

NEWS

Clean Energy and Equitable Transportation Solutions



CLEETS

September 2026

Welcome to this new edition of the CLEETS newsletter. Inside this Autumn/Fall issue you can find a round-up of all our latest highlights and developments from this international research project which teams up scientists and engineers to address transportation challenges, and to grow future researchers and scholars.

It's been a busy year so far. Inside you will find a spotlight on a selection of recently published papers authored by various member of the CLEETS team. These focus on a variety of topics including bus air pollution, electric vehicle power outages, and the protection of connected and autonomous vehicles from cyberattacks.

Discover more about two newly published books, plus gain an insight into recent industrial and stakeholder engagement.

2026 has seen a number of key events including the Spring School and Annual Meeting, plus several researcher visits and meetings have taken place during the past few months.

We hope you find this new edition useful and interesting. If you would like to share relevant news with the CLEETS team drop the editorial team a line at i.watkinson@bham.ac.uk

Inside this Issue

Topic	Page(s)
• Spotlight on New Papers.....	2
• Annual Meeting Review.....	3
• New Books	4
• Researchers visit WCTR.....	5
• Spring School.....	6
• Researchers at Net-Zero Energy Systems Workshop.....	7
• Research-focused Meeting	8
• Wales National Travel Survey.....	8
• Researchers at UK LCA Network Annual Conference.....	9
• CLEETS Approach and Mission.....	10
• CLEETS Partners.....	10
• Contact the Editors.....	10



Paper Spotlight #1

Electric vehicle charging stations at risk from hazardous events and power outages: Analytics and resilience implications

Wencheng Bao, Eleftheria Kontou
University of Illinois, USA

This study examines how natural hazards and power outages affect electric vehicle (EV) charging infrastructure across the United States. It found that EV charging stations, especially Level 2 chargers, are often concentrated in densely populated areas that also face higher natural hazard risks. Severe weather and natural disasters were identified as the leading causes of power outages that disrupt charging operations. Using Texas as a case study, the researchers found that counties with a Federal Emergency Management Agency (FEMA) risk index score above 97.18 are significantly more likely to experience outage-related impacts on charging infrastructure. The paper concludes that improving resilience through measures such as backup power, microgrids, flood protection, and stronger grid infrastructure is essential to ensure reliable EV charging as transportation becomes increasingly electrified. Visit Science Direct [here](#)



Paper Spotlight #2

Air quality and health co-benefits of bus electrification: Evidence from a UK metropolitan area

Jian Zhong, Tanmay Gojamgunde, James Hall, Ye Hang, Suzanne E. Bartington, Jenny Stocker, William James Bloss, Zongbo Shi
University of Greenwich, University of Birmingham & Cambridge Environmental Research Consultants, UK

This study assessed the effects of replacing diesel buses with electric buses across the West Midlands using air quality and health modelling. The results showed that full bus electrification could reduce roadside nitrogen dioxide (NO₂) concentrations by up to 27% and fine particulate matter (PM_{2.5}) by up to 4%, leading to modest but meaningful health benefits, including fewer asthma cases and an estimated 26 fewer air pollution-related deaths over ten years. While the air quality and health gains alone are relatively limited, the study concludes that bus electrification supports cleaner urban environments, improved public health, and broader net-zero transport goals. Visit Science Direct [here](#).



Paper Spotlight #3

A survey of learning-based intrusion detection systems for in-vehicle networks

Muzun Althunayyan, Amir Javed, Omer Rana
Cardiff University, UK & Majmaah University, Saudi Arabia

This paper provides one of the most comprehensive and up-to-date reviews of how machine learning, deep learning, and federated learning are being used to protect connected and autonomous vehicles from cyberattacks. It explains the security weaknesses of the CAN bus, reviews 86 state-of-the-art intrusion detection studies, compares their strengths and limitations, and highlights which approaches are most effective for detecting known and previously unseen attacks. The paper is particularly valuable for researchers and engineers because it not only summarizes existing solutions but also identifies important research gaps, such as adversarial robustness, real-world deployment challenges, privacy-preserving federated learning, dataset limitations, and the need for lightweight, real-time IDSs suitable for automotive systems. As a result, it serves as both an excellent introduction to in-vehicle cybersecurity and a roadmap for future research and development. For more details see [here](#).



Review

CLEETS Annual Meeting

Cardiff, UK | 8-10 June 2026

The CLEETS Global Center's 3rd Annual Meeting brought together researchers, partners and stakeholders from across the UK, USA, Mexico and India to review progress, strengthen collaborations, and define priorities for the coming year. Across three days of discussions, breakout sessions, and stakeholder engagement, a clear focus emerged: scaling CLEETS research impact while strengthening connections between science, policy, education and practice.

Event summary and highlights

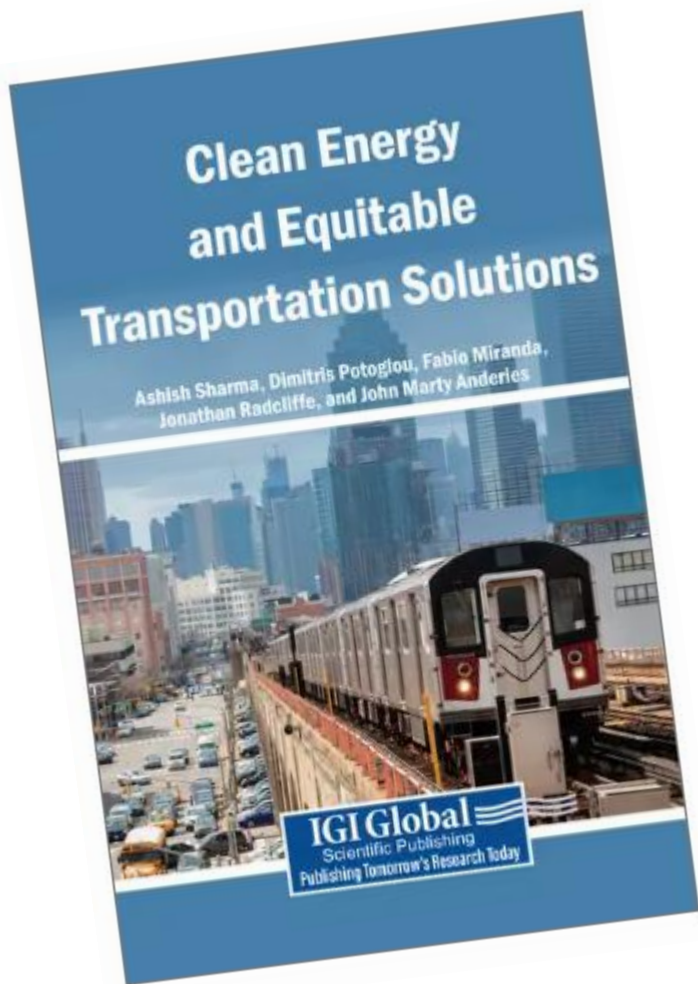
- Over 50 researchers and partners gathered in Cardiff to align on CLEETS' next phase of growth and impact.
- Strong emphasis on integrating research across the three thrusts and cross-cutting themes.
- New collaborative priorities identified in scenarios and simulations, data platforms, and policy.
- Development launched for a CLEETS Policy Insights Framework and UK-US Risk Framework White Paper.
- Discussed plans for the 2026 Fall School in Cardiff, focusing on cybersecurity and emerging digital risks.
- New AI-enabled approaches were explored to improve accessibility of CLEETS outputs and knowledge resources.
- International collaborations with partners from Mexico and India continue to expand CLEETS' global reach.
- Early Career Researchers were encouraged to lead publications, conferences, and collaborative research initiatives.
- Action plans for 2026-27 include policy impact metrics, improved communication platforms, cross-thrust research activities, and enhanced stakeholder engagement.

Industrial engagement

The CLEETS stakeholder workshop showcased collaborative research tackling sustainability challenges through technical innovation, stakeholder engagement, and interdisciplinary approaches. Attendees included representatives from Arup, Jaguar Land Rover, National Grid Electricity Distribution and Transmission, WSP and the Welsh Government.

Discussions covered energy justice, sustainable mobility, climate resilience, AI applications, and citizen science, with participants exploring opportunities for joint projects, student exchanges, and international partnerships.





Hot off the Press

This new book produced by the CLEETS team in association with IGI Global Scientific Publishing provides a comprehensive, multidisciplinary understanding of how clean energy, advanced analytics, and equitable transport planning can work together to create sustainable transportation systems.

It contains sections relating to:

- Clean energy systems
- Hydrogen-fuelled transportation
- Energy transition strategies
- Carbon reduction and net-zero pathways
- Infrastructure challenges associated with transport decarbonisation

For more information visit <https://www.igi-global.com/gateway/book/401367>

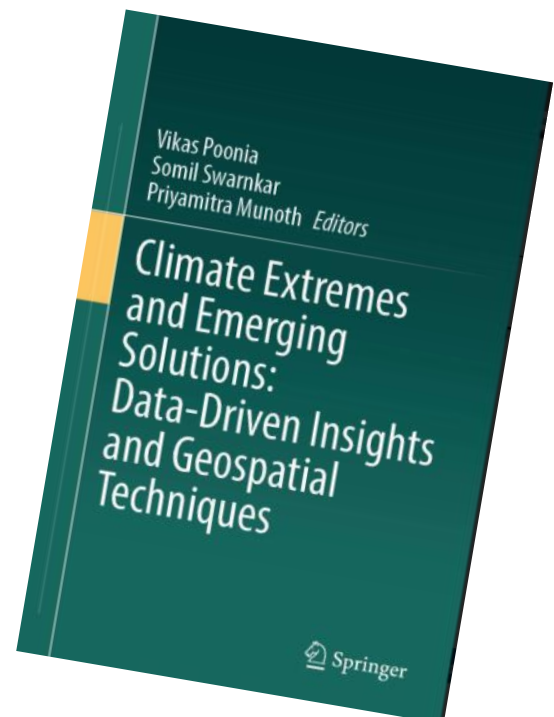
Another good read

Inside this online book you can find a chapter from CLEETS authors Abhinav Wadhwa, Karn Vohra, Elima Zholdubaeva, Peiyuan Li, Sicheng Wu, William Bloss and Ashish Sharma.

Entitled 'Integrating Satellite Data, Modelling, and Citizen Science to Derive Critical Insights into Urban Dynamics', this chapter focuses on a study comparing urban environmental risks in cities across the Great Lakes region (USA) as well as the West Midlands and South Wales in the UK using satellite-based analysis.

The researchers developed a transferrable framework that combines multi-sensor satellite imagery to assess vegetation, water presence, built-up areas, land surface temperature, flooding and urban heat island intensity.

Visit https://link.springer.com/chapter/10.1007/978-3-032-14457-7_7



CLEETS Researcher Visits

CLEETS at World Conference in Transport Research (WCTR)

Raymond Xu and Dilum Dissanayake from the University of Birmingham, UK attended the World Conference on Transport Research (WCTR) in Toulouse, France, from 6 to 10 July. WCTR is a prestigious global conference held every three years, bringing together transportation researchers, engineers, policymakers, and industry professionals from around the world to discuss key challenges and emerging developments in the transport sector.

Raymond presented his paper, “Exploring Attitudes Towards EV Transition with Increasing Market Expansion,” in Specialist Interest Group (SIG) G3: Urban Transport Planning and Policy session. His research examined public attitudes towards electric vehicle (EV) adoption in the context of growing market penetration.

Dilum delivered her presentation, “Modelling Shared Electric Mobility Adoption: Insights from a Hybrid Latent Class and Latent Variable Approach,” in SIG G2: Travel Behaviour and Choice Modelling session. Her research provided insights into the factors influencing the adoption of shared electric mobility services using advanced behavioural modelling approaches.

Read more about these presentations via their Pure profiles: See [Exploring Attitudes to EV Adoption and Transition: Analysis of People from Various Target Groups](#) and [Modelling Shared Electric Mobility Adoption: Insights from a Hybrid Latent Class and Latent Variable Approach](#).

WCTR provided an excellent platform for exchanging knowledge, sharing research findings, and engaging with leading international experts in transportation research. Topics were organised into nine broad themes, covering areas such as maritime and air transport logistics, infrastructure planning and design, urban traffic management, travel behaviour, transport economics, and the role of transport systems in developing countries. This multidisciplinary structure provides a valuable platform for knowledge exchange across a wide range of transport research domains.

Attendance at the conference enabled the development of new connections with both national and international academic researchers, as well as representatives from public and private sector organisations. These interactions have opened opportunities for future collaboration and knowledge sharing that will support the ongoing objectives of the CLEETS project.

Other CLEETS members, Paul Haggart and Dimitris Potoglou of Cardiff University, UK, also attended the conference and presented research arising from the CLEETS project. Their presentations further enhanced the visibility of the project within the international transport research community and facilitated engagement with experts working in related fields.



Review

CLEETS Spring School

Global Classroom | 15 April 2026

This event brought together over 80 students and researchers from the UK, US, India and Mexico for an interactive programme focused on transportation emissions, weather and long-term environmental risk.

Participants explored how road transport emissions are influenced not only by technology and policy, but also by weather variability, climate change and wider environmental pressures.

Highlights

- Expert talks covered transportation emissions, atmospheric modelling, climate risks and future environmental change.
- Hands-on sessions introduced participants to cutting-edge research tools, including ECCAD and Climate Inspector.
- Interactive exercises challenged students to analyse emission trends, climate projections and their implications for transport and air quality.
- The programme showcased the value of interdisciplinary research, bringing together perspectives from engineering, atmospheric science, policy and environmental studies.
- Group discussions generated lively debate on future mobility challenges, climate resilience and pathways to decarbonisation.
- The event provided valuable opportunities for international networking, collaboration and knowledge exchange across the CLEETS community.
- Overall, the Spring School was a great success, equipping participants with new skills, tools and insights to tackle the connected challenges of transport, climate and environmental sustainability.





CLEETS Researcher Visits

CLEETS at the 2026 Workshop on Secure and Resilient Net-Zero Energy Systems

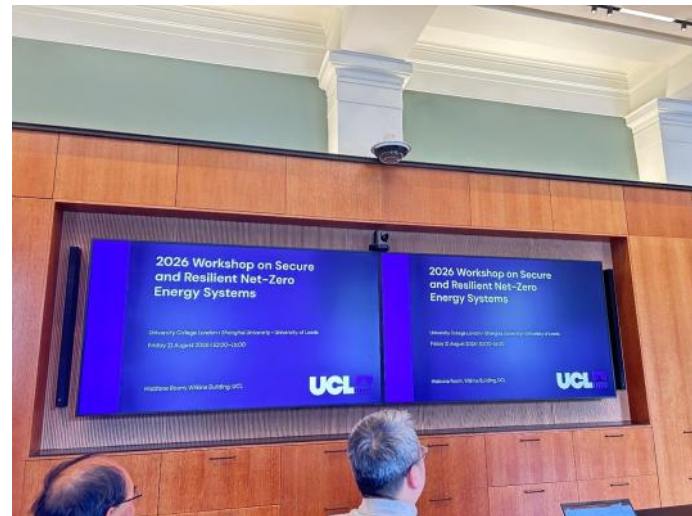
UK-China Workshop Advances Collaboration on Secure and Resilient Net-Zero Energy Systems

Researchers from universities across the UK and China came together at University College London (UCL) on 21 August 2026 for the 2026 Workshop on Secure and Resilient Net-Zero Energy Systems, held during UCL's bicentenary year. The workshop provided a platform for academic exchange and discussion on future collaboration in energy resilience, artificial intelligence, control and net-zero technologies.

The workshop was sponsored by the UCEER UK-China Regional Centre on Net Zero and Supply Resilience and the International Scientific Research Alliance on Intelligent Measurement Control and Applications of Complex Networked Systems, and organised with contributions from University College London, Shanghai University, and the University of Leeds. It aimed to strengthen research and education collaboration between UK and Chinese institutions in electrical and energy technologies, supporting efforts to address global climate change and accelerate the transition towards low- and zero-carbon energy systems.

Dr Fulong Yao from Cardiff University and the CLEETS Global Center participated in the workshop and served as a member of the organising committee, contributing to the wider UK-China research exchange. The organising committee brought together researchers from institutions including UCL, Shanghai University, the University of Leeds, Newcastle University, the University of Birmingham, the University of Leicester, the University of Strathclyde, Cardiff University.

Beyond the technical presentations, the workshop provided an opportunity for researchers from the UK and China to exchange ideas and discuss potential future collaborations around secure, resilient and intelligent net-zero energy systems. These discussions align closely with the objectives of the CLEETS Global Center, particularly its focus on bringing together expertise across energy systems, clean transportation, data science, AI and cybersecurity to support resilient low-carbon infrastructure.



The programme covered a broad range of topics, including networked control, artificial intelligence, multi-energy systems, energy flexibility, autonomous robotics, and low-carbon technologies. It included an introduction to UCL's Dynamic Systems Lab and a series of presentations highlighting recent advances in intelligent and networked control, AI-enabled energy management, energy flexibility and decarbonisation, autonomous inspection, and resilient infrastructure.

Wales National Travel Survey

Headline Results: preliminary, six-month results

On 12 June 2026, CLEETS hosted a webinar regarding the headline results of the Wales National Travel Survey, a large, annual, random-sample survey designed to collect data on travel attitudes and behaviours from people across Wales. Key participants in the webinar included Transport for Wales and the Welsh Government.



The results have been published in three reports:

- Travel behaviours
- Travel attitudes
- Factors that would encourage modal shift to sustainable travel modes users of different transport modes, as well as a two-day travel diary.

To see the latest results visit <https://tfw.wales/projects/wales-national-travel-survey/six-month-results>

Review

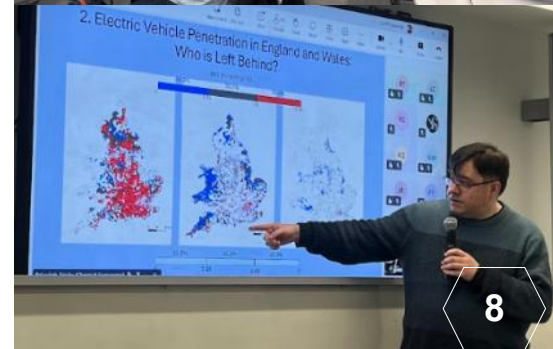
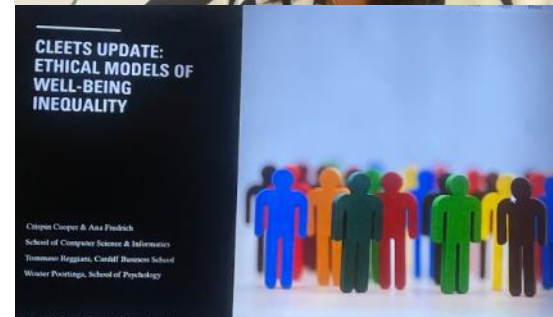
UK CLEETS Research-Focused Meeting

Cardiff | 17 April 2026

Researchers from across the Center gathered for a productive day of discussion, collaboration and knowledge exchange. The meeting reinforced the strength of the UK CLEETS community and highlighted the benefits of bringing researchers together to share knowledge, build connections, and identify new opportunities for collaboration. The ideas and actions emerging from the day will help shape future research activities, strengthen links across thrusts and cross-cuts, and support the delivery of impactful research outputs in the months ahead.

Highlights

- Early Career Researchers (ECRs) played a leading role in designing and delivering the meeting, demonstrating the strength of the Centers next generation of researchers.
- Updates from Thrusts 1, 2 and 3 showcased recent progress, emerging findings and key research challenges.
- The Crosscut team shared its approach and early outputs, highlighting opportunities to strengthen integration across CLEETS research activities.
- Collaborative discussions identified new opportunities to connect datasets, modelling approaches, case studies and methodologies across thrusts.
- Participants explored potential joint publications, reports, funding opportunities and policy-focused outputs.
- An Equality, Diversity and Inclusion (EDI) session provided space for discussion on building an inclusive and supportive research culture.
- Participants left with a shared commitment to delivering impactful, policy-relevant research that supports clean energy and equitable transport solutions.



CLEETS Researcher Visits

CLEETS at UK Life Cycle Assessment Network Annual Conference

Neha Mehta from the University of Birmingham represented CLEETS at the 1st UK Life Cycle Assessment Network Annual Conference hosted by the University of Sheffield on 16th and 17th June 2026. The conference brought together world-class researchers across departments from the UK and Ireland.

Neha delivered an oral presentation covering research on the Life Cycle Assessment (LCA) of the recycling of spent lithium-ion batteries in the 'LCA for Net Zero' session. The research was completed by previous MSc Sustainable Energy Systems students Manognya Nimishakavi and Kavin Kuamr Parthasarathy as part of the collaborative research projects between the Birmingham Energy Institute at the University of Birmingham and the Energy Consortium at the Indian Institute of Technology Madras, India. Dr. Nitin Muralidharan and Prof. Jonathan Radcliffe contributed to discussions on recycling and LCA.

Read more about ongoing CLEETS research on the Life Cycle Assessment of recycling of spent lithium-ion batteries here:

[Grave-to-cradle life cycle environmental impact assessment of recycling of spent lithium-ion batteries - University of Birmingham](#)

The conference led to new connections with national and international academic researchers, as well as representatives from the UK LCARSIN network, Below 280° and Tata Steel. The impact of AI on LCA methodology, bio-based materials and biogenic carbon, prospective and ex-ante LCA were prominent topics throughout the conference presenting opportunities for collaboration. How LCA findings can be put into action for driving policy decisions by using harmonisation approach was the key central theme that emerged from the conference oral and poster presentations and panel discussions.

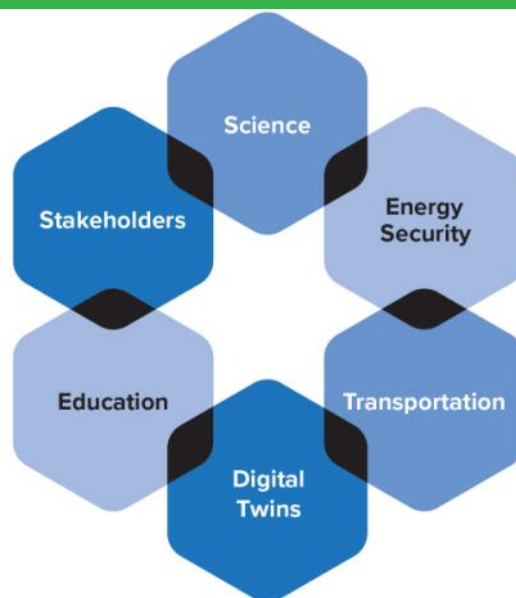


CLEETS Multidisciplinary Approach

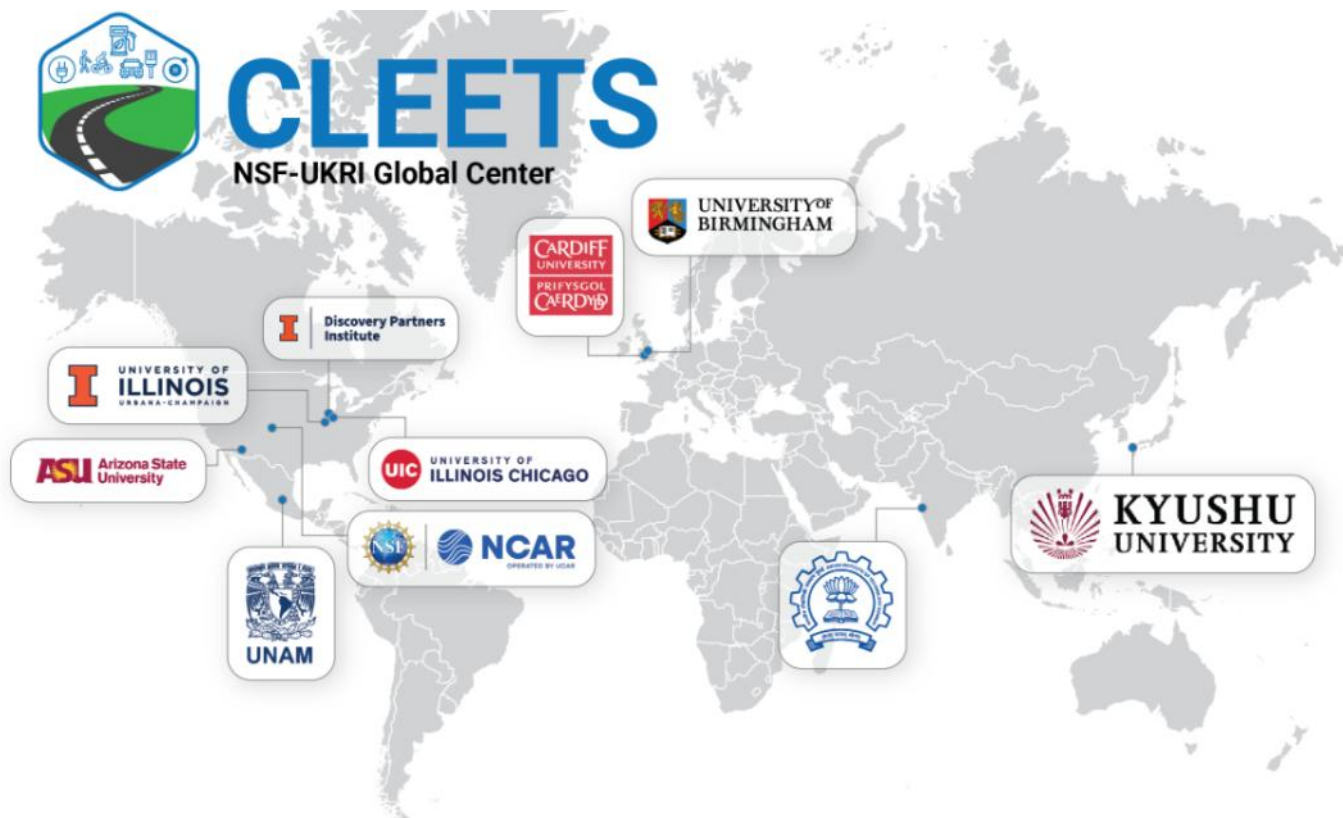
CLEETS generates cross-cutting knowledge in transportation engineering, material science, civil engineering, computing, social sciences, and atmospheric science.

Our mission is to:

- Establish a Global Center
- Create and grow international partnerships
- Co-produce knowledge and engage stakeholders
- Establish a novel education platform



CLEETS Global Partners



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