Institute for Transport Studies (ITS) – Annual Report 2010

UNIVERSITY OF LEEDS
Institute for Transport Studies

Introduction Dr Susan Grant-Muller

This has been a particularly busy year for ITS, marked by the launch of a new research strategy, looking forwards to the next five years and beyond. The new research strategy builds on the foundation of the core skills of excellence which have developed across ITS over the previous 40 years and which now feed into five priority areas of multidisciplinaryapplication: Energy and Carbon, Intelligent Transport, Business and the Economy, Transport and Health and Air Transport Policy. These application areas are aligned with the research priorities in the external environment and as a result the Institute will continue as a major supplier of research excellence to the Transport sector nationally and internationally.
During the first year of the new strategy, the Energy and Carbon theme made a particularly strong start. ITS is a participant in the Doctoral Training Centre for Low Carbon Technologies (hosted by the Faculty of Engineering) which consolidated its successful launch by welcoming its second cohort of PhD students during the year; a total of 50 PhDs will eventually be trained through the Centre. The autumn saw three further substantial successes including the launch of a major new £1.3m multidisciplinaryUniversity of Leeds Centre for Integrated Energy Research (CIER), for which ITS is a co-investigator in Transport-Energy interactions. A £1.3m Research Councils UK grant on understanding the potential for energy demand reduction through disruptive change was also awarded. Finally, a White Rose Universities network in Adapting Transport to a Low Carbon Future was established, involving student and research collaboration between the Universities of Leeds, Sheffield, Hull and York.

RESEARCH FACILITIES

The University of Leeds Driving Simulator is the UK's most sophisticated research facility of its type. It provides a safe and controlled environment to support research in driver behaviour and transport safety. Fully flexible hardware and software can fashion a multitude of highly realistic, virtual scenarios in a range of driving environments. The driving simulator offers the scope to undertake a wide variety of research, including much that would not be safe, ethical or cost effective to do on real roads. It is supported and operated by an expert team, who can tailor virtual scenarios and experimental data collection to the exact requirements of a particular investigation. It has been a key research tool for a number of studies in 2010, such as the safety implications of Advanced Driver Assistance Systems and the use of road engineering measures to reduce fatigue related accidents. For more information please visit
www.its.leeds.ac.uk/facilities/uolds
or contact the Facility Manager:
A.H.Jamson@its.leeds.ac.uk

STAFF NEWS

Dr Chandra Balijepalli continued to be active at the Transportation Research Board, conference as a member of the Transportation Network Modelling Committee and presented a research paper at the annual meeting in Washington D.C. in January (TRB).

Dr Yvonne Barnard presented a paper on Field Operational Tests (FOT) at the European Conference on Human Centred Design for Intelligent Transport Systems, Berlin in April, and another paper at the Human Modelling in Assisted Transportation conference, Belgirate, Italy in June. Together with Professor Carsten and colleagues from TNO (The Netherlands), Yvonne organised four seminars on FOT in Amsterdam, Tel Aviv, London and Brussels. She chaired a FOT-Net workshop session on data-analysis at the ITS World Congress in Korea in October and gave a short course for international professionals in the aviation domain on Knowledge Transfer at the Institut Aeronautique et Spatial, Toulouse in September.

Professor Peter Bonsall presented a paper on Pricing Policy to a Scottish Government Seminar on 'What works in Behaviour Change' in Edinburgh in June. In November he presented a paper on 'Data Needs' to a meeting of the EU COST Action on data harmonisation in London. In August, Peter contributed to a review of issues in the recent Dutch study on the value of time.

Professor Oliver Carsten gave an invited talk in November at an INRETS-organised seminar in Paris on acceptance of new in-vehicle systems. In December he gave an invited address on speed management and Intelligent Speed Adaptation to the Polish National Road Safety Seminar, organised by the National Directorate for Roads. In September he presented a paper at the International Federation of Automatic Control conference, held in Valenciennes, on the subject of the impact of automation in driving on driver inattention to the road and traffic situation.

Professor Andrew Daly's work at ITS has largely been concerned with an Engineering and Physical Sciences Research Council (EPSRC)-funded project on the analysis of panel data. To date, this has led to papers presented at the World Conference on Transport Research (WCTR), European Transport Conference (ETC) and the TRB. Other papers were also presented to these conferences. Andrew also presented papers at the Institute for Mathematics and its Applications (IMA) Conference and the Australasian Transport Research Forum. The book he edited (with Dr Hess) of the proceedings of the first International Choice Modelling Conference (ICMC) was published. Additionally, he organised a workshop on long-distance travel at Royal Institute of Technology in Stockholm (KTH). His work on Cost Damping in transport models was posted on the website of the UK Department for Transport (DfT) and incorporated in DfT Guidance (WebTAG).

Professor Gerard de Jong continued as guest researcher at the Centre for Transport Studies, KTH, where he worked on the organisation of an international seminar on freight transport modelling to take place in March 2011. In October, Prof. de Jong stepped down as Director of the Association for European Transport. He is a member of the Editorial Advisory Board of Transportation Research 'A' (Policy), the Journal of Choice Modelling, Transportation and Tijdschrift Vervoerswetenschap. Gerard was a member of the peer group for EU-DGTREN on regulation of long and heavy vehicles and gave invited lectures at the University of Amsterdam and Delft University of Technology. He acted as member of PhD committees at ITS and at TilburgUniversity. He was chairman of a session at ETC and gave a presentation on passenger and freight transport modelling for Flanders. He delivered a presentation on price elasticities in freight transport at two seminars organised by Transport and Environment in Brussels and also presented this to the European Parliament and the European Commission. He is a member of the external panel on transport policy and emissions for the Israeli Ministryfor the Protection of the Environment. For OECD and the International Transport Forum he acted as external reviewer of their report 'Improving reliability on surface transport networks'.

Dr Tony Fowkes was contracted to provide advice to Transport for London (TfL) regarding the WSP-built Freight in London Model.

Dr Susan Grant-Muller was awarded a 2010 White Rose Universities network in 'Adapting Transport to a Low Carbon Future' involving student and research collaboration between the Universities of Leeds, Sheffield, Hull and York. She also hosted two research interns under the 'Low Carbon Leeds' cross-faculty initiative at the University of Leeds. Dr Grant-Muller is a CO-I for the newly established Centrefor Integrated Energy Research (CIER), a significant new multi-disciplinary and cross-faculty

initiative hosted within the Faculty of Engineering. She hosted the autumn meeting of the International Road Federation (IRF) policy committee on Intelligent Transport, within which she remains chair of a sub-committee on research needs and capacity building. She gave a number of invited presentations, continues to act as sub-editor for the European Transport Research Review (ETRR) journal, joined the editorial panel for the Institution of Civil Engineers (ICE) transport series and within the University, is part of the steering group for the Women in Science, Engineering and Technology (WISET) network.

Dr Astrid Gühnemann was invited as expert to the GTZ/German Environmental Ministry's meeting on Sustainable Development in the Transport Sector Worldwide. She gave invited presentations on 'Challenges for combining indicators' at the final conference of COST 356 – EST 'Towards the definition of a measurable environmentally sustainable transport', Paris, and on 'Feasibility of tradable noise permits at airports' at the GARS Workshop on 'Airports and the Environment', Dresden. She also gave presentations at the WCTR in Lisbon on noise trading at airports and on pricing competition in the protection of transport sensitive areas.

Dr Stephane Hess won the Fred Burggraf Award given by the TRB in recognition of excellence in transportation research by researchers 35 years of age or younger (together with his PhD student James Fox). In January, he gave an invited workshop presentation on 'Fundamentals of Stated-Choice Studies: Practical Guide to Designing and Implementing Stated-Choice Surveys' at the TRB annual meeting. In May, he gave a keynote presentation at the TRB Conference on Innovations in Travel Modelling, Tempe, Arizona, entitled 'Conflicting interpretations of respondent heterogeneity'. Also that month, he was an invited participant in the 'International Choice Symposium' held in Florida. Dr Hess was made a member of the Scientific Committee of the World Conference on Transport Research Society, a member of the Editorial Advisory Board of Transportation, and a session track organiser for the travel behaviour stream at WCTR. He was also elected as a member of the Board of the International Association for Travel Behaviour Research. In late 2010, Dr Hess made an extended visit to the Institute of Transport and Logistics Studies at the University of Sydney, and to the Centre for the Study of Choice at the University of Technology Sydney (UTS). He also gave invited seminars at UTS, the University of Sydney, ETH Zurich, the Catholic University of Leuven, and the University of Manchester. He also examined PhD students at the Massachusetts Institute of Technology, and at ETH Zurich.

Frances Hodgson presented her work on physical and electronic connectivity to the United Kingdom Transport Research Centre (UKTRC), Social Impacts and Social Equity Issues in Transport workshop series on 'Researching connectivity in everyday lives: networks, resources and methods', at St Anne's College, University of Oxford in September. She also presented, with Martin Rivas Perez, at the second UKTRC workshop in the series Social Impacts and Social Equity Issues in Transport on 'Dynamics of access: exclusions and resiliencies in the search for work' in December, at the University of Warwick. Frances Hodgson developed with the University of Leeds Africa College a joint Africa College and World Bank funded workshop on 'Getting the Harvest to Market: Food, security, agriculture and transport in Africa' at the International Institute of Tropical Agriculture, Ibadan, Nigeria, in October. This was the follow-on workshop to the 'Food, transport and packaging' workshop held at Leeds. The Ibadan workshop's focus was on the role of transport in post-harvest loss and the gendered everyday practice of agriculture in Africa. The workshop brought together multi-disciplinary perspectives drawing on crop science, food science and processing, social science, transport and packaging across the international agencies, academic, public and business sectors; Frances presented on 'Research Challenges in this field'. As a result, Frances is coordinating a parallel theme on transport at the Africa College International Conference on 'Food security, health and impact', to be held June 2011.

Dr Hamish Jamson attended the Motion Cueing Workshop in March, hosted by the Technical University of Delft in the Netherlands. In December, he successfully defended his PhD thesis entitled 'Motion Cueing in Driving Simulators for Research Applications'. He also acts as a Scientific Advisor for the bi-annual International Symposium on Human Factors in Driver Assessment, Training, and Vehicle Design.

Dr Samantha Jamson was funded by the British Academy to visit academics at Taiwan's National Cheng Kung University in order to collaborate on a joint research project. The project focuses on motorcycle safety and new technologies, with data collection currently underway. She continues her work with the Leeds Teaching Hospitals NHS Trust on Sleep Apnoea, which was presented at the winter meeting of the British Thoracic Society. She presented research results from a DfT-funded project on low cost engineering solutions for speed reduction at a TRB session.

Daniel Johnson chaired a session and presented at ETC in October, and continued his work as part of the Freight Committee.

Andrew Koh chaired a session for Evolutionary Computation Stream at the World Online Conference on Soft Computing in November: www.dep.uminho.pt/wsc15/. . In the spirit of reducing the carbon footprint in research activity this conference of the World Federation of Soft Computing was held entirely on the Web: www.wfsc.de/. Andrew was interviewed by Numerical Algorithms Group (NAG) Ltd on his experience. The NAG suite of tools in Excel, Visual Basic and MATLAB is helping to solve optimization problems in transport planning and analysis. Andrew was joint winner of the best student paper award for 'Competition between Cities – An Exploration of Response Surfaces and Possibilities for Collusion' produced as part of the research towards his PhD on the Competitive Cities Project (see below) at the Annual Conference of the Hong Kong Society of Transportation Studies in December.

James Laird and Shujie Shen were awarded best paper at the Scottish Transport Applications and Research conference, Glasgow in May for their paper 'Accidents on rural roads – for better or worse'.

Dr Ronghui Liu was invited to serve as an international expert evaluator for the employment committee at KTH in May. She helped to select and appoint an associate professor at the Centre for Transport Studies, KTH. During the summer, Ronghui hosted visits from two EU Short-Term Scientific Mission (STSM) fellows: Dr Gunnar Flötteröd of EPFL, Switzerland, and Dr Jonathan Ward of Limerick University, Ireland. In October, Ronghui gave an invited presentation at the Special Workshop on Artificial Transportation Systems and Simulation at the IEEE ITSC conference in Madeira. She has been appointed to serve as a member of the editorial board for IET Journal of Intelligent Transportation Systems. She continues as associate editor for the international journal IEEE Transaction on Intelligent Transportation Systems.

Professor Peter Mackie gave a paper on appraisal challenges to the Modelling World conference in London in June and was a keynote speaker on Cost Benefit Analysis in transport at the OECD/ITF Round Table in Queretaro, Mexico in October. With Dr Marsden he gave written evidence to the House of Commons Select Committee on Transport's inquiry into Transport and the Economy followed by oral evidence and a presentation on the same theme to a CILT/TSUG conference in November. In the same month, he addressed a conference on the ITS research study for Government on Concessionary Travel Reimbursement. He continued as a member of the High Speed 2 Ltd's Analytical Challenge Panel.

Professor Mike Maher was an invited keynote speaker at the annual Danish Transport Conference: Trafikdage: www.trafikdage.dk/v2/index, held at the University of Aalborg in August. He gave talks in a special session on road safety evaluation studies on 'State-of-the-art estimation of site-specific safety effects' and 'What to do, when state-of-the-art methodology is not applicable?'. He also served on the steering group of the EPSRC/RSSB/DfT strategic partnership for rail research.

Dr Greg Marsden presented papers at WCTR and at TRB. He led a plenary presentation at the Universities' Transport Studies Group (UTSG) Conference in Plymouth. He was an invited speaker at the Cambridge University Energy Network conference on 'A low carbon sustainable

transport system – rhetoric or reality?' and as a discussant at the ELTIS+ European Expert Workshop on Sustainable Urban Mobility Plans. He gave a guest lecture at the University of Aberdeen on 'Rolling out good transport policies: Why is it so difficult and how might we improve?'. He submitted written evidence to the House of Commons Transport Select Committee with Professor Peter Mackie for the inquiry into Transport and the Economy. He was awarded the Samfunds litteratur 'Lærebogsprisen' (The Textbook Prize) at the Book Fair in Copenhagen for a text book proposal on Decision-Making and Sustainable Transport working in collaboration with Henrik Gudmundsson (Technical University of Denmark), Ralph Hall (Virginia Polytechnical Institute and State University) and Josias Zietsman (Texas A&M University).

Bryan Matthews hosted a delegation in March from the US Department of Transportation and the University of Pennsylvania who were undertaking an investigation into European High Speed Rail (their report was subsequently presented to Vice President Biden). The proceedings included presentations from Bryan and from Pedro Abrantes, Dr Greg Marsden and Professor Alan Pearman. Also in March, Bryan gave an invited lecture to staff and students at Liverpool University's School of Civic Design on the subject of European transport policy. In particular, the talk explored progress with the EU Transport White Paper since its publication in 2001, and looked forward to the new White Paper (since published in March 2011). In October, Bryan was invited to contribute to the Academic Network of European Disability experts (ANED), with a review of EU access to air and rail travel for people with a mobility impairment. The activities of the Network support the future development of the EU Disability Strategy and practical implementation of the United Nations Convention on the Rights of Persons with Disabilities. Bryan's review was compiled with other related reviews of access to employment and to justice and circulated within the European Commission's Disability Policy Unit.

Dr Natasha Merat presented a poster at the Human Factors and Ergonomics Society Europe Chapter conference in Berlin. The poster, entitled 'Technology acceptance by car drivers over the age of 70', presented results from the EPSRC funded BRIDGE project. Dr Merat was also invited to present the results of her projects on driver fatigue to an audience at the Driving for Better Business – Champions' Event.

Dr Gordon Mitchell completed work on the EPSRC-funded SOLUTIONS project, investigating the sustainability of spatial planning options for three UK urban regions - London and the wider SE, the North East, and the Cambridge sub-region. The work employed land use-transport interaction models, coupled to a series of models to quantify 22 criteria addressing social, economic, environmental and resource use domains. Results quantify the relative trade-offs between planning options (compaction, dispersal, polycentric development and edge expansion, but reveal that urban form is a relatively weak lever in terms of delivering sustainability in regions experiencing high growth pressure. The findings were discussed with DfT and CLG, and can be downloaded from www.suburbansolutions.ac.uk. The findings provide the basis for a follow-up study, 'ReVISIONS' in which the role of urban form, as a facilitator or constraint on technological options for delivering sustainability is being explored.

Frank Montgomery continued as a nominated member of the Council of the Chartered Institution of Highways and Transportation, and of its Education Board. He served for a fifth year on the Joint Board of Moderators. He continued as external examiner of the MSc Transportation Planning and Engineering at University of Southampton, and served as external member of the programme evaluation panel for new and revised BSc and MSc programmes in Transportation at University of Ulster. In December, he was a keynote speaker at the Indonesian Students International Scientific Meeting (TIIMI) at the Indonesian Embassy, London.

Dr Caroline Mullen joined ITS and is assisting with research on two projects: Competitive Cities and Understanding Walking and Cycling.

Professor Chris Nash spent February visiting the University of Sydney, giving seminars on rail policy and project appraisal there and in Wellington, New Zealand; he also spoke on high speed rail at a seminar in Canberra. On the return journey he gave seminars on rail policy at Universities in Taiwan. In April he spoke on competition in rail passenger transport at the Scandinavian rail conference in Stockholm, and on rail track access charges at a workshop in Barcelona, and in May he chaired a conference on the effectiveness of European rail policy in Brussels. He spoke on current debates on the cost-benefit analysis of transport projects in Great Britain at the conference on economic evaluation of transport infrastructure, Madrid in November; on enhancing the cost benefit analysis of high speed rail at the symposium on the environmental and other co-benefits of developing a high speed rail network, Berkeley, California in December; and on competition and the provision of high speed rail services at the UIC symposium on high speed rail, Beijing, China, also in December.

John Nellthorp was invited to speak in December at the French Ministry of the Environment and Construction Industry Development Board Conference.

Dr Dong Ngoduy was invited to be the member of the ITS Committee on TRB.

Dr Simon Shepherd attended the International Transport Forum Round Table on 'Implementation of congestion charging' held at the International Energy Agency, Paris in February.

Dr Andrew Smith continued to conduct collaborative research in his role as Visiting Researcher, Centre for Transport Studies, KTH and Swedish National Road and Transport Research Institute (VTI). Together with Phill Wheat he developed an international collaboration with Professor William Greene at NYU Stern Business School, New York. Andrew was voted by his academic peers from UK universities onto the executive committee of the Rail Research UK Association (RRUK). This body aims to be an effective bridge between the rail industry and universities. Andrew was an invited speaker at the 1st Florence Workshop on Rail Transport Regulation, Florence School of Regulation, European University Institute in November. He was also invited to speak at a number of industry bodies across Europe including The Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railways, Germany; the Swedish Transport Administration; the Effectiveness of EU Rail Policy Conference, Brussels; and the European Rail Research Advisory Council. Andrew continued to manage or direct important rail research projects. His work fed directly into the Office of Rail Regulation's Annual Efficiency Update and into the Sir Roy McNulty Rail Value for Money Study.

Dr James Tate accepted an invitation to join the editorial panel of the ICE flagship journal 'Civil Engineering'. Dr Tate is a Technical Advisor and partner on the Leeds City Region Low Emission Strategy Project - which is tasked with accelerating the uptake of low emission fuels and technologies to mitigate air pollution and carbon dioxide emissions associated with road transport.

Dr Miles Tight was editor (with Dr Moshe Givoni of Transport Studies Unit, Oxford) of a special edition of the journal Built Environment on 'The role of walking and cycling in advancing healthy and sustainable urban areas' published in December. He presented at WCTR, and at the Walk21 conference, The Hague in November. Miles was invited to give a presentation at a seminar on Interdisciplinary Opportunities in Low-Carbon Transport, Cardiff University in June and at the International Transport Conference at the University of Wuppertal, Germany in September. He also presented the Chartered Institute for Logistics and Transport (CILT) Laurie English lecture 'Thinking the unthinkable: Step-changes in urban transport to create sustainable urban futures' at the University of Leeds in November.

Dr Paul Timms made keynote presentations at the First and Second TURBLOG workshops, Lisbon in July and Lima in October on 'A Worldwide Overview on Urban Logistics Interventions and Data Collection Techniques'. The presentations and more information about the TURBLOG project are available from www.turblog.eu.

Dr Jeremy Toner was invited in November to address the Norwegian Public Roads Administration on 'Revenue Risk in Ferry Tendering'.

Professor Mark Wardman presented two papers at TRB. He also presented three papers at WCTR.

Professor David Watling presented an invited keynote paper at the IMA International Conference on Mathematics in Transport, jointly authored with Dr Paul Timms on 'Visions and narrative modelling for long-term transport planning'. He gave two further papers at the International Symposium on Dynamic Traffic Assignment in Takayama and was re-appointed as Overseas Invited Member of the International Association of Traffic and Safety Sciences.

Dr Tony Whiteing organised the Logistics Research Network Annual Conference, which was hosted by ITS and held in Harrogate in September. He also edited the book of conference proceedings which is published by CILT.

ACADEMIC VISITORS

During 2010 ITS welcomed **Dr Gunnar Flötteröd**, École Polytechnique Fédérale de Lausanne, Switzerland and **Dr Jonathan Ward**, University of Limerick, Ireland both hosted by Dr R Liu; **Dr Bhargab Maitra,** IIT Kharagpur, India hosted by Professor M Wardman; **Tatsuya Nakamoto**, University of Tokyo, Japan hosted by Dr R Connors; **Amanda Stathopoulos**, University of Trieste, Italy hosted by Dr S Hess; **Timur Sharipov**, Eurasian National University, Kazakhstan hosted by Professor C Nash; **Dr Kairan Zhang**, Southwest Jiaotong University, China and **Dr Pietro Zito**, University of Palermo, Italy both hosted by Dr H Chen.

PHDS AWARDED

Six PhDs were awarded since last year's report: **Muhammad Adnan** 'Development of a combined activity scheduling model for tours'; **James Jackson** 'Appraising rural railways: Are they a special case?'; **Hamish Jamson** 'Motion cueing in driving simulators for research applications'; **Sabariah Jemali** 'Decision-making process for LRT schemes in Malaysia'; **Habib Pathan** 'Modelling travellers' choice of information sources and of mode'; **Fayyaz Qadir** ' Incorporating reliability into network modelling for policy analysis'.

RESEARCH STUDENTS

John Armstrong 'Incorporating human learning into route-choice models and investigating the effects'; **Erica Ballantyne** 'How is urban freight logistics affected by transport demand management measures and policies?'; **Zahara Batool** 'Aberrant driving behaviour and attitude towards road safety in Pakistan'; **Ofelia Betancor** 'Pricing externalities in air transport markets: A case study of Madrid Barjas airport'; **Anzir Boodoo** 'Walking as an integral part of sustainable transport policy'; **Simon Brown** 'Customer optimised integrated asset management'; **Kaushali Dave** 'Preference elicitation and preference uncertainty: an application to noise valuation'; **Rawia El Rashidy** 'Use of digital data and ICT systems to improve resilience of transport systems to future climate extremes'; **Fahmi Fahmi** 'Transportation planning model for highway management system by using decision support system to increase economic growth based on transport planning policy for infrastructure network'; **James Fox** 'Temporal transferability of mode-destination models'; **John Haith** 'Application of the theory of constraints to understanding the capacity use, performance and pricing of congested rail networks'; **Daryl Hibberd** 'In-vehicle systems - developing a multiple warnings strategy'; **Qian Fu** 'Integrated evaluation model for public transport within rail transit hub'; **Nurul Hidayati** 'Modelling the effects of the physical facilities 'school safety zones' on passenger car equivalent values on urban roads'; **Calvin Jephcote** 'Spatio-temporal correlative analysis of the health effects of urban air pollutants from traffic'; **Fatimah Kamal** 'What do single transport authorities change in developing countries?'; **Chris Kelsey** ' Green Logistics: Optimal freight networks for future transport considerations'; **Andrew Koh** 'Particle swarm optimisation for transport planning'; **Ben Kolosz** 'A measuring performance, standardisation and control for intelligent transport systems'; **Georgios Kountouriotis** 'Vision, Attention And Steering'; **Chao Lu** ' Automated planning in intelligent transport systems'; **Anthony Magee** 'Modelling passenger demand for rail services'; **Mojtaba Moharrer** 'Studying driver behaviour across countries and the effect on safety'; **Helen Muir** 'The influence of area and person deprivation on pedestrian casualties'; **Said Munir** 'An investigation into new trends in air pollutant concentration (particularly ozone and nitrogen oxides)'; **James Musgrave** 'An evaluation of the trans-theoretical model of change behaviour to increase the short term usage of public transport to venue-based music events by young adults' **John Nellthorp** 'Transport investment, pricing and use of resources'; **Ian Phillips** 'The future role of walking and cycling in a world of health inequality and resource scarcity. Understanding and modelling the impact on travel, lifestyle and policy'; **Rahman Pilvar** 'Development of a modelling framework for optimising the interaction between planned street works and the performance of transport networks'; **Shafiq-Ur M Rahman** 'Improved public bus transport in Dhaka City'; **Martin Rivas Perez** 'The dynamics of access: A study of social inclusion, job opportunities, travel mobilities and developing the Gateshead Metro Centre'; **Doh Kyoum Shin** 'Explanation of factors influencing cyclists' route choice using actual route data'; **Janos Szabo** 'Extreme value theory and air pollution'; **Evona Teh** 'Development of a workload estimator'; **Andrew Tomlinson** 'Inferring personal movement patterns using locational data captured from mobile devices for transportation data collection'; **Phillip Wheat** 'Application (and development of) cost modelling and efficiency methods to transport problems'; **Zhitao Xiong** 'Development of UoLDS with intelligent traffic environment'; **Noor Zaitun Yahaya** 'Temporal and spatial variations of ultra-fine particles in the urban environment'.

RESEARCH PROJECTS

BRIDGE - Building Relationships with the 'Invisible' in the Digital (Global) Economy
Grant holder: *Y Barnard*
Investigators: *F Hodgson, Y Barnard, N Merat, M Daly, A Horrobin, K Chorlton*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *May 2009 – February 2012*
Research Group: *SAFETY & TECHNOLOGY*
Collaborative partners: *Business School, University of Edinburgh; Product Design & Engineering Department, Middlesex University*

Abstract
The problem of how to meet the needs of consumers who are new to the digital economy and thus invisible to companies and designers is addressed. The project aims to understand the needs of digitally-excluded people, to search for common requirements across the globe, to define new segments large enough to be economically feasible, to reduce both social and economic barriers to inclusion and to develop a bridge between two points of view: that of the invisible non-user and that of the developer and supplier of digital products and services. BRIDGE brings together qualitative methods to get a deep understanding of the needs of potential users, and quantitative methods used to identify partially excluded groups from the consumer records of large suppliers in the global digital economy. ITS performs research into the acceptance of advanced driver support systems by both young and old, digitally-excluded users, and the acceptance by older people of mobile technologies supporting walking.

CityMobil
ITS Project Manager: *H Jamson*
Investigators: *H Muir, C Kelly, S Shepherd, G Marsden, A Gühnemann, N Merat*
Funded by: *European Commission*
Dates: *May 2006 - December 2011*
Research Group: *SAFETY & TECHNOLOGY*
URL: www.citymobil-project.eu/

Abstract
CityMobil is a major European research, development and demonstration project addressing automated transport systems in urban environments. The focus is on the real-life implementation and assessment of the benefits at three sites: the Personal Rapid Transport system at Heathrow's Terminal 5; the Cybernetic Transport System at Rome's new Fiera Exhibition Centre; and the Hybrid Transport System (guided bus/tramway system) in the city of Castellón. Delays in the construction of the three schemes has resulted in an extension of CityMobil until December 2011, however project work undertaken by ITS is effectively complete. It involved the construction of strategic (MARS) and microsimulation (DRACULA) models to assess the future impacts of new technologies in four European cities; the development and application of a framework to

evaluate automated transport systems; co-ordination of links between CityMobil and the Heathrow T5 PRT; and use the University of Leeds Driving Simulator to assess the human factors associated with transfer of control between manual and fully-automated driving.

EuroFOT
Grant holder: *O Carsten*
Investigator: *S Jamson*
Funded by: *European Commission*
Dates: *May 2008 – February 2012*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
The aims of the project are to analyse driver behaviour and acceptability, to analyse and assess the impact of Intelligent Vehicle Systems using real data and to improve awareness about the potential of intelligent transport systems and create socio economic acceptance. A key concept of EuroFOT is that the systems will be used by drivers in their own vehicles. EuroFOT is testing systems that are already in the market or sufficiently mature to represent a commercial application, such as lane departure warning and forward collision warning. The ITS contribution is particularly on experimental design and the specification of questionnaires. Data collection is currently underway and work has started on the analysis of the subjective data.

FOT-NET
Grant holder: *O Carsten*
Investigators: *Y Barnard, S Jamson, F Lai, K Chorlton*
Funded by: *European Commission, via ERTICO*
Dates: *June 2008 - December 2010*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
The FOT-Net project aims to gather European and international stakeholders in a strategic networking platform to present results of Field Operational Tests (FOT), to identify and discuss common working items and promote a common approach for FOT in the form of Field operational test support action (FESTA) methodology. The ITS role is particularly oriented to conducting seminars on FOT evaluation issues. A follow-up project (FOT-Net 2) has been funded starting in January 2011.

ITERATE – IT for Error Remediation And Trapping Emergencies
Grant holder: *F Lai*
Investigators: *O Carsten, F Lai, Y Barnard, N Merat, H Jamson, A Horrobin, M Daly*
Funded by: *European Commission*
Dates: *January 2009 - December 2011*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
The objective of ITERATE is to develop and validate a unified model of driver behaviour and driver interaction with innovative technologies in emergency situations. This model will be applicable to and validated for all the surface transport modes including cars, trains, and ships. Drivers' age, gender, experience, and personality traits are factors that will be considered together with influences from the environment and the vehicle. Culture differences across borders will also be investigated. The ITERATE model can be used to improve design and safety assessment of innovative technologies and make it possible to adapt these technologies to the abilities, needs, driving style and capacity of the individual driver. This provides a useful tool for system manufacturers as well as authorities to assess Intelligent Transport Systems. The project consists of two large sets of simulator experiments. The first set of experiments collected driver behavioural data across five countries (UK, Sweden, France, Italy, and Israel) via two identical driving simulators. The simulators were equipped with interchangeable control interfaces for car and train driving. Data analysis is currently underway. The results will be fed into next stages of the project – construction of a desktop-based simulation tool and validation.

LancashireISA
Grant holder: *F Lai*
Investigators: *F Lai, S Jamson, O Carsten*
Funded by: *Department for Transport*
Dates: *April 2009 – May 2011*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
This project carries out Field Operational Tests for an Intelligent Speed Adaptation (ISA) system in the UK. An innovative yet low-cost in-vehicle speed management system has been developed. The equipment involves an enhancement to standard satellite navigation systems to provide warnings, visually and auditorily, when drivers are speeding and when they are approaching historical accident spots. The system is installed in the vehicles of 422 drivers for a nine-month trial. Data is transmitted back to the server through the Global System for Mobile Communications network. The tests take place in Lancashire using a digital speed map covering Lancashire and the two adjacent Unitary Authorities of Blackburn-with-Darwen and Blackpool. The data collection phase of the project will be completed in March 2011, followed by analysis and dissemination.

Nomadic Devices
Grant holder: *S Jamson*
Investigators: *S Jamson, O Carsten*
Funded by: *European Commission*
Dates: *January 2010 - July 2010*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
This project studied the regulatory situation in the Member States on mounting and using nomadic devices in motor vehicles. Following definition and classification of nomadic devices as well as an introduction to regulatory options and rule compliance with regards to nomadic device-related legislation, the study undertook two surveys. The first survey focussed on gathering information on the regulatory and legislative situation in the 27 EU Member States (plus Iceland and Switzerland) looking at four different kinds of nomadic devices (mobile phones, personal navigation devices, music players, and TV/video players). The second survey aimed to establish how drivers interact with their nomadic devices, in terms of how often they use them whilst driving, how often they undertake some predefined high-risk behaviours and the effect of these on their driving behaviour. Alongside this, we were also interested in how drivers perceive the distraction caused by nomadic devices, their knowledge of national legislation and their perception of the likelihood of this legislation being enforced.

Transport Research Knowledge Centre (TRKC)
Grant holder: *N Merat*
Investigators: *B Menaz, D Stantchev, A Whiteing, P Timms*
Funded by: *European Commission*
Dates: *April 2007 – July 2010*
Research Group: *SAFETY & TECHNOLOGY*

Abstract
The current contract of the TRKC came to a close in October. TRKC is a follow-on project to EXTRA (1999-2001) and EXTR@Web (2002- 2006). The aim of the project is to promote and disseminate the results of transport research activities from the European Research Area to policy-makers, academics, industry and other relevant stakeholders. A web-based information portal available at www.transportresearch/info/web/index.cfm has been established to provide comprehensive information about ongoing and completed transport research programmes and projects, transport events as well as thematic analyses of transport research results and their policy implications.

Advances in Modelling Human Choice behaviour
Grant holder and Investigator: *S Hess*
Funded by: *Leverhulme Trust*
Dates: *October 2008 - December 2010*
Research Group: *MODELLING*

Abstract
Almost without exception, human activity can be decomposed into individual choices. The mathematical representation/modelling of such choices had been one of the most active topics of theoretical research in the field of economics over recent years. The contribution of choice modelling to wider science was recognised in the award of the Nobel Prize in Economics to Daniel McFadden in 2000 and to Daniel Kahneman in 2002. Choice models are used across many different disciplines, from small scale studies looking at students' choices of course modules, to industrial studies looking at the potential interest in new mobile phone handsets and to large scale cost benefit analyses looking at the economic, environmental and societal sustainability of new infrastructure developments. While there have been impressive advancements in modelling methodology, there are still major gaps between how individual people make decisions and how these decisions are represented in a mathematical

model. At the same time, there is a prevailing and growing gap between theory and practice, with many real-world applications relying on inferior methodology that can lead to biased results. Both the theoretical shortcomings and the slow uptake of advanced methodology are worrying. Indeed, with the increasing reliance on choice models to guide important decisions, it is crucial to guarantee the reliability of the modelling work as any bias can have significant financial, environmental and societal effects. The aim of this fellowship was therefore two-fold. On the theoretical side, the research supported by this grant has led to developments that have reconciled modelled choice behaviour with actual human behaviour, while on the applied side, numerous applications have been conducted to bridge the gap between theory and practice by making advanced methodology accessible for large scale real world studies.

Continuously updating predictive accident models using modern data sources
Grant Holder: *M Maher*
Investigator: *R Connors*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *September 2010 - August 2012*
Research Group: *MODELLING*

Abstract
Reliable models to predict accident frequencies are essential to design and maintain safe road networks and yet the models in current use are based on data collected 20 or 30 years ago. Given that the national personal injury accident total fell by some 30% in the last 30 years, while over the same period road traffic almost doubled, significant errors in scheme appraisal and evaluation based on the models in current use seem inevitable. However, outdated predictive models tend to be applied within various computer programmes, without the user having a full appreciation of their limitations. The project (which is collaborative with the University of Liverpool) will improve understanding of the limitations of currently available predictive accident models and how these can be overcome. The basic idea underlying this proposal is that, because modern databases now mean that access to accident, traffic and design data is much more straightforward, it is now possible to devise methods to update accident models to any point in time so that up-to-date predictions are always available. Up-to-date models would mean that the accidents associated with alternative design proposals could be more reliably predicted. It would also mean that EuroRAP type maps could be developed but showing true high risk locations (locations that have significantly more accidents than those predicted by the models given the nature of the site and the level of traffic flow) not just those that have potentially misleading high accident rates. Also safety improvement schemes implemented at high risk sites could be properly evaluated taking account of factors such as trend and regression-to-the-mean. Three updating strategies have been identified as potentially feasible and further options may be identified in the course of the research. These will be applied and compared and the preferred approach identified. The principal outputs will be a tool to allow predictive models to be updated to any point in time and guidance to practitioners on both the data and data management systems needed for their application.

Estimation of Travel Demand Models
Grant holder: *S Hess*
Investigators: *A Daly, R Connors, D Johnson, P Chintakayala, S Hess*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *February 2009 – October 2010*
Research Group: *MODELLING*

Abstract
Random utility models (RUM) are increasingly estimated on datasets in which multiple choices are observed for each respondent, a situation that arises most prominently in the case of stated choice data. The fact that the standard modelling methodology was developed for a cross-sectional context poses an important issue at a time when many applications rely on panel data. This research project has highlighted the issues that arise with these standard approaches and have numerous contributions to the state-of-the-art and the state-of-practice in the field.

GHG-TransPoRD
Reducing greenhouse-gas emissions of transport beyond 2020: linking R&D, transport policies and reduction targets.
Grant holder: *S Shepherd*.
Investigators: *P Timms, A Gühnemann, M Tight, A Jopson*
Funded by: *European Commission*
Dates: *October 2009 – December 2011*
Research Group: *MODELLING*
Collaborative Partners: *Fraunhofer-ISI (Co-ordinator), TRT, JRC, TML*

Abstract
The main objective of GhG-TransPoRD project is to support the EU in defining a feasible research and policy strategy for greenhouse gas (GHG) reductions of transport. The project aims to contribute to the development of a research strategy for the EU to reduce the GHG emissions of the different transport modes (road, rail, air and shipping) linking this research strategy with the available policy measures. The project began with an analysis of patents and assessment of R&D efforts in the transport sector along-side a review of potential GHG reductions to be had from technology and policy interventions until 2020 and 2050. These were presented at workshops in Paris and Brussels. Since then we have estimated CO2 abatement cost curves which will inform policy and technology packaging. Next steps will involve modelling the packages and presenting results to stakeholders and drawing the final conclusions and policy recommendations.

INTERCONNECT
Grant holder: *P Bonsall*
Investigators: *P Bonsall, B Matthews, P Abrantes, J Shires, B Menaz, B Lythgoe, M Page, D Johnson, R Batley, S Hess, A Whiteing*
Funded by: *European Commission*
Dates: *June 2009 - May 2011*
Collaborative partners: *TRI (UK), MKMetric (Germany), MCrit (Spain), TRT (Italy), Tetraplan (Denmark), University of Gdansk (Poland).*
Research Group: *MODELLING*

Abstract
This project addresses the potential for greater efficiency and reduced environmental impact of passenger transport by judicious encouragement of integration, co-operation and, where appropriate, competition in the provision of local connections to long distance travel. The project focuses on journeys which might benefit from more effective interconnection between different modes and services, and on those situations where effective interconnection is currently hampered by institutional barriers, lack of investment, or failure to innovate. By identifying examples of good practice, the project shows how these situations could benefit from a more enlightened approach. The study has included collation of literature and data on the nature of long distance travel in Europe; case studies on the role of rail connections, and of local transport connections to rail; a study on the potential impact of enhanced local connectivity to and between airports in central Scotland; and collation of material produced by ITS and its collaborators to create a 'toolkit' of interventions which show particular promise. The Scottish airports study included collection of new data on revealed and stated preferences while production of the 'toolkit' involved categorisation of solutions (identifying for example; new links, improved links, improvements at the interchange, integrated ticketing, information and marketing, and institutional or regulatory reform) and selection of relevant evaluation criteria. Outputs from the project are posted on the project website as they emerge: www.interconnect-project.eu/

Introducing lanes and lane changing in analytic dynamic modelling of congested road traffic
Grant holder: *M Carey*
Investigators: *D Watling, C Balijepalli, R Liu*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *October 2009 to March 2012*
Research group: *MODELLING*

Abstract
Modelling of road traffic and its variation over time (dynamics) on networks is needed for designing, evaluating, pricing and managing road traffic, and for proposed intelligent transport systems based on informatics, route guidance, and other traffic control measures. Models of traffic flows on road network can be conveniently divided into approximately two categories, namely microsimulation models and, what are often referred to as analytic models or macroscopic

models. The former models traffic as individual vehicles and the latter models it as flows. Both approaches have important advantages and some disadvantages. A remarkable difference between the two approaches is that, in microsimulation, the modelling of lanes and lane-changing behaviour plays a very important, indeed essential, role. In contrast, in the current state of the art for 'analytic' models, lanes and lane changing is largely ignored and each road is typically treated as having only a single lane in each direction. This contrast, or lack of realism in analytic models, is sufficient to explain why microsimulation models are increasingly widely used in practice in contrast to analytic models despite many theoretical and computational advances and advantages of the latter. The purpose of the proposed research is to facilitate and advance the introduction of lanes and lane-changing behaviour into analytic macroscopic models, to bring to these models the benefits and advantages that it brought to microsimulation models, while so far as possible retaining existing advantages of analytic models. One of the main reasons why traffic changes from one lane to another is to avoid congestion, queues or spill-backs in the other lanes; hence we will simultaneously model the formation and behaviour of such congestion, queues and spillbacks. We propose to develop these models (with lanes, lane-changing, congestion, queues and spillback) in two ways: firstly by reformulating each of various existing traffic link models used in dynamic traffic assignment, so as to include lanes and lane changing; and secondly by introducing lanes and lane changing into the usual continuous single-lane traffic flow theory. We also plan to develop solution algorithms in each of the resulting models, and to investigate and compare the various properties, advantages and disadvantages of each of the models and algorithms, and the implicit trade-offs they make between, for example, realism, simplicity and computational cost.

Longevity of SAFED Training
Grant holder and Investigator: *M Maher*
Funded by: *Department for Transport*
Dates: *September 2009 – December 2010*
Research Group: *MODELLING*

Abstract
The SAFED programme for HGV drivers training programme was launched in 2003 by the Department for Transport to improve safe and fuel efficient driving techniques among HGV drivers, with a view to increasing safer driving and reducing fuel usage and carbon emissions. The programme was extended to vans in January 2006. Previous studies have shown, on the day of training, an average fuel saving of around 10 percent. The primary objective of this study, carried out by AECOM with specialist input by Professor Maher, was to investigate the longevity of these impacts, and thereby produce a statistically robust estimate for the average changes in fuel efficiency and safety that can be expected over time following a driver receiving SAFED training. In the study, 240 drivers of HGVs and vans of various sizes, and from a variety of companies, were recruited to undergo the SAFED training programme, and to have their fuel consumption data recorded before training and for 12 months after training. Analysis of the data aimed to estimate not only the immediate impact on fuel consumption of the training, but also whether this diminishes over time, and whether there are differences between types of vehicle and the management culture within the company.

Noisy Optimization in Transport
Grant holder: *M Maher*
Investigators: *R Liu, D Ngoduy*
Funded by: *Leverhulme Trust*
Dates: *October 2009 - March 2011*
Research Group: *MODELLING*

Abstract
In transport, as with other areas, many complex, real-world systems are represented by simulation models. Such models offer the means to try out alternative policies or strategies and study and compare their effects prior to implementation in practice. Models have been developed and applied to a wide variety of problems, ranging from logistics, scheduling and timetabling to traffic flows through networks. Such models are frequently very large and complex, involving many decision variables. The search for the values of these decision variables that optimize some measure of system performance is therefore often a challenging task. The number of possible solutions is frequently huge and such a search will typically involve many thousands of evaluations of trial solutions. Given that each evaluation requires a (possibly lengthy) run of the simulation model, it is vital that the search is conducted in an efficient and systematic way so that the final solution is reliable and as close to the global optimum as possible. A variety of approaches have been adopted to tackle such complex combinatorial optimization problems. These include evolutionary algorithms, particle swarm optimization, simulated annealing, and many others. One recent addition is an approach known as the cross entropy method. Previous work at ITS has demonstrated the successful application of the method to the problem of the optimization of traffic signal settings in a network, using a detailed, but deterministic, traffic simulation model. The current research is investigating the application of the method to noisy problems – that is, where the simulation model used to evaluate the trial solutions is Monte Carlo in nature and consequently the outputs are subject to random error, or noise. Applications of the method have been made to various forms of network signal optimisation problem, and to the calibration of traffic models.

Plug In Vehicles Economics and Infrastructure Project (PiVEIP)
Grant holder: *P Bonsall*
Investigators: *P Bonsall, S Shepherd, S Shen, A Fowkes, D Johnson, A Whiteing, R Batley*
Funded by: *Energy Technologies Institute*
Dates: *March 2010 – June 2011*
Research Group: *MODELLING*
Collaborative Partners: *Arup, EoN*

Abstract
ITS is working with Arup and EON in Sub project 3 (Economics and Carbon Benefits) of a major project to predict the uptake of electric vehicles and to assess the implications for electricity consumption and overall emissions. Our work has included the development of a dynamic model to explore the impact of factors such as user familiarity on the uptake trajectory, the specification of a range of scenarios and sensitivity tests to be explored using a consumer response model developed elsewhere in the project, development of routines and algorithms to capture effects such as the dependence of continued supply of charge points on the existence of a viable business model, the impact of access to public charge points on recharge behaviour and the consequences of reduced use of petrol vehicles for government revenues. ITS is also responsible for a stream of work using optimization procedures developed in a previous project (Fowkes et al. 1998 Transportation Research A32 no 2 pp149-157) to identify 'optimal' policy packages (seeking to meet emissions reduction targets at minimum cost to the UK Government) in different scenarios (e.g. assuming different electricity generation mixes, different rates of growth in GDP and in automotive technology).

SHANTI (Harmonised travel surveys using new technology)
Grant holder: *P Bonsall*
Investigators: *P Bonsall, J Dargay*
Funded by: *European Science Foundation Cooperation in Science and Technology*
Dates: *2009 - 2012*
Research Group: *MODELLING*

Abstract
This is a networking project which aims to facilitate the production of state-of-the-art reviews and recommendations for action in respect of the use of new technologies to collect data on passenger and freight movements in Europe. Previous work (e.g. FP6 project KITE, the COST 355 project and the 2008 ISCTSC conference) has shown that existing mobility data from National Travel Surveys in different European countries is generally not harmonised or comparable. SHANTI will address the pre-requisites for harmonisation of data and will focus on the role of new technologies in the collection or capture of travel information. GPS-based technologies, including hand-held devices and those fitted to vehicles, will be studied in particular depth as will the use of new technologies as an aid to travel diaries and the scope for construction of databases from multiple and disparate sources. ITS co-represents the UK within SHANTI's management group and provides the chair for a working group on vehicle-based surveys.

The Effects of Park and Ride Parking Supply on Public Transport Demand
Grant Holder: *M Wardman*
Investigators: *J Shires, M Wardman*
Funded by: *TransportScotland*
Dates: *June 2010 - November 2010*
Research Group: *MODELLING*

Abstract
ITS was appointed by Transport Scotland to explore the relationships between parking availability and the wider impacts on demand. The study sought to fill a significant research gap, with the outputs intended to develop an overall framework to assess the opportunities for other park and ride sites (both rail and bus based). The primary objective of the study was to assess the impacts of changes in parking supply, quality and pricing on the demand for public transport and how this varies depending on location and passenger behaviour. Some of the other research aims included: (1) The investigation of how the availability and cost of parking at bus and rail park and ride sites affects public transport patronage and what alternatives are used in the absence of formal parking facilities; (2) To assess the extent to which park and ride can influence modal shift to public transport, and to quantify the wider impacts including emissions and congestion; (3) To assess the relative importance of factors which influence and drive the use of park and ride facilities (separately for rail and bus based sites); (4) To establish whether and to what extent park and ride leads to undesirable outcomes, for example, an increase in car usage as passengers who previously walked, or made a journey entirely by public transport drive to a site, or drive further to make use of parking facilities; (5) To develop metrics to inform guidance to appraise the impact on demand and revenue; and (6) to try and identify the optimum pricing policy to maximise rail station car parking revenue. The research has resulted in the estimation of the first demand model to directly take into account the impact of changes in parking supply, quality and price on rail demand.

Transeuropean Transport Network Planning Methodology
Grant holder: *R Liu*
Investigators: *A Koh, J Laird, A Pearman (Leeds University Business School)*
Funded by: *European Commission, Directorate General for Energy and Transport*
Dates: *August 2009 - March 2010*
Research Group: *MODELLING*

Abstract
In 2009 the EU/ DG TREN, adopted the Green Paper 'TEN-T: A policy review – towards a better integrated trans-European transport network at the service of the common transport policy'. Since the first drafting of the TEN-T guidelines in 1996 Europe is faced with new political, economical and environmental challenges. Against this background the purpose of the review was to set out new objectives for the future development of the TEN-T policy. ITS participated in a consortium, led by Transport Mobility Leuven, and provided the guidance on methodologies for the evaluation of individual projects with Cost Benefit Analysis.

TURBLOG WW
Grant holder: *P Timms*
Investigators: *P Timms, T Whiteing, D Quinn*
Funded by: *European Commission*
Dates: *October 2009 –September 2011*
Research Group: *MODELLING*
Coordinating Partner: *TIS.PT (Portugal)*
Collaborative partners: *NEA (Netherlands), INOVA+ (Portugal), BHTRANS (Brazil), PTL-UNI (Peru), TIS.BR (Brazil)*
Project website: *www.turblog.eu/*

Abstract
The main goals of this study are to: (1) provide an international network of experts and a platform for the exchange of ideas, information and policies concerning the field of urban logistics; (2) to promote cooperation among relevant international networks on urban logistics; (3) to produce nine case studies for an analysis of potential transferability (Paris, Utrecht (Netherlands), Santiago (Chile), Belo Horizonte (Brazil), Mexico City, New York, Tokyo, Beijing and Mumbai); (4) to compare different business concepts and models based on the selected case studies; (5) to hold four thematic workshops coupled with site visits (Lisbon, Lima, Paris and Belo Horizonte); and (6) to develop a guide with recommendations on issues to be considered when transferring the selected case-studies to national contexts. Project highlights in 2010 included: the production (by ITS) of Deliverable 1 'A worldwide overview on urban logistic interventions and data collection techniques'; the production of five accompanying Regional Reports (EU, Asia, Brazil, Spanish-speaking Latin America, and the Rest of the World); and the first two thematic workshops, in Lisbon (July) and Lima (October). Deliverable 1 and all workshop presentations are available from the project website.

Valuation of Local Environment Indicators
Grant holder: *M Wardman*
Investigators: *J Nellthorp, J Shires, P Chintakayala*
Funded by: *Department for the Environment, Food and Rural Affairs*
Dates: *December 2010 to March 2011*
Research Group: *MODELLING*
Collaborative partner: *Professor Abigail Bristow of Loughborough University*

Abstract
The aim of this study was to place monetary valuations on 12 local environmental indicators, ranging from graffiti, fly-tipping and discarded chewing gum through to access to quiet areas and light pollution. Stated Preference exercises were conducted in Manchester, Coventry and London covering inner-city, suburban and semi-rural locations and a sample size of nearly 600 was obtained. The valuations obtained of these factors, as experienced in individuals' own neighbourhoods, can be used to identify priorities for spending.

COST 358: Pedestrians' Quality Needs
Grant holder and Investigator: *M Tight*
Funded by: *European Commission*
Dates: *November 2006 - November 2010*
Research Group: *SUSTAINABLE TRANSPORT POLICY*

Abstract
The main objective of this project was networking and the development of high quality collaborative research proposals in the area of pedestrians' quality needs. The study focused on three perspectives: functionality of the pedestrian environment, perception of that environment by the users, and durability. The project aimed to provide an essential contribution to systems knowledge of pedestrians' quality needs, thus stimulating structural and functional interventions, policy making and regulation to support an improved pedestrian environment across the EU and other involved countries. The project involved experts from 26 countries in Europe and beyond. The project ended with a range of special presentations at the Walk21 conference in The Hague in November. The final report is available at: www.walkeurope.org

Local and Regional Climate Change Research
Grant holder and Investigator: *M Tight*
Funded by: *Department for Transport*
Dates: *February 2010 - March 2010*
Research Group: *SUSTAINABLE TRANSPORT POLICY*

Abstract
This project reviewed the level of response of local authority transport departments to climate change in the UK, in particular focussing on the tools they have available and are using for determining the level of impact of the transport activity in their areas on climate. The final report is now available at:
www.dft.gov.uk/pgr/regional/policy/climatechange/)

Maternal Mortality and Emergency Transport
Grant holder and Investigator: *F Hodgson*
Funded by: *UK Department for International Development*
Dates: *October 2009 - April 2010*
Research Group: *SUSTAINABLE TRANSPORT POLICY*
Collaborative Partners: *Aga Khan Health Services Kenya and International Forum for Rural Transport and Development.*

Abstract
On the role of transport in maternal mortality in Africa this project has contributed to the international development aspirations expressed in the Millennium Development Goals. A systematic review of the research has established that inadequate transport is currently estimated to contribute directly to 34%, and indirectly to 70% of all maternal deaths. The project has developed a network of practitioners and academics across the sectors of transport and health.

MIME (Market Based Impact Mitigation for the

Environment)
Grant holder: *M Tight*
Investigators: *A Gühnemann, C Kelly, H Harwatt, R Connors, L Chernyavska, J Nellthorp, S Grant-Muller, J Shires, M Wardman, D Watling, A Horrobin, M Tight, R Batley*
Funded by: *European Commission*
Dates: *August 2007 - December 2010*
Research Group: *SUSTAINABLE TRANSPORT POLICY*
Collaborative Partners: *SINTEF (Norway), QINETIQ (UK), Eurocontrol Experimental Centre, ENV-ISA (France), Technical University of Munich (Germany)*

Abstract
The MIME project was completed in December 2010 with a final seminar held in Brussels. Despite considerable technical improvements towards quieter aircraft, air traffic noise is still a major source of annoyance to many residents in Europe and a restricting factor for airport expansion and growth in the aviation sector. More than 600 airports worldwide and 200 in the European Union today operate some form of noise regulation, often in response to local concerns about airport capacity extension. Hence, against the background of expected further growth in the aviation sector, there is a need to develop cost-effective instruments for regulating noise annoyance at airports while maximising airport capacity. As has been shown in other industries there are conditions under which a market-based mechanism using transferable permits can be used to provide improved control over environmental impacts, and at the same time, allow efficient business operations. MIME aimed to discover whether, and how, such mechanisms can be used to improve environmental noise control in air transport, especially at airports that have limited capacity due to noise constraints.

Sustainability Performance Measures
Grant holder and Investigator: *G Marsden*
Funded by: *United States National Cooperative Highways Research Program (NCHRP)*
Dates: *September 2009 - September 2010*
Research Group: *SUSTAINABLE TRANSPORT POLICY*

Abstract
This project aimed to develop guidance for State Departments of Transportation (DOTs) and other transportation agencies to understand and apply concepts of sustainability through performance measurement to enhance their planning, operations, and decision-making. The study conducted a comprehensive survey of available literature, current state-of-the-practice, and detailed case studies to gain a deeper understanding of how sustainability should be addressed; defining a set of guiding principles of sustainability and sustainability goals relevant to transportation agencies' functions; developing a framework to address performance measures and outcomes at different levels, thereby creating an organised system for measuring the performance of transportation with respect to sustainability criteria; compiling the research findings in the form of a guidebook that would help transportation agencies incorporate performance measurement for sustainability. The project was coordinated by the Texas Transportation Institute and ITS provided advice on performance measurement framework development and contributed to the case study exercise with UK examples of how sustainability has been put into practice.

UK Transport Research Centre (UKTRC) Capacity Building
Grant holder: *G Marsden*
Funded by: *Department for Transport*
Dates: *September 2009 – August 2014*
Research Group: *SUSTAINABLE TRANSPORT POLICY*

Abstract
UKTRC was established in 2009 as a £7.25m research centre by the Economic and Social Research Council (ESRC), the Department for Transport and Government Scotland. The aim of the Centre is to support top flight social science research and to bring new insights and evidence to bear on the UK's transport policy issues. UKTRC is jointly operated by the University of Leeds, Imperial College London and University College London. A key element of the UKTRC mission is to develop a strong and sustainable inter-disciplinary research base. This involves both attracting new people and perspectives into the field but also providing opportunities to re-skill current researchers and practitioners in state-of-the-art techniques and, to provide opportunities for the broader social science community to learn from leading techniques within the field of transport research. This element of UKTRC is being led by Dr Marsden and includes a research studentship programme, an annual Summer School for research students and early career researchers, a research student network, training events and a visiting scholars programme. 2010 saw the award of five PhD scholarships and the launch of the successful Summer School programme. Forty participants attended from 15 disciplines across the social sciences making for a truly multi-disciplinary environment. Whilst the majority of delegates came from UK based institutions, delegates also came from Russia, Germany, Italy, Norway and Sweden. In all, 27 academic institutions were represented.

Understanding Walking and Cycling
Grant holder: *M Tight*
Investigators: *A Jopson, H Harwatt, F Hodgson, S Clark, H Muir, M Page, C Mullen, A Whiteing*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *October 2008 – September 2011*
Research Group: *SUSTAINABLE TRANSPORT POLICY*
Abstract
It is widely recognised that an increase in walking and cycling for short journeys in urban areas could significantly reduce traffic congestion, improve the quality of the urban environment, promote improved personal health, and contribute to a reduction in carbon emissions. This is demonstrated by a wide range of policy initiatives by national and local governments, by health authorities and a variety of non-governmental organisations. Recent reviews of research on travel behaviour have emphasised that the ways in which travel decisions are made remains poorly understood, especially in the context of complex and contingent household travel arrangements. This project seeks to fill this research gap through an in-depth analysis of household decision making with respect to short journeys in urban areas and has two key aims: to develop better understanding of the complex ways in which households and individuals make everyday travel decisions about short trips in urban areas; and to develop a 'toolkit' that helps planners, policy makers and others concerned with promoting more sustainable travel practices in urban areas to target policies and interventions more effectively. The research will adopt a mixed methodology, but with the main emphasis on in-depth qualitative research, and will examine individual, family and household decision making in four different neighbourhoods. Throughout the research the project will engage with a range of stakeholders and potential users, and in the final part of the project will engage potential users with the development of outputs.

Visions (of the role of walking and cycling) in 2030
Grant holder: *M Tight*
Investigators: *P Timms, D Ngoduy, M Lawler, D Watling, A Gühnemann*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *October 2008 – March 2012*
Research Group: *SUSTAINABLE TRANSPORT POLICY*

Abstract
This research seeks to examine ways in which more people might be encouraged to walk and cycle in the future, what steps are needed to support this potential increase and how to improve the experience for those who already use these modes. Walking and cycling can make a considerable contribution to sustainable transport goals, building healthier and more sociable communities and contributing to traffic reduction and lower carbon emissions. The amount of walking and cycling in Britain has declined over the long term and research suggests that there are major obstacles to prevent people from using these modes. There have been many national and local initiatives to promote walking and cycling, but without a long term vision and consistent strategy it is difficult to see how a significant change may be achieved. The time is now right to examine the means by which such a fundamental change both in the quantity of walking and cycling, and in the quality of the experience can be achieved, which goes well beyond continuation of existing trends. The work will involve a series of expert workshops to develop visions of alternative futures and also draw in various ways on the experiences of different user groups of the public to ensure that the visions developed are

grounded in real experiences. The workshops and other participation events will be used to establish trend breaking views of the future and the key attributes of future conditions which will generate these visions. We will undertake impact assessments to consider the likely costs and benefits of these visions and the potential effects on lifestyle. The work will develop and use innovative methodologies using visualisation software to help users understand how futures might appear, using modelling techniques which examine narrative and storylines to understand how different futures might be attained, and using a range of social research methods to explore how different futures might affect individual lifestyles and society. We will offer people a range of tools that enable them to construct their own versions of the future, and to weave their own stories in and out of expert visions, thus opening up the possibility of a richer and expanded public engagement with the visioning process. This permits a shift from the narrow focus of people's current day decision-making and behavioural and lifestyle choices to a greater focus on the process through which people make decisions and the contextual factors which inform how people choose to live their everyday lives. The value of this project, and the innovative methodologies it adopts, such as the new approach to modelling, is that in this way it opens up the possibilities of a greater understanding of how walking and cycling could change in the future.

Concessionary Fares
Grant holder: *J Toner*
Investigators: *J Shires, J Nellthorp, B Menaz, P Wheat, J Dargay, P Mackie, A Smith*
Funded by: *Department for Transport*
Dates: *October 2008 – August 2010*
Research Group: *ECONOMICS*

Abstract
Reimbursement of bus operators for concessionary travel has become increasingly important with the introduction of free local travel for older and disabled people in April 2006, and the extension to free national travel on all local bus services in England from April 2008. The aim of this project was to provide the Department for Transport with reliable, robust, evidence-based estimates of the assessment of the feasibility of, and the key elements of reimbursement, together with any evidence necessary to support a more deterministic approach to reimbursement. The research has covered a number of areas, including the shape of demand curves, fare- and service-level elasticities, passholder trip rates and additional marginal and capacity costs. The evidence was brought together to produce a unified approach to reimbursement. The full work is reported in book form as 'Concessionary Travel: The Research Papers' (Mackie and Toner).

DfT Cost Econometrics
Grant holder: *A Smith*
Investigators: *A Smith, P Wheat, N Balijepalli, C Nash*
Funded by: *Department for Transport*
Dates: *June 2009 - January 2010*
Research Group: *ECONOMICS*
Collaborative partner: *Steer Davies Gleave consultants.*

Abstract
In this project ITS conducted econometric cost modelling work using a new dataset of franchised passenger train operating company (TOC) costs in order to inform DfT's future forecasts of TOC costs, based on understanding the drivers of costs, and also relative efficiency.

Ex-post evaluation of cohesion policy interventions 2000-2006
Grant holder: *C Kelly*
Investigators: *C Kelly, J Laird, J Nellthorp, C Nash, P Mackie*
Funded by: *European Commission, Directorate General*
Dates: *2010 – 2011*
Research Group: *ECONOMICS*
Abstract: Ex-post study of ten EC cohesion policy-funded transport projects. Aside from undertaking the ex-post cost benefit analysis of the transport projects the study also considers the more philosophical questions associated with the role and utility of ex-post studies in general.

Green Logistics
Grant holder: *A Whiteing*
Investigators: *A Fowkes, S Shen, D Johnson, D Stantchev, A Koh, W Whiteing*
Funded by: *Engineering and Physical Sciences Research Council*
Dates: *June 2006 - October 2010*
Research Group: *ECONOMICS*
URL: *www.greenlogistics.org*

Abstract
This four year research project into the sustainability of logistics systems and supply chains was undertaken by a consortium of six UK universities supported and steered by a range of project partners including the DfT, TfL and CILT(UK). The main focus was on the use of freight transport within supply chains, and how this can be made more environmentally sustainable. The research was conducted as a set of interlinked work modules, investigating (inter alia) opportunities for modal shift, problems associated with logistics operations in urban areas, the environmental sustainability of reverse logistics, the sustainability of home delivery operations and opportunities for improved scheduling of road freight. Enhanced methodologies for research into sustainable logistics have been developed to assist in future policy formulation in this important field. Carbon reduction has been a major focus of the project. A key conclusion is that whilst carbon reduction targets in freight transport in the UK appear to be broadly achievable by 2050, these targets are likely to prove very challenging in practice.

Guest Researcher Programme
Grant holder: *A Smith*
Investigators: *P Wheat*
Funded by: *Swedish National Road and Transportation Institute*
Dates: *April 2009 – September 2010*
Research Group: *ECONOMICS*

Abstract
Andrew Smith and Phill Wheat are visiting researchers to KTH and VTI, Sweden. They presented work and developed collaborative research proposals and papers.

Implications of reducing public sector expenditure through higher prices and taxes in the transport sector
Grant holder: *G Marsden*
Investigators: *G Marsden, J Laird, P Mackie*
Funded by: *Commission for Integrated Transport*
Dates: *2009 - 2010*
Research Group: *ECONOMICS*

Abstract
This small think piece is concerned with the impact that the current recession will have on transport investment and the ability to continue to invest in transport by raising revenue through a change in transport prices or taxes.

Increasing Rail Capacity; review of the Network Modelling Framework
Grant holder: *R Batley*
Investigators: *R Batley, M Wardman, P Wheat, K Ropkins, P Goodman, O Carsten, A Fowkes, D Watling*
Funded by: *National Audit Office*
Dates: *August 2009 - January 2010*
Research Group: *ECONOMICS*

Abstract
This study was commissioned against the backdrop of DfT's commitment that overcrowding by 2014 should be no worse than in 2009, a commitment which involves a planned spend of £15.3 billion through taxpayer support, and £55 billion through rail industry service provision. ITS was engaged to the task of auditing a key planning tool - namely the 'Network Modelling Framework' (NMF) - used to appraise the benefits and costs of capacity enhancement schemes, within the context of DfT's combined plans or 'High Level Output Specification'. The remit of the audit was to identify the strengths and weaknesses of NMF, with particular reference to the model's forecasts of constrained and unconstrained demand, passenger revenue, and indirect costs and benefits of capacity enhancements. The audit was based upon documentation compiled by the model's developers, as well as an interview of a senior member of DfT's NMF Team.

National Secondary Road Network Needs Study
Grant holder: *J Laird*
Investigators: *J Laird, A Guehnemann, P Mackie, M Page, S Shen, M Maher*
Funded by: *National Road Administration, Ireland*
Dates: *2009 – 2011*
Research Group: *ECONOMICS*

Abstract
This very large study reviews the whole 2,600km of national secondary roads with the objective of identifying a future national secondary road network and an outline programme for its delivery. ITS is responsible for the development of the appraisal methodology, including the Multiple Criteria Analysis, and the survey and analysis of walking and cycling behaviour and valuations. RPS (Ireland) is the lead consultant.

On the Buses
Grant holders: *C Kelly and J Nellthorp*
Investigators: *C Kelly and J Nellthorp*
Funded by: *National Institute for Health Research*
Dates: *February 2010 – June 2012*
Research Group: *ECONOMICS*
Collaborative partner: *London School of Hygiene and Tropical Medicine*
URL: *www.lshtm.ac.uk/php/hsrp/buses/*

Abstract
In London, free bus and tram travel was introduced for 12-16 year olds in 2005, and for under-18 year olds in 2006. This policy could have a positive effect on the determinants of health and health equity, for example promoting well-being by increasing young people's access to opportunities in London. There could also be negative effects, however, such as reducing the amount of healthier 'active transport' (e.g. walking and cycling). Increasing the number of trips that young people take might also have knock-on effects for other groups, such as elderly people. Using a mixed method, quasi-experimental design, this study aims to provide empirical evidence for the impact of free bus travel on public health, and evaluate the economic costs and benefits.

Productivity in Transport Evaluation Study
Grant holder and investigator: *J Laird*
Funded by: *Department for Transport*
Dates: *2008 - 2010*
Research Group: *ECONOMICS*

Abstract
This study examined ex-post economic data for increases in total factor productivity as a result of a transport infrastructure investment. The study was led by the London School of Economics. James advised the study team on the implications for transport appraisal.

Regional and Local Economic Impacts of Rail Investments
Grant holder: *J Laird*
Investigators: *J Laird, C Nash*
Funded by: *Welsh Assembly*
Dates: *2009 to November 2010*
Research Group: *ECONOMICS*
Collaborative partners: *Mott MacDonald and Colin Buchanans.*

Abstract
This study reviewed the ex-post literature on the economic impacts of rail investment. As the literature in general and its relevance to Wales in particular is limited, a number of Welsh ex-post analyses on recent service changes and new lines, was undertaken.

Review of Bus Profitability in England
Grant holder: *J Toner*
Investigator: *A Smith*
Funded by: *Department for Transport*
Dates: *January 2010 – June 2010*
Research Group: *ECONOMICS*

Abstract
This project extended our work on bus cost modelling, seeking to establish evidence on scale effects, relative efficiency, technical change and parent company effects. We found there are mildly increasing returns to scale. This is in contrast to previous evidence, which suggested that, at the highest levels of passenger volume, there were diseconomies of scale. The industry is heavily skewed towards larger operators with 80% of traffic being carried by 20% of operators. Average costs have been trending up over time by about 2.3% in real terms, a little over half of which is due to lower efficiency. The policy implication is that, since increasing returns to scale prevail even for the largest operators, and there being no sign of diseconomies setting in, there are no reasons to break up large operators into smaller units. On the contrary, the data suggest bigger operators have lower average costs.

Review of Methodologies to Assess Transport's Impacts on the size of the Economy
Grant holder: *J Laird*
Investigators: *J Laird, P Mackie*
Funded by: *Northern Way*
Dates: *2010*
Research Group: *ECONOMICS*

Abstract
This review considered the contribution of recent empirical work on estimating gross value-added (GVA) impacts of transport schemes and how this relates to more traditional cost benefit analysis methods. The review focuses on the interface between CBA and GVA measures and recent empirical evidence on transport's contribution to productivity.

SITPRO Plus
Grant holder: *A Pearman (Leeds University Business School)*
Investigators: *B Matthews, F Hodgson, M Lawler, D Stantchev, B Menaz, H Chen*
Funded by: *European Commission Directorate General*
Dates: *October 2008 – September 2010*
Research Group: *ECONOMICS*
Collaborative partners: *ICCR, NESTIER and TIS*
URL: www.sitproplus.eu

Abstract
SITPRO Plus assessed the impacts of transport projects funded by the European Commission within the 5th and 6th Framework Programmes for Research and Technological Development. Its final aim was to use these findings to define new transport research policy objectives and to provide the European Commission with a methodology for impact assessment in the ongoing and future Framework Programmes. The project held its final workshop in September 2010 and was attended by a range of key European Commission research and policy officers.

SNCF
Grant holder: *D Johnson*
Investigators: *D Johnson, C Nash, B Menaz, A Koh*
Funded by: Societe Nationale des Chemins de fer Francais
Dates: *September 2009 – November 2010*
Research Group: *ECONOMICS*

Abstract
The aim of this project was to contribute to the understanding of the effects of introducing competition in rail passenger markets in France by means of a review of literature and experience, including actual experience of competition and past modelling exercises, and by fresh modelling of competition on one or two French routes using the PRAISE software tool.

Travel Time Savings Phase 1
Grant holder: *R Batley*
Investigators: *R Batley, G de Jong, A Fowkes*
Funded by: *Department for Transport*
Dates: *August 2009 – May 2010*
Research Group: *ECONOMICS*
Collaborative partners: *John Bates Services, Department of Transport at the Technical University of Denmark, via UKTRC*

Abstract
The DfT commissioned a team to scope a national value of travel time (VTT) and reliability study. Such a study would provide material to update WebTAG, which outlines the basis for the appraisal of transport schemes in the UK. A national update study would be a substantial piece of work, and would need to inform policy and appraisal for the next decade or more. The scoping study involved answering a number of key questions: (1) Should the core study be a repeat of the 1999 VTT study, so as to ensure comparability of results or should it make use of enhanced methods of data collection and analysis, at the very least ensuring that methods are consistent with current best practice as documented by the likes of WebTAG? Or should the core study seek to combine 1999 methods with current best practice? (2) While adhering to the general principle that VTT studies should be comparable across modes to ensure a level playing field, is it acceptable to extrapolate values derived from car journey data (as was the case in 1999) to other modes, or should each mode be separately investigated? (3) How should the study address various open questions such as the influence of group size, journey length and size of time saving on values of time savings for appraisal? (4) Should the VTT reliability benefits be considered separately from or in conjunction with VTT study? What insights can be drawn from national studies of VTTS/VTTR in other European countries? (5) Should further work be commissioned on the freight and logistics sector, and if so where would

the research effort best be directed? (6) Given our answers to the above, how should the main study be composed, and what are the anticipated budget, timescale and key risks?

University of Leeds Travel Survey
Grant Holder: *J Shires*
Investigator: *A Whiteing*
Funded by: *University of Leeds*
Dates: *April 2010 – June 2010*
Research Group: *ECONOMICS*

Abstract
This survey collected data on travel behaviour from University of Leeds' staff and students to assist with the University's travel planning and to enable the calculation of Scope 3 travel emissions in accordance with new local authority environmental planning controls. This involved looking at both commuting and business travel for staff and travel between term time and non-term residences for students.

Value for Money of Small Schemes
Grant holder: *C Kelly*
Investigators: *J Nellthorp, P Abrantes*
Funded by: *Department for Transport*
Dates: *September 2009 – December 2010*
Research Group: *ECONOMICS*

Abstract
This research was funded by the DfT, as part of work to improve the evidence base on the Value for Money of small transport improvement schemes (costing less than £5 million). It focused on the methodology and feasibility of determining a robust Benefit Cost Ratio calculation for these schemes and applied this methodology to existing local authority monitoring data. The methodology and case study results are presented on the project website: www.its.leeds.ac.uk/aoss

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