INTRODUCTION

The Transport Systems Catapult (TSC) is the UK’s innovation centre for Intelligent Mobility; harnessing new technologies to improve the movement of people and goods around the world.

By applying business-led research and encouraging collaboration, the TSC helps transform great ideas into valuable products and services to compete in the global markets of tomorrow. The TSC focuses on mobility across and between all transport modes. Our three product led strategic initiatives are:

- Connected and Autonomous Transport
- New Mobility Services
- Open Data Platform for Transport

The two foundational programmes which enable the product led initiatives are:

- Academic Engagement
- SME Engagement

Mission of the Academic Engagement Programme

The vision of TSC’s academic engagement activities: Fostering relationships between academia and industry helps the UK be a world leader in Intelligent Mobility – to grow faster, create better products and services, and gain access to new markets.
ACADEMIC ENGAGEMENT PROGRAMME

The TSC launched its new Academic Engagement Strategy in November 2017. Academic engagement is the foundation for making the UK the world leader in Intelligent Mobility (IM). The Academic Engagement Strategy describes the TSC’s intention to engage with the whole UK academic base by reaching out to academics whose research relates or can be applied to transport innovation and undertaking more focused activity with universities whose research overlaps with our capabilities.

Membership of our Academic Network for IM is growing and is an ideal communication channel for academics to find out about relevant opportunities, funding calls and events that are of interest to them. At the same time, we have started to develop strategic partnerships with universities undertaking strong IM transport research.

Academics and institutions who engage with our network can benefit from:

- Summer Internship for students on projects connected to Connected and Autonomous Transport, New Mobility Services and Open Data Platform for Transport
- Placements – for university staff seeking support from the TSC to validate a proof of concept
- TSC guest lectures
- Catapult Researchers in Residence scheme, where academics can gain up to £50k funding to undertake a research project with one or more Catapults
- Award for the best IM student
- Networking events like our Transport Café – where you can build relationships with SMEs and influencers
- Industry-led Hackathons

We value the relationship we have developed with the UK knowledge base and look forward to working closely with them in the future.

Beata Szoboszlai, Head of Academic Engagement, Transport Systems Catapult
NEWS

Institute for Transport Technologies, IM and Cities in University of Nottingham

As part of the Deep Academic Alliance programme, the TSC is collaborating with the University of Nottingham to establish an Institute for Transport Technologies, IM and Cities. This new Institute will be a vehicle through with the IM community and SMEs can engage with the university, leveraging their innovations to solve the future challenges that span Transport, mobility and city domains. Bringing these disciplines together will enable IM community to get effective and fast access to the knowledge in the whole across the university and to its SME network as well which will help TSC expand its SME Engagement Programme.

As a part of the DAA, Nottingham are working with the TSC to develop a business case and set up an institute that covers Transport Technologies, Intelligent Mobility and Cities. In this new type of collaboration, the TSC are acting as quality assurance and a critical friend in this process, providing invaluable guidance to ensure our proposition is thoroughly considered and relevant to our stakeholder.

Vicki Ball, Research Strategy Manager at University of Nottingham

University of Leeds and Transport Systems Catapult announce alliance

The Transport Systems Catapult and University of Leeds have announced the signing of a ‘Deep Academic Alliance’ agreement which will support the development and implementation of innovative transport technologies in the UK. Deep Academic Alliances are key partnerships between universities, industry and the TSC that align transport related research and educational roadmaps with industry strategies. They aim to maximise the potential of local SME networks and create a strong group of universities who can lobby for funding for transport innovation and develop enabling capabilities with industry for the benefit of UK PLC.
NEWS
TSC academic engagement team member receives award for best technical paper at the ITS World Congress

TSC senior technologist Dr. Patrizia Franco who is part of our academic engagement team won the best technical paper for Europe at the ITS World Congress. The paper, entitled Multi-Modal Activity-Based Models to Support Flexible Demand Mobility Services is based on the agent-based simulation being developed as part our Mobility on Demand Laboratory Environment (MODLE) project. This model uses big-data (e.g. mobile network data) to find untapped demand for transport services and then to assess how attractive proposed services will be to different demographics. Its aim is to get closer to the right service for a given situation before putting vehicles on the ground.

Dr Patrizia Franco
Best technical paper (Europe)
Winner
ITS World Congress 2017
Multi-Modal Activity-Based Models to Support Flexible Demand Mobility Services

Tackling the forecasted skills shortage through CAV-OP

The TSC is leading a UK based development of a Connected and Autonomous Vehicles Online Programme (CAV-OP). The CAV-OP has brought together academia, industry and government in the development of the programme content. Academics from the University of Nottingham, De Montfort University, Nottingham Trent University, Cranfield University and the University of Aberdeen are participating in the development of course materials. The Institution of Engineering and Technology, (IET) will host the course on their platform.

CAV-OP aims to tackle the forecasted skills shortage in Intelligent Mobility by increasing the quality and quantity of CAV related skills through theoretical and practical modules. This initiative is supported by CCAV (Centre for Connected and Autonomous Vehicles).
## EVENTS

### RECENT AND FORTHCOMING ACTIVITIES

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<th>Activity</th>
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<td>Blockchain Disruption in Transport Conference with University of Sheffield</td>
<td>22nd February 2018</td>
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<td>Event on Consolidating Public Sector Logistics Operations Conference with University of Southampton</td>
<td>23rd February 2018</td>
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<td>Transport Café: SME Support and Networking: International Trade</td>
<td>28th February 2018</td>
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<td>Launch the Internship Programme opportunities</td>
<td>March 2018</td>
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<td><strong>Application for the Researchers in Residence scheme. The TSC is creating applications for three opportunities:</strong></td>
<td><strong>Until 23rd March 2018</strong></td>
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<td>• Social/behavioural change research</td>
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<td>• Intelligent transport services in association with the High Value Manufacturing and Satellite Applications Catapults</td>
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<td>• Digital and data science complex systems in association with the Digital Catapult</td>
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<td>Institute for IM Industry Engagement Workshop at the University of Nottingham</td>
<td>18th April</td>
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<td>Workshop on Connected and Autonomous Vehicles from Social Science point of view with UCL</td>
<td>April 2018</td>
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<tr>
<td>Keynote Seminar: Developing the role of universities in regional innovation – developing clusters, supporting collaboration and responding to the new regulatory environment with Westminster Higher Education Forum</td>
<td>10th May 2018</td>
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EVENTS

The TSC engaged in and supported numerous activities over the past few months. The following details a few of the highlights from our programme:

IMPETUS concludes at launch of new transport research facility, September 2017
The three year programme of activities undertaken by the IMPETUS University Partnership Programme between the University of Nottingham, University of Leicester and TSC was showcased at an event in September. The showcase took place during the launch of University of Nottingham’s ‘Aerospace and Transport Technologies Research Priority Area’ which included an audience of colleagues and representatives from industry and other external industries.

CAV event with Aberdeen City Council, September 2017
The increasing emergence of Connected and Autonomous Vehicles (CAVs) as areas of research and testing has highlighted the need to better understand their potential implications for cities and local governments. This University of Aberdeen led event brought together experts from the TSC, Aberdeen City Council and DfT to provide insights into emerging issues and possibilities associated with their implementation and was successful in linking and bringing stakeholders together.

IoT Freight Logistics with Chartered Institute of Logistics in Edinburgh, September 2017
Organised in conjunction with the Chartered Institute of Logistics (CILT) and led by Heriot-Watt University, this event met its objective to spread knowledge and awareness of developing technologies that will alter the configuration of logistics and supply chains in coming decades. Speakers from a range of organisations from industry, academia, and the public sector gave their perspectives the trends, benefits and risks.

IMPART Intelligent Mobility Conferences, January 2018
IMPART, consisting of four universities De Montfort, Coventry and Nottingham Trent, led by Loughborough University, worked with the Transport Systems Catapult as part of its Universities Partnership Programme since 2015. The partnership increased academic-industry engagement. IMPART ran two outstanding well-attended IM conferences in 2016 and January 2018 which attracted over 500 delegates.

This has been a great collaboration between IMPART and the Transport Systems Catapult that has allowed us to build a new focus for Intelligent Mobility in the Midlands.

Prof Pete Thomas, Academic lead of IMPART
EVENTS

Academic Engagement Strategy Launch, November 2017

Around 90 academics, industry and other stakeholders attended the launch of our Academic Engagement Strategy at the TSC on 21st November 2017. The event covered the high-level framework for the Academic Engagement Programme.

Since the launch of our Academic Engagement strategy, membership of our academic network for IM has grown to 89 from 29 UK universities and we are continuing to encourage other academics to join.

Universities Transport Studies Group Conference 2018

On the 3rd January 2018 academics from UK universities gathered together for the 50th Universities Transport Studies Group Conference, at the University College London. The TSC presented three joint papers with the University of Nottingham and the University of Southampton which emanated from three placements: Dr. Bo Gao presented on the Traffic Control Testbed project, Dr Moe Mamouei presented an application of the external driver model developed under the LIFE project and Gregor Engelmann presented on mobile phone network data and telematics from his placement on the MODLE and Catch! project.
PLACEMENTS
Field trials help understand what makes pedestrian trust CAVs

It is crucial that pedestrians trust CAVs to be safe and reliable. To look into this important area, the TSC supported George Filip, a Nottingham University PhD student, as he undertook a three-month placement exploring pedestrian interactions with CAVs. George observed how pedestrians and other traffic participants interacted with the LUTZ Pathfinder automated pod during field trials in Milton Keynes. He also interviewed TSC staff to further explore the theme and took part in two Imagine Festivals.

Following his internship, George successfully applied for an Impact Grant from the Horizon CDT to further explore cyber security and transparency issues in CAVs. He then secured the role of Knowledge Transfer Manager for the Knowledge Transfer Network, where he is helping businesses innovate in the area of CAVs.

Pedestrian reaction to Autonomous Vehicles in VR

As autonomous vehicles begin to populate our roads, it is important to consider how pedestrians will behave around them. Stuart Mould, a University of Nottingham Master of Engineering student, decided to investigate how pedestrians react to autonomous vehicles using his two month placement at the TSC. Supervised by Professor Sarah Sharples (TSC non-executive director), he developed a project that focused on improving pedestrian safety by examining their interactions with autonomous vehicles. Stuart used the TSC’s virtual reality system, created by the visualisation team, to run his experiments in Nottingham.

Participant feedback provided data for Stuart’s Masters project and helped him gain a first class degree in 2017. He went on to secure a job with Romax Technology – a global leader in software and services for rotating and electric machinery.

Better understanding of the behaviour of traffic microsimulation models

Supervised by TSC Senior Technologist Richard Tusting, Dr Richard Mounce, Research Fellow, University of Aberdeen undertook a placement at the TSC to “Implement responsive signal control in VISSIM”.

Traffic signal control is an important tool in traffic management. In order for signal control to be used effectively it is imperative that the relationship between changes in signal control and day-to-day changes in travellers’ route choices is understood. Various strategies exist for responsive signal control as well as debate as to their effectiveness. Traffic modelling software provides a platform for these responsive signal control strategies to be tested. The result of Richard’s research was a better understanding of the behaviour of traffic microsimulation models (which VISSIM is an example of) when different responsive control strategies are employed.
University of Sheffield PhD students, John Charlton and Luis Montana Gonzalez, and undergraduate George Baron, combined a large-scale pedestrian simulation model developed using the University’s FLAME GPU with the Unreal Engine. They were able to further extend their simulation by collaborating with the TSC to produce a virtual reality implementation based on a 3D representation of the area around Milton Keynes train station.

Perhaps the most exciting opportunity is to consider large scale city sized virtual worlds populated by both traffic and people to provide a virtual test bed for coordinating future transport infrastructure. Such a technological vision might not be far away from becoming a reality, or at least a virtual reality.

Dr Paul Richmond, Research Fellow University of Sheffield

Validating an instrumented bicycle (iBike) system

Visiting Researcher at the University of Southampton, Shahjahan Miah embarked on his three month placement at the TSC in January 2018. He is working with the Modelling and Visualisation team and SME company Vivacity to validate an instrumented bicycle (iBike) system, which has been developed as part of his PhD research project, with the traffic monitoring system installed at Milton Keynes central railway station. This project aims to improve the positioning in the instrumented bike and accelerate the validation of sensors produced by Vivacity.
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OPPORTUNITIES FOR IM ACADEMICS

Sign up to become a member of our Academic Network for IM

Commencing in 2018, the new three-year Academic Engagement Network has been developed based on the TSC’s wider organisational strategy. It is designed to help participating universities gain recognition for international excellence in research fields that are relevant to our vision of IM. By establishing the Academic Network, which includes academics from former UPP partners and other UK universities, we will be working with academics in a number of different ways, always ensuring that we are quick to adapt to business needs.

For further information email us at: academia@ts.catapult.org.uk

Catapult Researchers in Residence scheme

The Catapult Researchers in Residence call offers academics up to £50,000 to engage with one or more Catapults for up to four years. The programme aims to help increase connections between the UK research base and the Catapults. Research Councils UK is supporting the development of new collaborations through research visits/residencies for university (and other eligible research organisations) academics to spend time embedded within the Catapult teams.

The TSC was successful in identifying researchers for its three opportunities: Intelligent Mobility and Artificial Intelligence; Cybersecurity in Intelligent Mobility and Modelling and Visualisation for Air Quality in Urban Settings which is in conjunction with the Future Cities Catapult.

Details of the winners will be announced by the Engineering and Physical Sciences Research Council shortly.

TSC is currently inviting applications for three more opportunities:

• Social/behavioural change research
• Intelligent transport services in association with the High Value Manufacturing and Satellite Applications Catapults
• Digital and data science complex systems in association with the Digital Catapult