Capturing Heterogeneity in Demand Modelling MAsc. (Concordia), Co- Supervision with Z. Patterson <i>Current Work: Started Ph.D. at Concordia</i>	Sep, 2014 – Aug, 2016
GS15	Mohammad Kianpour	Bayesian Estimation of Traffic Flow Conditions using Streaming GPS Data MAsc. (Polytechnique), Sole Supervision	May, 2014 – Jan, 2017
GS16	Dariush Etehadieh	Systematic Parameter Optimization and Application of Automated Tracking Pedestrian-Dominant Situations MAsc. (Polytechnique), Co-Supervision with N. Saunier <i>Current Work: Consultant at WSP, London</i>	Sep, 2013 – Dec, 2014
GS17	Gabriel Sicotte	Modelling the Interdependence between Transportation Modes and Trip Chains MAsc. (Polytechnique), Co-Supervision with C. Morency <i>Current Work: Consultant at AMT, Montréal</i>	Sep, 2013 – Dec, 2014
GS18	Hamzeh Alizadeh	Route Choice Modelling using GPS Data Ph.D. (Polytechnique), Co-Supervision with N. Saunier	Sep, 2013 – present
GS19	Marija Nikolic	Modelling the Stochastic Relationship between Pedestrian Flow Indicators Ph.D. (EPFL, Switzerland), Co-Supervision with M. Bierlaire	Nov, 2012 – Aug 2013
GS20	Flurin Hunsler	Macroscopic Demand Loading Models for Pedestrian Flow Ph.D. (EPFL, Switzerland), Co-Supervision with M. Bierlaire <i>Current Work: Postdoc at TU Delft</i>	Oct, 2012 – Aug 2013

GS21	Antonin Danalet	Activity based Travel Demand Modelling for Pedestrians Ph.D. (EPFL, Switzerland), Co-Supervision with M. Bierlaire <i>Current Work: Scientific Collaborator Mobility and Transport at the Swiss Federal Office for Spatial Development (ARE)</i>	May, 2012 - Aug 2013
GS22	Ricardo Hurtubia	Random Utility based Integrated Spatial Modelling Ph.D. (EPFL, Switzerland), Co-Supervision with M. Bierlaire <i>Current Work: Assistant Professor at Catholic University, Chile</i>	Jan, 2011 - Aug 2012
GS23	Sohrab Saleh	Simulation based Calibration of Social Force Model MAsc. (EPFL, Switzerland), Co-Supervision with M. Bierlaire <i>Current Work: Engineer at Transitec, Switzerland</i>	Jan, 2012 - Aug 2013

#### **Undergraduate Research Students**

#	Name	Project Title, Program Information, and Activities	Dates
UR1	Grace Yip	Design of Behavioural Experiments in Immersive Virtual and Augmented Reality Environment Sole Supervisor	Jan, 2018 – present
UR2	Rafael Vasquez	Open Platform for Immersive Virtual and Augmented Reality based Travel Behaviour Experiments Sole Supervision <b>Awarded: Ryerson University Research Lab Placement Scholarship</b>	Sep, 2017 – present
UR3	Nikki Rahnamaei	Distributed Dynamic Routing of Connected and Autonomous Vehicles Sole Supervision	May, 2017 – Dec, 2017
UR4	Laurent Ferradou	Analysing Mobility Patterns in Gay Village Pedestrianized Streets Sole Supervision <b>Awarded: UPIR Scholarship (2016-2017)</b>	Sep, 2016 - present
UR5	Pascal Desrochers	Wi-Fi Sensors Development for Mobility Detection Sole Supervision	May, 2016 - Aug, 2016
UR6	Felita Ong	Ubiquitous Data Collection in Gay Village Pedestrianized Streets Sole Supervision <b>Awarded: Polytechnique Placement Scholarship</b>	May, 2016 - Aug, 2016
UR7	Zihui Zhong	Immersive Virtual Reality Environment for Transportation Experiments Sole Supervision <b>Awarded: NSERC USRA, UPIR Scholarship (2015-2016, 2016-2017)</b>	Sep, 2015 - present
UR8	Tristan Brousseau-Rigaudie	Long-term deployment of Sensors Network Sole Supervision <b>Awarded: UPIR Scholarship (2015-2015)</b>	Sep, 2015 - May, 2016

UR9	Thinh Phuc	Automated Data Processing in Ad-hoc Sensor Network Sole Supervision <b>Awarded: MITACS Globalink Scholarship</b>	May, 2015 - Aug, 2015
UR10	Viet Dang Ba	Development of Positioning System in Ad-hoc sensors network Sole Supervision <b>Awarded: MITACS Globalink Scholarship</b>	May, 2015 - Aug, 2015
UR11	Alexandra Beaulieu	Analysing Mobility Patterns in Street Festival Sole Supervision	May, 2015 - Dec, 2015
UR12	Richard Sim	Modelling Mobility Services Satisfaction in Montréal Sole Supervision	May, 2015 - Sep, 2015
UR13	Anas Balboul	Development of an agent based microsimulator for pedestrian movement Sole Supervision <b>Awarded: UPIR Scholarship (2016-2017)</b>	Sep, 2014 - Aug 2015
UR14	Marwan Ragab	Development of an ad-hoc sensors network for transportation data collection Sole Supervision <b>Awarded: UPIR Scholarship (2016-2017)</b>	Sep, 2014 - May 2015
UR15	Mélissa Bidegain--Yeung	Generalization of SimPSynz for Transportation Information Fusion Sole Supervisor	May, 2014 - Aug, 2014

#### Graduate Research Assistants Supervised

#	Name	Project Title, Program Information, and Activities	Dates
GRA1	Ismaïl Saadi	Short-term Demand Prediction in Ride-Hailing Services Sole Supervisor <i>Current Work: Postdoc at University of Liège</i>	Jan, 2017 - Apr, 2017
GRA2	Yue Zhao	Optimizing Matching in Ride-Hail Pooling Sole Supervisor	Oct, 2016 - Apr, 2017
GRA3	Petr Jandik	Calibration and validation of dynamic traffic assignment Microsimulation Sole Supervisor <i>Current Work: Consultant at WYG, Czech Republic</i>	Sep, 2014 - May, 2015
GRA4	Thomas Mühlematter	Development of a Macroscopic Multi-directional Pedestrian Propagation Model Co-Supervision with M. Bierlaire <i>Current Work: Senior Data Scientist at Credit Suisse</i>	Jan, 2013 - Jun, 2013
GRA5	Javier Lopez-Montenegro Ramil	Visualization of Mobility in a 3D Graph Co-supervised by M. Bierlaire	Jan, 2013 - Jun, 2013
GRA6	Paul Anderson	Bi-Partite Transportation Association Problem Co-supervised by M. Bierlaire <i>Current Work: Ph.D. student at University of California, Berkeley</i>	Sep, 2012 - Dec, 2012



## **6.B Editorial and Review Activities**

### **Grant Proposal Reviewer**

1. NSERC Discovery (2015, 2016, 2017, 2018)
2. NSERC CRD (2016)
3. Swiss National Foundation (2014)
4. French National Agency of Research (2014, 2015)
5. MITACS (2015, 2016)

### **Journal Manuscript Peer Reviewer**

1. Transportation Research Part A: Policy and Practice (2 manuscripts reviewed)
2. Transportation Research Part B: Methodologies (10)
3. Transportation Research Part C: Emerging Technologies (9)
4. Transportation Research Part D: Transport and Environment (2)
5. IEEE Transactions on Intelligent Transportation System (2)
6. IEEE Transactions on Sensors (1)
7. Intelligent Transportation Systems (2)
8. ASCE, Transportation Engineering Part A: Systems (2)
9. Canadian Journal of Civil Engineering (2)
10. Journal of Advanced Transportation (1)
11. INFORM journal of Operations Research (1)
12. Transportation (8)
13. Journal of Choice Modelling (2)
14. Transportmetrica (5)
15. Transportation and Land Use (2)
16. Euro Journal of Transportation and Logistics (1)
17. Transportation Research Record (35)
18. International Journal of Microsimulation (1)
19. Natural Hazards Review (1)

## **7.C International Activities**

### **International Research Collaborations**

Through his research publications and involvement in international conferences, workshops, and projects, Dr. Farooq has established himself as a leading researcher in travel demand analysis with a strong international stature. In 2016, he was invited by Dr. Zhang Li, President of Guangdong University of Technology (GUT) to spend up to three months at GUT (fully funded). His time there resulted in a) a collaborative research project on demand sensitive application design, and b) an industrial research project related to congestion propagation analysis on urban roads in Guangzhou, Guangdong, China, sponsored by UCtrl, first transportation systems analysis company listed on the Shanghai stock exchange.

In January 2017, Dr. Farooq hosted Dr. Elisabetta Cherchi of Newcastle University (a world-renowned researcher on the travel behavior impacts of disruptive technologies) at Polytechnique for developing research collaborations between the two universities. During this time, Dr. Cherchi introduced her research to the graduate students at Polytechnique on the travel behaviour changes in response to disruptive technologies. This visit resulted in one research article authored by Dr. Farooq and co-authored by his student and Dr. Cherchi. This article is currently under-review in the journal of Transportation Research Record. Dr. Cherchi will be visiting Dr. Farooq again in October 2017 at Ryerson to further develop their collaborations. Dr. Farooq has also recently been invited by Dr. Cherchi to be part of her grant application to the Economic and Social

Research Council (ESRC) on the analysis of travel behaviour changes as a result of connected and autonomous vehicles. Other partners include economists, geographers and social scientists from British universities and industrial partners including Nissan. In this grant application, he is leading a sub-project on the design of immersive virtual reality experiments for behavioural analysis.

His collaboration with Shanghai Jiang Tao University, China, has resulted in the exchange of three graduate students between the labs of Dr. Farooq and Dr. Jiang Hang Chen of Jiang Tao U. In December 2016, he was invited by Dr. William Lam, Chair Civil Engineering, Hong Kong Polytechnic University to present his research as a guest lecturer. In April 2017, Dr. Lam visited Dr. Farooq at Ryerson University to develop a formal student exchange and research collaboration program.

From 2014 to 2015, he collaborated with colleagues Dr. Cools and Dr. Teller at the University of Liège to build upon his earlier work on transportation information fusion. This work resulted in a publication in the top transportation journal, Transportation Research Part B. In 2016-2017, his colleagues from University of Liège sent a PhD student on exchange program to work with Dr. Farooq. This collaboration has resulted in a manuscript, which is under review in Transportation Research Part C. From 2011 to 2013, he was invited to be part the SustainCity research project, which was funded by European Union's Horizon 2020 fund. This project involved 8 different universities in Europe, University of California, Berkeley, and 3 major transportation consulting firms of Europe. This project resulted in 4 research articles in top journals, 2 chapters in a book, and several conference proceedings on integrated modelling and simulation of transportation and other urban infrastructure systems. In 2013, he was invited by MIT-Portugal international research program to deliver a short-course in Simulation Methods to the Ph.D. students in the program. He has also been invited by TransportNET, a network of European Universities, to deliver a short-course on Travel Demand Modelling at University of Antwerpen.

### **International Research Workshop/Conference Organization**

In recognition of the international impact of his work on travel demand modelling using innovative data sources, Dr. Farooq was invited to Co-Chair the "Best-Practices for Estimating Advanced Choice Models Based on Large-Data" workshop at the International Choice Modelling Conference held in April 2017 in Cape Town, South Africa. He has been invited to Co-Chair the "Recent Advances in Experiment Design" workshop to be held in October 2017 in Montréal, which will result in a resource paper written by the Co-Chairs as part of the conference proceedings. In the field of travel demand research, there is a long-established tradition of inviting international experts to organize such workshops and asking them to write resource paper that can act as a major reference on the topic. He Organized and Chaired a workshop on Pedestrian Crowd Dynamics Modelling at the International Federation of Operational Research Societies (IFORS) Annual Conference in June 2017 in Québec City.

In July 2016, Dr. Farooq was invited by the Transportation Research Board (TRB) and the Association of Unmanned Vehicle Systems International (AUVSI) to present his research and participate at the Autonomous Vehicle Symposium. He was invited to present his work on immersive virtual reality application in transportation in January 2017 at the TRB Workshop on Visualization in Choice Experiments. He has been invited to organize a follow-up workshop on the topic at TRB 2018, which planned to be sponsored by TRB committees: Traveler Behavior and Values (ADB10), Effect of Information and Communication Technologies on Travel Choices (ADB20), and Travel Survey Methods (ABJ40).

Dr. Farooq is the founding member of the program committee of the annual workshop on Agent-Based Modelling of Urban System (ABSUM). The workshop is a premium venue for presenting

methodological and empirical research related to agent based mathematical modelling and simulation of transportation and other urban systems. In 2012, he was invited to be on the organization committee of the 13<sup>th</sup> Triennial Conference of International Association of Travel Behaviour Research. Dr. Farooq is the invited member of TRB committees ADB10 and ADB20, where he is involved in developing the research agenda, managing the review process of research articles, and other organizational activities.

#### **7.D Committee Memberships**

1. Transportation Research Board (TRB) *Part of National Academies of Sciences Engineering and Medicine, USA*
  - ADB10: Committee on Traveler Behavior and Values. 2017-2020
  - ADB20: Committee on Effects of Information and Communication Technologies on Travel Choices. 2015-2020
  - AHB45(2): Subcommittee Crowd Dynamics Modelling
2. Association for Unmanned Vehicle Systems International
  - Behavioral Experiments for Adoption and Use of Automated Vehicle

#### **7.E Organization of Conferences and Workshops**

1. Co-Chair: 2018 Annual General Meeting and Conference of Intelligent Transportation System, Canada.
2. Workshop Organizer and Chair: "Use of Virtual Reality and Gaming in Transportation Demand Analysis," Workshop in planning for the 97<sup>th</sup> Annual meeting of the Transportation Research Board, Washington DC, January 2018.
3. Workshop Organizer (Co-Chair with Ricardo Daziano, Cornell University): "New Directions in Experimental Design," Workshop organized as part of the International Conference on Travel Survey Methods, Montréal, October 2017.
4. Workshop Organizer (Co-Chair with Meead Saberi, Monash University, Australia): "Pedestrian Crowd Dynamics Modeling," Workshop organized as part of the Annual Meeting of International Federation of Operational Research Societies (IFORS), Québec City, June 2017.
5. Founding Member Program Committee: International Workshop on Agent-Based Modelling of Urban Systems (ABMUS)
  - Reviewed 5 manuscripts for 1<sup>st</sup> Workshop, ABMUS2016, Singapore, May 2016
  - Reviewed 4 manuscripts for 2<sup>nd</sup> Workshop, ABMUS2017, Sao Paulo, Brazil, May 2017
6. Member Organization and Scientific Committees: Latsis Symposium 2012: 1<sup>st</sup> European Symposium on Quantitative Methods in Transportation Systems, Lausanne, September 2012.
  - Reviewed 5 extended abstracts for the Scientific Committee
  - Chaired session entitled: Pedestrian Modelling
  - Organized volunteers for 2<sup>nd</sup> day of the conference
7. Scientific Committee: 13<sup>th</sup> International Association for Travel Behaviour Research (IATBR) Conference, Toronto, July 2012
  - Reviewed 21 extended abstracts for the Scientific Committee
  - Chaired session entitled: Location Choice Modelling

#### **7.F Selected Invitations on Panels**

1. Automated Vehicle Symposium (July 11-13, 2016): Invited to present and participate in the breakout session on Behavioral Experiments for Modeling Adoption and Use of Automated Vehicles; upon invitation only (open to the public).
2. Transport Canada, Symposium U15 with Quebec Universities, Ottawa (November 28, 2014): A one-day workshop organized by Transport Canada to discuss a diverse set transportation

issues at a national scale (e.g. improving access to Global Value Chains, Resilience of transportation systems, etc.); upon invitation only (not open to the public).

### **7.G Consulting**

Dr. Farooq has been active in consulting on issues related to urban and interurban transportation systems. In past five years, he has provided services to public organizations, including: Swiss Railways, City of Toronto, Montréal Public Transit System (STM), Montréal Commuter Train Service (AMT) and private organizations: Montréal Gay Village, Train Hôtel, Montréal MURAL Festival, Montréal Farmers Markets, Transnomis (World-leading Intelligent Transportation Systems Consultant based in Ontario), and Uctrl, Guanzhou, China (1<sup>st</sup> Transportation company in China that is traded on the Shanghai Stock Exchange).

### **7.H Volunteering**

1. Member, Committee for Strategic Planning of Usage for Parking Space, X-Condominium, Toronto
2. Chair, Committee for Promotional Activities, Department of Civil, Geotechnical, and Mining Engineering, École Polytechnique de Montréal, 2014-2016

## **8. RESEARCH CONTRIBUTIONS**

### **8.A Presentations**

- P1. Emerging Trends in Urban Transportation Systems. City of Toronto. December 14, 2017.
- P2. Autonomous Vehicles on Urban Roads: What About Pedestrians. University of Toronto. December 1, 2017.
- P3. New Sources of Data/Challenges/Methods: The State-of-the-art. Workshop on Modelling with Large-Datasets. April 4, 2017
- P4. Immersive Virtual Reality Discrete Choice Experiments for Disruptive Transportation Technologies. TRB Workshop 110: Use of Visualization in SP Surveys. January 9, 2017.
- P5. Patterns Mining in Ubiquitous Transportation Big Data. Guangdong University of Technology, December 16, 2016.
- P6. Ubiquitous Sensing of Urban Activities and Mobility. Hong Kong Polytechnic University, December 12, 2016.
- P7. Urban Activities, Mobility, and Ubiquitous-Networks. ITE University of Toronto, November 25, 2016.
- P8. Analyse de la demande de nouveaux services interurbains. Montréal-Sherbrooke Corridor Train Project, Bromont, July 6, 2016.
- P9. Smart Cities, Innovative Data Sources, and Data Science. Columbia University, February 29, 2016.
- P10. Harnessing Innovative Data Sources and Data Science for Transportation Systems of Tomorrow. University of Michigan Transportation Research Institute, Ann Arbor, February 19, 2016.
- P11. Micro-simulation de la gare centrale de Montréal. Invited Speaker, Agence métropolitaine de transport, Montréal, January 29, 2016.
- P12. Recent Advances in Sustainable Urban Transportation Systems Research, Special Lecture Series, McGill University. June 08, 2015.
- P13. Sustainable Active Urban Mobility: Research and Applications, City of Toronto. May 25, 2015.
- P14. Pedestrian Modelling and Public Health. Transportation and Public Health Workshop, Montreal, May 1-2, 2015.
- P15. Use of Big Data for Improving Urban Living, CityZeen Inc. Workshop on Big Data. May 03, 2015.

- P16. Activity based Travel Demand Modelling for Pedestrian Infrastructure Planning, Canada-Germany Hands-on Sustainable Urban Mobility Workshop. May 2014.
- P17. Études de la dynamique du Flux des piétons dans les installations de transport collectif, Société de transport de Montréal (STM). April 2014.
- P18. La modélisation et la micro-simulation intégrée des systèmes urbaines, Service de la modélisation des systèmes de transport, Transports Québec. January 2014.
- P19. New Directions in Population Synthesis for Microsimulation of Urban Systems, CIRRELT, Canada. October 2013.
- P20. Integrated Transportation and Urban Infrastructure Systems: Planning and Design, École Polytechnique de Montréal, Canada. December 2012.
- P21. Simulation: Theory and Application in Urban Systems, PhD course for PhD student in MIT-Portugal project, University of Coimbra, Portugal, November 2012.
- P22. Market Behaviour within Large-Scale Models of Urban Infrastructure Systems, Department of Transportation, Denmark Technical University, Copenhagen, March 2012.
- P23. Integrated Approach Towards Urban Engineering Infrastructure Systems, Pillar of Systems Engineering, Singapore University of Technology and Design, Singapore, February 2012.
- P24. Recent advances in agent synthesis for large-scale integrated models. Transportation Research Seminar Series, University of Toronto, Canada, November 2011.
- P25. Multidimensional discrete-continuous modelling of choice bundles: Theory and application. School of Economics, University of Antwerp, Antwerp, Belgium, March 2011.
- P26. Understanding the Evolution of Urban Built Space. New England Complex System Institute, Boston, November 18, 2010.
- P27. Modelling built-space supply decisions within integrated microsimulation framework of urban systems. TRANSP-OR Laboratory, Ecole Polytechnique Fédérale de Lausanne, May 2010.
- P28. Land Use and population evolution in the Integrated Land Use, Transportation, and Environment (ILUTE) modelling framework. Centre for Transport Studies, Imperial College London. August 2008.

## **8.B Interview and Media Relations**

1. Radio Canada/CBC, Report on study conducted by my research group on new train service (<https://goo.gl/Mz4p43>)
2. Breakfast Television, City TV. Interview on URBANFlux System. Aired: July 6, 2016 ([www.btmontreal.ca/videos/5023121711001/](http://www.btmontreal.ca/videos/5023121711001/))
3. Le Code Chastenay. Télé Québec. Interview and featured research on crown movement in the popular science programme. Aired: March 8, 2016 (<http://goo.gl/rNTmqX>)
4. Métro Daily Journal. Mention of the research project on MURAL Festival. September 11, 2015.

## **8.C Publications and Citations**

### **Published Refereed Contributions**

#### **Articles in Scholarly Refereed Journals (Trainee names with \*):**

- J1. Farooq, B., Cherchi, E., Sohrabi, A., (2018) "Virtual Immersive Reality for Stated Preference Travel Behaviour Experiments: A Case study of Autonomous Vehicles on Urban Roads," Manuscript#18-02075, Journal of Transportation Research Record.
- J2. Wong, M.\*, Farooq, B., Bilodeau, G.A. (2018) "Discriminative conditional restricted Boltzmann machine for discrete choice and latent variable modelling," Journal of Choice Modelling, Accepted: November 2017, Manuscript# JOCM\_2017\_79.

- J3. Poucin\*, G., Farooq, B., Patterson, Z. (2018) "Activity Patterns Mining in Wi-Fi Access Point Logs," *Computer Environment and Urban Systems*. 67: 55-67.
- J4. Anderson\*, P., Farooq, B. (2017) "A Generalized Partite-Graph Method for Transportation Data Association," *Transportation Research Part C: Emerging Technologies* 76: 150-169. doi:10.1016/j.trc.2017.01.004
- J5. Aliabadi\* H.A., Farooq, B., Morency, C., Saunier, N. (2017) "On the Role of Bridges as Anchor Points in Route Choice Modeling," *Transportation*: 1-26 (available online). doi:10.1007/s11116-017-9761-7
- J6. Al-Mallah\*, R., Quintero, A., Farooq, B. (2017) "Distributed Classification of Urban Congestion Using VANET," *IEEE Transactions on Intelligent Transportation Systems*: 1-8 (available online). doi:10.1109/TITS.2016.2641903
- J7. Saadi\*, I., Mustafa, A., Teller, J., Farooq, B., Cools, M. (2016) "Hidden Markov Model based Population Synthesis," *Transportation Research Part B: Methodological* 90: 1-21. doi:10.1016/j.trb.2016.04.007 *Ranked 15 in the TOP 25 viewed articles of Transportation Research Part B during May-July 2016.*
- J8. Nikolić\*, M., Bierlaire, M., Farooq, B., Delapperant, M. (2016) "Probabilistic Speed–Density Relationship for Pedestrian Traffic," *Transportation Research Part B: Methodological* 89: 58-81. doi:10.1016/j.trb.2016.04.002
- J9. Elgar, I., Farooq, B., Miller E.J. (2015) Simulation of Firm Location Decisions: An Attempt to Replicate Office Location Choices in the Greater Toronto Area. *Journal of Choice Modelling* 17, 39–51. doi:10.1016/j.jocm.2015.12.003
- J10. Wissen, H.U., Efthymiou\*, D., Farooq, B., von Wirth, T., Teich, M., Neuenschwander, N., and Grêt, R.A. (2015) "Indicators for the Quality of Urban Patterns: Spatially Explicit Evidence for Multiple Scales," *Landscape and Urban Planning* 142(0), 47-62. doi:10.1016/j.landurbplan.2015.05.010
- J11. Hänseler\*, F.S., Bierlaire, M., Farooq, B., Mühlematter\*, T. (2014) "A Macroscopic Loading Model for Time-Varying Pedestrian Flows in Public Walking Areas," *Transportation Research Part B: Methodological* 69: 60-80. doi:10.1016/j.trb.2014.08.003 *Ranked 11 in the TOP 25 hottest articles of Transportation Research Part B during October-December 2014.*
- J12. Danalet\*, A., Farooq, B., Bierlaire, M. (2014) "A Bayesian Approach to Detect Pedestrian Destination-Sequences from Wi-Fi Signatures," *Transportation Research Part C: Emerging Technologies* 44: 146-170. doi:10.1016/j.trc.2014.03.015
- J13. Anderson\*, P., Farooq, B., Efthymiou\*, D., Bierlaire, M. (2014) "Association Generation in Synthetic Population for Transportation Applications: Graph-Theoretic Solution," *Transportation Research Record* 2429: 38–50. doi:10.3141/2429-05
- J14. Efthymiou\*, D., Farooq, B., Bierlaire, M., Antoniou, C. (2014) "Multidimensional Indicator Analysis for Transport Policy Evaluation," *Transportation Research Record* 2430: 83–94. doi: 10.3141/2430-09
- J15. Farooq, B., Müller, K., Bierlaire, M. Axhausen K.W. (2014) "Methodologies for synthesizing populations, in *Integrated Transport and Land Use Modeling for Sustainable Cities*," Editors: Michel Bierlaire, André de Palma, Ricardo Hurtubia and Paul Waddell, EPFL Press.
- J16. Farooq, B., Hurtubia\*, R., Bierlaire, M. (2014) "Simulation based generation of synthetic population for Brussels case study," in *Integrated Transport and Land Use Modeling for Sustainable Cities*, Editors: Michel Bierlaire, André de Palma, Ricardo Hurtubia and Paul Waddell, EPFL Press.

- J17. Farooq, B., Bierlaire, M., Hurtubia\*, R., Flötteröd, G. (2013) "Simulation Based Population Synthesis," *Transportation Research Part B: Methodological* 58: 243-263. doi:10.1016/j.trb.2013.09.012
- J18. Farooq, B., Miller E.J., Chingcuanco\* F., Giroux-Cook\* M. (2012) "Microsimulation Framework for Urban Price-Taker Markets," *Journal of Transportation and Land Use*. 6(1): 41-51.
- J19. Farooq, B., Miller E.J., Haider M. (2012) "A Multidimensional Decision Modeling Framework for Built Space Supply," *Journal of Transportation and Land Use*. 6(3): 61-74.
- J20. Farooq, B., Miller E.J. (2012) "Towards Integrated Land Use and Transportation: A Dynamic Disequilibrium based Microsimulation Framework for Built Space Markets," *Transportation Research Part A: Policy and Practice*, 46 (7), 1030-1053. doi:10.1016/j.tra.2012.04.005
- J21. Miller, E.J., Farooq, B., Chingcuanco, F. Wang, D. (2011) "Historical Validation of an Integrated Transport–Land Use Model System," *Transportation Research Record*, 2 (2255), 91-99.
- J22. Farooq, B., Miller E. J., Haider, M. (2010) "Hedonic Analysis of Office Space Rent," *Transportation Research Record*. 2174, 118–127.
- J23. Elgar, I., Farooq, B., Miller E. J. (2009) "Modeling Location Decisions of Office Firms: Introducing Anchor Points and Constructing Choice Sets into the Model System," *Transportation Research Record*, 2133 (2), 56–63.

### **Other Refereed Contributions**

#### **Papers Published in Conference Proceedings (Trainee names with \*):**

- C1. Wong\*, M., Farooq, B., Sobhani, A. (2017) "On the Similarities between Integrated Choice and Latent Variable (ICLV) and Conditional Restricted Boltzmann Machine (C-RBM) Models," *Proceedings of the International Conference of Hong Kong Society for Transportation Studies*, December, 2017.
- C2. Beaulieu\*, A., Farooq, B. (2017) "Next Location Choice Modelling Using Ubiquitous Wi-Fi Signals Data," *Proceedings of the 6<sup>th</sup> European Association for Research in Transportation*, September, 2017.
- C3. Yazdizadeh\*, A., Patterson, Z., Farooq, B., (2017) "Using Smartphone Travel Survey Experiment for Transportation Mode Detection: An Application on DataMobile Trip Data in Montreal," *11<sup>th</sup> International Conference on Transport Survey Methods*, September, 2017.
- C4. Aliabadi\*, H.A., Bourbonnais, P.L., Morency, C., Farooq, B., Saunier, N. (2017) "An Online Survey to Enhance the Understanding of Car Drivers Route Choices," *International Conference on Transport Survey Methods*, September, 2017.
- C5. Sobhani\*, A., Farooq, B. (2017) "Immersive Head Mounted Virtual Reality based Safety Analysis of Smartphone Distracted Pedestrians at Street Crossing," *International Conference on Road Safety and Simulation*, October, 2017.
- C6. Yazdizadeh\*, A., Farooq, B., Patterson, Z. (2017) "Generic Form for Capturing Unobserved Heterogeneity in Discrete Choice Modeling: Application to Neighborhood Location Choice," *Transportation Research Board Annual Meeting*, January, 2017.
- C7. Aliabadi\*, H.A., Farooq, B., Morency, C., Saunier, N. (2017) "Classifying Behavioral Dynamics of Taxi Drivers Route Choice using Longitudinal GPS Data," *Transportation Research Board Annual Meeting*, January, 2017.

- C8. Grapperon\*, A., Farooq, B., Trépanier, M. (2016) "Activity Based Approach to Estimation of Dynamic Origin-Destination Matrix Using Smartcard Data," 9<sup>th</sup> TRISTAN symposium, Aruba, 13-17 June 2016.
- C9. Wong\*, M., Farooq, B., Bilodeau, G.A. (2016) "Next Direction Route Choice Model for Cyclist using Panel Data," 51<sup>th</sup> Annual Conference of Canadian Transportation Research Forum, May, 2016.
- C10. Beaulieu\*, A., Farooq, B. (2016) "Large-Scale Multi-sensor Monitoring of Pedestrian Dynamics in Public Spaces: Preliminary Results," Transportation Research Board Annual Meeting, January, 2016.
- C11. Poucin\*, G., Farooq, B., Patterson, Z. (2016) "Pedestrian Activity Pattern Mining in Wi-Fi Network Connection Data," Transportation Research Board Annual Meeting, January, 2016.
- C12. Farooq, B., Beaulieu\*, A., Ragab\*, M., Ba\*, V.T. (2015) "Ubiquitous Monitoring of Pedestrian Dynamics: Exploring Wireless Ad Hoc Network of Multi-Sensor Technologies," IEEE SENSORS, Busan, Korea. November 2015.
- C13. Pibrac\*, A., Farooq, B. (2015) "Microscopic Dynamic OD Matrix for Pedestrian Movement in a Transportation Hub," 14<sup>th</sup> International Conference on Travel Behaviour Research. London. July 2015.
- C14. Anderson\*, P., Farooq, B. (2015) "Generalized Partite-Graphs Solutions for Association Problems in Transportation," 14<sup>th</sup> International Conference on Travel Behaviour Research. July 2015.
- C15. Shetwi\*, R.Y., Farooq, B., Popa, C. (2015) "Optimizing Large-Scale Transportation Infrastructure Projects using Building Information Modelling (BIM)," 50<sup>th</sup> Annual Conference of Canadian Transportation Research Forum, May, 2015.
- C16. Reinoso\*, G., Farooq, B. (2015) "Urban Pulse Analysis using Big Data," 50<sup>th</sup> Annual Conference of Canadian Transportation Research Forum, May, 2015.
- C17. Ettehadieh\*, D.E., Farooq, B., Saunier, N. (2015) "Systematic Parameter Optimization and Application of Automated Tracking in Pedestrian-Dominant Situations," Transportation Research Board.
- C18. Ettehadieh\*, D., Farooq, B., Saunier, N. (2014) "Automated Pedestrian Data-Collection and Flow Analysis in Public Spaces," Transportation Research Procedia (PED2014) 2: 207-212.
- C19. Nikolic\*, M., Bierlaire, M., Farooq, B. (2014) "Probabilistic Speed-Density Relationship for Pedestrians based on Data Driven Space and Time Representation," 14<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, May 2014.
- C20. Nikolic\*, M., Bierlaire, M., Farooq, B. (2013) "Spatial Tessellations of Pedestrian Dynamics," 2<sup>nd</sup> Symposium of the European Association for Research in Transportation, Stockholm, Sweden. September, 2013.
- C21. Danalet\*, A., Bierlaire, M., Farooq, B. (2013) "A Bayesian Estimation of Pedestrian Activities Using Sensors Data," TRISTAN VIII, San Pedro de Atacama, Chile, June 2013.
- C22. Hänseler\*, F., Farooq, B., Mühlematter\*, T., Bierlaire, M. (2013) "Mesoscopic Model for Pedestrian Flow in Train Stations," 13<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, April 2013.
- C23. Farooq, B., Bierlaire, M. (2013) "Simulation Based Associations Generation in Synthetic Population," 13<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, April 2013.



- C24. Efthymiou\*, D., Farooq, B., Bierlaire, M., Antoniou, C. (2013) "Agent-based Indicators Analysis in the Context of Policy Evaluation," 13<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, April 2013.
- C25. Danalet\*, A., Farooq, B., Bierlaire, M. (2013) "Pedestrian Activity Choice Modeling from Sensors Data," 13<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, April 2013.
- C26. Nikolić\*, M., Farooq, B., Bierlaire, M. (2013) "Exploratory Analysis of Pedestrian Flow Characteristics in Mobility Hubs using Trajectory Data," 13<sup>th</sup> Swiss Transport Research Conference, Monte Verità, Switzerland, April 2013.
- C27. Danalet\*, A., Farooq, B., Bierlaire, M. (2012) "Estimating Pedestrian Activities from Digital Footprints," Latsis Symposium 2012: 1<sup>st</sup> European Symposium on Quantitative Methods in Transportation Systems, Lausanne, September 2012.
- C28. Danalet\*, A., Bierlaire M., Farooq B. (2012) "Estimating Pedestrian Destinations using Traces from WiFi Infrastructures," 6<sup>th</sup> International Conference on Pedestrian and Evacuation Dynamics, June 2012.
- C29. Sahaleh\*, S., Bierlaire, M., Farooq, B., Danalet\*, A. (2012) "Microscopic Calibration and Validation of Pedestrian Models: Integrating Discrete Choice Model into Social Force Model," 6<sup>th</sup> International Conference on Pedestrian and Evacuation Dynamics, June 2012.
- C30. Hänseler\*, F., Farooq, B., Bierlaire, M. (2012) "Preliminary Ideas for Dynamic Estimation of Pedestrian Origin-Destination Demand within Train Stations," 12<sup>th</sup> Swiss Transport Research Conference, Ascona, May 2012.
- C31. Sahaleh\*, S., Bierlaire, M., Farooq, B., Danalet\*, A., Hänseler, F.S. (2012) "Scenario Analysis of Pedestrian Flow in Public Spaces," 12<sup>th</sup> Swiss Transportation Research Conference, Ascona, May 2012.
- C32. Danalet\*, A., Bierlaire, M., Farooq, B. (2012) "Preliminary Exploration of Pedestrian Destinations using Traces from Wi-Fi Infrastructures," 12<sup>th</sup> Swiss Transport Research Conference, Ascona, May 2012.
- C33. Farooq, B., Bierlaire, M., Flötteröd, G. (2012) "A New Approach to Synthesize Heterogeneous Agents and their Associations for Urban Microsimulations," Proceeding of the 2<sup>nd</sup> Workshop of Urban Dynamics, Chile, March 2012.
- C34. Hurtubia\*, R.G., Farooq, B., Bierlaire, M. (2011) "Simultaneous Modeling Approach for Location Choice and Real Estate Prices in a Microsimulation Context," Proceedings of the European Regional Science Conference, Barcelona, August 2011.
- C35. Farooq, B., Miller, E.J., Chingcuanco\*, F., Giroux-Cook\*, M. (2011) "Microsimulation Framework for Urban Price-Taker Markets," Proceedings of the World Symposium on Transport and Land Use Research, Whistler BC, July 2011.
- C36. Farooq, B. (2011) "Towards a Unified Framework of Urban Built Space Evolution," Proceedings of the Swiss Transportation Research Conference, Monte Verità, Switzerland, May 2011.
- C37. Farooq, B., Miller, E.J., Haider, M. (2011) "A Multidimensional Decision Modeling Framework for Built Space Supply," Proceedings of the 90<sup>th</sup> Transportation Research Board Conference, Washington DC, January 2011.
- C38. Farooq, B., Chingcuanco\*, F., Miller, E.J. (2010) "Modelling Transportation Markets: A Price-Taker Market Framework," Proceedings of the TRANSLOG, Hamilton, July 2010.
- C39. Farooq, B., Miller, E.J., Haider, M. (2010) "Modelling the Evolution of Office Space Supply," Proceedings of the World Conference on Transportation Research, Lisbon, July 2010.

- C40. Miller, E. J., Farooq, B., Wang, D. (2010) "Microsimulating Urban Spatial Dynamics: Historical Validation Tests using the ILUTE Model System," Proceedings of the World Conference on Transportation Research. Lisbon, July 2010.
- C41. Derrible, S., Farooq, B. (2010) "The Four Outcomes of Transit and Land-Use," Proceedings of the CTRF 45<sup>th</sup> Annual Conference, Canadian Transportation Research Forum. 2010.
- C42. Farooq, B., Miller, E.J., Chingcuanco\*, F. (2009) "A Dynamic Microsimulation Model for Demographic Update," Proceedings of the North American Meetings of the RSAI, San Francisco, November, 2009.
- C43. Farooq, B., Miller E.J., Habib, A. (2009) "A Microsimulation Housing Market Clearing Model," Proceedings of the 12th International Conference on Travel Behaviour Research, Jaipur, December, 2009.
- C44. Farooq, B., Miller E.J., Habib, A., Haider, M. (2008) "Dynamic Microsimulation of Housing Market for the Greater Toronto Area within the Integrated Land-Use Transportation and Environment (ILUTE) Framework," Proceedings of the North American Meetings of the RSAI. New York, November 2008.
- C45. Habib, A., Farooq, B., Miller E.J. (2008) "A Microsimulation Model of Residential Location Processes," Proceedings of the North American Meetings of the RSAI. New York, November, 2008.
- C46. Habib, A., Miller E.J., Farooq, B. (2008) "Estimating a Reference Dependent Residential Location Choice Model within a Relocation Context," Proceedings of the North American Meetings of the RSAI. New York, November, 2008.
- C47. Elgar, I., Farooq, B., Miller E.J., (2007) "Modelling Office Firm Relocation Decisions," Proceedings of the North American Meetings of the RSAI. 2007.

### **Non-refereed Contributions**

#### **Conference Abstracts Published in Proceedings (Trainee names with \*):**

- A1. Farooq, B., Beaulieu\*, A. (2017) "Large-Scale Pedestrian Movement Analysis using a Network of Wi-Fi Sensors," Conference of the International Federation of Operational Research Societies, May 2017.
- A2. Sobhani\*, A., Farooq, B. (2017) "Innovative Intercity Transport Mode: Application of Choice Preference Integrated with Attributes Nonattendance and Value Learning," Conference of the International Federation of Operational Research Societies, May 2017.
- A3. Saadi\*, I., Wong\*, M., Farooq, B., Teller, J., Cools, M. (2017) "Short-Term Demand Estimation for Ride-hailing Systems using Machine Learning Approaches," Conference of the International Federation of Operational Research Societies, May 2017.
- A4. Wong\*, M., Farooq, B., Bilodeau, G.A. (2017) "Latent Behaviour Modelling using Restricted Boltzmann Machines," International Choice Modelling Conference, April 2017.
- A5. Farooq, B., Cherchi, E., Sobhani\*, A. (2017) "Virtual Immersive Reality Environment (VIRE) for Disruptive Vehicular Technology Choice Experiments," International Choice Modelling Conference, April 2017.
- A6. Farooq, B., Cherchi, E. (2016) "Immersive Virtual Reality Experiments for Analyzing Autonomous Vehicle Demand," Transportation Research Board Invited Speaker at Automated Vehicles Symposium 2016, San Francisco, 18-22 July 2016.
- A7. Grapperon\*, A., Farooq, B., Trépanier, M. (2016) "Enrichir les données de validation des titres de transport en commun," 51<sup>e</sup> congrès de l'Association Québécoise des Transports, Québec, 11-13 avril 2016.

- A8. Farooq B., Bierlaire, M., Flötteröd, G. (2012) "A New Approach to Synthesize Heterogeneous Agents and their Associations for Urban Microsimulations," 2<sup>nd</sup> Workshop of Urban Dynamics, Chile, March 2012.

**Technical and Consulting Reports** (Trainee names with \*):

- R1. Farooq, B., Sobhani\*, A. (2017) "Train Hôtel: Analysis of Expected Future Demand," Night Train Foundation.
- R2. Beaulieu\*, A., Farooq, B. (2016) "Pedestrianized Gay Village: Large-Scale Multi-Sensor Monitoring of Pedestrian Dynamics over Summer 2016," Gay Village Authority.
- R3. Ferradou\*, L., Beaulieu\*, A., Farooq, B. (2016) "Large Scale Multi-Sensor Monitoring of Pedestrian Dynamics during the Montréal MURAL Festival in June 2016," Organizers of MURAL Festival.
- R4. Farooq, B., Pibrac\*, A., Sim\*, R., Beaulieu\*, A. (2015) "Analyse des mouvements piétonniers autour de la station d'autobus et de métro Rosemont," Société de transport de Montréal (STM).
- R5. Beaulieu\*, A., Farooq, B. (2015) "Large-Scale Multi-Sensor Monitoring of Pedestrian Dynamics during the Montréal MURAL festival in June 2015," Organizers of MURAL Festival.
- R6. Hänseler\*, F.S., Sahaleh\*, S., Farooq, B., Bierlaire, M., (2012) "Analysis of Pedestrian Flow in Lausanne Train Station," Swiss Railways.
- R7. Haider, M., Farooq, B. (2010) "Employment Distribution Forecasting for the Greater Toronto Area," City of Toronto.
- R8. Miller, E.J., Chingcuanco\* F., Farooq B., Habib K.M.N., McElroy, D. P. (2008) "Development of an Operational Integrated Urban Model System, Volume IV: Demographic & Labour Market," Transport Canada, Transportation Planning and Model Integration (TPMI) Initiative.
- R9. Miller, E.J., Farooq B., Habib M.A. (2008) "Development of an Operational Integrated Urban Model System, Volume V: Microsimulating Spatial Market: Conceptual Design and Implementation of a Housing Market Model," Transport Canada, Transportation Planning and Model Integration (TPMI) Initiative.
- R10. Elgar, I, Miller E.J., Farooq B. (2008) "Development of an Operational Integrated Urban Model System, Volume VI: Modelling Firm Mobility & Location Choice," Transport Canada, Transportation Planning and Model Integration (TPMI) Initiative.
- R11. Farooq B., Salvini, P.A., Miller, E.J., (2008) Development of an Operational Integrated Urban Model System, Volume X: Software Documentation," Transport Canada, Transportation Planning and Model Integration (TPMI) Initiative.

**Theses**

- T1. Farooq, B. (2011), "Evolution of Urban Built Space: Markets and Decisions," Ph.D. Thesis, University of Toronto. Toronto, Canada.

**Forthcoming Contributions**

**Submitted Journal Manuscripts** (Trainee names with \*):

- F1. Pibrac, A., Farooq, B. "Integrated Microsimulation Framework for Dynamic Pedestrian Movement Estimation in Mobility Hub," Transportation Science. Manuscript# TS-2016-0083. Preprint: <https://arxiv.org/abs/1702.02624>

- F2. Grapperon, A., Farooq, B., Trépanier, M. "Enriching Socio-Demographic Information in Smart Card Transactions Data using Information Fusion," Information Fusion. Manuscript# INFFUS\_2017\_89. Preprint: <https://www.cirrelt.ca/DocumentsTravail/CIRRELT-2016-59.pdf>
- F3. Aliabadi\*, H.A., Farooq, B., Morency, C., Saunier, N. "Classifying Behavioural Dynamics of Taxi Drivers Route Choices Using Longitudinal GPS Data," Transportation. Manuscript# PORT-D-17-00042.
- F4. Yazdizadeh\*, A., Farooq, B., Patterson, Z., Razaei, A. "A Generic Form for Capturing Unobserved Heterogeneity in Discrete Choice Modeling: Application to Neighborhood Location Choice," Transportation. Manuscript# PORT-S-16-00422\_2.
- F5. Sobhani\*, A., Aliabadi, H.A., Farooq, B. "Metropolis-Hasting based Extended Path Size Logit Model for Bicycle Route Choice Using GPS Data," Transportmetrica A: Transport Science. Manuscript# TTRA-2016-0198. Revision requested.
- F6. Grapperon\*, A., Farooq, B., "Effects of Aggregation within High Resolution Time Series Data on Traffic Conditions," Transportmetrica B: Transport Dynamics. Manuscript# TTRB-2016-0053.

### **Open Source Projects**

- O1. Smart Card Enricher (BataclanSlim) A set of tools for developing complete trip chain and associate socio-demographics to tap-in smart card transaction data. The code is available at: <https://github.com/billjee/BataclanSlim>
- O2. Simulation based Population Synthesizer (SimPSynz) A set of tools for the information synthesis and fusion for transportation applications. The code is available at: <https://github.com/billjee/simpsynz>
- O3. Pedestrian Cell Transmission Model (PedCTM) A tool for dynamic pedestrian flow allocation on a network of cells in a public pedestrian infrastructure. The code is available at: <https://github.com/flurinus/PedCTM>
- O4. Tracker Optimization for Object Identification/Tracking (TrOPed) A tool for the calibration of video based trackers via simulated annealing for object tracking in a given video. The code is available at: <https://github.com/Drushkey/TrOPed>

### **Invited Short Courses**

- E1. Simulation: Theory and Application in Urban Systems. PhD course for PhD student in MIT-Portugal project, University of Coimbra, Coimbra, Portugal. March 2013.
- E2. Choice Modelling. TransportNet Course on Research Methodologies for PhD students, Marie-Curie Fund, European Union, Antwerp, Belgium. January 2012.

### **8.D Intellectual property**

#### **Invention Disclosure (Trainee names with \*):**

- I1. Farooq, B., Beaulieu\*, A., Poucin\*, G., Rajab\*, M. URBANFlux: Internet of Things based Urban Services and Analytics. Polytechnique Montréal Invention Disclosure. June 15, 2016.