Minh **Kieu**

Research Fellow

Leeds Institute for Data Analytics & School of Geography, University of Leeds

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Vision

My research focuses on incorporating Machine Learning with individual-based simulation to solve complex urban transport problems. I believe that this combination will revolutionise Transportation Science and support policymakers to give better informed decisions.
I am currently the Research Team Leader and AGILE Scrum Master for a team working on an ERC Horizon 2020 project on incorporating real-time Big Data into large-scale Agent-Based Simulation model of cities. My other research experience includes being the PI for a project for the Alan Turing Institute, being the Co-I for a proposal for funding from the British Academy, and developing a fellowship proposal for the UKRI Future Leaders.
Previously, I led a small team to deliver the prestigious NSW Premier's Innovation Initiative project at the CSIRO, Australia. My team and I were responsible to develop a Machine Learning interface to Traffic Simulation, and Travel Behaviour Modelling.
I have also been teaching two courses at the University of Leeds (Geocomputation and Predictive Analysis) and organising an international workshop on Agent-Based Modelling. An interactive version of my Resume can be found here:
`https://prezi.com/view/s2w5HBG23mBpn5Kvnpvg/`

Research Experience

University of Leeds

Leeds, United Kingdom

Research Fellow — *Sep. 2018 - now*

- **Research Team Leader** *Data Assimilation for Agent-Based Models (DUST)*: I am leading a team to deliver a 5-year project to develop a cutting-edge simulation of a city that can be dynamically optimised with streaming Big data.
- **Principal Investigator** *Dynamic Emulators of Agent-Based Models*: I am developing machine learning surrogate models to make agent-based models more amenable to policy makers.
- **Co-Investigator** *Urban Transport Modelling for Sustainable Well-being in Hanoi*: I am working with British and Vietnamese researchers to develop a transport model of Hanoi.
- **Leadership** I am mentoring 2 PhD students and 3 Data Science Interns.

Alan Turing Institute

London, United Kingdom

Visiting Fellow — *May. 2019 - now*

- **Principal Investigator** GSMA Data Science Challenge

Data61, CSIRO

Sydney, Australia

Senior Research Scientist — *Oct. 2016 - Aug. 2018*

- **Project Leader** *NSW Premier's Innovation Initiatives (PII) and Intelligent Congestion Management Program (ICMP):* I led a team of 4 to: (1) Model urban flows within the Sydney public transport network using Artificial Intelligence; and (2) Develop a Machine Learning-inspired platform to automatically calibrate and incorporate Big Data into large-scale Traffic Simulation models.
- **Principal Investigator** *NSW On-demand Transport:* I work with industrial partner Keolis Downer to deliver a mobility-as-a-service On-Demand Transport system in Northern Beaches, NSW.
- **Leadership** I mentored a Research Scientist and an Intern. I also led a team of 4 PhDs including myself to deliver applied research projects.

Queensland University of Technology

Brisbane, Australia

Post-doctoral Research Associate — *Jun. 2015 - Oct. 2016*

- **Principal Investigator** *Traffic simulation and planning of the Pacific Motorway, Brisbane*: I led a team of 2 to model a 30-km section of the Pacific Motorway near Brisbane in the popular Traffic Simulation software Aimsun, and used the calibrated model to plan and solved the congestion problems on the motorway.
- **Principal Investigator** *Traffic estimation using bus GPS data*: I developed an algorithm to estimate the travel time of private vehicles using the GPS data from buses.
- **Leadership** I mentored 2 PhD and 4 Master students.

Teaching Experience

University of Leeds

Leeds, United Kingdom

Lecturer

Sep. 2018 - now

- Geocomputation
- Predictive Analytics

University of Canterbury

Christchurch, New Zealand

Guest lecturer

March. 2017

- Transport Network Modelling

Linkoping University

Norrkoping, Sweden

Tutor

Oct. 2010

- Traffic Safety Audit

University of Transport and Communications

Hanoi, Vietnam

Assistant Teaching Fellow

Aug. 2008 - Aug. 2009

- Introduction to Civil Engineering and Infrastructure
- Road Geometry Design

Awards & Funding

Awards

2019	**Travel grant to Shanghai, China**, Alan Turing Institute and Newton Fund, UK
2019	**Young Tall Poppy Science Awards Nomination**, Queensland University of Technology
2016	**Research visit travel grants**, Swinburne University, Australia
2015	**Scholarship**, QWU Scholarship, QUT
2015	**Award**, Outstanding Higher Research Degree award, QUT
2011-2015	**Scholarship**, Faculty of Science and Engineering Scholarship, QUT
2012	**Award**, Representative alumnus of the ITS Master Program, Linköping University
2011	**Award**, Sparbanksstiftelsen Alfas stipendiefond for Linköping University
2011	**Award**, Sparbanksstiftelsen Alpha International Scholarship, Swedbank Sweden
2011	**Award**, Eastern Asia Society for Transportation Studies (EASTS) 2011 outstanding young researcher award
2010	**Award**, Wala och Folke Danielssons fond scholarship, Linköping University
2004 & 2005	**Award**, 1st place, Student Science Project Competition, UTC
2004	**Award**, Encouragement prize, Student Science Program, Vietnam Ministry of Education

Research funding as Princial Investigator: Total £225,000

2019	**£20,000**, GSMA Data Science Challenge: Telenor (Norway)	*Alan Turing Institute, UK*
2018	**£80,000**, Improvements of Public Transport Information & Priority System	*TfNSW, Autralia*
2018	**£40,000**, NSW On-demand Transport Pilot project	*NSW Government, Autralia*
2016	**£60,000** , Traffic microsimulation and planning of the Pacific Motorway	*TMR, Autralia*
2015	**£25,000**, Traffic estimation using bus GPS data	*TMR, Autralia*

Campus and Invited talks

Campus and Invited talks

7 items

- **Kieu, L. M.** & Malleson, N. A Machine Learning interface to real-time traffic microsimulation. *Leeds Institute of Data Analytics Research Seminar*. Leeds, UK. November 2018
- **Kieu, L. M.**. Solving complex urban problems with a marriage between Machine Learning and Individual-based Simulation. *Big Data in Intelligent Transport System Symposium*. Leeds, UK. October 2018
- **Kieu, L. M.** & Cai, C. Predictive Demand Modelling for On-Demand Transport. *Mobility as a service Maas18: Digital Mobility, Smart Journeys*. Sydney, Australia. May 2018
- **Kieu, L. M.**, Nguyen, H., Ou, Y. & Cai, C. Multi-modal Big Data analytics. *Premier Innovation Initiatives Milestones Workshop*. Sydney, Australia. October 2017
- **Kieu, L. M.**, Bhaskar, A. & Chung, E. Transit passenger segmentation using Smart Card data. *STRC Annual Symposium*. Brisbane, Australia. June 2016
- **Kieu, L. M.**, Bhaskar, A. & Chung, E. Findings from the Automatic Vehicle Location of the Customers' First pilot project. *Translink workshop*. Brisbane, Australia. January 2015
- **Kieu, L. M.**, Bhaskar, A. & Chung, E. Transport data analytics with RFID and GPS data. *QUT-UQ workshop*. Brisbane, Australia. August 2013

Publications (373 citations, h-index: 11)

2019

8 items

1 Nguyen, H., Bentley, C., **Kieu, L.-M.**, Fu, Y.. & Cai, C. (2019) A Deep Learning System for Travel Speed Predictions on Multiple Arterial Road Segments. *Transportation Research Record: Journal of the Transportation Research Board (In Press).*

2 **Kieu, L.-M.**, Ngoduy, D., Malleson, N. M. & Chung, E. (2019) Stochastic schedule-following simulation model of bus route. *Transportmetrica B: Transport Dynamics (Under Review)*.

3 **Kieu, L. M.**, Malleson, N. & Heppenstall, A. (2019) Dealing with stochastic and dynamic features in agent-based models through calibration and data assimilation. *Proceedings of the National Academy of Sciences of the United States of America (PNAS).* ***CiteScore: 8.59 (Under Review)***

4 Nguyen, H., **Kieu, L. M.**, Cai, C. & Vu, H. (2019) A Multi-variate Deep Learning Approach for Short-term Travel Demand Prediction on Public Transport Networks. *IET Journal of ITS (Under Review).*

5 Nguyen, H., Bentley, C., **Kieu, L. M.**, Fu, Y. & Cai, C. (2019) A Deep Learning System for Travel Speed Predictions on Multiple Arterial Road Segments. *In Proceedings of the 98rd Annual Meeting of the Transportation Research Board. Washington DC,US.*

6 **Kieu, L. M.**, Ou, Y., Nguyen, H., Truong, L. & Cai, C. (2019) Predictive Demand Modelling for On-Demand Transport. *Transportation Research Part C: Emerging Technologies.* ***CiteScore: 5.17*** *(Under Review)*

7 **Kieu, L. M.**, Malleson, N., Minors, K., West, A. & Heppenstall, A. (2019) Reducing the impacts of stochastic and dynamic data in agent-based modelling for real-time prediction. ABMUS 2019 : The 4^{th} International Workshop on Agent-Based Modelling of Urban Systems. Montreal, May 2019.

8 Malleson, N., Archers, L., **Kieu, L. M.**, Ward, A.J., Heppenstall, A. & Anagnostopoulos, C. (2019) State Estimation and Data Assimilation for an Agent-Based Model using a Probabilistic Framework. ABMUS 2019 : The 4^{th} International Workshop on Agent-Based Modelling of Urban Systems. Montreal, May 2019.

2018

4 items

9 **Kieu, L. M.**, Cai, C. (2019) Stochastic collective model of public transport passenger arrival process. *IET Journal of Intelligent Transport Systems.* DOI: 10.1049/iet-its.2018.0085.

10 **Kieu, L. M.**, Ou, Y., Cai, C. (2019) Large-scale Transit Market Segmentation with Spatial-Behavioural Features. *Transportation Research Part C.* DOI: 10.1016/j.trc.2018.03.003. **CiteScore: 5.17**

11 Nguyen, H., **Kieu, L.-M.**, Wen, T. & Cai, C. (2018) Deep Learning Methods in Transportation Domain: A Review. *IET Journal of Intelligent Transport Systems*. DOI: 10.1049/iet-its.2018.0064.**[Most downloaded paper of Jan 2019]**

12 **Kieu, L. M.** (2018) Analytical Modelling of Point Process and Applications to Transportation. In *Human and Machine Learning: Visible, Explainable, Trustworthy and Transparent. Chapter 19, Part V: Domain Knowledge and Machine Learning*, DOI: 10.1007/978-3-319-90403-0_19.

2017

1 item

13 **Kieu, L. M.**, Bhaskar, A., Cools, M. & Chung, E. 2017. An investigation of timed transfer coordination using Event-based Multi Agent Simulation. Vol 81. p 363-378. Transportation Research Part C. DOI:10.1016/j.trc.2017.02.018.**CiteScore: 5.17**

2016

4 items

14 **Kieu, L. M.**, Bhaskar, A., Almeida, P.E.M. & Chung, E. (2016) Transferring demand prediction for timed transfer coordination in operational control. *Journal of Advanced Transportation*. DOI: 10.1002/atr.1440.

15 Sabar, N. R., **Kieu, L. M.**, Chung, E., Tsubota, T. & Almeida, P.E.M. (2016) Memetic Algorithm for Real World Multi-intersection Traffic Signal Optimisation Problems. *Expert Systems With Applications.* DOI:10.1016/j.engappai.2017.04.021. **CiteScore: 5.22**

16 Truong, L.T., **Kieu, L. M.** & Vu, T.A. 2016. Spatiotemporal and random parameter panel data models of traffic crash fatalities in Vietnam. Accident Analysis & Prevention.94:153-61.DOI:10.1016/j.aap.2016.05.028.

17 **Kieu, L. M.**, Bhaskar, A. & Chung, E. 2016. Insights into the bus bunching problem: a multi-agent simulation approach. In Proceedings of the 95rd Annual Meeting of the Transportation Research Board. Washington DC,US.

2015

5 items

18 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2015) A modified density-based scanning algorithm with noise for spatial travel pattern analysis from Smart Card AFC data. *Transportation Research Part C*. DOI: 10.1016/j.trc.2015.03.033. **CiteScore: 5.17**

19 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2015) Passenger segmentation using Smart Card data. *IEEE Transactions on Intelligent Transportation Systems*. DOI 10.1109/TITS.2014.2368998. **CiteScore: 5.14**

20 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2015) Empirical modelling of the relationship between bus and car speeds on signalised urban networks. *Transportation Planning and Technology.* DOI: 10.1080/03081060.2015.1026104.

21 **Kieu, L. M.**, Bhaskar, A. & Chung, E. 2015. Public transport travel time variability definitions and monitoring. *ASCE Journal of Transportation Engineering*. DOI: 10.1061/(ASCE)TE.1943-5436.0000724.

22 **Kieu, L. M.**, Ngoduy, D. & Vu, H. 2015. Cross entropy method for the calibration of stochastic microscopic models. In the 20th International Conference of Hong Kong Society for Transportation Studies, 12-14 Dec 2015, Hong Kong.

2014

4 items

23 Bhaskar, A., **Kieu, L. M.**, Qu, M., Nantes, A., Miska, M. & Chung, E. (2014) Is bus overrepresented in Bluetooth MAC Scanner data? Is MAC-ID really unique? *International Journal of Intelligent Transport System.* DOI: 10.1007/s13177-014-0089-9.

24 Bhaskar, A., Tsubota,T., **Kieu, L. M.** & Chung, E. (2014) Urban traffic state estimation: Fusing point and zone based data. *Transportation Research Part C.* DOI: 10.1016/j.trc.2014.08.015. **CiteScore: 5.17**

25 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2014) Transit passenger classification by temporal and spatial travel regularity mined from Smart Card data. In *Proceedings of the 93rd Annual Meeting of the Transportation Research Board*. 12-16 January, Washington DC,US.

26 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2014) Establishing the Definitions and Modelling the Public Transport Travel time Variability. In *Proceeding of the 93rd Annual Meeting of the Transportation Research Board* 12-16 January, Washington DC, US.

2013

2 items

27 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2013) Empirical Evaluation of Public Transport Travel time Variability. In *Proceedings of the Australasian Transport Research Forum*. 2-4 October, Brisbane Australia.

28 **Kieu, L. M.**, Bhaskar, A. & Chung, E. (2013) Mining temporal and spatial travel regularities for transit planning. In *Proceedings of the Australasian Transport Research Forum*. 2-4 October, Brisbane, Australia.

2012

2 items

29 **Kieu, L. M.**, Bhaskar, A. & Chung, E. 2012. Benefits and issues of bus travel time estimation and prediction. In Proceedings of the 35th Australasian Transport Research Forum 2012. Perth, Australia.

30 **Kieu, L. M.**, Bhaskar, A. & Chung, E. 2012. Bus and car travel time on urban networks: integrating bluetooth and bus vehicle identification data. In Proceedings of the 25th ARRB Conference 2012. Perth, Australia

2011

1 item

31 **Kieu, L. M.** & Rydergren, C. 2011. Evaluation of Roundabout and Signalized Intersection Designs using Microsimulation. In Proceedings of the 9th Eastern Asia Society for Transportation Studies Conference. Jeju, Korea.

Education

Hanoi University of Transport and Communications (UTC)

Hanoi, Vietnam

BSc. in Civil Engineering

2003 - 2008

Linköping University (LiU)

Linköping, Sweden

MSc. in Intelligent Transport Systems

2009-2011

Queensland University of Technology (QUT)

Brisbane, Australia

PhD. in Transportation Science

2011-2015

Technical Skills

Machine Learning/Artificial Intelligence

7 years

- Deep Learning: Long Short-term Memory Network, Convolutional Neural Network, Generative Adversarial Networks & Hybrid architectures
- Regression: Poisson Regression & Negative Binomial Regresion.
- Classification: Logistic Regression & Support Vector Machine.
- Unsupervised learning: Stochastic Block Model, DBSCAN, Affinity Propagation & Self-Organising Maps.

Modelling

9 years

- Traffic micro-simulation
- Agent-based modelling
- Non-linear models
- Choice Modelling

Optimisation

4 years

- Model-based methods: Cross-Entropy Method
- Evolutionary Algorithms: Genetic Algorithms & Particle Swarm Optimisation
- Maximum Likelihood Estimation

Admin & Services

2019	**Chair**, International Workshop on Agent-Based Modelling of Urban Systems	*International*
2019	**Organising committee**, Alan Turing Institute's Data Study Group	*UK*
2018-	**AGILE Scrum Master**, Urban Analytic Program, University of Leeds	*UK*
2018-now	**Departmental activities**, Centre for Spatial Analysis and Policy, School of Geography, University of Leeds	
2016	**Organising committee**, The Conference of Australian Institutes of Transport Research 2016 (CAITR)	*Australia*
2013	**Organising committee**, OPTIMUM International Symposium of Transport Modelling (21st -23rd Apr, 2013)	*Australia*
2012 & 2014	**Moderator**, Smart Transport Research Centre Fortnightly Research Seminars	*Australia*
2012-now	**Reviewers**, IEEE Transactions on ITS, IET Journal of ITS, Journal of Transportation Engineering, Mathematical Problems in Engineering and Transportation Resarch Part C: Emerging Technologies.	

Professional Affiliations

2018-now,	Member of the Alan Turing Institute's Urban Analytics Program	*UK*
2016-now,	Member of Member of Planning Institute Australia	*Australia*
2015-now,	Member of American Society of Civil Engineering – Transportation and Development	*USA*
2015-now,	Member of AITPM Young Professional Group	*Australia*
2014-now,	Member of IEEE Young Professionals	*International*
2011-now,	Member of Eastern Asia Society for Transportation Studies (EASTS)	*International*

I hereby certify that all the information provided in this CV is true and correct. Referees would be available upon your request.