

Curriculum Vitae

Dr Hussein Dia



Career Vision

To inspire people to transform our world and build a brighter future through learning, excellence and innovation

Current Position

Associate Professor, Centre for Sustainable Infrastructure, Swinburne University of Technology

Editor, IEEE Transactions on ITS

Qualifications

PhD (ITS Studies), Monash University, Australia (1997)

M.Sc. (Civil Engineering), Purdue University, USA (1985)

B.Sc. (Civil Engineering), Purdue University, USA (1983)

Memberships

Fellow, ASCE, USA

Fellow, ITE, USA

Fellow, Engineers Australia

Chartered Professional Engineer
National Professional Engineers Register

Queensland Representative, ITE-ANZ and ASCE-Australia Executive Committees

Member, TDI (ASCE), USA

Years in industry

29

Hussein Dia is a Civil Engineer with specialisation in Smart Infrastructure Systems, focusing on Intelligent Transport Systems (ITS) and modelling of complex transport systems. His career spans more than 29 years of infrastructure engineering experience, and has spent the last 22 years of his career working in the ITS field as an Advisor to leading organisations and as an academic, supervisor, mentor, and more recently as a Technical Director of ITS in a global consulting firm, and also as Director of ITS Australia. Through his research and consulting background he has expertise in a broad range of specialist services in smart infrastructure systems, ITS, traffic simulation and modelling, traffic and transport engineering, problem solving, expert advice, auditing and project management of transport systems.

Current Role

Hussein is currently Associate Professor in the Centre for Sustainable Infrastructure at Swinburne University of Technology. In his current roles, Hussein offers:

- Ability to create smart technology driven solutions to complex technical and operational problems through detailed analysis and awareness of latest developments gained through worldwide interaction with specialists
- Ability to give sound advice based on a good understanding of the principles underpinning smart infrastructure project strategic planning and design
- Ability to advise stakeholders on technical and financial issues in technology project investment context
- Hands on leadership of smart infrastructure & ITS initiatives at most senior level

Research Interests and Specialisation

- Smart transport systems including network management and safety systems, travel information, communications and control, freight efficiency, rail technology, emergency management, cooperative mobility, and public transport systems
- Development and evaluation of predictive analytics, network optimisation, operational research, artificial intelligence and multi-agent smart algorithms for network management and control
- Development and evaluation of pollutant emissions and fuel consumption models for use in traffic simulation and assessment of ITS impacts
- Traffic modelling and simulation of ITS and complex dynamic applications. Proficiency in state-of-the-art traffic modelling tools ranging from analytical control to sophisticated micro and meso-simulation, and macro models

Awards and Achievements

- 2005 Best Paper Award. Intelligent Vehicles and Road Infrastructure Conference (IVRI '05), 16-17 February 2005, Melbourne, Australia
- 1999 Best Paper Award. 11th Mini-Euro Conference on Artificial Intelligence in Transportation Systems and Science, 2-6 August 1999, Helsinki, Finland.
- 1995 Monash University Civil Engineering Department Scholarship, VicRoads Sponsorship
- 1993 Monash University Graduate Scholarships 1993-1997 (only 100 offered annually across University)

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Specialisation

Smart Infrastructure Systems
Intelligent Transport Systems
Transport and Traffic Modelling

Personal Information

Nationality: Australian
Marital Status: Married with two children
Date of Birth: 02-Nov-1960
Place of Birth: London, England

Languages

English: Excellent
Arabic: Excellent

References

A list of referees can be provided upon request

Contact Details

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T: [@HusseinDia](https://twitter.com/HusseinDia)

L : [linkedin.com/in/husseindia](https://www.linkedin.com/in/husseindia)

1982 Purdue University Undergraduate Scholarship (1981-1983)

1977 American Field Service (AFS) Exchange Student

Employment History

- 2013-present Managing Director Urban4square Pty Ltd
Associate Professor, Centre for Sustainable Infrastructure,
Swinburne University of Technology
- 2010-2013 Director and ITS Technical Leader
AECOM Australia and New Zealand, Brisbane, Australia
- 2009-2010 Group ITS Leader
Aurecon, Brisbane, Australia
- 1998- 2009 Director ITS Research Lab (2003-2009), Senior Lecturer (2003),
Lecturer (1998-2002), Department of Civil Engineering, The
University of Queensland, Brisbane, Australia
- 1993-1997 Lecturer (1997), Post Doctoral Researcher (1996), Research
Scholar (1993-96), Department of Civil Engineering, Monash
University, Melbourne, Australia
- 1986-1992 Office and Site Civil Engineer, various organisations
- 1983-1985 Research Assistant, Department of Civil Engineering, Purdue
University, USA

Professional Affiliation

- Fellow American Society of Civil Engineers (ASCE), USA
(232909)
- Fellow Institute of Transportation Engineers (ITE), USA
(14055)
- Fellow Institution of Engineers, Australia (806231)
Chartered Professional Engineer (CPEng)
National Professional Engineers Register (NPER)
- Member Transportation and Development Institute (ASCE),
USA

Services to ITS Profession

- Invited membership on editorial boards and conference committees for international ITS events. These include IEEE Transactions on ITS, Symposium of Transport Simulation, ASCE Conference on Applications of Advanced Technologies and the International Symposium on Transportation and Traffic Theory
- Peer review and independent audit of ITS projects and research proposals including review of grant applications for the Australian Research Council, and similar organisations in Hong Kong and Canada
- Reviewer for local and international ITS journals and conferences including IEEE Transactions on ITS and ITS World Congress
- Delivery of Professional Development Courses including ITS, simulation and modelling, and traffic and transport engineering

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Standing in the ITS Field

Hussein's standing in the ITS Profession is highlighted by his ongoing involvement in a number of executive committees and editorial boards at the national and international levels. It is also highlighted by the invited presentations, invitations for peer review and technical audits, and professional development courses he has delivered

International Committees

At the International level, Hussein is active with IEEE-ITS committees and currently serves as an Editor for the prestigious IEEE Transactions on ITS, which currently has the highest impact factor rating of all transport journals

National Committees

At the national level, Hussein serves as Director ITS Australia and the Queensland Director and Representative on the Executive Committees for the recently established ASCE-Australian Section and the ITE-ANZ Board.

Previous Committees and Boards

In the past, Hussein has served on a large number of technical committees for conferences and international workshops and meetings on ITS.

Executive Committees and Editorial Boards

2004 – Present	Editor	International Journal IEEE Transactions on Intelligent Transportation Systems [Journal with highest impact factor of all transport-related journals 2009-2011]
2012-	Publications Chair	IEEE International Intelligent Vehicles Conference, 2013, Gold Coast, Australia
2010-	Queensland Representative	Executive Committee - ASCE-Australian Section
2010-	Queensland Representative	Executive Committee - ITE-ANZ Section
2010	Program Committee	The IEEE 13th International Conference on Intelligent Transportation Systems (Portugal)
2008	Program Co-Chair	The 3rd International Symposium on Transport Simulation (ISTS08), Gold Coast, Australia.
2007	Program Co-Chair	Third International Symposium of Transport Simulation, 6-8 August 2008, Gold Coast, Australia
2007	Program Committee	Second Intelligent Vehicles and Road Infrastructure (IVRI) Conference, 4-6 December 2007, Melbourne, Australia
2007	Program Committee	Workshop on Artificial Intelligence Applications for Sustainable Transportation Systems, 13th Portuguese Conference on Artificial Intelligence, 3-7 December 2007, Guimarães, Portugal
2007	Program Committee	Third International Conference on Information and Automation for Sustainability ICIAfS, 4-6 December 2007, Melbourne, Australia
2007	Scientific Committee	International Conference on Intelligent Transportation and Logistics Systems (ITS-ILS '07), AGH University of Science and Technology, 11-12 October 2007, Poland
2006	Program Co-Chair	The IEEE 9th International Conference on Intelligent Transportation Systems (Toronto, Canada)
2006	Program Committee	The Fourth Workshop on Agents in Traffic and Transportation,, AAMAS 2006, Hakodate, Japan.
2005	Editor	The IEEE 8th International Conference on Intelligent Transportation Systems (Vienna, Austria)
2005	Program Committee	First Intelligent Vehicles and Road Infrastructure (IVRI) Conference, 16-17 February 2005, Melbourne, Australia
2004	Convenor	International workshop on "Traffic Simulation – Bridging Theory and Practice" (Brisbane)
2004	Program Committee	The 8th ASCE International Conference on Applications of Advanced Technologies in Transportation Engineering (Beijing, China)
2002	Program Committee	The 15th International Symposium on Transportation and Traffic Theory (Adelaide, Australia)

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2002	Program Committee	The IEEE 5th International Conference on Intelligent Transportation Systems (Singapore)
2000	Program Committee	The 6th International Conference on Applications of Advanced Technologies in Transportation Engineering (Singapore)
2000	Program Committee	The Second Workshop on Agents in Traffic and Transportation, ITS World Congress, Sydney, Australia.

Invited Presentations

Hussein has attended and presented papers at more than 80 transport conferences and meetings both within Australia (Brisbane, Gold Coast, Sydney, Melbourne and Canberra) and internationally (Finland, Austria, Brazil, Korea, Singapore, Hong Kong, Thailand and Japan).

In addition, Hussein was invited to present the following seminars:

- IEEE Victoria Chapter, 2014
- Centre for Sustainable Infrastructure, Swinburne (2014)
- Road Engineers Association for Asia and Australasia, 2012 (keynote)
- Australian ITS Summit, Gold Coast (2011)
- Australian ITS Summit, Melbourne (2009)
- ITS Asia Pacific Forum, Thailand, July 2009
- ITS Symposium, QUT, Brisbane, October 2009
- Australian Institute of Traffic Planning and Management, 2006
- University of Tokyo, Japan, 2005
- Institution of Engineers (IEAust), Gold Coast Section, 2004
- Institution of Engineers (IEAust), Brisbane, 2003
- American University of Sharjah, Dubai, 2003
- University of Aachen, Germany, 2002
- German Aerospace Centre – ITS Division, Berlin, Germany, 2002

Delivery of Professional Development Courses

Hussein's knowledge and expertise has provided opportunities to deliver training courses in the fields of Intelligent Transport Systems, simulation and modelling (AIMSUN and VISSIM), and traffic and transport engineering. These courses are regularly sought and attended by local and international participants from road and transport authorities, research organisations, consultants and the private sector.

In October 2014, Hussein organised and ran a short course on Fundamentals of Transport Modelling (RACV City Club) which was attended by representative from government agencies, industry and consulting

Invitations for Peer Review and Technical Audits

Review of research grant applications for the Natural Sciences and Engineering Research Council of Canada (NSERC)	2007 - Present
Review of research grant application for the Australian Research Council (International Reviewer Status)	2006 – Present
Review of research grant applications and funding proposals for the Malaysian Government Multimedia Super Corridor, Malaysia	2002

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Review of research grant applications for the Hong Kong Research Council Grants	2000 – Present
Examination of Masters and PhD Students Theses from Australia and overseas including attending VIVA PhD examinations in Hong Kong	1997 – Present

Reviewer for International Journals and Conferences

ASCE Journal of Transportation Engineering	Autonomous Agents and Multi-Agent Systems (AAMAS)
IEEE Transactions on ITS	ASCE International Conference on Applications of Advanced Technologies in Transportation Engineering
Non-linear Dynamics	Intelligent Vehicle and Road Infrastructure Conference
Road and Transport Research	International Conference on Intelligent Transportation and Logistics Systems
Transportation Research Part C	International IEEE Conference on ITS
Transportmetrica	International Symposium on Transportation and Traffic Theory
Transport Reviews	ITS World Congress
Transportation Planning and Technology	Portuguese Conference on Artificial Intelligence
	TRB Annual Meeting

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Research Interests

- Microscopic traffic simulation and computer modelling of Intelligent Transport Systems (ITS)
- Modelling the impacts of Intelligent Transport Systems and transport environmental emissions
- Development of Operational Research/Artificial Intelligence techniques for solving transport problems
- Development and evaluation of algorithms for traffic management and information systems

Research Grants and Contract Research

Year	Grant/Contract	Value
2006-2007	Development and Evaluation of Freeway Travel Time Forecasting Models. Client: QDMR	\$100,000
2006-2007	Evaluating the Impacts of Incidents. Client: QDMR	\$50,000
2006-2007	Evaluating the Impacts of Traffic Strategies in Reducing Incident Impacts. Client: QDMR	\$50,000
2006-2007	Simulation of the Impacts of Heavy Vehicle Restrictions. Client: QDMR	\$29,755
2006-2007	Development, Calibration and Validation of the Pacific Motorway Traffic Simulation Model. Client: QDMR	\$ 49,115
2005-2006	Development, Calibration and Validation of the Gold Coast Traffic Simulation Model. Client: QDMR	\$53,020
2005-2006	ITS Strategy for South Coast Hinterland District: Situation Analysis. Client: QDMR	\$9,900
2005-2006	Comparative Evaluation of Environmental Emissions Models using Traffic Simulation. Client: CSIRO	\$36,720
2004-2005	Scoping Study- Machine Vision Applications in Transportation. Client: CSIRO	\$9,900
2004-2005	Scoping Study- Performance Evaluation of Traffic Control Systems Using Traffic Simulation. Client: Brisbane City Council	\$ 10,890
2003-2004	Signal Coordination Benefits – Analysis of Travel Time and Speed Surveys. Client: QDMR	\$8,090
2003-2004	Evaluation of Traffic Signal Control Systems for Brisbane. Client: Brisbane City Council	\$ 20,364
2002	Intelligent Transport Systems Research Laboratory (Dia, Vlacic, Tay and Hidas). Australian Research Council Linkage Infrastructure	\$655,000
2002	Drivers Behavioural Response to Information (Horberry, Wallis and Dia). Australian Research Council Linkage Project	\$60,000
2000	Modelling Dynamic Driver Behaviour using Intelligent Agents (Dia). Queensland Department of Main Roads	\$34,500
2000	Modelling the Environmental Impacts of Intelligent Transport Systems (Dia). University of Queensland Early Career Researcher	\$17,772
1999	Short-Term Traffic Forecasting using Neuro-Genetic Techniques (Dia). QDMR	\$23,500
1999	New Staff Member Research Start-up Fund (Dia). University of Queensland	\$9,960

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Research Contributions

Through his research and publications, Hussein has made the following contributions to the ITS and traffic/transport modelling fields:

- Published more than 100 papers and technical reports in the field of Intelligent Transport Systems, Traffic Simulation, and Traffic and Transport Engineering
- Attracted more than A\$2 million in ITS research funding and contract research including an Infrastructure Grant from the Australian Research Council (\$655,000) which resulted in the establishment of the ITS Research Laboratory at the University of Queensland. The Laboratory is now recognised as a major research facility in traffic simulation in Australia and provides the research infrastructure and training needed for developing, testing and evaluating transport technologies.
- Received 232 citations in the Web of Science and 834 citations in Google Scholar (as of 19-April-2013)

Hussein's specific research contributions in the ITS and transport modelling fields include:

1. Development of dynamic driver behaviour models. The simplicity and accuracy of the agent-based algorithms, compared to conventional driver behaviour models, provides a means for determining the critical factors that influence drivers' behaviour and modelling their decisions under the influence of traffic information.
2. Microscopic traffic simulation and the development of agent-based car following models. This research demonstrated for the first time the feasibility of developing Neugent (neural agent) car following algorithms for modelling the longitudinal interaction of vehicles in a traffic simulator. The Neugent model results clearly showed better replication of field car following behaviour than conventional models.
3. Development of adaptive agent-based algorithms for traffic signal control. In this research, multi-agent algorithms are used to coordinate signalised intersections along a study corridor. Each single intersection is modelled as a local autonomous controller equipped with local optimisation model. The results from this research showed superior performance to fixed time control and provided better throughput across the intersections.
4. Automatic early detection of accidents on freeways to facilitate prompt dispatch of emergency services to victims and the injured. Dr Dia's PhD thesis research on developing neural network incident detection architectures resulted in the implementation of these algorithms in a number of traffic control centres in Australia. In addition to their safety benefits, these systems have also been found to improve the efficiency of the freeway facility by around 40 per cent.

Details of the most cited publications are provided on the next page.

Most Cited Publications and Journal Impact Factors

Publication	SCI Journal Impact Factor 2011	5-Year Impact Factor 2011	No of Citations Web of Science 19-April-2013	No of Citations Google Scholar 19-April-2013
Dia, H. (2001). An Object-oriented Neural Network Approach to Short-term Traffic Forecasting. <i>European Journal of Operations Research</i> , 131(2), pp. 253-261. (Elsevier)	1.815	2.277	63	153
Dia, H. (2002). An Agent-based Approach to Modelling Driver Route Choice Behaviour under the Influence of Real-time Information. <i>Transportation Research Part C</i> , 10(5-6). Special Issue on Intelligent Agents in Traffic and Transportation, pp 331-349. (Elsevier)	1.957	2.284	61	162
Dia, H. and Rose, G. (1998). Development and evaluation of neural network freeway incident detection models using field data. <i>Transportation Research-C</i> , 5(5). Special Issue on the Applications of Neural Networks in Transportation, pp. 313-331. (Elsevier)	1.957	2.284	42	104
Panwai, S. and Dia, H. (2005). Comparative Evaluation of Microscopic Car Following Behaviour. <i>IEEE Transactions on Intelligent Transportation Systems</i> , 6(3), pp 314-325. (IEEE)	3.452	2.748	48	125
Dia, H. and Panwai, S. (2007). Modelling driver's compliance and route choice behaviour in response to travel information. <i>Nonlinear Dynamics</i> , 49(4), pp 493-509. (Springer)	1.247	1.346	9	30
Panwai, S. and Dia, H. (2007). Neural Agent Car-Following Models. <i>IEEE Transactions on Intelligent Transportation Systems</i> . Volume 8, Issue 1, pp. 60-70. (IEEE)	3.452	2.748	9	27

Google Scholar Citations: <http://bit.ly/Ys28zJ>

Web of Science Citations: <http://www.researcherid.com/rid/B-1542-2008>

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Research Impacts

The impact of Hussein's work is evident by 232 citations in the Web of Science and 834 citations in Google Scholar (19-April- 2013).

Research Impacts

The impact of Hussein's work is demonstrated by the status of five of his career-best publications as shown below (refer to publications list):

1. **Dia, H. (2001). An Object-oriented Neural Network Approach to Short-term Traffic Forecasting. European Journal of Operations Research, 131(2), pp 253-261.**

In this paper, Dr Dia initiated the development of short-term traffic forecasting models using a special class of object-oriented neural network algorithms. These models were successful in predicting travel times up to 15 minutes into the future with a 93 to 95 percent accuracy which is unmatched by other algorithms in the literature. The standing of this work is highlighted by its publication in a Tier 1 journal (**Impact Factor 1.627 in 2009**) and its listing in international databases like the Web of Science, Ei Compendex, Scirus and TRIS online (TRB). The paper is also listed in Google Scholar. This publication was derived from a conference paper which received **Best Paper Award** at the International Conference on Artificial Intelligence in Transportation Systems and Science, Helsinki, Finland.

2. **Dia, H. (2002). An Agent-based Approach to Modelling Driver Route Choice Behaviour under the Influence of Real-time Information. Transportation Research Part C, 10(5-6). Special Issue on Intelligent Agents in Traffic and Transportation, pp 331-349.**

This paper established for the first time the feasibility using intelligent agents to develop driver route choice models under the influence of travel information. These models have now been shown to extend the capabilities of microscopic traffic simulators and improve their reliability, credibility and applicability to modelling ITS applications. The standing of this work is highlighted by its publication in a Tier 1 journal (**Impact Factor 1.082 in 2009**) and its listing in international databases like the Web of Science, Ei Compendex, Melvyl (The Catalog of the University of California Libraries), Scirus and TRIS online (TRB). The paper is also listed in Google Scholar.

3. **Dia, H. and Rose, G. (1998). Development and evaluation of neural network freeway incident detection models using field data. Transportation Research-C, 5(5). Special Issue on the Applications of Neural Networks in Transportation, pp. 313-331.**

This paper developed and evaluated the performance of neural network incident detection models based on field data collected from Melbourne Freeways. The models showed a higher detection rate and lower false alarm rate compared with the models that were available in the mid 1990s. The standing of this work is highlighted by its publication in a Tier 1 journal (**Impact Factor 1.082 in 2009**) and its listing in international databases like the Web of Science, Ei Compendex, Melvyl, Scirus and TRIS online (TRB).

4. **Panwai, S. and Dia, H. (2005). Comparative Evaluation of Microscopic Car Following Behaviour. IEEE Transactions on Intelligent Transportation Systems, 6(3), pp 314-325.**

This paper is a first attempt in the literature to provide a comprehensive evaluation of car following models implemented in leading microscopic traffic simulators. The standing of this work is highlighted by its publication in a Tier 1 journal (**Impact Factor 1.69 in 2009**) and its listing in international databases like the Web of Science, Ei Compendex, IEEE

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Xplore and TRIS online (TRB). Hussein co-authored this paper with his PhD student Sakda Panwai.

- 5. Panwai, S. and Dia, H. (2005). A Reactive Agent-Based Neural Network Car Following Model. Proceedings of the 8th International IEEE Conference on Intelligent Transportation Systems, September 13-16, 2005, Vienna, Austria, pp. 326-331.**

This paper presented a novel approach for car following models using reactive agent techniques for mapping perceptions to actions. The results showed that the model outperformed the Gipps and Psychophysical family of car following models. The standing of this work is highlighted by its acceptance and publication in the proceedings of the International IEEE Conference on Intelligent Transportation Systems (ITS), which is now recognised as the premier international conference on ITS. The paper acceptance rate to this conference was 67 percent. The standing of this paper is also evidenced by its listing in international databases like Ei Inspec and IEEE Xplore. Hussein co-authored this paper with his PhD student Sakda Panwai.

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Student Supervision

During his 10-year tenure at the University of Queensland in Brisbane, Hussein supervised and graduated a number of higher research degree students including (4) PhD and (3) Masters student. He also supervised the honours theses for more than 40 students.

Doctoral and Masters Research Students

Name	Degree	Research Topic	Award Date
Dr Noppakun Boongrapue	PhD	Development and evaluation of neural network environmental emissions models	Feb 2010
Dr Sakda Panwai	PhD	Modelling driver behaviour under the influence of traffic information	Feb 2007
Dr Suphasawas Nigarnjanagool	PhD	Development and evaluation of agent-based adaptive traffic signal control systems	Feb 2007
Dr Caroline Sutandi	PhD	Performance evaluation of advanced traffic control systems in a developing country	Sep 2006
Mr William Gondwe	Masters	Evaluation of incident management benefits on integrated arterial/motorway road networks	Dec 2008
Ms Kim Thomas	Masters	Incident detection on arterials using neural network data fusion	Mar 2005
Mr Nick Cottman	Masters	Modelling the impacts of Intelligent Transport Systems using microscopic traffic simulation	Sep 2003

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Publications

Hussein has published the following:

- 2 Theses on Intelligent Transport Systems and Transport Operational Research Topics
- 4 Book chapters on Intelligent Transport Systems
- 17 Journal papers on Intelligent Transport Systems and Traffic Simulation and Modelling
- 74 Conference papers on Intelligent Transport Systems, Traffic Simulation, Traffic and Transport Engineering
- 20 Technical Reports

Publications List

Theses

- [T.02] **Dia, H.** (1996). Artificial Neural Network Models for Automated Freeway Incident Detection. Doctor of Philosophy Thesis, Monash University, Australia.
- [T.01] **Dia, H.** (1985). Transport Applications of Vehicle Routing using the Postman Algorithm. M.Sc. Thesis, Purdue University, USA.

Chapters in Books

- [B.04] **Smit, R., Dia, H.** and Morawska, L. (2009). Road Traffic Emission and Fuel Consumption Modelling: Trends, New Developments and Future Challenges. In Traffic Related Air Pollution. Editors S. Demidov and J. Bonnet, pp. 29-68, Nova Science Publishers.
- [B.03] **Dia, H.** (2001). Towards Sustainable Transportation- The Intelligent Transportation Systems Approach. In *Towards Sustainability in the Built Environment*. Shanableh, A. and Chang WP (editors). pp. 412-422.
- [B.02] **Dia, H.** and Rose, G. (1998a). The impact of data quantity on the performance of neural network freeway incident detection models. In *Neural Networks in Transport Applications*. Himanen, V., Nijkamp, P. and Reggiani, A. (editors), pp. 311-340.
- [B.01] **Dia, H.** and Rose, G. (1998b). Assessing the performance of artificial neural network incident detection models. In *Transportation Networks: Recent Methodological Advances*, Bell, MGH (editor), pp. 255-272. (Pergamon)

Journal Papers

- [J.17] **Dia, H.** and Panwai, S. (2011). Neural Agent (Neugent) Models of Driver Behavior for Supporting ITS Simulations. *International Journal of Intelligent Transportation Systems Research: Volume 9, Issue 1 (2011)*, Page 23.
- [J.16] **Dia, H.** and Thomas, K. (2010). Development and evaluation of arterial incident detection models using fusion of simulated probe vehicle and loop detector data, *Informat. Fusion (2010)*, doi:10.1016/j.inffus.2010.01.001
- [J.15] **Dia, H.** and Panwai, S (2009). Evaluation of discrete choice and neural network approaches for modelling driver compliance with traffic information. *Transportmetrica Online*. Published August 2009. Available <http://www.informaworld.com/smpp/content~db=all~content=a914135669> [Accessed 03-Nov-2009]
- [J.14] **Stirzaker, C.** and **Dia, H.** (2007). Evaluation of Transportation Infrastructure Management Strategies Using Microscopic Traffic Simulation. *Journal of Infrastructure Systems*, Volume 13, No. 2, pp. 168-174, American Society of Civil Engineers. Volume 13, Issue 2, pp. 168-174 (June 2007)
- [J.13] **Panwai, S.** and **Dia, H.** (2007). Neural Agent Car-Following Models. *IEEE Transactions on Intelligent Transportation Systems*. Volume 8, Issue 1, pp. 60-70.
- [J.12] **Dia, H.** and Panwai, S. (2007). Modelling drivers' compliance and route choice behaviour in response to travel information. Special issue on

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- Modelling and Control of Intelligent Transportation Systems, Journal of Nonlinear Dynamics, Volume 49, Number 4, September, 2007 (Springer).
- [J.11] Thomas, K. and **Dia, H.** (2006). Comparative Evaluation of Freeway Incident Detection Models Using Field Data. IEE Proceedings on Intelligent Transport Systems, Vol. 153, No. 3, pp. 230-241, The Institution of Engineering and Technology, UK.
- [J.10] **Dia, H.** and Cottman, N. (2006). Evaluation of Arterial Incident Management Impacts Using Traffic Simulation. IEE Proceedings on Intelligent Transport Systems, Vol. 153, No. 3, pp. 242-252, The Institution of Engineering and Technology, UK. **[Invited Paper]**
- [J.09] Panwai, S. and **Dia, H.** (2005). Comparative Evaluation of Microscopic Car Following Behaviour. IEEE Transactions on Intelligent Transportation Systems, Vol 6, No 3, Sep 2005, pp 314-325.
- [J.08] Nigarnjanagoo, S. and **Dia, H.** (2005). Evaluation of a Dynamic Signal Optimisation Control Model using Traffic Simulation. Special Issue on the Computerization of Transportation: Sophisticated Systems Incorporating IT in the Mobility of People and Goods. Journal of International Association of Traffic and Safety Sciences, 29(1), pp. 22-30.
- [J.07] Thomas, K. and **Dia, H.** (2004). Development and evaluation of fractal dimension models for freeway incident detection. Road and Transport Research Journal, Vol 13, No. 2, pp 2-20, June 2004. **[Invited Paper]**
- [J.06] **Dia, H.** (2002). An agent-based approach to modelling driver route choice behaviour under the influence of real-time information. Transportation Research-C, 10(5-6). Special Issue on Intelligent Agents in Traffic and Transportation, pp 331-349.
- [J.05] **Dia, H.** (2001). An object-oriented neural network approach to short-term traffic forecasting. European Journal of Operations Research, 131(2), pp. 253-261. **[Best Paper Award]**
- [J.04] **Dia, H.**, Harney, D. and Boyle, A. (2001). Dynamics of drivers' route choice decisions under advanced traveller information systems. Roads and Transport Research. Vol. 10, No. 4, ARRB Transport Research Ltd, Vermont South, Victoria, Australia. pp. 2-12.
- [J.03] **Dia, H.** and Purchase, H. (1999). Modelling the impacts of advanced traveller information systems using Intelligent Agents. *Road and Transport Research*, Vol. 8, No. 3, September 1999, ARRB Transport Research Ltd, Vermont South, Victoria, Australia. pp. 68-73. **[Invited Paper]**
- [J.02] **Dia, H.** and Rose, G. (1998). Development and evaluation of neural network freeway incident detection models using field data. Transportation Research-C, **5(5)**. Special Issue on the Applications of Neural Networks in Transportation, pp. 313-331.
- [J.01] Elkarmi, A. and **Dia, H.** (1993). A Stochastic Model for the Assessment of the Environmental Risks from Genetically Modified Microorganisms. *DIRASAT (Series B: Pure and Applied Sciences)*, Vol. 20B, No. 1, 1993, pp. 119-129.

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CONFERENCES AND PRESENTATIONS

INVITED PRESENTATIONS

- [C.74] **Dia, H.** (2012). Delivering world class ITS operations, Road Engineers Association for Asia and Australasia, New Zealand, August 2012
- [C.73] **Dia, H.** and Boongrapue, N. (2011). Instantaneous vehicle emission models for evaluating environmental impacts of ITS. Proceedings of ITS World Congress, Florida
- [C.72] **Dia, H.** (2011). Next generation ITS and proactive transport technologies. ITS Summit, Gold Coast
- [C.71] **Dia, H.** (2011). Connected mobility for smart cities. Asia Pacific Cities Summit, The Business of Cities, Brisbane, 6-8 July 2011
- [C.70] **Dia, H.** (2011). Evaluation of impacts of ITS using traffic simulation. IPENZ Transportation Group Conference, Auckland, New Zealand
- [C.69] **Dia, H.** (2010). The Global ITS sector – current situation and future trends. AITPM ITS Workshop, Brisbane, August 2010.

CONFERENCE AND OTHER PROCEEDINGS AND PRESENTATIONS

- [C.68] **Dia, H.** (2011). Shaping smart cities of the future. National Outlook Magazine, Tomorrow's Cities Today, Spring 2011
- [C.67] **Dia, H.** (2011). Connected mobility for smart cities. Highway Engineers Australia, September 2011
- [C.66] Tey, L.S, Ferreira, L and Dia, H. (2009). Evaluating Cost-effective Railway Level Crossing Protection Systems. Australian Transport Research Forum, New Zealand.
- [C.65] **Dia, H,** Smit, R and Morawska, L (2010). Future Trends in Modelling Road-Based Pollutant Emissions and Fuel Consumption. Proceedings of the Australian Institute of Traffic Planning and Management (AITPM) National Conference 2010, 20-23 July, Brisbane, Australia
- [C.64] **Dia, H.** (2009). Evaluation of the Impacts of Traveller Information Systems. Invited presentation. Australian ITS Summit, Melbourne, Australia
- [C.63] **Dia, H.** (2009). Evaluation of Incident Management Strategies using Traffic Simulation. Invited presentation. QUT ITS Symposium, Brisbane.
- [C.62] Mojarrabi, B, Gwal, AK, **Dia, H** and Bhattacharya, S (2009). First Passage Time Anisotropy: Upgrading the Criterion for Superstatistical Framework of Social and Transport Network. Proceedings of the Eastern Asia Society for Transportation Studies, Vol.7
- [C.61] Tey, L, Ferreira, L and **Dia, H** (2009). Evaluating Cost-effective Railway Level Crossing Protection Systems.

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- Proceedings of 32nd Australasian Transport Research Forum, Auckland, New Zealand.
- [C.60] **Dia, H** and Panwai, S (2009). Models of Driver Behaviour for supporting vehicle telematics and ITS simulations. Proceedings of the 10th ITS Asia Pacific Forum and Exhibition, 8-10 July 2009, QSNCC, Bangkok, Thailand.
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Private Sector Experience and Leadership Roles

In his most previous role as AECOM's Director and ITS Technical Leader for Australia and New Zealand, Hussein offered:

- Hands-on leadership of ITS projects at the most senior level
- Ability to give sound advice based on a good understanding of the principles underpinning ITS project strategic planning, design and delivery methods
- Expertise in managing project technical and operational risk to the benefit of all project stakeholders
- Ability to advise stakeholders on technical and financial issues in ITS project investment context
- Knowledge of ITS standards and practices across the Asia Pacific Region
- Ability to create ITS solutions to complex technical and operational problems through detailed analysis and awareness of latest developments gained through worldwide interaction with specialists
- Expertise in operational modelling of effectiveness and impacts of ITS projects
- Infrastructure asset management and contract and project management

Key Industry Technology Project Experience

Recent ITS and Transport technology projects include:

2012/2011

Bruce Highway Managed Motorways – ITS Tender Design – Stage 1, Leighton Contractors

- Responsibility for leading the ITS team to develop a Preliminary ITS Managed Motorway design for the 33-km Motorway between Brisbane and Caboolture. Also responsible for coordination of ITS and Managed Motorway aspects of the project with Leighton, VisionStream and the ultimate client, TMR.

Travel Time Information Project, Department of Transport and Main Roads, Queensland.

- Responsibility for leading the development of a combined options analysis, business case and concept design for an en-route travel time information system on the M3 in Brisbane.

Traffic Incident Management System, Hong Kong Department of Transport, Hong Kong

- ITS specialist providing input into the automated incident detection algorithms and system required for effective incident management in Hong Kong. Role also includes specialists services on the requirements for data fusion of the many systems currently implemented by the Client in Hong Kong.

Congestion Management and ITS Study, Marina Coastal Expressway, Land Transport Authority, Singapore

- Responsibility for leading the identification and development of ITS options and strategies for reducing congestion in the tunnel and surrounding road network

ITS Strategy for Department of Transport and Main Roads, Far North Region, Queensland, Australia

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- Responsibility for leading the development of a comprehensive ITS strategy for the Far North Region in Queensland, Australia. Hussein is currently working with the client to develop a vision for the short-term (5 years), medium-term (10 years) and long-term (20 years) ITS technologies and applications for the region, and for developing tactics and actions for achieving the objectives of the strategy.

Development of Ramp Signalling Operational Strategies, Department of Transport and Main Roads, Queensland.

- Responsibility for leading the development of Ramp Signalling Operations Strategy (OS) reference document for use on the Pacific Motorway (M3) between Loganlea Road and Cornwall Street. This document is aimed at guiding staff in the operation of the new state-of-the-art dynamic and coordinated ramp signalling system (HERO algorithm), which is being implemented on the M3.

SCATS Service Transition Plans, Brisbane City Council., Queensland, Australia

- Responsibility for leading the review of the documentation and approach to the service transition plans from BLISS to SCATS traffic signal control system for the Brisbane Metropolitan Region.

Advanced Traffic Management Using ITS Technologies, Roads ACT

- Responsibility for developing an ITS strategy for the ACT to provide directions for the short, medium and long-term deployment of ITS to improve road network performance, safety and mobility for road users in the ACT

Review of Mobile Speed Camera Technologies, Roads ACT

- Technical lead for a study to review current mobile speed camera technologies available in Australia and overseas, and evaluate their suitability for implementation in the ACT

Fremantle Ports – Access and Traffic Control Technologies

- Project Director for a study aimed at identifying access and traffic control technologies for improving management of truck movements, such as vehicle booking system for the container terminals and the Truck Marshalling Area (TMA), to manage truck queuing during peak freight periods

2010

Gold Coast Rapid Transit – Project Scope Requirements (PSR), Queensland Government

- Responsibility for providing specialists ITS services for the PSR documents including the Annexure on Control Systems. The role involved liaison with key stakeholders and drafting of the ITS functional requirements.

Bruce Highway Upgrade Project, Department of Transport and Main Roads, Queensland

- Responsibility for leading the ITS design team and identifying different ITS options for improving operational performance and road safety, including investigation of variable speed limits, point-to-point speed enforcement and incident management systems.

Logan Motorway Corridor Plan, Department of Transport and Main Roads/Queensland Motorways

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- Responsibility for leading the ITS component of the project, including review of existing ITS equipment and applications, establishing future year operational requirements and identification of a number of ITS options to ensure that the Motorway operates efficiently and safely under future year conditions.

Box Hill Transit Station, Department of Transport, Victoria

- Responsibility for leading the ITS component of the project, including the functional design of a Bus Management System coordinated with passenger information and a number of ITS and control systems to facilitate the efficient and safe operations of the interchange. This includes dynamic bus stop assignments, automated management of bus movements within the interchange, monitoring of utilisation of bus layover facilities, bus detection and tracking, real-time passenger information, automated door locking and unlocking systems, and automated passenger counting.

Hoddle Street Planning Study, VicRoads

- Responsibility for leading the ITS component of the project, including identification of ITS options for the efficient and safe movements of vehicle traffic and public transport on the corridor.

2009

Northern Busway Concept Design and Impact Management Plan (CDIMP) Project, Department of Transport and Main Roads

- Responsibility for the operational modelling aspects for the above project. This involves coordinating the meso modelling activities and testing of a number of options for the proposed Northern Busway Project in Brisbane, including evaluation of operational impacts and staging of different components of the project.

2009

On-demand Bus Call-up ITS Project, Translink Transport Authority, Queensland

- Responsibility for the development of a number of ITS options for an on-demand bus call-up system to be used on Caseys Road on the Gold Coast. The work included identification of options including hardware and operational requirements; undertaking an evaluation of options to determine a preferred solution; and estimation of costs for implementation. The evaluation was based on a number of criteria including ease of use, reliability, low maintenance, cost and limited opportunity for misuse.

2008

Mudgeeraba Interchange, Robina and Pacific Motorway Simulation Model, Queensland Department of Main Roads

- This project involved the development of microscopic traffic simulation models to inform the planning decisions regarding the upgrade of the interchange.

Burleigh Connection Road and Bermuda Street Traffic Simulation Models, Queensland Department of Main Roads

- This project involved developing a microscopic traffic simulation model for future years 2016 and 2026 and evaluated the impacts of a number of design options and ITS solutions to reduce congestion on the road network.

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2007

Development and Evaluation of Freeway Travel Time Forecasting Models, Queensland Department of Main Roads

- This project developed a freeway travel time forecasting model and tested its performance using a simulation approach. The model is easily transferable and can be used to provide drivers with information on travel times between strategic locations on any motorway facility.

Evaluating the Impacts of Incidents, Queensland Department of Main Roads

- This project used a simulation approach, supplemented with field data, to evaluate the impacts of incidents on the arterial and motorway network on the Gold Coast.

Evaluating the Impacts of Traffic Strategies in Reducing Incident Impacts, Queensland Department of Main Roads

- This study evaluated the impacts of a range of ITS strategies in reducing the impacts of incidents on arterial roads and motorways. The ITS strategies tested included ramp metering, incident management, information systems and adaptive traffic signal control.

Simulation of the Impacts of Heavy Vehicle Restrictions, Queensland Department of Main Roads

- This project evaluated the impacts of restricting heavy vehicles to the slow lanes of motorway facilities. A simulation approach was used to determine localised and network-wide impacts on private and commercial traffic.

Simulation of the Impacts of Arterial Incidents, Queensland Department of Main Roads

- This project analysed the incident data logs from the Gold Coast Transport Management Centre and supplemented the field data with a simulation approach to evaluate both the localised and network-wide impacts in terms of increased travel times, delays, reduced speed, reduced public safety and amenity.

Development, Calibration and Validation of the Pacific Motorway Traffic Simulation Model, Queensland Department of Main Roads

- This project involved the development of a large-scale traffic simulation model for the Pacific Motorway between Logan and the Gold Coast. The model was developed to test a range of ITS scenarios aimed at improving the efficiency and safety of the Motorway.

2006

Development, Calibration and Validation of the Gold Coast Traffic Simulation Model, Queensland Department of Main Roads

- This project developed a detailed traffic simulation model for the main arterial routes within the Gold Coast traffic network. The model was used to evaluate the impacts of major sporting events and to test the feasibility and effectiveness of a number of traffic management and ITS strategies aimed at improving traffic movements and circulation patterns within the areas impacted by the events.

ITS Strategy for South Coast Hinterland District: Situation Analysis, Queensland Department of Main Roads

- In this project, Hussein was commissioned to write a number of chapters of the ITS strategy for the Gold Coast. Those chapters covered the existing situation and documented future ITS strategies to be implemented over the next 10 years.

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Comparative Evaluation of Environmental Emissions Models using Traffic Simulation, CSIRO

- This project involved the use of traffic simulation to compare the performance of a number of power-based vehicle emissions models which have been developed to estimate fuel consumption and pollutant emissions from motorised traffic. Each model was coded in AIMSUN and was tested using second-by-second data obtained from each vehicle in the simulation. The results from each model were then compared to real data to determine model accuracy in replicating field conditions.

2005

Scoping Study- Machine Vision Applications in Intelligent Transport Systems, CSIRO

- This project reviewed and evaluated existing machine vision applications, and identified new technologies and applications with potential for further research, development and commercialisation in the ITS field. The feasibility and market potential of each new technology was evaluated and presented to key stakeholders with the aim of progressing the most prospective machine-vision technology for ITS.

Drive Cycle Data Collection (Austroads Strategic Routes in Brisbane): Second National In-Service Emissions Study, University of South Australia

- This study collected and analysed field data from an instrumented vehicle travelling on a number of strategic routes in Brisbane for use in the NIS Emissions Study. The data was subsequently used to develop models for estimating the fuel consumption and pollutant emissions on the strategic routes.

Scoping Study- Performance Evaluation of Traffic Control Systems Using Traffic Simulation, Brisbane City Council

- This project investigated the application of traffic simulation to evaluate the performance of three systems currently operating in Australia: BLISS, STREAMS and SCATS. The study proposed to interface a simulation version of each traffic control system to a traffic simulation model of a road network in Brisbane. The basic premise of the work was to use simulation to replace the real world actuation of detectors and for the simulator to respond in a realistic manner to signal information received from the Traffic Control System. The scoping study explored the feasibility of the simulation approach, selection of traffic simulator and detailing of study design.

2004

Signal Coordination Benefits – Analysis of Travel Time and Speed Surveys, Queensland Department of Main Roads

- This project analysed before-and-after travel time and speed survey data collected from fourteen signalised routes in the North Coast-Hinterland District. The data was pre-processed and used to determine the impacts of signal coordination on a number of performance measures, including travel times, speeds, number of stops, vehicle operating costs and pollutant emissions

Evaluation of Traffic Signal Control Systems for Brisbane, Brisbane City Council

- This study compared the traffic signal control philosophies and urban traffic management features of BLISS, STREAMS and SCATS. The traffic

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management perspectives including resources, skills, training, support and maintenance were also documented for each system. The study showed that substantial road user benefits can be realised from advanced traffic signal control systems. Summaries of cost estimates, road user benefits and resource requirements for each system were also identified.

Functional Safety Assessment of Adaptive Traffic Control Systems – SCATS2, UniQuest

- In this project, Hussein was engaged by UniQuest (commercial arm of the University of Queensland) to provide technical evaluations to aid the general planning for the SCATS-2 functional safety assessment.