



Annual Report 2022

How we've moved forwards in
pictures, words, facts and figures

TSU
TRANSPORT
STUDIES UNIT



“The war in Ukraine may well be the biggest driver of changes in transport across Europe in 2022-2023, plunging millions of households in a vicious combination of transport and energy poverty.”

Tim Schwanen, 2022



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Message from the director



For the TSU the past year has been one of expansion, diversification and preparation. Various researchers joined us to work on a range of topics, including traffic safety, vehicle insurance, and the mobilities of key workers and people with a disability. We have also had a record number of DPhil students starting their exciting research projects in October, and ran our first executive education course tailored to the needs of a large company. Our successful ‘infrastructure’ course was offered separately to a group of 15 enthusiastic employees of TransJakarta, which operates the world’s largest bus rapid transit (BRT) system in Indonesia’s capital.

2022 has been an important year from a transport perspective. With China as notable exception, traffic levels at local, national and international scales have seen limited effects of new or ongoing policies to reduce mobility’s contribution to COVID-19 infections. That is not to say though the world has returned to a pre-pandemic ‘normal’. Across advanced liberal democracies teleworking remains more common and business flights have not quite picked up as much as expected. Public transport ridership also continues to lag, threatening financial sustainability and the legitimacy of much-needed investments in upgrading and expansion of existing systems.

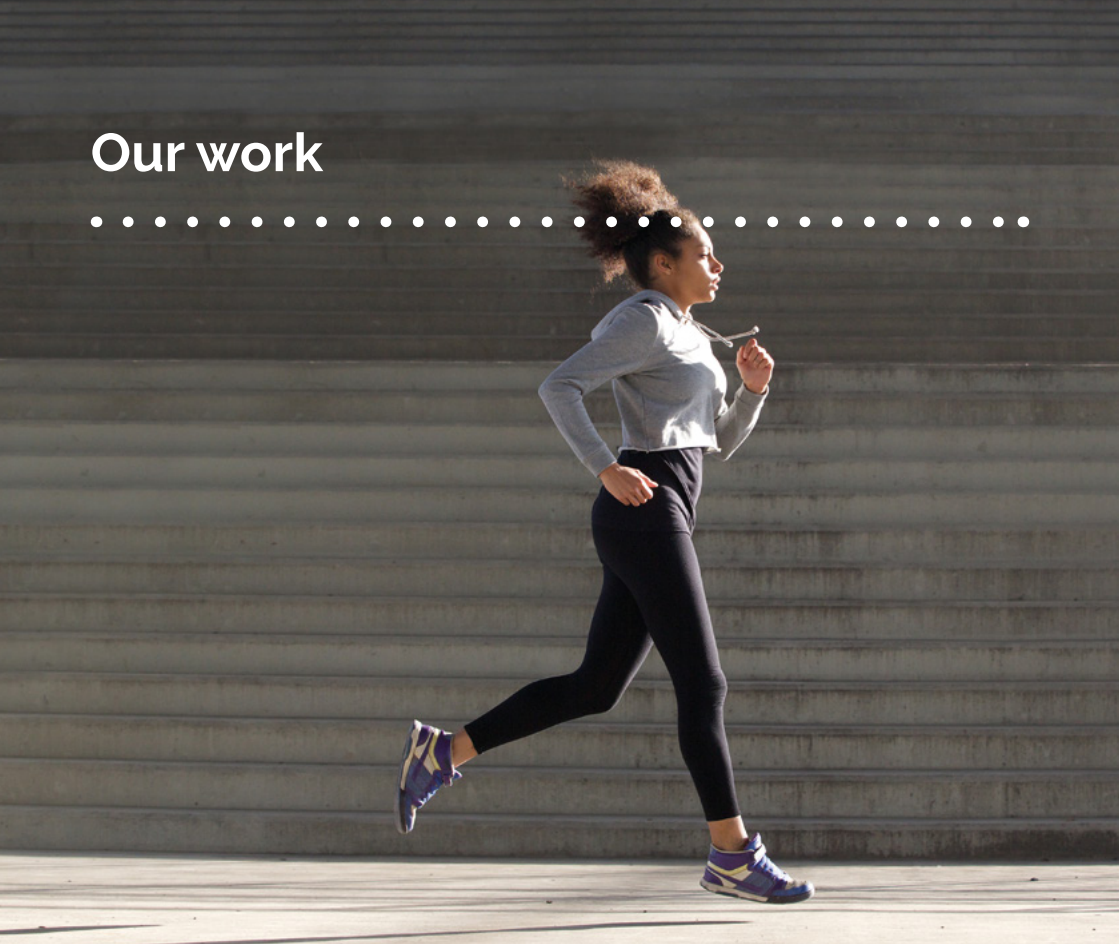
It is now also clear that the pandemic has not become the driver to put transport on a pathway towards genuine environmental sustainability and social justice. This is no doubt another squandered opportunity, in a year where the horrible floods in Pakistan showed how weather events exacerbated by climate change can wash away entire transport systems, amidst almost everything else, on a truly unprecedented scale.

Perhaps the biggest driver of change in transport in Western Europe has been the war in Ukraine, where rises in petrol and energy prices are intensifying transport, energy and indeed general poverty among millions of households. The implications on the mobility side remain to be documented, and will constitute a fertile area for research in the coming years.

Moving forwards, we have begun extensive preparations for the TSU’s 50th anniversary celebrations over the course of 2023. We look forward to reporting on these in our next Annual Report.

Professor Tim Schwanen, TSU Director

Our work



Reducing energy demand to achieve net zero

Christian Brand

One of the biggest oversights in the transport decarbonisation debate is the role of energy. Whilst electric vehicles (EVs) are responsible for considerably lower emissions over their lifetime than conventional vehicles, they still have climate impacts generated by the coal-intensive electricity used to power and manufacture them.

TSU researcher Christian Brand has been involved in research by the RCUK-funded Centre for Research into Energy Demand Solutions (CREDS) on the UK's net zero target. This work suggests that it will be difficult and expensive to meet the UK's net-zero target without measures to reduce demand for energy. In fact, reducing the UK's overall energy demand provides a necessary and major contribution to net-zero emissions by 2050 as part of a comprehensive climate plan, with many associated benefits that would improve quality of life for all.

For mobility, our research found that the scale of reduction required cannot be achieved with electric vehicles alone but requires a reduction in distance travelled delivered through car restraint policies, investment in public transport and active travel and a ban on the building of new roads. Full details were published in October 2021, which can be accessed via the CREDS project website: low-energy.creds.ac.uk/mobility/

Cutting energy use could:

- deliver around half of UK emissions' reduction by 2050;
- enhance quality of life, with significant co-benefits that align with other policy objectives (health, biodiversity, affordable warmth);
- reduce the risks and costs associated with relying on untested, undeveloped technical solutions in energy supply and engineered carbon dioxide removal (CDR, sometimes called geoengineering).

The RCUK-funded work was ground-breaking in looking across all sectors of the UK economy as well as at the interactions between them. It resulted in a seminal report on [Positive Low Energy Futures](#) and a high impact publication in [Nature Energy](#). The Foresight team of the UK Government Office has since funded further work on a Net Zero Society for Science that will continue into 2023.

Urban Development, Energy infrastructure and Sustainable MObility (UDESMO)

Tim Schwanen

The transition to electric mobility will have significant impacts on energy infrastructure systems, and urban development plays a crucial role in determining where the need may arise for electric vehicles (EVs) and their charging infrastructure. Yet to date, the interaction and dependency of energy infrastructure and urban development, alongside the impacts of EV policies, within different institutional contexts remain insufficiently explored.

In August, a workshop co-organised with colleagues at Cranfield University brought together scholars and policymakers from the UK and South Korea who work at the intersection of electric vehicles and energy in cities. The workshop celebrated research undertaken and presented by early career researchers, including our own Hannah Budnitz. The second day was centred on policymaking at both the national and local levels, with participation by policymakers from the Department for Business, Energy and Industrial Strategy (BEIS), Oxfordshire County Council and various Korean policy institutes and think tanks. The workshop allowed researchers and policymakers to network and learn from experiences across the UK and South Korea. A follow-up is scheduled for May 2023 in Seoul.

- Discover more at: www.tsu.ox.ac.uk/research/UDESMO



UDESMO workshop participants





Africa emobility week (photos by Utu etuktuk)



Workshop participants, Kenya

Everyday life & justice

Climate compatible growth for developing countries

James Dixon and Christian Brand

The Climate Compatible Growth (CCG) programme aims to contribute to the evidence base in low- and middle-income countries (LMICs) to help support low-carbon economic development whilst simultaneously unlocking profitable investment in green infrastructure, opening up new markets and supporting delivery of the Sustainable Development Goals (SDGs). Funded by the Foreign Office, the work spans more than six countries, including Ghana, India, Kenya, Laos, Vietnam and Zambia.

During March, inception workshops took place in Kenya and Zambia, bringing together key stakeholders from government, academia, NGOs and private companies across sectors including transport, electricity networks, renewable energy and climate finance. The purpose of the workshops was to co-create CCG's agenda for the year ahead, setting out a programme of demand-led research to address the countries' challenges in realising their commitments to the Paris Agreement.

The outcomes are now being put into action in CCG's Transport research plan. Alongside colleagues from the University of Nairobi, Strathmore University, the Association for Electric Mobility and Development in Africa (AEMDA) and Sustainable Transport Africa (STA), our work will develop integrated low-carbon transport-energy storylines for Kenya in trialling possible policy options against credible outcomes. This includes the development of a strategic transport-energy systems model – TEAM-Kenya – adapted from the TSU's original Transport Energy Air pollution Model (TEAM). Research is also being undertaken with colleagues in Zambia to develop an open-access transport-energy database for Zambia, which will feed into wider efforts supported by the German development agency (GIZ) on transparent transport data for LMICs in providing inputs for the development of Paris-compliant pathways for transport systems across the world.

The long-term aims of CCG are closely aligned with the aims of the COP26 Energy and Transport campaigns to accelerate the low-carbon transition. The programme and its partners will develop a range of open source tools, models, and datasets that will be global public goods available to all countries.

- Discover more at www.tsu.ox.ac.uk/research/ccg/

Measuring access to healthy living in Colombia

Juan Pablo Orjuela

Adequate access to health and well-being will be key in creating sustainable cities. Cities and communities are important enablers of a healthy lifestyle. They provide and maintain systems and structures that support health, promote healthy behaviours, and foster consciousness around the importance of health as an asset. A lack of access to a healthy lifestyle can impact on physical, mental and social well-being and increase risk of major illness. For people with very low incomes, access to healthy living is particularly challenging because of pre-established social inequities, from lack of affordability and social exclusion to land use policies that benefit higher-income neighbourhoods. So, how do we ensure our future cities are fair and sustainable in the healthy living opportunities

they provide? And what role do environmental, transport and land use policies play in this access?

Juan Pablo Orjuela has been working with a group of 40 low-income women from a peripheral settlement in Itagüí, in the Medellín metropolitan area of Colombia for three years. Their access to healthy living is often

severely constrained because their working conditions are inflexible, safety concerns limit public transport use and mobilities at night, and distances to shops selling healthy and affordable groceries, places to exercise, and healthcare facilities are too far. Together with the low-income women and Tim Schwanen, Juan Pablo is co-producing a tool to measure and define the main issues surrounding access to healthy living. The team aims to create a model of accessibility to healthy living that is sensitive to this local urban context, but that can also be applied to develop healthier, fairer cities elsewhere.

This research is part of the PEAK Urban programme, which aims to aid future decision-making on the development of urban cities.

● Discover more at www.peak-urban.org

Older adult's mobility

Léa Ravensbergen

The world's population is rapidly aging. Population projections estimate that seniors could make up one fifth of the population in the UK by 2030. Promoting the wellbeing of this growing ageing population is a pressing contemporary issue. A key factor relating to older adults' quality of life is their mobility. Not only is mobility a basic human need associated with independence, health, and wellbeing, but it is also important for older adults wishing to "age in place": to remain living in their homes or their communities with some level of independence, rather than in residential care. To successfully age in place, older adults need to remain mobile to stay active, to access desired people and places, to meet their daily needs, and to participate in social life.



During the summer, we began research to identify some of the ageist biases that exist in our cities' transport systems, using Oxford as a case study to explore older adults' mobility. By studying how older people meet their mobility of care needs – the travel needed to fulfil basic needs, such as travel to grocery stores, pharmacies, and doctor's appointments – we hope to make visible the work that is imposed on older generations moving through a world built for young and able-bodied people. We hope this work will help transport planners and researchers foster more age-friendly transport systems and cities.

New projects

Everyday life & justice

Inclusive transport infrastructure appraisal

Anna Plyushteva

Transport infrastructure projects are evaluated mostly for their contribution to 'the economy'; their impact on inclusion and inequality is rarely assessed. This project addresses this gap, building on intersectional feminist work in the social sciences to develop a set of tools for appraising the impact of transport research on disadvantaged groups, and identify opportunities for projects to become more inclusive.

The project is a collaboration between TSU, Jacobs, and Lancashire County Council, and is funded by the University of Oxford's ESRC Impact Acceleration Account until 2023. The new tools will be tested through the case study of Pennine Reach, a £40m rapid bus scheme connecting Blackburn, Darwen and Accrington in Lancashire.

- Discover more at www.tsu.ox.ac.uk/research/itia/

Energy, climate & environment / Health & wellbeing

Innovative Light ELEctric Vehicles for Active and Digital Travel (ELEVATE)

Christian Brand and Labib Azzouz

Micro-mobility is often introduced as a promising solution for accelerating the transition to sustainable transportation that fulfils social needs and minimises negative environmental impacts while generating economic benefits. ELEVATE's main aim is to explore the role and ways in which micro-mobility modes – such as e-bikes, e-scooters, and e-cargo bikes – help cut energy consumption and carbon emissions while promoting a healthy lifestyle.



ELEVATE is a 4-year project funded by the UK's EPSRC, which will engage with policymakers, transport professionals and the public in Oxford, Leeds, and Brighton. This exciting interdisciplinary collaboration between the universities of Oxford, Leeds, and Brighton will partner with researchers from TU Eindhoven and TU Dortmund, the World Health Organization, Sustrans, and local authorities in the three cities.

- Discover more at www.tsu.ox.ac.uk/research/elevate

Politics, power & governance

The Politics of Road transport InsuraNCE (PRINCE)

Johannes Kester and Zakiyya Adam

Road transport is witness to a range of innovations like electrification, automation, mobility-as-a-service, micro-mobility and shared forms of travel. Besides innovative companies, potential consumers and governments, motor vehicle insurance plays a key role behind these innovations. Car insurance companies not only need to adapt to these innovations as a business they are also in a position to influence the speed and direction of the adoption of these innovations (by refusing to insure risky endeavours, curtailing acceptable use cases, etc.). PRINCE aims to understand how insurers are adapting to and affecting these innovations in the United Kingdom, the Netherlands and Germany. This project is funded by the ESRC New Investigator grant until September 2023.

- Discover more at www.tsu.ox.ac.uk/research/prince/



Latest reports

Opportunities and obstacles for EV car sharing

Published 26 July 2022

Hannah Budnitz and CoMoUK

The transition to electric vehicles (EVs) is the flagship policy to decarbonise transport in the UK, but there is no one-size-fits-all approach to overcome the barriers to widespread EV adoption. EV car sharing provides a number of opportunities to enable more car drivers to adopt an EV sooner as well as reducing total car ownership and use. However, a lack of funding for accessible and reliable charging infrastructure is holding back the expansion of shared EV options.

Better access and integration with EV charging infrastructure can make EV car sharing more viable and able to meet social and environmental policy goals. This report sets out the potential demand for EV car sharing and recommends dedicated funding and policy support.

- Read the full report: www.tsu.ox.ac.uk/pubs/EV-Car-Share-Final.pdf

Preferences for public electric vehicle charging

Published 10 February 2022

Hannah Budnitz and Tim Schwanen

The majority of UK electric vehicle (EV) owners charge their vehicles at home on private driveways via cheaper domestic electricity tariffs. To encourage the mass adoption of EVs, and make uptake more inclusive, safe and attractive alternatives both on- and off-street need to be provided to those who cannot install or access private charging.

This report describes the preferences of those without private parking for public EV charging services in residential areas, and sets out key recommendations to policy makers and charge point suppliers and operators to support the planning of accessible public residential charging infrastructure.

- Read the full report: www.tsu.ox.ac.uk/pubs/final_PB2_ParknCharge-Feb2022.pdf

Charging when parking – a social change of routine

Published 10 February 2022

Hannah Budnitz and Tim Schwanen

Electric vehicle (EV) adoption involves more than a change in engine and power train, as EV owners adapt their parking routines to include charging. The benefits include eliminating separate journeys to refuel, engaging in other activities whilst charging, and taking advantage of lower energy costs. The ability to maximise these benefits depends upon the space and equipment at the EV driver's disposal, as well as their skills and social context.

This report explores how changes in parking routines to accommodate charging make EV ownership more or less attractive, with recommendations for complementary measures such as local EV champions and community forums to increase confidence in the use and the appeal of EV charging options.

- Read the full report: www.tsu.ox.ac.uk/pubs/final_PB3_ParknCharge-Feb2022.pdf

Digital reset: Redirecting technologies for the deep sustainability transformation

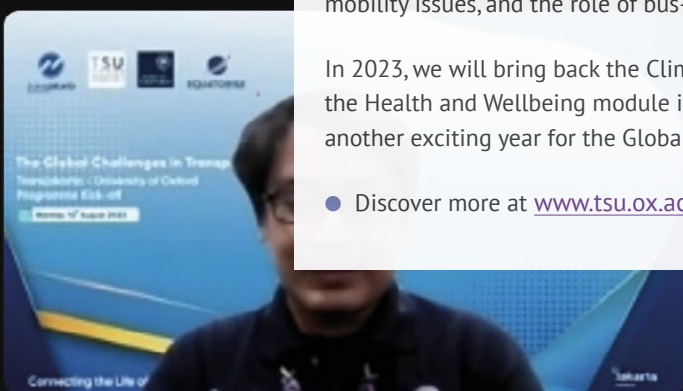
Published 30 September 2022

Tim Schwanen (contributing author)

New initiatives to govern digital technologies and media infrastructures mostly disregard the broader implications of digitalisation for environmental sustainability and social justice. A deep sustainability transformation is needed to fundamentally reorganise the economy and all its sectors, including transport.

This report provides a blueprint for the European Union on how to reconceptualise digitalisation so that it first and foremost contributes to achieving carbon neutrality, resource autonomy and economic resilience, while supporting equity and fully respecting citizen's rights and privacy. It is the outcome of a two-year international science-policy dialogue, **Digitalization for Sustainability (D4S)**, of which Tim Schwanen was one of the 15 expert panel members.

- Download via www.tsu.ox.ac.uk/news/220930-digital-reset.html



Executive leadership courses

Global Challenges in Transport explores Smart Technologies and Infrastructures

“ The course provided me with very useful frameworks and concepts to analyse and understand more in depth how sociotechnical transitions work in different contexts.”

Course participant

This year we ran two online executive leadership courses as part of the Global Challenges in Transport Programme, having some of the most exciting and diverse groups in our programme’s history. The move to online courses has provided an opportunity to connect with a wider audience from around the world and allows us to discuss in greater depth the challenges transport systems face in very different contexts.

In February and March 2022, we ran the Smart Technologies course where we had an exciting line-up of speakers from very different sectors including academics from all over the world, private sector leaders, and of course researchers from TSU sharing their exciting work. We explored the need for comprehensive thinking when considering technology adoption and transitions in transport systems as well as the intended and unintended consequence of new technologies.

Our second course, Infrastructures, took place in September and October. We discussed the role that civil society plays in the planning of new infrastructures for mobility, the political economy of transport infrastructure finance and investment, and we explored the social and economic impacts of various transport infrastructures around the globe. With guest speakers from Colombia, Costa Rica, Turkey, and the UK, the course offered ample perspectives that fostered a critical discussion of current transport systems. The course was also offered to a group of officials from TransJakarta, the company that operates the world’s longest bus rapid transit system, allowing us to critically consider Jakarta’s mobility issues, and the role of bus-based systems around the globe.

In 2023, we will bring back the Climate Change module in February and the Health and Wellbeing module in September, so it promises to be another exciting year for the Global Challenges in Transport Programme.

- Discover more at www.tsu.ox.ac.uk/course/

Highlights

Transport and the climate emergency

Christian Brand

Transport is one of the most challenging sectors to decarbonise because of its heavy fossil fuel use and reliance on carbon-intensive infrastructure, such as roads, airports and the vehicles themselves, and the way it embeds car-dependent lifestyles.

We know that transport has the highest reliance on fossil fuels of any sector, globally accounting for 37% of CO₂ emissions from end-use sectors in 2021. So, what needs to happen to decarbonise our transport systems in the face of the impending climate emergency? Having been invited to co-author a chapter in Greta Thunberg's **The Climate Book**, TSU researcher Christian Brand, together with Jillian Anable (University of Leeds), outline the most energy-efficient and low-carbon forms of transport available today. It is not straight-forward, and they argue that focusing solely on electric vehicles and technology that is not proven at scale is actually slowing down the path to zero emissions – diverting resources and political will away from other solutions. This is partly because electric cars are not truly zero-carbon, because mining the raw materials for their batteries, manufacturing them and generating the electricity they run on, produces emissions. In reality, if we are to meet the decarbonisation targets of the Paris Agreement by 2050, we also need to focus on the movement of people and goods. One way of doing this would be to introduce traffic reduction targets for the UK, as has happened in Scotland and Wales.

Their chapter outlines the range of science-based solutions needed, including the importance of changing our behaviour towards transport (by switching short car journeys to active forms of transport), to 15-minute neighbourhoods, banning large SUVs in cities, car restraint, 'slow steaming' and frequent flying. A holistic approach is required if we are to effectively decarbonise the transport sector but in addressing these issues we are also improving our health, safety and air quality, using resources more efficiently and equitably, improving social and economic vitality, making for better neighbourhoods, whilst playing our part in tackling the mammoth task that is saving the planet.



Change and normality in transport: recorded seminars

Eight experts from seven national and international institutes and think tanks contributed to our 'Change and Normality in Transport' seminar series that ran from January to June. The topics covered:

- business travel and how COVID-19 has impacted the sector
 - the role of railways and HSR in the 'Levelling Up' agenda
 - transport infrastructure development in China (and its geopolitical implications), and
 - if and in what way pledged increase in funding for climate change adaption will change how our transport systems are designed, planned and used.
- Full recordings of the seminars are available at: www.tsu.ox.ac.uk/events/ht22_seminars/



Shaping Urban Futures: a new open access course launches

Tim Schwanen and Juan Pablo Orjuela

Sharing the latest research findings with a wide audience can sometimes be difficult. Academic papers can reach other researchers in a specific area that can get over the hurdles of paywalls and theoretical jargon. Sometimes newspapers or blogs offer an opportunity to share findings, but the main message can be lost amid daily news and political turmoil. Massive Open Online Courses (MOOC) can be a great opportunity to share research findings with people around the globe that have a particular interest in the topics we work on.



Minibus taxi, Tanzania

As part of the UKRI-funded PEAK Urban research programme, Tim Schwanen and Juan Pablo Orjuela have contributed to the development of the Shaping Urban Futures (SUF) MOOC. SUF is a truly international effort, with participation from researchers at five global research institutions: The African Centre for Cities in Cape Town, Universidad EAFIT in Medellin, Indian Institute for Human Settlements in Bangalore, Peking University and the University of Oxford.

Launched in September 2022, SUF enables learners to imagine how they can make a difference to the future cities that will shape tomorrow's planet. With the majority of the world's population predicted to be living in cities by 2050, overcoming the challenges associated with rapid urbanisation will be a major factor in worldwide sustainable development outcomes in the years to come. SUF focuses on many of those challenges.

SUF is relevant for both urban scholars and professionals across government, corporate, social and non-profit sectors. The course draws on new urban sciences combined with insights from social sciences and humanities to intervene in shaping the urban future.

- To find out more and enrol visit: www.coursera.org/learn/shaping-urban-futures

Timeline

Hilary Term 2022

(January – March)

Director Tim Schwanen receives Francqui Chair medal

The faculty of Sciences of Ghent University offered Tim Schwanen (second from left) a Francqui Chair, a visiting professorship sponsored by the Belgian Francqui Foundation. Tim travelled to Ghent to deliver a ten-part lecture series titled 'Just Transformation in Urban Mobility: Planetary Changes', starting in February. All the lectures in the series can be listened to online.

- Find out more: geoweb.ugent.be/francqui-schwanen



Zakiyya Adam joins the TSU as Research Associate in Mobility Governance.

Hilary Term 2022

(January – March)



Paola Castenada passes DPhil viva. Paola successfully defended her DPhil thesis. Her research was titled 'How is the bike made mobile? Learning from bicycle activism and mobilities in Latin America'.



Léa Ravensbergen joins the TSU as Research Associate. Supported by a post-doctoral fellowship from the Social Sciences Humanities Research Council of Canada, Léa has been working with Tim Schwanen on a project on mobilities of care in Oxfordshire.



Labib Azzouz joins the TSU as Research Associate in Transport and Energy Innovation. He is working on the ESO (Energy Superhub Oxford) project at ECI and the TSU's ELEVATE project led by Christian Brand.



Daniel Muñoz joins the TSU as Postdoctoral Fellow. Funded by the Social Sciences Division and the John Fell Fund, Daniel has been working primarily with Jennie Middleton on the relationship between mobilities and care.

Trinity Term 2022

(April – June)



Won Do Lee, Brendan Doody and Jin-ho Chung leave the TSU

Helen Morrissey, Hannah Budnitz and Johannes Kester give presentations at UTSG Conference

The UTSG conference in July saw Helen present her work on the role and effects of digital data in formalisation pilots in South Africa's minibus taxi industry. Johannes in turn shined a light on the challenges that the car insurance sector faces following increasing automation of road vehicles and how that is affecting future automobility. Hannah highlighted that transport policy



documents are inherently lacking representations of subgroups even when talking about representing 'the people'.

Jennie Middleton, Ersilia Verlinghieri, Daniel Muñoz and Brendan Doody present at the RGS-IBG Annual Conference in August

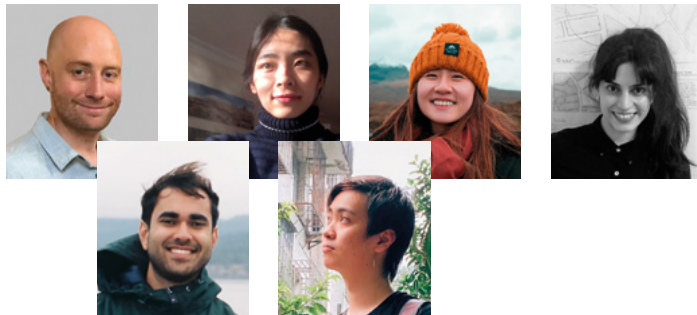
Michaelmas Term 2022

(October – December)

GCT September Course on “Infrastructure” with TransJakarta begins

TSU welcomes new DPhil students

Welcome to Clive Parkinson, Sieun Lee, Yi Fan Liu, Camila Ramos Yanez, Shiv Yucel, Eric Zhou, who all joined the TSU in October.



Xiao Li joins the TSU as a Senior Research Associate in Urban Mobility.



Zahra Zarabi joins the TSU as a visiting Postdoctoral Fellow from Fonds de recherche du Québec – Société et culture (FRQSC) of Canada.

Michaelmas Term 2022

(October – December)

The Walkable City book launch

The publication of Jennie Middleton’s book ‘The Walkable City’ (Routledge, 2022) is celebrated at St Anne’s College.

Intervention in the Colombian Congress debate on air pollution

Juan Pablo Orjuela participated in the debate on air pollution of the Sixth Commission of the lower chamber of the Colombian Congress, emphasising the need for more ambitious air quality goals. He also argued that Colombia needs different air quality indicators that show high air pollution levels in places where disadvantaged communities live. It is also important to better support that civil society led initiatives of air pollution monitoring because they help to make air quality monitoring more democratic. He was one of four academic and civil society experts invited to speak at the event which also included interventions from the Ministers of Environment, Transport, and Energy, as well as presentations by the three members of Congress who were summoned for the debate.



A photograph of a person with long dark hair, wearing a bright yellow hooded jacket, black leggings, and black shoes, walking away from the camera into the open doorway of a red train carriage. The carriage has yellow door frames. The person is carrying a black bag. The train is at a station platform with a yellow tactile paving strip in the foreground. The station has a large glass and steel roof structure. A dark blue triangle is overlaid on the left side of the image, containing white text.

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