Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

ANNUAL REPORT

2023 - 2024

TRINITY CENTRE FOR TRANSPORT RESEARCH AND INNOVATION FOR PEOPLE (TRIP)

CONTENTS

Centre Name: Trinity Centre for Transport Research and Innovation for People (TRIP)
Director: Professor Margaret O'Mahony
Deputy Director: Professor Brian Caulfield

INTRODUCTION

The Trinity Centre for Transport Research and Innovation for People (TRIP) was established in 2001, funded by the HEA's HEA's Programme for Research in Third-level Institutions (PRTLI). The HEA funded the Centre in an area of new and emerging potential at the time. In the initial phase, the TRIP Centre's team conducted a series of research projects in the areas of: Information and Communication Technologies (ICT) for transport; transportation demand and supply; safety improvements across all modes; environmental impacts of transport and their management; and quality of life. In the 24-year history of TRIP over 20 researchers have completed their PhD's in our centre.

Since then, its focus has changed, as the needs of society have, and now its key focus is on the sustainability and environmental aspects of transportation. Its aim is to develop and deliver cohesive and dynamic interdisciplinary research on a range of topics: electric vehicles, cycling, environmental impacts of transport, reducing traffic congestion, health impacts of transport, quality of life, and safety. The research is focused on the following UN SDG's; 3 (Good Health and Well-being), 5 (Gender Equality), 11 (Sustainable Cities and Communities) and, 13 (Climate Action).

The TRIP Centre is the only one of its kind in the country and is the go-to for government, industry and the media for advice and research on developments in the transport field. The Centre has generated over €10 million in research income and is currently working on projects funded by Horizon Europe, SFI, SEAI, EPA, etc. Current projects focus on mobility hubs, electric vehicles, mitigation of air pollution from rail transport, health impacts of transport, energy decarbonisation, AI applications on land use, ebikes, eCargo, eHUBS, sustainable mobility models, and Irish climate change.

GOAL AND MISSION

The TRIP Centre's aim is to develop and deliver cohesive and dynamic interdisciplinary research on a range of topics: electric vehicles, cycling, environmental impacts of transport, reducing traffic congestion, health impacts of transport, quality of life, and safety.

KEY RESEARCH GROUPINGS/THEMES

Electric vehicles, cycling, environmental impacts of transport, reducing traffic congestion, health impacts of transport, quality of life, and safety.

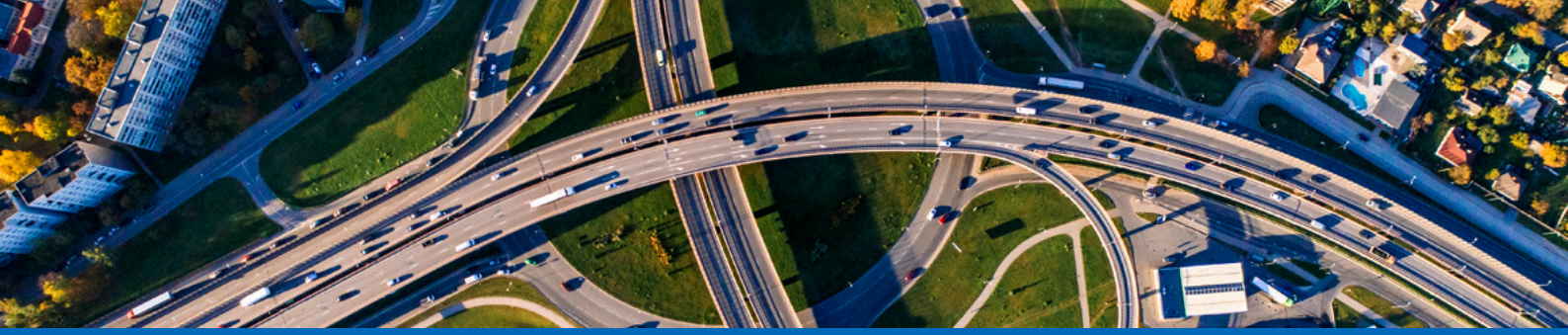


TABLE 1: LIST OF PRINCIPLE INVESTIGATORS

Professor Margaret O'Mahony	Trinity College Dublin
Professor Brian Caulfield	Trinity College Dublin
Professor Brian Broderick	Trinity College Dublin
Professor Biswajit Basu	Trinity College Dublin
Professor Henry Rice	Trinity College Dublin
Dr John Gallagher	Trinity College Dublin
Professor Aonghus McNabola	RMIT University Australia
Professor Aoife Foley	Queen's University Belfast
Dr William Brazil	National Transport Authority
Mr. Barry Colleary	National Transport Authority
Mr. Marcello Corsi	National Transport Authority

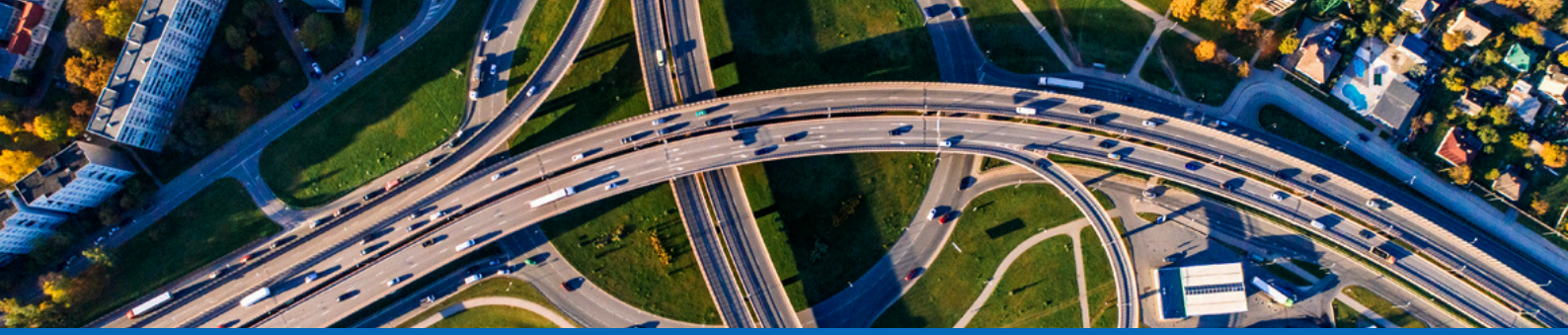


TABLE 2: LIST OF RESEARCHERS (FELLOWS AND RAS)

Dr Robert Egan	(2021 – present)
Dr Anna Charly	(2021 – 2023)
Dr Agnieszka Stefaniec	(2021 – 2024)
Dr Seyedkeyvan Hosseini	(2022 – present)
Dr Ubaid Illahi	(2022 – 2024)
Dr Tushar Pramod Choudhair	(2022 – present)
Dr Afaq Khattak	(2024 – present)
Dr Abhilash Chandra Singh	(2024 – present)

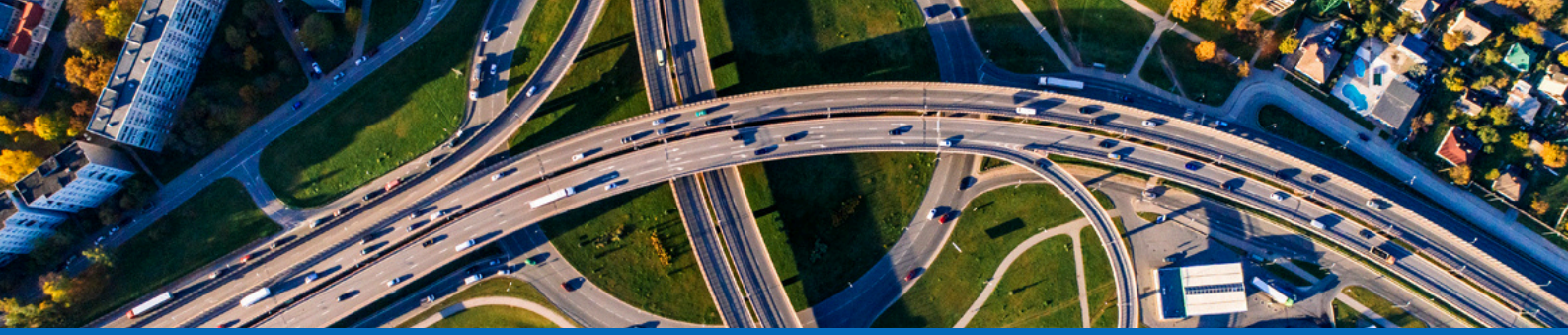


TABLE 3: LIST OF PHD STUDENTS

Shreya Dey	(Graduated PhD, 2019)
Mohammadamin Rezaei	(Graduated PhD, 2019)
Rodolfo Benevenuto	(Graduated PhD, 2019)
Aonghus O'Domhnaill	(Graduated PhD, 2022)
Giulia Oeschger	(Graduated PhD, 2024)
Niamh O'Reilly	(Graduated PhD, 2024)
Belal Endres	(Due to submit March 2026)
Yuxuan Guo	(Due to submit September 2025)
Suhail Akhtar	(Due to submit September 2025)
Harry Smith	(Due to submit September 2025)
Shima Rahmani	(Due to submit March 2026)

TABLE 4: LIST OF OTHER STAFF (ADMIN

Gary Corcoran	Administrative Officer

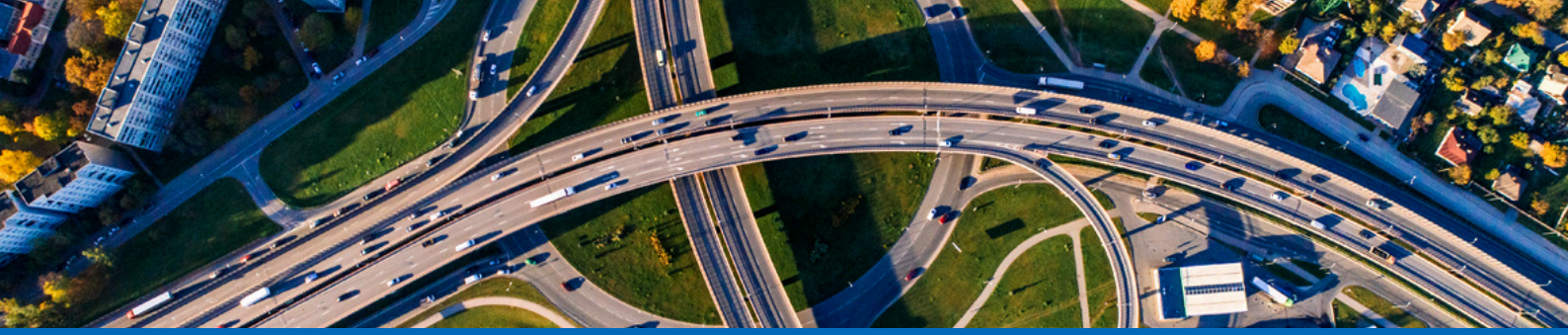


TABLE 5: CENTRE STAFF CONTRIBUTIONS

Year	Type of Output	Description
2019 – present	Media	Prof Brian Caulfield has made 250+ media interviews and contributions
2020	Report	Prof Brian Caulfield was the lead author of Transitioning to low carbon and sustainable mobility, Working paper No. 8, A Working paper commissioned by the Climate Change Advisory Council
2021-2022	Member	Prof Margaret O'Mahony served on the ITS Ireland Board.
2021	Talk	Prof Brian Caulfield spoke to the Joint Committee Environment and Climate Action, Oireachtas Committee on Electric vehicles – possible policy directions
2021-2022	Expert Review	Prof Brian Caulfield was a Steering Group member for the review and update of the GDA Transport Strategy with the National Transport Authority
2022	Talk	Prof Brian Caulfield spoke at the Citizens Assembly on the Transport Powers for a directly elected Dublin Mayor
2023	Expert Review	Prof Brian Caulfield was the expert reviewer of the National Speed Limit Review
2023	Report	Prof Brian Caulfield was one of the lead authors of: Climate Change Assessment: Volume 4: Realising the Benefits of Transition and Transformation, Environmental Protection Agency, 2023

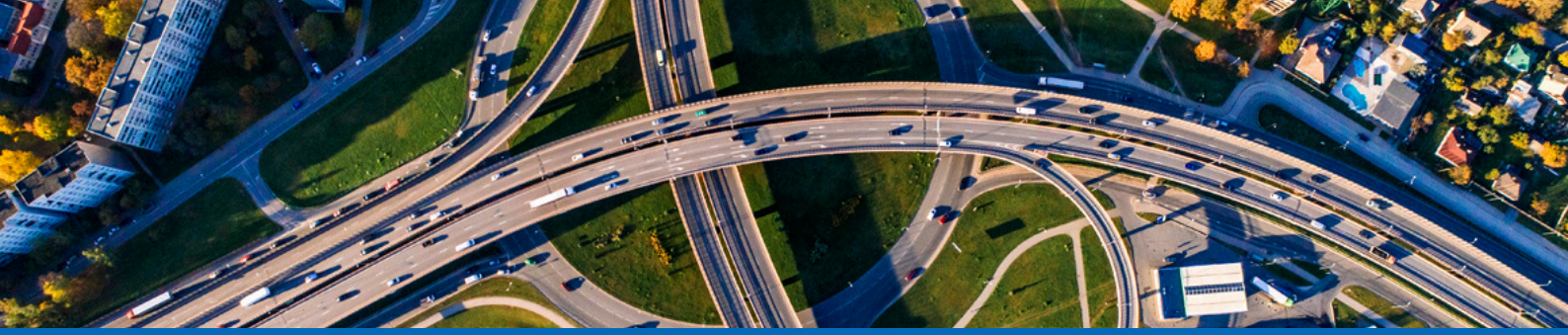


TABLE 5: CENTRE STAFF CONTRIBUTIONS CONT.

Year	Type of Output	Description
2023	Report	Prof Margaret O'Mahony and Prof Brian Broderick were lead authors of: Impact of Nitrogen Dioxide on Health with Particular Emphasis on Vulnerable Groups, Environmental Protection Agency, 2023
2023	Report	Prof Margaret O'Mahony and Prof Brian Broderick were co-authors on a paper on Short-Term Air Pollution as a Risk for Stroke Admission: A Time-Series Analysis which is informing the national air pollution / health debate
2024	Talk	Prof Brian Caulfield attended: Ireland's Climate Change Assessment, Joint Committee Environment and Climate Action, Oireachtas Committee
2024	Report	Prof Brian Caulfield is the lead author of Chapter 8: Environment and Mobility, EPA 2024 State of the Environment Review

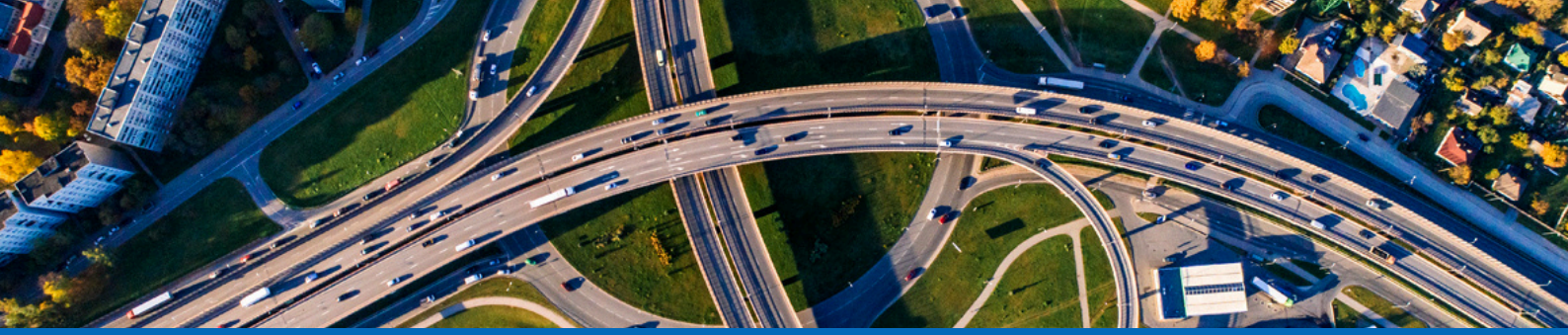


TABLE 6: RESEARCH COLLABORATIONS

KU Leuven (BE	Infineon Technologoies (DE)	Tampere University (FI)	QUB (UK)	ESB (IE)	University of Leeds (UK)
Volvo (SE)	Rogers (BE)	UCD (IE)	Enterprise (IE)	OECD	University of Birmingham (UK)
Chalmers University (SE)	S.C.I.R.E. (IT)	School of Medicine (TCD) (IE)	University of Melbourne (AU)	Uber (IE)	Transport Infrastructure Ireland (TII) (IE)
National Transport Authority (NTA) (IE)	Mathworks (NL)	FreeNow (IE)	SMA Magnetics (PO)	Dublin Bus (IE)	University of Newcastle (UK)
University of Sydney (AU)	Department of Transport (IE)	Microsoft Ireland (IE)	University of Liverpool (UK)	Bleeper Bikes (IE)	ATU (Sligo and Galway) (IE)
ARUP (IE)	Nissan Ireland (IE)	ETH Zurich (CH)	Toyota Ireland (IE)	Moby Bikes (IE)	University of Huddersfield (UK)
University of Maynooth (IE)	RPS (IE)	Atkins (IE)	UCC (IE)	AECOM (IE)	Austrian Institute of Technology (AT)
Dun Laoghaire Rathdown County Council (IE)	Fingal County Council (IE)	Road Safety Authority (IE)	Dublin City Council (IE)		

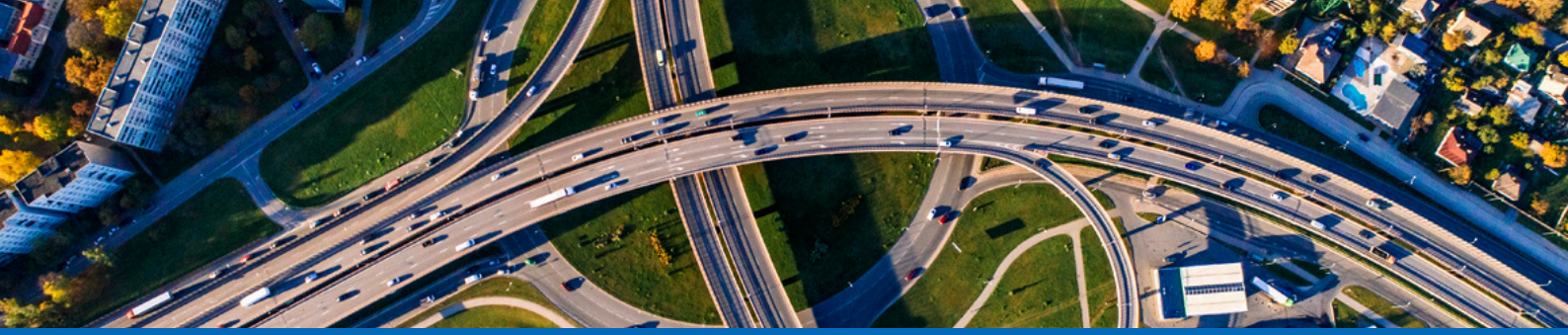


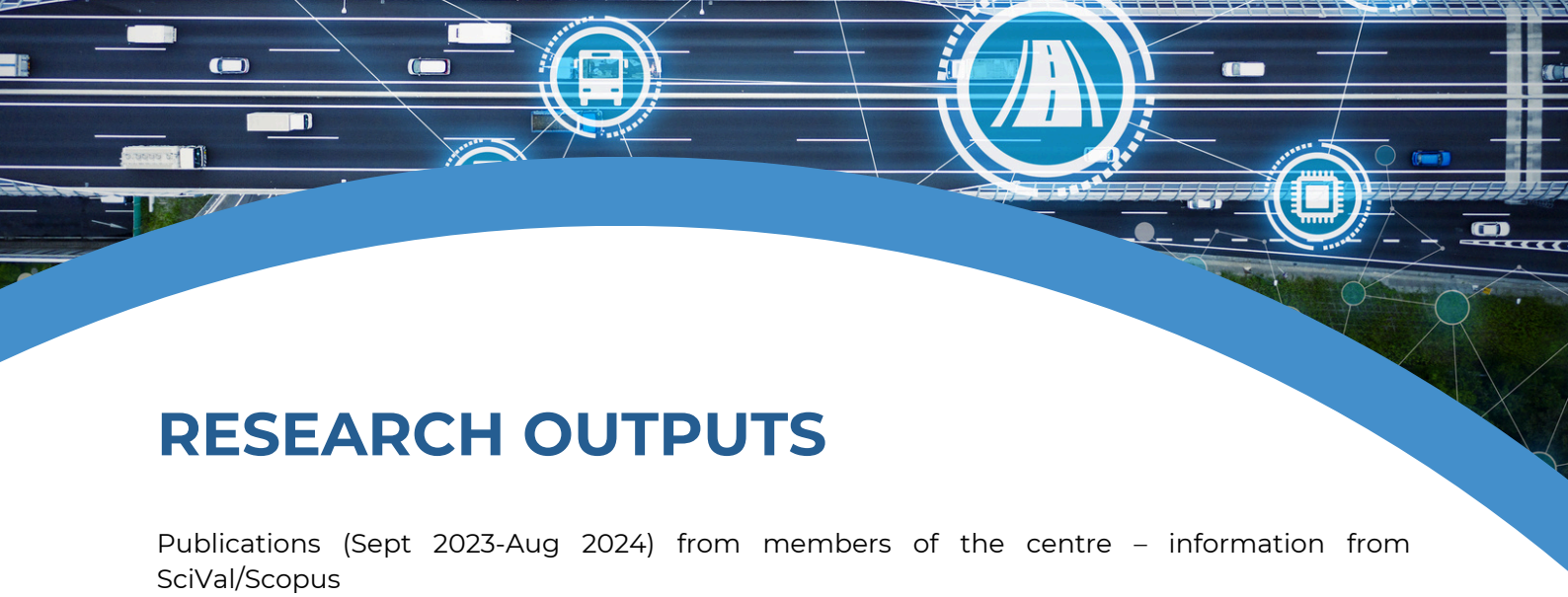
TABLE 7: RESEARCH FUNDING

Year	Funder	Project	Amount
2019	SEAI	DiSTRaCT: moDal ShifT Reduce Carbon in Transport	€100,000
2020	SFI	SMILE: Smart Mobility Initiative for Lower Emissions	€20,000
2021	SFI/Microsoft	Terrain-AI	€190,000
2021	SFI	DLR Active Travel Testbed	€140,000
2021	EPA	5 Year Assessment Report on Climate Change	€140,000
2021	ESB	HubX	€130,000
2022	SFI	NexSys	€350,000
2022	SEAI	TRACT: TRAnsport Behaviour Change Trials	€611,000
2022	EU Horizon Europe	Powerdrive: Power electronics optimisation for next generation electric vehicle components	€341,580
2023	SEAI	Electric shaRed mOBility hUbS Trial (ROBUST)	€1,349,984
2023	SEAI	E-cargo bikes – Fellowship	€160,000
2023	SFI	CONUNDRUM	€246,555
2023	SEAI	RATE: Irish Car Stock Model	€456,745
2024	TCD	Health and transport in the AI era	€560,000

RESEARCH ACTIVITY AND RESEARCH EXCELLENCE

The added value is the momentum created by the TRIP Centre in collaborations between academics working on transport and with other transport-focused organisations. Its long-standing high performance and critical mass enables significant visibility for TCD in the transport sector where the TRIP Centre is now recognised nationally as the go-to for advice and research in the transport domain. It also performs well above its weight internationally with the PIs having a reputation for research excellence and strong visibility in key forums such as the Transportation Research Board in the US and the Transport Research Arena in Europe.

The TRIP PIs have been instrumental in establishing the MSc in Transport Engineering, Policy, and Planning (the first of its kind in Ireland), which has a significant annual intake of students. Modules on this course are also provided to the E3 MSc in Smart & Sustainable Cities, E3 MSc in Statistics & Sustainability.



RESEARCH OUTPUTS

Publications (Sept 2023-Aug 2024) from members of the centre – information from SciVal/Scopus

Scholarly Output: The number of publications from Centre members based in Trinity College Dublin
64

Number of citations
116 – Combined citation Count

Number of publications related to Sustainable Development Goals

1	Zero Hunger (SDG2)
14	Good Health and Well-Being (SDG3)
1	Quality Education (SDG4)
4	Clean Water and Sanitation (SDG6)
19	Affordable and Clean Energy (SDG7)
6	Decent Work and Economic Growth (SDG8)
11	Industry, Innovation and Infrastructure (SDG9)
23	Sustainable cities and communities (SDG11)
6	Responsible consumption and production (SDG12)
8	Climate action (SDG13)
1	Life on land (SDG15)

Top Research Topic Clusters
Transport
Climate Change
Data Assimilation
Sea Level
Road
Computational Fluid Dynamics
Energy Engineering
Regression Analysis
Atmospheric Aerosol
Emissions

RESEARCH OUTPUTS

Top Cited Publications (Sept 2023-Aug 2024)

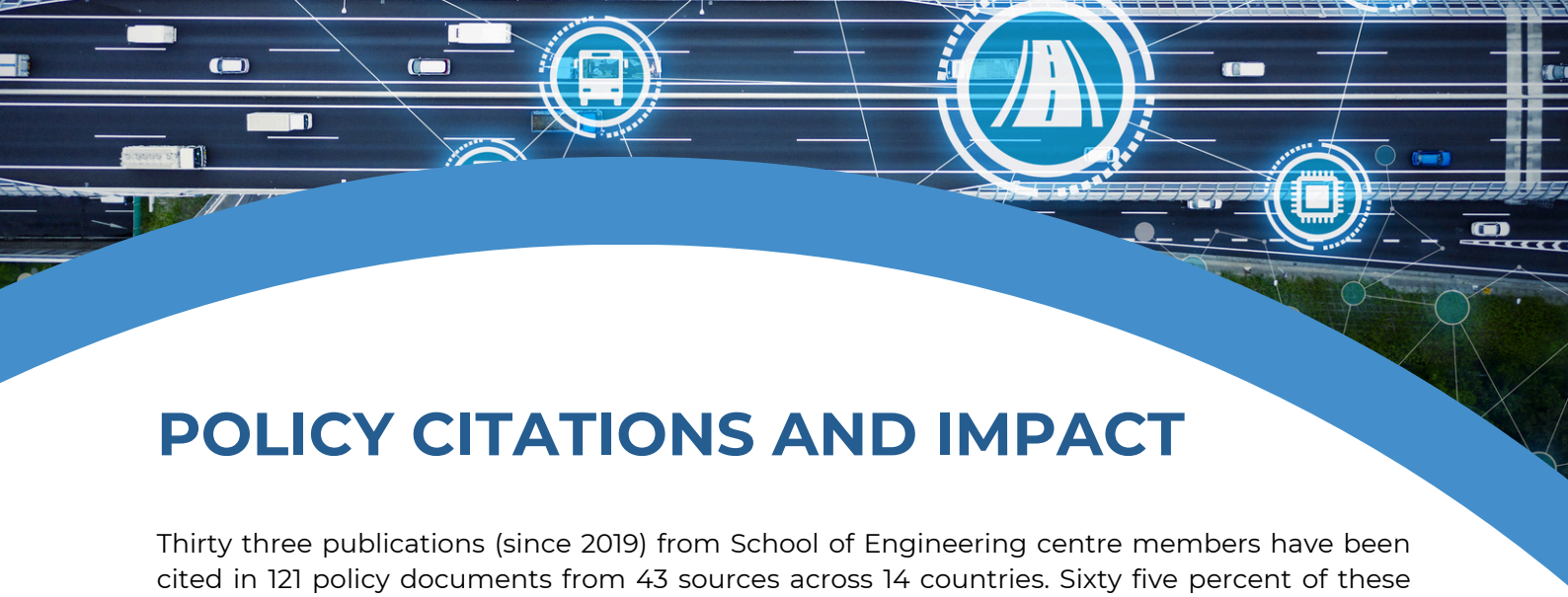
Mérida García, A., Gallagher, J., Rodríguez Díaz, J.A. and McNabola, A. (2024). An economic and environmental optimization model for sizing a hybrid renewable energy and battery storage system in off-grid farms. Renewable Energy,220

Hosseini, K., Stefaniec, A., O'Mahony, M. and Caulfield, B. (2023). Optimising shared electric mobility hubs: Insights from performance analysis and factors influencing riding demand. Case Studies on Transport Policy,13

Brown, A., Hampton, H., Foley, A., Furszyfer Del Rio, D., Lowans, C. and Caulfield, B. (2023). Understanding domestic consumer attitude and behaviour towards energy: A study on the Island of Ireland. Energy Policy,181

Jin, M. Y., Zhang, L. Y., Peng, Z. R., He, H. D., Kumar, P., & Gallagher, J. (2024). The impact of dynamic traffic and wind conditions on green infrastructure performance to improve local air quality. Science of the Total Environment, 917, 170211.

Khattak, A., Chan, P. W., Chen, F., & Peng, H. (2023). Assessing wind field characteristics along the airport runway glide slope: An explainable boosting machine-assisted wind tunnel study. Scientific Reports, 13(1), 10939.



POLICY CITATIONS AND IMPACT

Thirty three publications (since 2019) from School of Engineering centre members have been cited in 121 policy documents from 43 sources across 14 countries. Sixty five percent of these articles are cited more than once in policy. Some examples are given below.

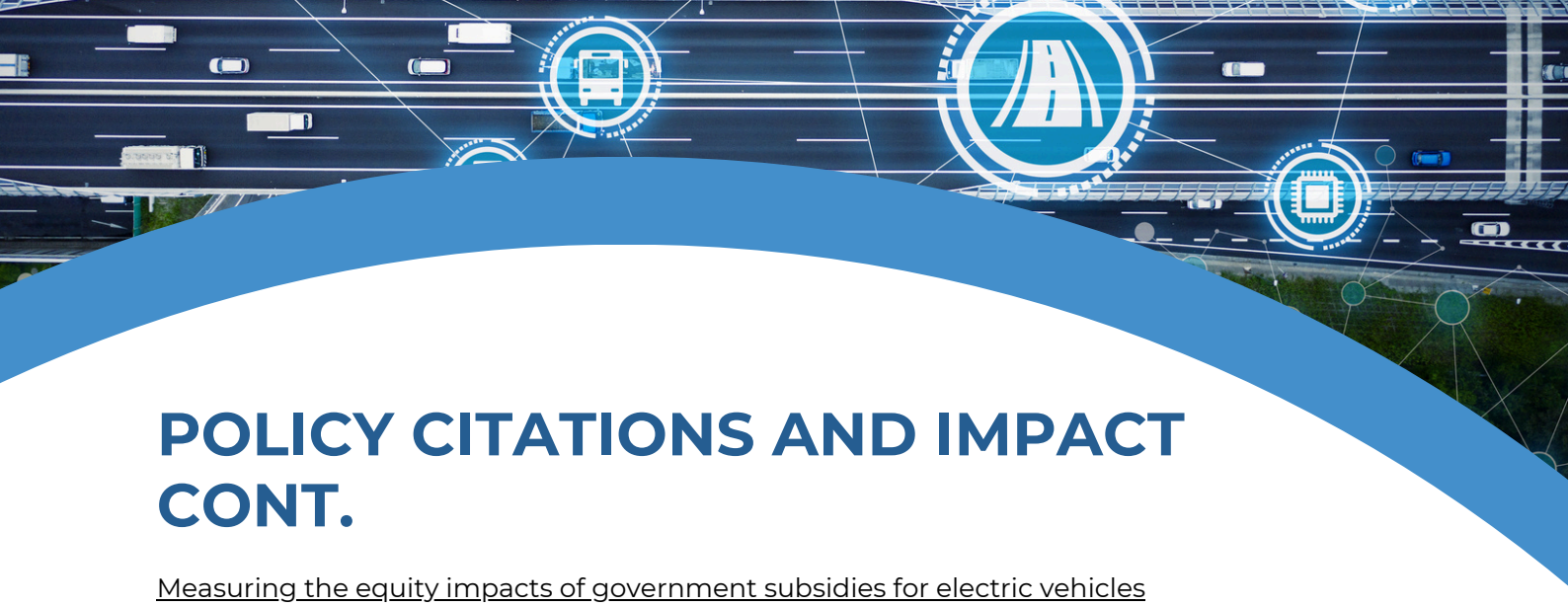
Identifying hotspots of transport disadvantage and car dependency in rural Ireland

Carroll, P., Benevenuto, R. and **Caulfield, B**., 2021. Identifying hotspots of transport disadvantage and car dependency in rural Ireland. Transport policy, 101, pp.46-56.

Cited by 17 policy documents including:

EU	Eurofound	Bridging the rural-urban divide: Addressing inequalities and empowering communities
IGO	International Transport Forum	Sustainable Accessibility for All
IGO	OECD	Innovations for Better Rural Mobility
Ireland	Climate Change Advisory Council	Redesigning Ireland's Transport for Net Zero report
Ireland	Environmental Protection Agency	Ireland's Climate Change Assessment Volume 2.
Sweden	VTI	Fair accessibility for rural areas and smaller urban areas through mobility as a service and e-commerce - a feasibility study
UK	Royal Society	A healthy future – tackling climate change mitigation and human health together

Table 8 Identifying hotspots of transport disadvantage and car dependency in rural Ireland



POLICY CITATIONS AND IMPACT CONT.

Measuring the equity impacts of government subsidies for electric vehicles

Caulfield, B., Furszyfer, D., Stefaniec, A. and Foley, A., 2022. Measuring the equity impacts of government subsidies for electric vehicles. Energy, 248, p.123588.

Cited by 13 policy documents including:

EU	Publications Office of the European Union	Gender Equality Index 2023
IGO	OECD	Demand-side policy measures for environmental sustainability
IGO	United Nations Framework Convention on Climate Change	The Bezos Earth Fund, ClimateWorks Foundation, Climate Action Tracker, Climate Analytics, NewClimate Institute, the United Nations Climate Change High-Level Champions, and World Resources Institute - State of Climate Action 2022 report
Ireland	ESRI	The National Development Plan in 2023: priorities and capacity
USA	National Renewable Energy Laboratory	Advancing Transportation Efficiency and Electric Vehicles in Tonga: A Review of Relevant Trends and Best Practices

Table 9 Measuring the equity impacts of government subsidies for electric vehicles

POLICY CITATIONS AND IMPACT CONT.

The nexus between air pollution, green infrastructure and human health

Kumar, P., Druckman, A., **Gallagher, J.**, Gatersleben, B., Allison, S., Eisenman, T.S., Hoang, U., Hama, S., Tiwari, A., Sharma, A. and Abhijith, K.V., 2019. The nexus between air pollution, green infrastructure and human health. Environment international, 133, p.105181.

Cited by 12 policy documents including:

Australia	Australian Institute of Health and Welfare	Benefits of the environment to health. A literature review of health benefits derived from 3 ecosystem services: air filtration, local climate regulation, and recreation
EU	Publications Office of the European Union	Evaluating the impact of nature-based solutions: a handbook for practitioners.
IGO	World Health Organization	Measures to reduce risks for children's health from combined exposure to multiple chemicals in indoor air in public settings for children with a focus on schools, kindergartens and day-care centres
Spain	Oficina de Ciencia y Tecnología del Congreso de los Diputados	Air quality: advances and best practices
USA	Government Publishing Office (GPO)	Climate adaptation actions for urban forests and human health

Table 10 The nexus between air pollution, green infrastructure and human health

POLICY CITATIONS AND IMPACT CONT.

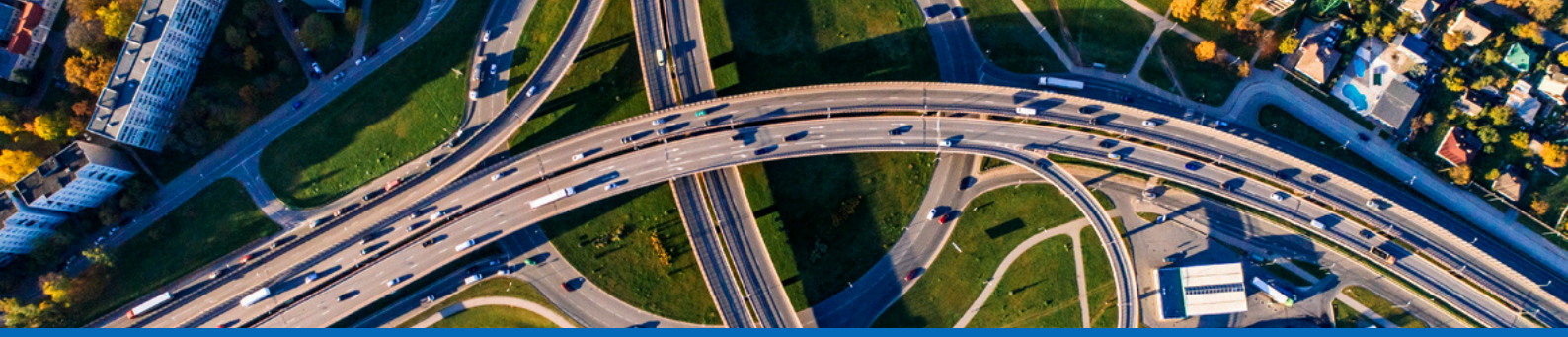
Is There a Residual and Hidden Potential for Small and Micro Hydropower in Europe? A Screening-Level Regional Assessment

Quaranta, E., Bódis, K., Kasiulis, E., **McNabola, A**. and Pistocchi, A., 2022. Is there a residual and hidden potential for small and micro hydropower in Europe? A screening-level regional assessment. Water Resources Management, 36(6), pp.1745-1762.

Cited by 4 policy documents including:

EU	Joint Research Centre	Challenges and opportunities for territorial cohesion in Europe
EU	Joint Research Centre	Renewable Energy production and potential in EU Rural Areas
EU	Joint Research Centre	Clean Energy Technology Observatory: Hydropower and Pumped Hydropower Storage in the European Union - 2023 Status Report on Technology Development, Trends, Value Chains and Markets

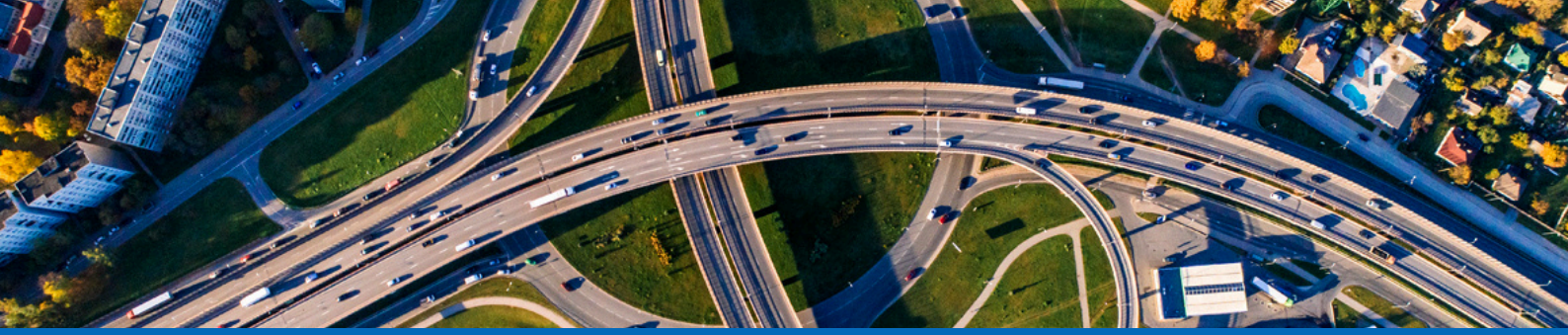
Table 11 Is There a Residual and Hidden Potential for Small and Micro Hydropower in Europe? A Screening-Level Regional Assessment



GRANTS AWARDED 2023/2024

PI Name	Project Title	Funding Body	Call Name
John Gallagher	Transforming Rural water communities into positive Climate and Energy Districts across Europe	Enterprise Ireland	Horizon Europe Co-ordinator Proposal Preparation Support Scheme
John Gallagher	Transforming Rural water communities As positive Climate and Energy districts (TRACE)	Science Foundation Ireland	SFI NCF 2023-Sustainable Communities
Aonghus Mc Nabola	intelligent Asset Management Platform for Hydropower operation and maintenance	European Commission	HORIZON-CL5-2022-D3-03-08
Aonghus Mc Nabola	Hybrid solutions for Renewable Energy Systems: achieving net-zero Atlantic area energy consumers & communities	European Regional Development Fund	Interreg Atlantic Area 2022
Aonghus Mc Nabola	Hybrid solutions for Renewable Energy Systems: achieving net-zero Atlantic area energy consumers & communities	Trinity College Dublin	Not Applicable
Biswajit Basu	InDyCORE: Innovation in Dynamic Cables for Offshore Renewable Energy	Sustainable Energy Authority of Ireland	Research, Development and Demonstration Funding Programme 2023

Table 12 Grants Awarded 2023/2024

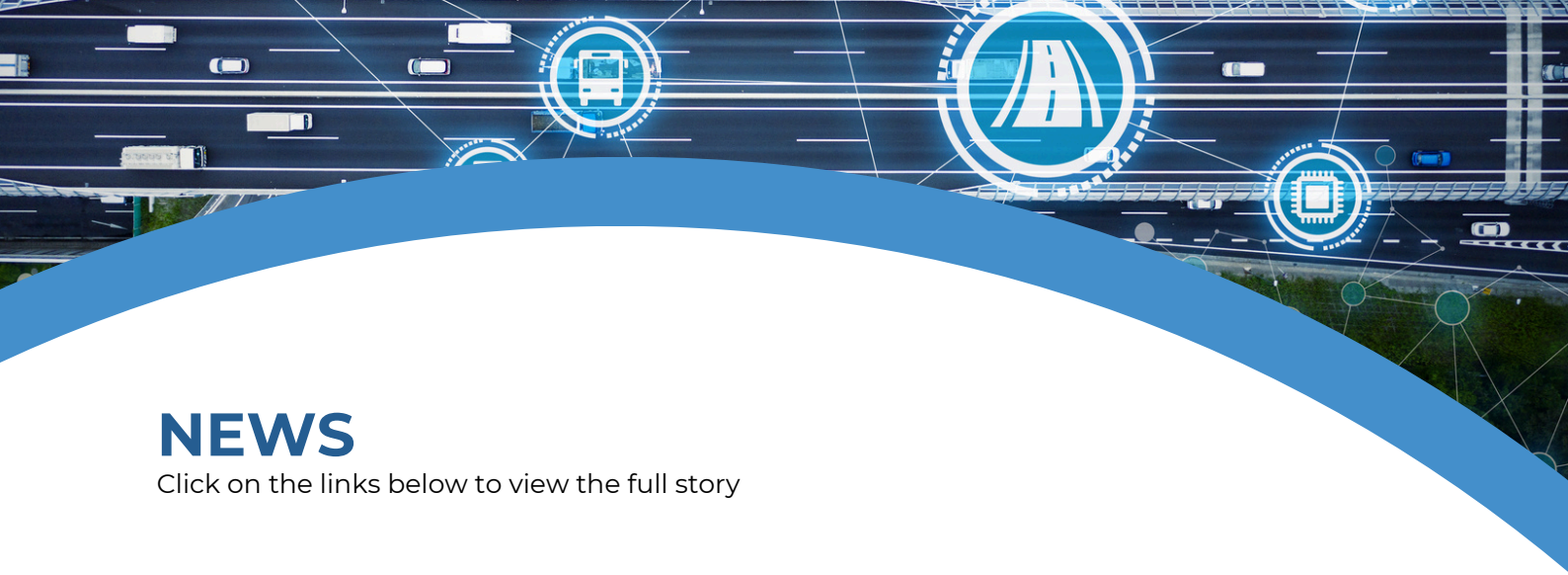


GRANTS AWARDED 2023/2024

PI Name	Project Title	Funding Body	Call Name
Brian Caulfield	CONUNDRUM: Co-creating sustainable and shared community mobility.	Science Foundation Ireland	SFI National Challenge Fund-2050 Challenge
Brian Caulfield	Irish Car Stock Model	Sustainable Energy Authority of Ireland	Research, Development and Demonstration Funding Programme 2023

FUTURE STRATEGY OF CENTRE

The areas for growth are significant given the major disruptors beginning to alter the transport landscape, e.g. driverless vehicles, zero emission targets, active travel targets, sustainability, etc. The TRIP Centre is already the national leader in targeting funding opportunities in many of these areas, with particular focus on EU and national funding.



NEWS

Click on the links below to view the full story

Trinity College Dublin School of Engineering Celebrates Innovative Research on E-Bike Sharing Systems in Dublin
20 Jun 2024

TRACT EV app | Trinity College Dublin Engineers Launch Innovative App Promoting Electric Vehicle (EV) Adoption
03 May 2024

Researchers join National Challenge Fund to help Ireland prepare for green transition and digital transformation
11 September 2023

THANK YOU

CONTACT US :

margaret.omahony@tcd.ie

www.tcd.ie/transport-research/

Trinity Centre for Transport Research and Innovation for People (TRIP)
Department of Civil, Structural & Environmental Engineering
Trinity College Dublin
Dublin 2