Transport Research Institute

Transport Research Institute

Edinburgh Napier University

Annual Report 2018

Informing decisions.
Shaping policy.

Our vision

"To be internationally recognised by academics, public policy makers, the transport industry and investors for the relevance, quality and rigour of our research in areas that contribute to a growing economy and more sustainable and healthy mobility."

Welcome

Transport Research Institute Annual Report 2018

2018 was another year of growth for the Transport Research Institute, further building its portfolio of projects, its public profile, its publications and its staff. We were very pleased to welcome as new members of staff Dr Grigorios Fountas, a new transport lecturer with a PhD from the University of Buffalo and considerable expertise already in the field of statistical analysis of road safety data; and Professor Adrian Davis, the UK's (and possibly the world's) first Professor of Transport and Health, who has particular expertise in road safety policy, public health policy as it relates to transport, and translational research. We bade farewell to our researcher Monika Grigorova, but welcomed new research staff Suzanne Meade and Niaz Ghavari, working respectively with Tom Rye and Grigorios Fountas. Meanwhile, Faqhrul Islam and Clare McTigue successfully defended their PhD theses on, respectively Ubiquitous Real Time Public Transport Information, and the Implementation of Local Transport Policy – we congratulate them and wish them every success in their future careers.

Our consultancy portfolio grew, with a place on the Transport Scotland Research Framework (via partners WSP), and more work for City of Edinburgh Council, analysing pedestrian-cyclist interaction at so-called "floating" bus stops where segregated cycleways pass behind the bus stop; and further assisting them with the roll-out of the City of Edinburgh Street Design Guidance, implementing a package of training for Council staff. In addition we carried out work for Sustrans, training their staff in aspects of the Equality Act that are relevant to the charity's work. Our work on driver eye-height standards, also for Transport Scotland but with a keen interest also shown by the UK Department for Transport, also continued.

In research, two EU Horizon 2020 projects continue, and two new ones were launched: Park4SUMP, on parking, led by Prof Tom Rye; and DIAMOND, on women and data in transport planning, led by Prof Wafaa Saleh. Both projects will run until 2021. We were also lucky enough to win a new project funded by the Rees Jeffreys Road Fund which will evaluate and test the use of "continental" zebra crossings (without zigzags and belisha beacons, but only signs and markings) in Scotland. Also very excitingly, TRI is part of a consortium on a new Innovate UK Autonomous Vehicle project which will test a self-driving bus on a route in the East of Scotland. TRI's role is to evaluate driver, passenger and non-user attitudes to the new vehicle and service.

We maintained TRI's profile with a large number of media appearances in the newspapers, on radio and television, but also with several successful events on topics such as health and transport; autonomous vehicles; and of course our now regular Electric Vehicle Event which attracted record numbers of participants. External recognition of our work also came in the form of a further award to Richard Llewellyn for his work on intelligent road studs; and invitations to Tom Rye and Jonathan Cowie to give evidence on the new Transport Bill to the Scottish Parliament's Rural Affairs, Economy and Connectivity Committee. Tom Rye was also a member of the Cross-Parliamentary Group on Walking, Cycling and Buses; and a national trustee of the pedestrians charity Living Streets.

All this activity is of course critical for TRI's research reputation, but it also feeds into keeping our key teaching offer, our highly successful MSc Transport Planning and Engineering programme (led by Jonathan Cowie, and one of the few in the world to be offered in distance learning format) up to date and industry relevant. TRI is about research and teaching and the two activities support each other closely.

We very much look forward to continuing on our success and working with you in 2019!

2018 **HIGHLIGHTS**

AWARDS

In recognition of his contribution to both the institution and the profession, **Richard Llewellyn** was appointed Fellow of the Chartered Institution of Highways and Transportation (FCIHT). This is the highest grade of membership awarded by the institution and is only given to those with proven ability who have made a significant contribution to their profession.

Richard's fellowship will reinforce the links between Edinburgh Napier University and this major professional institution and in turn will further contribute to the industrial and vocational focus of our transportation teaching and research activities.

Congratulations to **Suzanne Meade** who won the best paper prize at the Scottish Transport Applications and Research (STAR) conference held in Glasgow on Tuesday 22nd May 2018. Suzanne, formerly an Associate Director with RPS Consulting Engineers, is currently a research student at Edinburgh Napier University undertaking a research programme in 'Vulnerable Road User (VRU) Collision Involvement and the development of safety performance indicators' supervised by Dr. Kathryn Stewart and Prof. Mike Maher. Suzanne's winning paper was entitled 'Measurement of cycling risk and quantitative policy' and was presented in a session on Safer Places for All.

Well done to **Suzanne Meade** for winning the runner-up award in the School of Engineering and Built Environment's best PhD paper competition 2017/2018 in September for her paper 'Modelling Cycling Flow for the estimation of cycling risk at a meso urban spatial level.'

Suzanne also won the best paper award at the Civil Engineering Research in Ireland 2018 (CERI2018) which included a travel bursary for international conference attendance.

It was held jointly with the Irish Transport Research Network (ITRN2018) at University College Dublin on 29-30 August. The keynote speakers were Professor Ken Gavin from TU Delft, Professor Ahmed Elghazouli from Imperial College London, Professor Lizbeth Goodman from UCD, Dr. Sree Nanukuttan from QUB, Andrew McIntosh from Banah UK, Professor Laurence Gill from Trinity College Dublin, Dr Christine Buisson from the French Institute of Science and Technology for Transport, Development and Networks.

APPOINTMENTS

Richard Llewellyn was appointed to serve a 4-year term as a non-Councillor board member on the South East of Scotland Transport Partnership (SEStran) Board.

Richard went through a rigorous interview and selection process and was appointed following formal approval by the Scottish Government Transport Minister this summer.

In his role, Richard will attend the quarterly Partnership Board meetings in addition to various other specialist topic area committee meetings and forums as required. In conjunction with his fellow board members, he will oversee and help drive the direction of the organisation in the ever-changing transport landscape.

Richard's appointment will reinforce the links between Edinburgh Napier University and Scotland's main transport bodies, continuing the contribution of the Transport Research Institute to the national transport agenda.

MEDIA APPEARANCES

Prof Tom Rye was interviewed on the *BBC news* on the topic of whether Scottish businesses should be asked to pay extra tax to their local councils if they provide free car parking spaces to their staff or customers.

Prof Tariq Muneer's article 'Renewable energy and better batteries will power the rollout of electric cars' appeared in *The Scotsman*.

Prof Tom Rye appeared on the *BBC News, BBC Reporting Scotland* and had an article on ScotRail in *The Times* - Tom Rye commented on major changes to ScotRail timetables. Tom Rye welcomed the faster journey times and additional services but said the costs involved in improving the rail network were "huge".

Prof Adrian Davis' article 'No trade-off between accidents and keeping traffic moving is the zero sum game' was published in the *Scotsman* in November.

Prof Tom Rye was interviewed on *STV Scotland Tonight TV* on the merits of workplace parking levies in November.

Prof Adrian Davis' launch of new TRI plain language research archive appeared in *Transport Today* and *Transport Xtra* in November. Adrian Davis continued in his efforts to strengthen the links between transport and health.

TRI was part of a consortium on an INNOVATE UK project proposal on self-driving buses where our part of the application through EPSRC was successful. Research Assistant Lucy Downey and Dr Achille Fonzone will carry out the research work for this. Their role was to evaluate users' and non-users' attitudes and responses to the self-driving bus. Articles appeared in: *The Scotsman, The Courier, Business Green, Fleet Manager Online, Transport Engineer, TU Automotive, Professional Engineering, Energy Live News, Traffic Technology Today, Public Technology, Bus and Coach Buyer, Route One, Transport Business and Holyrood.*

EVENTS

Workshop on Autonomous Vehicles

In September, Prof Wafaa Saleh chaired a one-day workshop on autonomous vehicles, organised by Wafaa and Yvonne Lawrie. The workshop was attended by colleagues from a number of academic universities, road organisations and private sector organisations from the UK, Japan, and Sweden. Research topics included the impact of autonomous vehicles on the road network, society and on traffic control. Research and empirical investigations were shared and debated.

Also key to the seminar was Dr Akito Higatani, a visiting Post Doctoral Research Fellow from Hanshin Expressway, in Japan who was working with Prof Saleh. Dr Higatani contributed to both the organisation of the workshop and the debate on the impact of autonomous vehicles. He also welcomed a number of his colleagues from Hanshin Expressway to the workshop.

Transport Planning & Public Health Seminar

This half-day seminar, headed up by Prof Adrian Davis, took place in November at our Merchiston Campus. The Chief Medical Officer, Dr Catherine Calderwood, provided the opening address. Presenters addressed a number of topics in both the theory and practice of transport and health. Following the presentations, some discussion and debate was invited on what collaborative actions we might undertake in order for Scotland to move forward on road transport and health.

4th Annual Electric Vehicle Event

Prof Tariq Muneer and Yvonne Lawrie organised and hosted a successful Electric Vehicle Event which was held at Edinburgh Napier University's Craiglockhart Campus in October.

Michael Matheson MSP praised a university-hosted conference as an "excellent opportunity" to discuss progress towards phasing out the need for new petrol and diesel cars.

The Cabinet Secretary for Transport, Infrastructure and Connectivity delivered the keynote address at the Transport Research Institute's 4th Annual Electric Vehicle event.

Scores of delegates from universities, Transport Scotland, local authorities, energy companies, enterprise groups and other organisations attended the conference.

Mr Matheson told them the Scottish Government wanted to end the need for new petrol and diesel cars and vans by 2032 and the event was a good chance to discuss how they were working with partners to achieve this goal.

STAFF ACTIVITIES 2018

Professor Tom Rye is a member of the following: STAR Steering Group; Cross Party Group Cycling Walking and Buses; Invited Chair, OECD Workshop on Measuring Accessibility in Transport; Chair, Universities Transport Studies Group; Member K2 International Advisory Board; Chair of Jury, European Mobility Week Award, 2009; and member of jury for 2010 award.

Prof Tom Rye was invited to deliver a keynote address at the **Scotland Policy Conferences Keynote Seminar:** Next steps for transport in Scotland – infrastructure, decarbonisation and promoting economic growth which was held in November in Edinburgh.

It focussed on proposals to decarbonise Scotland's transport system and look ahead to the key issues for provision of transport infrastructure ahead of the expected publication of the draft National Transport Strategy in January 2019. In particular, the following areas were covered:

- Next steps for implementing Low Emission Zones;

- Increased investment low carbon transport including low emission vehicles;

- Key issues for the provision of major transport projects ahead of the expected publication of the draft National Transport Strategy.

Prof Tom Rye was invited to speak at the **Clean Air Summit** in Edinburgh in June.

Prof Tom Rye has been retained for 20 months by the **World Bank Transport Division** to support them as a special advisor on a project that is assisting two Turkish cities, Kocaeli and Izmir, with their Sustainable Urban Mobility Plans. He also ran workshops with national government officials on public transport regulation and sustainable transport.

Prof Tom Rye spoke at **Police Scotland's Tactical Options Working Group** about a possible project to improve enforcement of Highway Code 170, which gives pedestrians crossing a minor road junction priority over turning vehicular traffic.

Prof Tom Rye took part in the panel discussion and Q&A session at the **'Rail: North of the Border 2018 event'** in Glasgow in September. He made some points about the high cost of rail infrastructure and operations here compared to elsewhere in northern Europe.

Rail: North of the Border aims to bring together key figures from Scotland's rail sector to engage in discussion around the country's key priorities.

Prof Tom Rye was in Krakow for three days as a **visiting professor at Krakow Technical University** in October, as a guest of Dr Maciej Michnej, Vice Director of the Institute. Tom gave lectures to their Bachelors and Masters students, and met their staff to discuss possible research collaboration.

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Professor Wafaa Saleh was invited to visit the Department of Civil and Environmental Engineering at The Hong Kong Polytechnic University to discuss possible research collaborations and gave a presentation 'Pedestrian crossings at urban areas in the UK: are they safe?' As part of Wafaa's academic activity and interest in the Middle East, she was invited to visit Princess Nourah University (PNU) for girls in Riyadh and their newly established Faculty of Engineering for girls. She has taken a great interest in the faculty as it is a step forward towards engaging women in the public and academic life in Saudi Arabia. She was also invited as a keynote speaker at the International Traffic Safety Conference in Qatar and presented 'Identification, assessment and reduction on HGV crashes in Qatar'. The conference was organised by Qatar University and the Road Traffic Safety Committee in Qatar. Wafaa has been working with colleagues at TRI for the organisation of the 9th International Symposium on Travel Demand Management which will be hosted in Edinburgh in June 2019. She has recently concluded a project on 'Investigating pedestrian crossing behaviour to improve pedestrian accident rates and severities in the State of Qatar' with Lucy Downey. Wafaa is leading Edinburgh Napier's contribution in the DIAMOND project (EU Horizon 2020), which aims at exploiting technological advances and innovations, to (i) analyse real-world scenarios where these open issues exist, and (ii) take concrete action, to create a fair and inclusive transport system. Professor Saleh is continuing as EE on the MSC Transport Engineering Programmes at Leeds University and was invited as a PhD external examiner at Salford University on driver's behaviour at traffic signals and modelling of dilemma zones.

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Professor Tariq Muneer was invited as a keynote speaker at the four-day event on '2018 EU-China symposium on sustainable energy, energy efficiency and phase change energy storage technologies' held at University of Hull from 29th July to 1st August. The entire funding of this event was obtained from EPSRC, Innovate-UK and British Council. Professor Muneer's presentation covered the solar energy research work that his group has undertaken over the past two decades.

As Chairman of Solaris Board, Tariq Muneer delivered a keynote address to the Solaris International Conference in Chengdu, China on 30th-31st August. He spoke about solar energy and also presented work of his PhD students. The articles will be published in proceedings as well as a refereed journal.

The Solaris network was created at Edinburgh Napier University after consultation amongst members from Canada, Greece, Hong Kong, Israel, Spain, UK and USA. The Solaris conference network provides a platform for meetings for professionals researching into the areas of solar radiation and daylighting to meet solar energy conversion systems and efficient energy use in the built environment. The main aim of the conference was: presentation of state of the art in the solar energy and building energy research; to establish close contact amongst researchers for dissemination of their research outcomes; and to facilitate professional collaboration.

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Dr Achille Fonzone and Faqhrul Islam shared their research on URTPI with Transport for London. Over the last decade, Ubiquitous real-time passenger information (URTPI) has become popular among public transport passengers. The effectiveness of URTPI, and hence the value of the investments into the necessary systems, can be increased with a clear understanding of how URTPI influences passenger behaviour. However, understanding is still limited and fragmented. This study fills this gap by evaluating the impact of URTPI on bus passenger route choice which has been derived from the work of Faqhrul Islam, a PhD candidate at TRI. The research outcome will benefit transport planners and operators with regard to information provision and efficient demand management. As a part of TRI's continuous effort in contributing to sustainable urban transport, Faqhrul Islam and Achille Fonzone took part in a meeting with Transport for London on 2nd July 2018 to discuss the research aim and the practical implications of the results.

In November, Dr Achille Fonzone was interviewed about the Transport Scotland strategy on Connected and Autonomous Vehicles (CAV). At the CAV Scotland event at the end of October, the Scottish Government announced its ambition to be at the forefront of the CAV revolution. Transport Scotland is working with KPMG on the development of a CAV Strategy for Scotland, to be published in the first half of 2019.

During the interview, Dr Fonzone stressed that the deployment of CAV may lead to an increase of vehicle miles travelled and have a negative impact on congestion if automated cars will be used in the future in the same way the non-automated cars are used at the moment. Therefore he suggested that Scotland should invest not only on the development of the technology but also on the development of policies and services to induce shared ownership and shared ridership of CAV.

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Prof Adrian Davis commenced his post at the start of September 2018 on two days per week. With a firm footing in both transport planning and public health much of 2018 was spent developing networks and contacts across Scotland. A high point of this endeavour was the 'Transport Planning and Health Seminar: Towards a healthier transport system for Scotland', held on 22nd November. Chief Medical Officer, Catherine Calderwood, gave a Keynote speech, with an international perspective given by Marco Martuzzi from WHO Regional Office for Europe. The event was intended as a catalyst for collaboration and action. One of Adrian's passions is translational research and a match-funded grant from Paths for All helped kick-start this new free service which was launched at the November Seminar https://blogs.napier.ac.uk/tri/essential-evidence-scotland/. Early discussions have commenced with senior NHS staff ahead of the establishment of Public Health Scotland in December 2019 as to how to better integrate areas such as transport planning into the public health landscape in order to work more effectively with transport planners. This is a challenge, not least given the structural divide with public health's base in Health Boards rather than in local government. Reaching out to other academic groups, Adrian has a Visiting Professorial role with the Physical Activity and Health Research Centre at the University of Edinburgh. There he is pursuing funding opportunities for a study of travel mode exposure to air pollution and overall health effects.

Looking ahead, focusing on funding is a priority. Within TRI Adrian has initiated a Road Safety Interest Group and also one addressing cycling. This is with the expectation that ideas can be assisted and nurtured in a shared interests environment and where he can share his experience and enthusiasm with colleagues. Adrian is leading the development of a bid for a large-scale e-bike trial across Scotland in the NHS, working with Dr Richard Kyle, Head of Population & Public Health in the School of Health & Social Care. Within the University, links have also been developed with the Scottish Institute for Policing Research (SIPR) in the School of Applied Sciences and an exploratory study to understand Police Scotland approaches to the enforcement of 20mph speed limits will be published through SIPR. Several peer reviewed papers for TRI appeared in 2018. A series of publications is in draft or planned for 2019. A busy year lies ahead!

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Professor Christiane Bielefeldt
Christiane Bielefeldt retired from Edinburgh Napier University in early 2017 from the post of Professor for Strategic Transport Management. She is now a Professor Emeritus, and has since been re-employed part-time by Napier as an adviser for the evaluation in the H2020 project SUNRISE, which deals with mobility planning and implementation at urban district level through "neighbourhood mobility labs". Key research interests: sustainable transport; co-modal and intermodal transport; ICT in transport; urban and motorway traffic control.

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Richard Llewellyn's research work has focussed on his current PhD topic, 'The Influence of Illuminated Road Studs on Safe Driving Behaviour.' He undertook a major user survey through distribution of 11,000 postal questionnaires to residents of the Scottish Borders. The survey was designed to look at perception of safety on the road as a result of implementation of LED powered road studs at nine junctions on the route.

Another research project Richard is leading is a review of Driver Eye Height as part of an update of the Design Manual for Roads and Bridges. In this project, TRI is working as technical advisor to CH2M, in providing advice to their clients Transport Scotland and Highways England. Later in the year Richard will be undertaking on-road measurements which will be used to inform the update of this important technical standard.

Richard has continued to be an active member of the transportation teaching team at the university.

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Dr Jonathan Cowie
Jonathan Cowie is a lecturer in Transport Economics and programme leader of the MSc in Transport Planning and Engineering. He teaches modules on transport policy, freight transport, public transport and transport economics, and has considerable experience of teaching research methods. Jonathan's main research interests are in public transport supply side economics (regulation, competition, production economics), freight transport and research methodologies. He is author of the book 'The Economics of Transport' published by Routledge and joint editor of the 'Routledge Handbook of the Principles of Transport Economics' published in August 2017.

At the regional Logistics & Freight Forum in December the South East of Scotland Transport Partnership (SEStran), Edinburgh Napier University & ZEDIFY launched an e-cargo bike pilot for Edinburgh as part of an EU funded project that aims to research and develop sustainable urban logistic hubs, SURFLOGH.

Modern issues like increased online consumerism, with a 24-hour delivery promise, mean our cities are becoming more and more congested. Light Goods Vehicle (LGVs) are a significant contributor to congestion and emissions today in our cities. These crucial services are creating multiple, negative impacts on the liveability of our cities.

SEStran is working with Dr Jonathan Cowie. Jonathan comments: *"Through collaboration with operators like ZEDIFY we have the opportunity to carry out meaningful action research and thereby explore different commercial approaches to logistics in a crowded urban environment like Edinburgh. This should provide valuable insights into future approaches to sustainable city logistics."*

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Dr Grigorios Fountas joined TRI in August 2018 as a Research Lecturer. His research interests include statistical and econometric applications to various aspects of transportation planning and engineering, traffic safety, analysis of driving behaviour with naturalistic driving study and driving simulation data, emerging transportation technologies, and infrastructure asset management. Greg had a successful proposal in the Internal Research Funding Competition. Greg was also appointed as a Paper Review Co-ordinator in the Transportation Research Board (TRB) Standing Committee on Statistical Methods (ABJ80).

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Lucy Downey
Lucy has been working with Qatar University as part of a project funded by the Qatar National Research Fund. The research involved investigating pedestrian crossing behaviour at junctions and mid-block locations. The study design included a literature review, video recording, data extraction, statistical analysis and simulation modelling. The findings provided guidelines to improve existing simulation models. In addition, recommendations were made towards improving the crossing environment and reducing pedestrian casualty rates. Lucy also used the UK STAT19 contributory factors database to research social deprivation and pedestrian road casualty accidents at mid-block crossings and junctions.

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Dr Mark Taylor
Mark continues working on the dataBike project and is now working with Glasgow City Council to help them with developing their cycling infrastructure asset management processes. Mark is also developing new geospatial mapping techniques to assist in the collation and analysis of cycling infrastructure condition data. Dr Mark Taylor, Professor Chris Oliver (Physical Activity for Health Research Centre, PAHRC) and Jack Bayram (student at Edinburgh Napier University) presented research examining hand-arm vibration exposure symptoms whilst cycling. The results of the medical sympton survey and cycling vibration exposure measurements were presented at the 53rd UK conference on human responses to vibration in September. Mark also presented research findings at the 1st Annual Meeting of the Cycling Research Board conference in Amsterdam in November. He was also invited to give a keynote presentation at the Cycling Industries Europe Innovation Summit in Aviemore in November.

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Dr Zuansi Cai
Zuansi Cai is an Environmental Modeller with over ten years' research experience. He joined Edinburgh Napier University as a lecturer in 2016, after working as a Research Associate/Fellow for three multi-million pound RCUK and EU research projects at University of Sheffield and Queens' University Belfast. His research interests include groundwater risk assessment of fracking for shale gas, water resources and climate change. Currently, Zuansi is collaborating with research Prof Tariq Muneer in Renewable Energy and Electric Vehicles. His earlier research experience included solid waste technology, soil and groundwater remediation, flow and transport modelling as well as uncertainty quantification.

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Dr Nazan Kocak
Dr Nazan Kocak is a senior research fellow at TRI. Naz is a town planner with a PhD in road user charging; MSc in traffic planning and implementation; and a PGDip in Urban Design. Having worked in academia, consultancy and local government, Naz has 360 degree experience in development and execution of transport policies and strategies; transport and traffic modelling; scheme appraisal; public transport schemes; active travel (walking and cycling) planning and scheme design; and urban and street design in the light of the Scottish Government's Designing Streets policy.

Nazan is responsible for delivering Napier's contribution to the EU project Civitas Park4SUMP – parking as a game changer in urban mobility. Parking management is an important part of sustainable urban mobility planning (SUMP) but unfortunately, it is one the most underdeveloped segments. Most EU member states lack national level policy and guidance on parking. PARK4SUMP aims to change this, because good parking management has proved to be of utmost importance. It frees the public space, supports local businesses, reduces search travel, generates revenue, increases safety, supports urban planning and can make cities more attractive. The general concept is to take the very best parking management examples, contexts and expertise in Europe, learn and profit from these, and transfer them on a large scale and in the best way possible to new cities. Further information regarding the project and Napier's involvement can be found at https://park4sump.eu/ .

Prior to the Park4SUMP project, Nazan was responsible for delivering Napier's contribution to the EU project Civitas PROSPERITY which aims to enable and create a culture shift in government agencies and local authorities to support Sustainable Urban Mobility Plans (SUMPs). The project focuses on promoting and supporting a broad take-up of SUMPs especially in countries, regions and cities where the take-up is currently low. It aims to achieve this by providing mechanisms and tools for national and regional agencies to take a leading role in the development of SUMPs, and building professional capacity through peer-to-peer exchange programmes and tailor made training programmes on various aspects of SUMPs and/or innovative approaches in sustainable urban mobility. Further information regarding the project and Napier's involvement can be found at http://sump-network.eu/.

Prior to joining Napier, Nazan was one of the key officers who led the development of the Edinburgh Street Design Guidance and the detailed technical manual that supports it. Nazan continues to provide support for the City of Edinburgh Council on street design issues. In 2018, Nazan and Richard Llewellyn delivered introductory staff training workshops on some of the key issues dealt with in the Guidance.

Nazan took part in the Parliamentary Advisory Council for Transport Safety (PACTS) Conference in November 2018: Streets Safe for Walking as a panellist to share her experience in street design.

Nazan chaired a session on 'New developments in parking' at 2018 Polis Conference in Manchester and was invited to represent Park4SUMP at the Polis Annual Conference in Manchester in November 2018 to promote embedding parking control and management into cities' SUMPs.

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Dr Kathryn Stewart
Dr Kathryn Stewart is chair of the programme committee for the Scottish Transport Applications and Research (STAR) conference, she represents TRI on the City of Edinburgh Council Transport forum and is branch treasurer for the Scottish Branch of the IMA (Institution for Mathematics and it's applications).

Dr Kathryn Stewart presented research at the Cycling and Society Annual Symposium held at the Centre for Transport and Society, University of the West of England, Bristol, 6th -7th September 2018. This was the 15th Annual Cycling and Society Symposium and is of particular interest this year because it would also play host to the European Cyclists' Federation (ECF) Scientists for Cycling colloquium. The Cycling and Society symposium series was launched in 2004 at Lancaster University. The symposia are linked to the Cycling and Society Research Group whose members span many disciplines and approaches to the study of cycling. Since 2004 there have been annual Cycling and Society symposia around the UK.

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Dr Damian Stantchev
Dr Damian Stantchev continued in his role as external examiner and Member of the Complaints Commission for the 'Industrial Buying Behaviour' module at the University of Agder, Norway.

Damian continued to be a member of the International Editorial Board of the Yearbook of the University of National and World Economy (UNWE) in Bulgaria, a peer-reviewed compendium of selected publications. The UNWE is a leader among the higher educational institutions in Southeastern Europe in the fields of economics, management and administration, law and politics.

Damian continued to supervise a PhD student in the Business School who is conducting research in humanitarian logistics, jointly with Dr Miles Weaver and Prof Grant MacKerron from the Business School. In November 2017 he started supervising another PhD student in the Business School whose preliminary research topic is "Scalable framework creation for sustainable supply chain management and digital marketing within the context of future trends in retail".

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Yvonne Lawrie
Yvonne continues to provide administrative support to TRI's Director, staff, PhD students and visiting students and the School of Engineering and Built Environment. Yvonne organised the 4th Annual Electric Vehicle Event in October and is organising the 5th event to be held on Wednesday 9th October 2019. She assisted in the organisation of an Autonomous Vehicle seminar in September 2018 and is part of the organising committee for the TDM Symposium on 19th-21st June 2019. She co-ordinates the Advisory Board meetings and other seminars. She compiles TRI's Annual Reports, Newsletters and other marketing material. She manages TRI's blog and twitter account and deals with stakeholder engagement and general enquiries.

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STUDENTS PRESENTING PAPERS

Suzanne Meade presented her paper 'Modelling Cycling Flow for the estimation of cycling risk at a meso urban spatial level' at The 6th International Symposium of Transport Simulation and the 5th International Workshop on Traffic Data Collection and its Standardization, which was held in Matsuyama in Japan. This paper describes the use of recently developed open source transport modelling software and an open source bike routing application to assign realistic cycling flows to the network and validation against observed network link flows. The cyclist flows provide the 'exposure' variable to examine cyclist safety performance at macro and meso levels. The results highlighted the need for a local level mobility-based exposure metric to describe cyclist safety performance and the superior ability of local accident prediction models to describe safety performance of cyclists in urban contexts, where population based, and global models mask urban spatial patterns of safety performance. The paper will be published in the Transportation Research Procedia (TRPRO).

Augustus Ababio-Donkor's transport research study 'The Influence of Narcissism on Transport Mode Choice was presented at "The 15th International Conference on Travel Behaviour Research, 2018 (IATBR)" in July at Santa Barbara, California, USA. Narcissism describes a person's obsession with oneself and one's physical appearance. Much research work in consumer behaviour has found that this personality trait influences subjects' consumer behaviour. However, the link between this personality trait and travel behaviour is weak. This study bridges the gap by investigating the impact of narcissism on subject's transport mode choice behaviour. Augustus took part in a two-day workshop chaired by Dr Chandra Bhat to identify gaps in time use and travel research and translate these gaps into tangible research problem statements.

Ke Du attended the Annual conference of the International Association of Maritime Economists (IAME) – Sustainable Maritime, Port and Logistics Industry Growth in Emerging Economies' held in Mombasa, Kenya on 11th September 2018. Miss Ke Du presented her paper 'Green port strategies in developed and developing countries: The case of China'. The focus of her presentation was on the research results of green port strategy applications in China.

Suzanne Meade presented her research on cycling safety to the City of Edinburgh Council – Suzanne presented new PhD research on cycling safety to the City of Edinburgh Council as part of their Seminar Series. The seminar took place at the Urban Room on June 26th and was attended by cross disciplinary teams dealing with cycling and safety within the Council and Dr Kathryn Stewart and Dr Nazan Kocak from TRI.
The presentation was delivered by Suzanne Meade on her current research which uses open source data and modelling applications to provide cycling flow information, investigate cycling accident rates, explore Safety-in-numbers effect, visualise cycling flows and accident rates. The presentation concluded with a discussion on the practical application of this research for potential monitoring and strategic development of cycling policies and safety measures.

Suzanne Meade attended the Irish Transport Research Network (ITRN) Conference hosted by University College Dublin in August where she presented her research paper. The conference was organised by Civil Engineering Research Association of Ireland (CERAI) and Irish Transportation Research Network (ITRN).

Mohamed Jama Mohamed participated in and presented a research paper at the WCTR (World Conference in Transport Researches) Society's Special Interest Group SIG G2 "National and Regional Transport Planning and Policy" workshop at Vienna University of Technology.

Mohamed presented his paper entitled "UberPOOL Services – Approaches from Transport Operators and Policy makers in London". This was based on the findings from recent research that looked at impacts of ridesourcing services on public transport, and involved interviews with 30 transport policy makers, experts, operators and innovators.

Mohamed Jama Mohamed, undertook a two-week study visit to Stockholm, Sweden as part of the MISTRA SAMS programme led by KTH and VTI. In addition to learning about the progress of MISTRA SAMS programme and reviewing recent publications from the programme, Mohamed undertook follow up on his research data collected in 2017 in Sweden to understand if there had been any changes or updates to Stockholm's approach on managing and regulating ridesourcing services.

STAFF AND STUDENTS

Alan Rehfisch joined TRI in August as a part-time PhD student and will be studying social equity in transport in Scotland.

We were sorry to say goodby to research assistants Monika Grigorova who took up a post at Cambridge University and Clare McTigue who now works as a Travel Plan & Research Monitoring Officer at the City of Edinburgh Council.

ASSOCIATE RESEARCH FELLOWS

Kirsty Lewin joined TRI as an Associate Research Fellow. Until recently, Kirsty was working for the Scottish Government's Energy and Climate Change Directorate, where she focused on Climate Change plans, the Adaptation Programme, Climate Challenge Fund and Climate Justice Fund. She previously worked in the Transport Directorate and during that period worked closely with City of Edinburgh on its plans for congestion charging in the early 2000s. She is also a SUSTRANS UK Trustee, and member of the Centre for Climate Justice Advisory Group.

Professor Keith Dickinson
Prof Keith Dickinson continued as Emeritus Professor of Transportation at TRI. His student, Faqhrul Islam completed his PhD, a studying the Impact of Ubiquitous Real-time Passenger Information (URTPI) on travellers' choice, during the year.

Professor Mike Maher
Professor Mike Maher is a Professor Emeritus. He continues to be on the Editorial Advisory Board for Accident Analysis and Prevention. He is involved in two Aecom/Atkins projects for the DfT on (i) the impact of 20 mph speed limits and (ii) the effect on accidents of the recent increases in HGV speed limits, advising on statistical methodology. He is an honorary professor at University College London.

David Scotney
David Scotney (Associate Research Fellow) is a continuing board member of the Tayside and Central Scotland Regional Transport Partnership (Tactran) and a programme committee member for the STAR conference. He is undertaking research on mainly historical aspects of transport development and their potential lessons: during 2017 he continued work with colleagues in TRI on the differing specifications and costs of transport provision in various countries and collaborated with specialists from Russia on the development and utilisation of the formerly extensive narrow gauge networks in Russia and the USSR.

Professor Steve Stradling
Emeritus professor Steve Stradling continues to serve (since 2009) with the group of transport psychologists that comprise the Course Development Unit of the UK National Driver Offender Retraining Scheme (NDORS), reporting via UK Road Offender Education Ltd to the National Police Chiefs Council, designing and evaluating eight different divergence from prosecution courses for errant motorists in England and Wales. These courses have been attended by around 10 million drivers since 2010. Recent independent evaluation showed that the courses were more effective over a 3 year period than issuing fines and penalty points. Around 1.2 million UK motorists attended Speed Awareness Courses in 2018, including 100,000 on a new motorway awareness course for offences such as tailgating and middle-lane hogging and disobeying lane signals on smart motorways. From 2017 he acted as an expert advisor to Driver2020, a large-scale national evaluation of six different interventions aimed at improving safety in young and novice drivers commissioned by the Department of Transport through the DVSA and administered by the Transport Research Laboratory.

He continues as a judge on the annual Prince Michael International Road Safety Awards scheme.
The charity busking band for which he plays conga drums was given the Queen's Award for Voluntary Service in 2016. They have raised over half a million pounds for Cancer Research UK, playing in town centres, artisan markets, community centres and retirement homes.

David Hunter
David Hunter has been an Associate Research Fellow of TRI since June 2015 and is active in a number of voluntary, professional and statutory bodies including the Mobility and Access Committee for Scotland. During the year David has been pursuing a number of interests on accessible and inclusive travel, including forthcoming papers on the changing patterns of travel by disabled people and further work on trends in the use of dial-a-ride services in the UK. He helped facilitate TRI's seminar on 'Shared Spaces' in April 2017.

ADVISORY BOARD

We'd like to thank our dedicated Advisory Board members for their continued support throughout the year. Our Advisory Board comprises: Prof George Hazel (Chair), Prof Richard Allsop (Emeritus Professor of Transport Studies at UCL), Alex Macaulay (Partnership Director of SEStran), Dr Kit Mitchell (Emeritus member of TRB and member of CIHT), Martin Richards (Executive Chairman of MVA until his retirement), John Martin (Transport Consultant), Neil Paulley (Visiting Professor at the University of Surrey, retired), Prof Keith Dickinson (Higher Education Consultant & Academic Adviser), Dr Steve Cassidy (Managing Director, Viaqqio Ltd, part of the ESP Group), Neil Johnstone (SYSTRA), Kirsty Lewin (Sustrans UK Board Member), and Laurence Kenney (ChargePlace Scotland Programme Manager at Transport Scotland).

PROJECTS ACTIVE IN 2018

Projects that TRI researchers participated in during 2018 are listed below, with details of funding bodies and collaborating partners.

SUSTAINABLE ENERGY AND TRANSPORT

Prof Tom Rye (Project Lead), Dr Nazan Kocak, Dr Damian Stantchev:
PROSPERITY (EU Framework Programmes)
[September 2016 - 31/08/2019]

PROSPERITY is an Horizon 2020 project in the CIVITAS family of projects on sustainable urban mobility. It aims to enable and create a culture shift in government agencies and local authorities to support Sustainable Urban Mobility Plans (SUMPs). The project focuses on promoting and supporting a broad take-up of SUMPs especially in countries / regions and cities where the take up is so far so low. It aims to achieve this by providing mechanisms and tools for national / regional agencies to take a leading role in the development of SUMPs; and building professional capacity through peer-to-peer exchange programmes and tailor made training programmes on various aspects of SUMPs and/or innovative approaches in sustainable urban mobility. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690636.

Prof Tariq Muneer (Project Lead), Ian Hunt:
Enerwater
[1 Oct 2014 - 31 Oct 2018]

This project involves the research and development of novel systems to recover and re-distribute energy in food processing and manufacturing premises, especially where there are demands for refrigeration and heating on-site and localised. The project also aims to optimise the production of heated water as a process requirement for heating, cleaning or sterilisation, by re-cycling both the waste heat and treating the waste water stream, so that it may be recoverable and re-cycleable. The user industry attraction will be local energy recovery for useful purposes, including water supply streams. Treatment of water itself for recycling is an additional attraction reducing external energy, resource treatments and requirements. The proposed developments may be applied within an industrial complex that can provide source and "sink" needs, or interbusiness or community to other industrial or domestic premises. This approach therefore minimises the industrial consumption of energy and diverts it to other localised energy users, which could be a range of uses, such as aligned similar site or other local heat consuming processes or domestic or office localised heating needs.

MOBILITY MANAGEMENT AND TRAVEL PLANNING

Prof Wafaa Saleh (Project Lead), Augustus Ababio-Donkor:
DIAMOND (EU Horizon 2020 Project)
[1 Oct 2018 - 30 Sep 2021]

Current transport systems do not sufficiently take into account physical and social characteristics of women in the design of products and services, and in fostering women's employability in the industry. Technologies such as data mining and analytics, together with the use of elicitation techniques to gather and analyse information from different stakeholders, allow the generation of actionable knowledge for addressing gender-specific needs for transport decision-making, planning tools and methods. DIAMOND will exploit such technological advances and innovations, to (i) analyse real-world scenarios where these open issues exist, and (ii) take concrete action, to create a fair and inclusive transport system. DIAMOND's main goal is to turn data into actionable knowledge with notions of fairness, in order to progress towards an inclusive and efficient transport system. This objective will be achieved by the development of a methodology based on the collection and analysis of disaggregated data, including new sources, analytics and management techniques. Thus this allows to identify, design and evaluate specific measures for fulfilling the needs and expectations of women as users of different transport modes and as jobholders in the sector. The knowledge gathered in the data analysis will then be fed into a toolbox that will provide recommendations on how to achieve fair inclusiveness for women in each of the identified use-cases. Interdisciplinary analysis combining methods from social sciences and computer science will contribute to fairness of the model and its results (i.e. condition of being free from bias or injustice). To proof actionability, this project will make concrete advances in four real-world scenarios (use-cases) where inclusiveness is currently a central issue: 1.- railways and public multimodal transport, 2.- Vehicle Dynamics control towards autonomous driving, 3.- vehicle sharing and 4.- corporate social responsibility and employment.

Prof Tom Rye (Project Lead), Dr Nazan Kocak:
Park4SUMP (EU Horizon 2020 Project)
[1 Sep 2018 - 28 Feb 2022]

Parking management should be an important part of sustainable urban mobility planning (SUMP) but unfortunately, it is one the most underdeveloped segments. Most EU member states lack national level policy and guidance on parking. PARK4SUMP aims to change this, because good parking management has proved to be of utmost importance. It frees the public space, supports local businesses, reduces search travel, generates revenue, increases safety, supports urban planning and can make cities more attractive. The general

PROJECTS ACTIVE IN 2018 continued

concept is to take the very best parking management examples, contexts and expertise in Europe, learn and profit from these, and transfer them on a large scale and in the best way possible to new cities . This covers raising awareness and gaining acceptance among relevant stakeholders; building capacity, particularly among cities that have difficulty in picking up such policies; stimulating further innovation; and achieving wide roll-out and transferability. Park4SUMP will work on traffic and travel avoidance; it will support less car dependent lifestyles and put into practise innovations in planning and location policy. It will also optimise the use of existing infrastructure. Furthermore the modal shift towards more efficient modes like walking, cycling and public transport will be encouraged. Convincing arguments to incorporate parking management can be given : it has low costs, it pays for itself, it delivers money, it is easy to implement and to modify and it can be done in incremental steps. The main expected impact will be cities with strongly improved parking policies that are creatively used to improve the quality of life and business in cities and develop the cities in a more sustainable way. Park4SUMP aims to establish parking management as an essential part of SUMPS of its leading, follower and external follower cities. Park4SUMP will deliver behaviour change whilst generating revenue.

Dr Achille Fonzone (Project Lead), Prof Christiane Bielefeldt, Dr Damian Stantchev:
SUNRISE
[1 May 2017 - 30 Apr 2021]

SUNRISE will develop, implement, assess and facilitate learning about new, collaborative ways to address common mobility challenges at the neighbourhood level. Towards this aim, 6 cities will foster collaborative processes in specific neighbourhoods as "Neighbourhood Mobility Labs" with the explicit mandate to implement innovative solutions for and with their residents, businesses etc. SUNRISE rests on several pillars: A) Utilisation of neighbourhood-specific opportunities. B) Co-creation of solutions, i.e. through strategic civic-public alliances C) Socio-technical nature of solutions as combinations of services, social arrangements, rules, technologies or small infrastructures etc. D) New forms of synergies between bottom-up and top-down. All SUNRISE activities are structured along the following phases of the innovation chain: 1) Co-identification of mobility problems; 2) Co-planning / co-selection of solutions; 3) Co-implementation of solutions; 4) Co-evaluation; 5) Co-learning and uptake. The SUNRISE action neighbourhoods will use a blend of proven state-of-the-art online and face-to-face participation techniques and will establish longer-term collaborative forums. These will systematically involve citizens, businesses, NGOs, local authorities, academics etc. – always with a view to also involve under-empowered sections of the population like migrants, women, older and young people. Alongside the mobility benefits for the action neighbourhoods, the project will result in a suite of products – most prominently the SUNRISE Neighbourhood Mobility Pathfinder – which will be provided to European cities, their stakeholders and citizens through a powerful exchange process to inspire and inform change across Europe. This will include a group of 20 Take-Up neighbourhoods and various city networks in cooperation with CIVITAS.

ROAD SAFETY

Prof Wafaa Saleh (Project Lead), Lucy Downey:
Qatar Pedestrian Research (Qatar National Research Fund)
[1 April 2016 - 31 Mar 2018]

Investigating pedestrian crossing behaviour to improve pedestrian accident rates and severities in the State of Qatar The study aim is to investigate pedestrian crossing behaviour at high accident rate locations in urban areas in Doha by developing an in-depth understanding of pedestrians' interaction with each other and with motorised traffic. The investigation will model pedestrian crossing behaviour at 24 junctions and mid-block locations with different characteristics (e.g. road speeds, pedestrian volumes and traffic control measures). The study design includes a literature review, video recording and data extraction, statistical analysis and simulation modelling using VISWALK PTV software. It is anticipated that the findings will provide guidelines to improve existing simulation models. In addition, recommendations will be made towards policies to improve pedestrian safety and reduce accidents as well as improving the crossing environment for pedestrians.

Prof Tom Rye (Project Lead), Prof Adrian Davis, Lucy Downey
Continental Style Zebra Crossings (Rees Jeffreys Road Fund Project) [1 Dec 2018 - 30 Nov 2019]

TRI, in partnership with Transform Scotland, are conducting research to assess the feasibility of making continental-style zebra crossings legal on Scottish roads (Funded by RJRF). Zebra crossings without flashing amber Belisha Beacons or zig-zag markings are not legal on public roads in UK. In contrast, in continental Europe, zebras marked only by signs are standard. The research will consider continental-style zebra crossings impact on pedestrian safety, attitudes and experience. The study design includes literature review, observational studies, postal survey, key stakeholder consultations, analysis of the legal and policy framework and, finally, on-road tests involving installing two continental style zebra crossings on public roads in Scotland.

Prof Wafaa Saleh (Project Lead) **TABUK2 Identification, assessment & enhancement of accident date collection & analysis in KSA**
[1 Oct 2013 - 28 Feb 2018]

It has been estimated that the annual cost of traffic accidents in the Kingdom of Saudi Arabia (KSA) exceeds 6 billion US dollars, in addition to other social, health, and economic impacts, such as disability, rehabilitation, and unemployment due to traffic accident injuries. Tabuk city KSA, has a high accident rate. There are not many studies, if any, in Tabuk for the investigations and development of a framework for accident reduction. The main aim of this project is to propose a framework to study, assess and enhance accident data collection and analysis in KSA. A proposed framework for accident reduction by integrated processes will include risk identification, risk assessment and risk reduction processes. If implemented, the proposed framework will improve data collection processes and analysis and will identify the hot spot locations, along with accident severity.

PROJECTS ACTIVE IN 2018 continued

Prof Tom Rye (Project Lead), Dr Nazan Kocak, Dr Damian Stantchev:
PROSPERITY
[1 Sep 2016 - 31 Aug 2019]

The objectives of this project are as follows. The project will:
- Produce a culture shift in terms of environment for Sustainable Urban Mobility Plans (SUMPs) in member states and in the organisational culture of transport planning in city authorities.
- Get ministries and national agencies to play a national leading role on SUMPs, as in many member states these are the organisations from which cities take their main direction; where ministries are already playing this role, to support and strengthen their approach.
- To provide mechanisms and tools for ministries to take this lead role.
- Analyse clearly the problems of (lack of) take-up of SUMPs – to understand from cities themselves why they are not taken up and then to help cities to address these barriers.
- Get more cities to take up effective high quality SUMPs that are in line with EU SUMP guidelines – both directly through cities' involvement in the project and indirectly through more cities hearing about SUMPs in their country from the project.
- Ensure that these SUMPs contain and will lead to implementation of a broad range of innovative sustainable transport measures.
- Build cities' capacity to develop and implement SUMPs that genuinely reflect the spirit of the EU SUMP Guidelines, rather than being mandatory documents written to fulfil a requirement linked to major transport infrastructure documents.
- Deliver a measurable impact such that by the end of the project 250 cities in twelve member states will be implementing SUMPs, when they were not at the beginning of the project.

STREET DESIGN

Richard Llewellyn (Project Lead), Prof Tom Rye, Dr Nazan Kocak
City of Edinburgh Street Design Guidance [1 Mar 2017 - 31 Dec 2018]

- Provision of consultancy services and technical support to the City of Edinburgh Council in preparation of new Street Design Guidance for Edinburgh.

Dr Nazan Kocak (Project Lead), Richard Llewellyn
City of Edinburgh Street Design Training [1 Feb 2018 - 31 Jan 2019]

- Organising and providing training courses on street design for CEC staff.

ACTIVE TRAVEL

Dr Mark Taylor:
Intellibike: A novel approach to engineering condition assessment of cycling infrastructure.

The UK National Cycle Network comprises 23,660 km of cycling and walking paths of which a significant percentage is dedicated off-road infrastructure. This represents a significant civil engineering infrastructure asset that currently contributes to the provision of a sustainable transport mode option nationwide. Commuting and recreational cyclists have observed the often hazardous conditions on these paths. There are various simple measures that could be taken to improve the maintenance of such off-road paths. Reliance on walk-over surveys (direct visual inspection) and path users notifying the local authority may not be tackling maintenance in a resource efficient manner. The proposed inspection method includes the use of an instrumented bicycle to examine cycle path condition through user perception of satisfaction and quality. A questionnaire was conducted to identify the attributes of off-road cycling infrastructure people find most important in relation to their personal satisfaction. An exploratory factor analysis was undertaken on perception study data to elucidate the determination of the variables associated with perceived user satisfaction. The study has shown that people find maintenance issues to be of high importance, especially surface issues. The results were used to assist the creation of dedicated user perception based surface condition rating-scales. The Intellibike will be used to assist local authorities in the collection of cycling infrastructure asset management condition data and ensure more efficient use of maintenance resources.

MODELLING OF USERS' BEHAVIOUR

Neil Urquhart (Project Lead), Achille Fonzone, Simon Powers
Agent-Based Optimisation of Commuting and Travel
1 Sep 2017 - 31 Jul 2018

- This project is designed to support the ongoing School Of Computing / TRI research work into the use of Software Agents to model person-centered travel problems, such as commuting to/from places of work.

PROJECTS ACTIVE IN 2018 continued

MARITIME TRANSPORT, FREIGHT AND LOGISTICS

Norwegian Research Council, November 2015 to October 2019
Dr Yuhong Wang

The SeaConAZ project represents a holistic perspective on the supply chains of consumables produced in China destined for European retailers. The focus of the project is on exploring the potential of a system changing approach, where the point of cross-docking and consolidation of less-than full container consignments (LCL) into full container loads (FCL) for a single, or cluster of, retailing points is moved from Europe to China. The academic consortium for the SeaConAZ project comprises universities and research centres in Norway, Sweden, UK, The Netherlands and China.

Dr Jonathan Cowie (Project Lead)
Smart Urban Freight Logistics Hubs
[1 Jun 2017 - 31 Oct 2020]

All cities and regions face challenges related to freight flows entering and leaving central areas which negatively impact on air quality, noise, road safety, climate and the general attractiveness of the centre. SURFLOGH aims to examine, through action research, the role of strategically located urban freight centres in connecting long-distance freight transport to last mile distribution. The project will provide the partners with best practices regarding the development of urban freight hubs in cities, the successful introduction of zero-emission vehicles for last-mile transport and innovative strategies for cooperation in the logistics chain.

TRI is working in conjunction with SEStran in leading on the development of business models for urban freight hubs. Our business models will focus on the scalability and applicability of models for different locations and circumstances, and practical lessons and insights from our work package will be published via case studies. The prime pilot in Edinburgh, an e-cargo bike last mile delivery service, has been established for just under a year, and in conjunction with the business partner, research is on-going with regards to current issues and the potential business opportunities that the initiative presents.

ESSENTIAL EVIDENCE 4 SCOTLAND

At the Transport Planning and Public Health Seminar on Thursday 22nd November 2018 the Transport Research Institute commenced a fortnightly one-page plain-English set of summaries on aspects of transport planning from robust peer reviewed studies.

In the busy world of transport planning, access to peer reviewed evidence is both time consuming but also often impossible without a university library card! But even overcoming such hurdles, then finding the material is often problematic and time-consuming not least because of the searches required and also because academic language, the jargon, can provide yet another barrier. Knowledge translation services can, therefore, be a critically important way for practitioners to have access to the most robust and recent peer reviewed evidence at their fingertips.

The value of de-jargonised summaries of robust academic evidence being made available, particularly to those in transport planning service delivery and associated disciplines is, arguably, that it can help improve policy making and practice. Concise summaries addressing a range of sustainable and health promoting aspects of transport, from behaviour change to infrastructure interventions can also be of value to consultancies, advocacy groups, and public health practitioners working across Scotland.

The ultimate aim is to increase the use of robust evidence-based research in order to improve the health outcomes of local authority transport interventions. At least twenty one page summaries are being issued in the first 12 months. Over a longer period the ambition is to build a library of accessible summaries of peer reviewed evidence increasingly known of and used across Scotland.

The free series of Essential Evidence 4 Scotland is drafted by Adrian Davis, Professor of Transport & Health. This series is match-funded by Paths for All.

Smarter Choices, Smarter Places

Supporting Sustainable Travel

PHD STUDENT RESEARCH TOPICS IN 2018

PhD Student: Augustus Ababio-Donkor
Research Topic:
Applying behavioural economics in modelling and analysing the demand for public transport using MINDSPACE and Structural Equation Modelling

The demand for travel is derived from people's need for social and economic activity participation because this is necessary for human existence, the level of this activity participation measures the economic vibrancy and success of a city and mostly correlate the level of road traffic congestion. Meanwhile it is conventionally accepted that the most efficient and sustainable way of addressing the travel demand for activity participation is through the use of public transport. This has led to several transport related research, and subsequently, schemes to promote public transport patronage. Notwithstanding, traffic in major UK cities maintain an upward trend whilst public transport ridership is recording a decline. It still remains uncertain as to which factors are most important in influencing mode choice decisions.

Traditional travel demand models explained, travel choices based on the attributes of the travel modes available and the socio-economic characteristics of the decision maker. This method has been widely criticised for not taking into account for attitudinal, social and psychological factors which have been found to influence travel choices. This has led to the development of latent/hybrid choice models that account for the heterogeneity of decision makers by incorporating elements like comfort, safety, risk etc in the decision making process. However, recent studies in the field of cognitive psychology, behavioural economics and consumer behaviour suggest that consumer decision is largely influenced by a framework called "MINDSPACE" (mnemonic for Messenger, Incentive, Norm, Default, Salience, Priming, Affects, Commitment and Ego). it is therefore suggested that individual transport behaviour could be modelled and better explained using MINDSPACE.

This research aims to investigate the effect of MINDSPACE in travel decision making and build upon the extant travel choice models by incorporating elements of MINDSPACE as latent factors in calibrating a latent travel mode choice model using structural equation modelling.

PhD Student: Benjamin Afuye
Research Topic:
Investigation of operational and perceived characteristics of buses in Edinburgh.

Improved urban bus operational performance characteristics provide significant opportunities to generate a number of positive outcomes such as increased public transport modal shift, reduction of road traffic congestion and the emissions of greenhouse gases and local pollutants. Vehicle Speed-time profile factors are often complex, changes over time and some occurs in so many directions. This study is aimed at investigating the performance of buses in Edinburgh, utilising some readily available advanced technology. The driving cycle of typical buses in Edinburgh will be measured, analysed and assessed. The characteristics of the driving cycles of the different types of buses will be used to assess the operational performance of each type of studied bus. Then the perceived performance of each of these buses measured by the emotional and reported reaction of the users will also be analysed and compared. Finally, a detailed comparison and analysis of the two results will be performed to assess the operational and perceived quality of Edinburgh buses. The work is novel in a number of areas: a) the investigation and comparison of the driving cycle of different types of buses in Edinburgh b) the use of advanced technology to monitor and analyse passengers' responses to bus operations, and c) comparing operational characteristics of buses with perceived performances obtained and drawing conclusions on any links if applicable.

PhD Student: Emine Zehra Akgun
Research Topic:
Investigating how consolidation centres can reduce emissions and congestion caused by freight transport in urban areas.

Emine started at the Transport Research Institute in September 2015. Her main research interest includes sustainable urban freight transportation, consolidation centres and urban freight policies. Cities are the centres for various economic and social activities, such as living, working, leisure, production, travelling as well as shopping. Therefore, freight transportation to and from the urban areas becomes crucial to keep the cities alive. Freight is transported by motorized vehicles which causes much air pollution, noise nuisance, congestion and traffic accidents. Local authorities work for developing strategies in order to mitigate negative economic, societal and environmental impacts of urban freight transportation. Among various mitigation strategies Emine is interested in understanding how freight consolidation platforms can reduce the negative impacts caused by freight transport in urban areas and which local policies can contribute to the consolidation efforts for performing more sustainable operations in the urban freight.

PhD Student: Joseph Appiah
Research Topic:
Modelling and Simulation of traffic/driver behaviour.

This research aims to investigate driving behaviour and car following models and techniques as well as enhancing the collection of traffic flow and driver behaviour data. This area of research has attracted the attention of many leading transport researchers and continues to be a promising and motivating area of study with the current advancement of technology. The continuous urge by researchers to improve driver behaviour models and driver safety in car-following situations has led to different methods of data collection being adapted for different studies such as aerial observation of traffic flow by helicopter. For this study, a novel driver behaviour data collection systems called instrumented vehicle was introduced. A private vehicle was equipped with different elements of modern traffic measuring devices (i.e. long rangefinder radar sensors, video-audio monitoring systems (i.e. GPS based video VBOX), speed measuring systems (i.e. GPS based performance box and laptop) to collect real time sequence traffic data in Scotland, more especially the City of Edinburgh and the surrounding areas. The study focuses on using traffic data to develop a new car following model that replicates real driving behaviour and also to improve the calibration parameters of the existing car-following models that replicate real individual driving behaviour.

PHD STUDENT RESEARCH TOPICS IN 2018 continued

PhD Student: Ke Du
Research Topic:
Intermodal transport green port benchmarking application on Chinese ports

Ke joined TRI as a research student in February 2017. Since then she has been working on the green port strategies in China. Her study is focused on understand the gap between developed and developing countries in green port strategy application by analysis of ports in China. The study will also search the proper model to monetarize external environmental costs caused by different transport methods to find the best environmentally friendly modes of transportation in coastal cities. In the final stage, the proper strategy for Chinese green port management will be discussed under Chinese policy background.

Ke attended ENRICH conference 2017 in Dalian, STAR conference 2018 in Glasgow and presented a paper ('Green port strategies in developed and developing countries: the case of China') at IAME conference 2018 in Mombasa. This paper was also published in Bergqvist, R., Monios, J. (Eds). Green Ports; Inland and Seaside Sustainable Transportation Strategies. Elsevier: Cambridge, MA.

Full citation: Du, K., Monios, J., Wang, Y. (2019). Green port strategies in China. In: Bergqvist, R., Monios, J. (Eds). Green Ports; Inland and Seaside Sustainable Transportation Strategies. Elsevier: Cambridge, MA.

PhD Student: Sayed Mohammed Faruque
Research Topic:
Residential location choice in the era of Shared Autonomous (SAV) Vehicles with socio-economic perspectives: A Stated choice Analysis.

Over the last few decades the concept of Urban Mobility has changed in a multifaceted way. The introduction of Autonomous Vehicles is a relatively new feature that has a lot of potential in the near future. According to the Department of Transport, Autonomous Vehicles will give benefit to a wide range of people with significant environmental, economic and social benefit including improved social inclusion.

Sayed's research is to do with the usefulness and motivation of Autonomous Cars for journey experiences. While the theme, the objective of this research is to measure the value of travel time savings for different journey aspects by Autonomous Vehicle. When automated driving will be fully implemented, people's perception about time and space can be greatly modified which will further enhance the location and travel choice behaviour of people. This choice variation will be guided by the time dependent travel theory. Theoretically, Autonomous or Driverless cars are the new generation of cars where driving functions are fully or partially controlled without human contact. So these cars are computer controlled rather than human interaction but serving people with greater benefits to mobility.

Vehicle Automation is the spectrum of driver assistance technologies as specified by the Society of Automation Engineers (SEA) where the highest level refers to the complete hands/feet/drain off driving and can interact with the surroundings by seamless data sharing and intelligent decision making.

PhD Student: Suzanne Meade
Research Topic:
Vulnerable Road Users Safety Performance in Scotland

Vulnerable Road User (VRU) road safety performance has lagged behind the improvements achieved for motorised users despite having the same road safety targets for reduction across EU and UK. Scottish policy aspirations aim to increased mobility alongside commitments to improve road safety, which poses the question: Why has VRU road safety performance not improved in tandem with motorised modes over the past decade in Scotland?

The aim of the research is to investigate whether there is a VRU SiN effect in Scotland due to increased mobility and examine if there are wider spatial, demographic and policy differences affecting VRU safety performance.

Equity within the transport system for VRU is essential for those who do not have the choice or access to a private car due to deprivation, age, gender, disability, and location. The current method for gauging performance is the use of global number of fatalities per population and to a lesser extent fatalities expressed by kilometres travelled. It is hoped that this research will develop safety performance indicators at a local level, based on risk equity rather than aggregate global numbers of fatalities within a population.

PhD Student: Yusong Wang
Research Topic:
Balanced objectives of stakeholders decide the Free-Floating Bike Sharing Schemes' success

The bicycle, as an affordable, clean and sustainable means of short distance transportation, has for some time been promoted by many cities worldwide. Seen as a possible alternative for public transportation, Bike Sharing Schemes (BSSs) are currently operated or planned in around 2000 cities. However, schemes in China have in recent years experienced a fast rise and a sharp fall in private operated free-floating BSSs (FFBSSs). This raises issues over why such schemes are established, and why in many cases these fail very quickly.

This research therefore first probes the benefits FFBSSs' offer to the public and the transport 'problems' that these resolve. Then through stakeholder interviews and surveys, the research identifies the main issues behind the difficulties experienced by FFBSSs. What the results suggest is that whilst there are many stakeholders, such as private operators, investors, public sector institutions, and users who's own private interests can be identified to have a positive effect on the successful operation of FFBSSs, these bring with them a set of conflicting objectives between the stakeholders themselves, which ultimately lead to rapid FFBSS failure. These early findings suggest that the key to FFBSS success is in addressing or trading off these objectives. Research is therefore focusing on identifying (in successful FFBSS schemes) the mechanisms through which conflicting objectives are prioritize and balanced between the relevant stakeholders. From this, conclusions and recommendations of best practice will be made to improve FFBSS's operation and the possibility of its success and sustainability n other parts of the world.

PhD COMPLETIONS IN 2018

PhD students Aisling Doyle, Joseph Appiah and Shelly-Ann Julien graduated in June 2018. Their research topics are below:

Aisling Doyle: 'An investigation into the thermal characteristics in an electric car'.

Joseph Appiah: 'Modelling and Simulation of traffic/driver behaviour'.

Shelly-Ann Julien: 'International Trade Economics, firm/industry level evolutionary technical efficiency and productivity'.

PhD students Clare McTigue and Faqhrul Islam graduated in November 2018. Their research topics are below:

Clare McTigue: 'Identifying barriers to the implementation of bus policy at a local level in Great Britain using a decision support framework'.

Faqhrul Islam: 'Smarter urban mobility'.

ACADEMIC VISITORS IN 2018

Academic visitors who spent time at TRI during 2018 included:

▪ **Francesco Forlani** came over from Bologna, Spain for 6 months to continue his research on 'Transport and logistics' under Dr Achille Fonzone's direction.

▪ **Dr Piera Orofino** spent 3 months with us from Politecnico di Bari, Italy to study transportation with Dr Achille Fonzone as her mentor.

▪ **Akito Higatani** from the Traffic Research & Survey Group in Japan from July 2017 to March 2019 under Prof Wafaa Saleh's supervision.

"I'm Akito Higatani. I'm from Japan. I have been here as a visiting scholar since July 2017. I investigated the impact of AVs (Autonomous Vehicles) on traffic flow with Professor Wafaa. Specifically, I investigated the car flowing behaviour of AV and assessed the impact on Japanese motorway congestion using microsimulation model, VISSIM. I also investigated the impact of AV on intersection which is one of the main causes of local road congestion. Additionally, with a lot of help from TRI (especially thanks to Prof Rye, Dr Fonzone and Ms Lawrie), Prof Saleh and I held a workshop about AV and big data in September where we invited a lot of researchers and practitioners from Japan. Furthermore, I was allowed to attend some classes for post-graduate students at my request and also joined drinking parties with teachers and PhD students. I have only good memories because all of the people are very kind and helpful. It is a treasure of my life that I could work and share time with TRI people. Thank you very much."

▪ **Cyril Martin** joined us from EVIP, Paris Engineering School, France for 2 months. He was interested in environmental and transport topics and was supervised by Prof Tom Rye.
"I spent my three months internship at Napier University, Transport Research Institute. The mission aimed to test the hypothesis: There is no relationship between the amount and method of public consultation carried out and citizen satisfaction with their local and regional transport system. I had a lot of autonomy to conduct my study and it was really educational to learn how to manage my time and efforts on a project that is at the same time a short time project regarding research field and a long time project regarding what I already had done. However, when I needed advice, remark or feedback, I always found someone, usually my supervisor Tom Rye, to help and guide me. TRI provided me with a great environment to conduct my internship, thanks to the facilities, the professionals, the warming welcome and the ability to reach and get in touch with other professionals in Edinburgh. A city that is, to conclude, one of the brightest I know."

▪ **Vinicius Tischer** visited us from Brazilian University (Univali) from September 2018 to February 2019 under the supervision of Prof Tom Rye.

"Developing countries such as Brazil face several challenges in transportation and urban mobility, especially in reducing the economic, social and environmental impacts resulting from a mobility model based on individual and private modes. The exchange of knowledge is important to seek better solutions. The Transport Research Institute (TRI) at Edinburgh Napier University specialises in transport research, and in particular, in integrating aspects of sustainability. In this period of exchange, I have been improving a diagnostic-prognostic methodology for evaluating five main externalities of the transport system: traffic noise and air pollution, accidents, fuel consumption, and delay-time. With the help of the TRI staff and expertise from Professor Tom Rye and Dr Grigorios Fountas, new strategies have been implemented and important perspectives, cutting edge analysis tools and policies are being applied to research, and will yield promising results within the academic context, and above all, may influence implementation of improvements in the Brazilian transport system. In addition, the university has good facilities that help to focus on the work, the staff are very attentive, supportive and friendly. Also, the social events help the integration of the staff. In conclusion, it was a very enriching experience, overcoming challenges, improving skills and new friendships that I will miss."

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Since it was established in 1996, the Transport Research Institute (TRI) at Edinburgh Napier University has delivered high quality transport research, consultancy and knowledge transfer projects to a range of clients and funding bodies.

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Transport Research Institute Annual Report 2018
(Issued May 2019)

Transport Research Institute