



**UKCRIC**

UK COLLABORATORIUM  
FOR RESEARCH ON  
INFRASTRUCTURE & CITIES

# Annual Review 2018-2019



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## Who we are and what we do

**UKCRIC is an integrated research capability with a mission to underpin the renewal, sustainment and improvement of infrastructure and cities in the UK and elsewhere. We were founded by a collaboration of universities who recognised that governments struggle to think about infrastructure in a joined-up way, and want to address the impacts that siloed planning can have on current and future infrastructure.**

With considerable support from EPSRC, we have funded 13 cross-disciplinary infrastructure laboratory and urban observatory facilities, many of which are now up and running. We are collecting, collating and curating large volumes of diverse data about current and proposed infrastructure. This data will enable policies, regulation, planning and capital investments and strategic, tactical and operational decisions to be made on the basis of evidence, analysis and innovation.

We are working to benefit society by encouraging disparate areas of infrastructure to work collaboratively with each other; areas such as water, waste, transport, energy, connectivity, and data. We engage with stakeholders to better understand and address complex infrastructure challenges through collaborative research, and we are always looking for opportunities to help improve situations. UKCRIC does not have a single geographical home. Each academic partner leads a theme and contributes to others, creating a strong collaborative network with multiple centres and connections between them. This spreads the benefits across the UK and into teaching programmes throughout higher education in the UK and beyond.

## Foreword

The Government is increasingly placing importance on our national infrastructure and its considerable value to society and to our economy. The design, management, maintenance and upgrading of infrastructure systems all require fresh thinking to minimise the use of materials, energy, and labour whilst ensuring resilience. National and local infrastructure in the UK need to be fit for purpose to support societal development in a changing world. To achieve this, there is huge value in having centralised, coordinated and coherent infrastructure data. There is also considerable potential for innovations and new technologies to improve performance and value through reducing construction costs and updating design methodologies.

These developments are best achieved by collaboration between government, academia and industry. UKCRIC has great potential to facilitate this through its network of experts in the UK's leading universities engaged in research on infrastructure and cities, together with its world leading research facilities – many of them recently completed or currently in development. UKCRIC's coordinated approach to infrastructure research will enable innovative solutions to address the challenges of ageing infrastructure as well as improving new construction. Its network of interlinked urban infrastructure 'observatories' across the UK will enable the digital capture, mapping, sensing and monitoring of real urban infrastructure systems, capturing their complex inter-relationships with the environment, people and society.

Building on its strong collaborations with industry, UKCRIC can enable infrastructure and urban systems to adapt to the challenges of climate change, changing patterns of use, societal expectations and emerging technologies. This Annual Review illustrates the considerable progress that UKCRIC has made over the past year and how it is uniquely placed to support the delivery of transformational infrastructure and urban systems for a changing world.

### **Professor Lord Robert Mair**

Head of the Centre for Smart Infrastructure and Construction, University of Cambridge



## A letter from the Convenor



It has been a year of achievement for UKCRIC, as we passed, with flying colours, a major Gateway review by our funder, the Department for Business, Energy and Industrial Strategy, who commented particularly on our strong commitment to the overall goal of collaboration. And in the 2019 Times Higher Education Awards, our Urban Observatories were shortlisted for Research Project of the Year: Science, Technology, Engineering and Mathematics (STEM).

We are delighted to have been joined by The University of Edinburgh and Heriot Watt University, extending our reach into Scotland. Their membership is based on the huge investment and opportunity of the Edinburgh and South East Scotland City Region Deal, which will see colleagues helping shape infrastructure decisions that will benefit the communities they serve.

We have had positive engagement with the proposed East-West (Cambridge-Milton Keynes-Oxford) Arc development. UKCRIC Management board member Jim Hall's Multi-scale InfraSTRUCTure systems ANALytics (MISTRAL) modelling was presented at a well-attended event at the ICE in London in November 2019. A genuinely inspiring research brainstorming workshop was held in Birmingham in August 2019, which saw the concept move from a railway to a system that has the potential to improve people's lives, and led to East West Rail commissioning four scoping studies from UKCRIC universities to help shape their thinking.

Our infrastructure laboratories across the UK are in various build stages, and continue to make good progress. The National Research Facility for Water and Wastewater Treatment at Cranfield launched in Summer 2019. The National Research Facility for Infrastructure Sensing in Cambridge, and the National Infrastructure Laboratory in Southampton both opened in September. The National Distributed Water Infrastructure Facility at Sheffield came on stream in October.

I write this from my study at home, one week into a soft lockdown in response to the Coronavirus (COVID-19) pandemic. As the US baseball player Yogi Berra is reported to have said, 'it's tough to make predictions, especially about the future'. But it's likely that this continuing event will change the way we view and interact with infrastructure in our daily lives. Our urban observatories gather real-time data on how people use cities and infrastructure. Deploying our full range of expertise and facilities for observation, experimentation and modelling, UKCRIC is well placed to develop research and knowledge that will help ensure our future infrastructure and city systems are relevant to the new world order that emerges.

**Professor William Powrie,**  
UKCRIC Convenor



## 2018-19 in numbers

**12**   
**INFRASTRUCTURE LABORATORIES**

**6**   
**URBAN OBSERVATORIES**

**15**   
**PARTNER UNIVERSITIES**

**£138m**  
**INVESTMENT**  
  
 from **EPSRC**

**£138m**  
**MATCHED FUNDING**   
 from **UNIVERSITIES**  
 and **INDUSTRY**

**210**   
**DIFFERENT ACADEMICS**  
 named in UKCRIC publications

**48**   
**DIFFERENT UNIVERSITIES**  
 named in UKCRIC publications

**53** **LIVE & RECENTLY COMPLETED**  
 projects using UKCRIC infrastructure laboratories worth over **£40m**

**34**   
**CURRENT PROPOSALS** to use UKCRIC infrastructure laboratories

**69**   
**NON-ACADEMIC ORGANISATIONS** using UKCRIC infrastructure laboratories

**19** **LIVE & RECENTLY COMPLETED**  
 projects using UKCRIC Urban Observatories worth over **£25m**

**34**   
**CURRENT PROPOSALS** to use UKCRIC Urban Observatories

## Our missions

UKCRIC's energies and activities are guided by a set of four Missions designed to facilitate the delivery of interconnected, integrated and multi-disciplinary research programmes and projects.

The four Missions are:

### INFRASTRUCTURE AND URBAN SYSTEMS FOR ONE PLANET LIVING

Empowering society to thrive within the capacity of the planet through responsible consumption, resource efficiency and sustainable growth.

### OWNERSHIP, GOVERNANCE AND BUSINESS MODELS FOR INFRASTRUCTURE AND URBAN SYSTEMS

Coping with greater system interdependencies, changing patterns of use and new, disruptive technologies whilst at the same time delivering social justice and affordability.

### TRANSFORMATIONAL INFRASTRUCTURE AND URBAN SYSTEMS FOR A CHANGING WORLD

Enabling infrastructure and urban systems to adapt to the challenges of climate change, changing patterns of use, societal expectations and emergent technologies.

### INFRASTRUCTURE AND URBAN SYSTEMS AS DRIVERS OF EQUITY, INCLUSION AND SOCIAL JUSTICE

Forging healthy, happy and productive lives for all through urban design, planning, policy and infrastructure.

Our Missions bring into focus problem-specific societal challenges that require many different sectors to interact to find a solution. This focus on problems, rather than on sectors, means that solutions can be applied to multiple challenges faced by society.

UKCRIC's Missions, and the way that we use them, continue to evolve through discussion and workshops and in response to shifting societal needs.

## National and international collaborations



### EUROPE

**ENGLAND**  
 Cranfield University  
 Durham University  
 Imperial College London  
 Newcastle University  
 University College London  
 University of Bath  
 University of Birmingham  
 University of Bristol  
 University of Cambridge  
 Canterbury Christ Church University  
 University of Exeter  
 University of Leeds  
 University of Manchester  
 University of Sheffield

University of Southampton  
 University of Warwick  
 Loughborough University  
 Coventry University  
 University of Surrey

**SCOTLAND**  
 University of Edinburgh  
 Heriot Watt University, Edinburgh  
 University of Strathclyde, Glasgow  
 University of Dundee

**WALES**  
 Cardiff University

**NORTHERN IRELAND**  
 Queen's University Belfast

**NETHERLANDS**  
 University of Twente, Enschede

**BELGIUM**  
 Vrije University, Brussels

**SWITZERLAND**  
 ETH Zurich  
 EMPA, Dübendorf

**ITALY**  
 University of Roma-Tre, Rome

**GREECE**  
 University of Patras

### NORTH AMERICA

**UNITED STATES OF AMERICA**  
 California Institute of Technology  
 Oregon State University  
 University of Illinois  
 SUNY - State University of New York  
 University of Texas at Austin  
 School of the Art Institute of Chicago  
 Massachusetts Institute of Technology  
 UCLA - University of California

**CANADA**  
 Queen's University, Kingston

**SOUTH AMERICA**

**COLOMBIA**  
 Universidad del Cauca  
 Universidad del Valle

### AFRICA

Water Land and Resource Centre,  
 Addis Ababa University, Ethiopia  
 University of Makerere, Uganda

**SRI LANKA**  
 International Water Management  
 Institute

**NEPAL**  
 Tribhuvan University, Kirtipur  
 Kathmandu University, Dhulikhel

### INDIA

School of Planning and Architecture,  
 Delhi, India  
 IIT Delhi, India

### MALAYSIA

Universiti Teknologi Malaysia

### CHINA

Fuzhou University, Fuzhou

### AUSTRALIA

University of Canberra  
 University of Melbourne  
 University of Technology Sydney

## UKCRIC's Resources

We develop and invest in research on infrastructure systems and cities; offering new ways of coping with the grand challenges of the 21st century such as climate and demographic change, resource scarcity and social justice.

UKCRIC is composed of three strands: infrastructure laboratories, Urban Observatories, and the Data & Analytics Facility for National Infrastructure (DAFNI).

The **infrastructure laboratories** are a collection of facilities conducting research on the basic science, technology and engineering that underpins the infrastructure sectors and delivers innovative solutions which meet sustainability and resilience criteria. While some of the laboratories are complete and operational, others are still in the very early build phases.

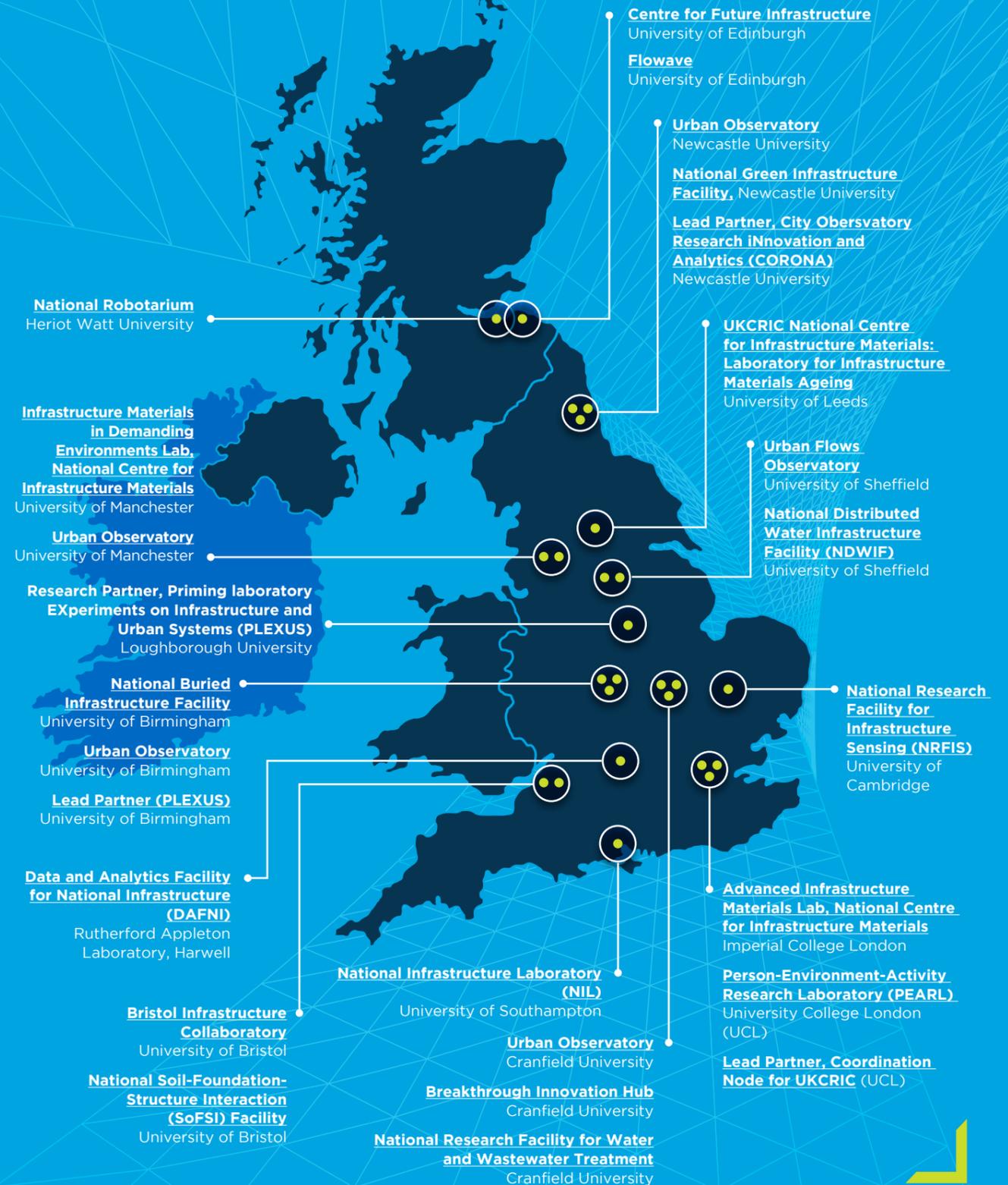
The **Urban Observatories** are a network of UK institutions collecting real-time environmental data – on everything from air quality to noise pollution – to build a picture of each city and the environment it creates. Each of the six observatories is linked to a university and the data collected is openly available. They are based in Newcastle, Bristol, Sheffield, Cranfield, Manchester and Birmingham, with the joint aim of developing a new understanding of cities.

DAFNI, the **Data & Analytics Facility for National Infrastructure**, is the National Platform to satisfy the computational needs in support of data analysis, infrastructure research, and strategic thinking for the UK's long term infrastructure and cities planning and investment needs.

A **Coordination node** provides governance and coordination on behalf of UKCRIC as a whole to ensure that the collective impact of the investments and research is achieved and communicated across and between sectors and communities.

Full information is available at [www.ukcric.com/facilities](http://www.ukcric.com/facilities).

## Resources map





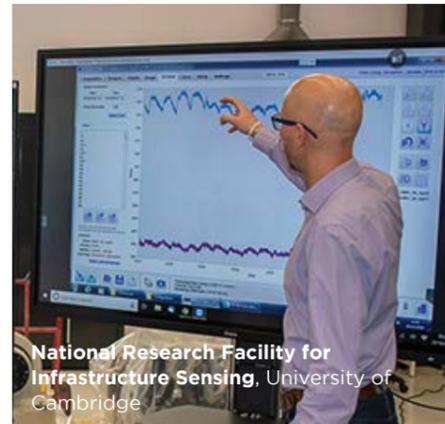
National Research Facility for Water and Wastewater Treatment, Cranfield University



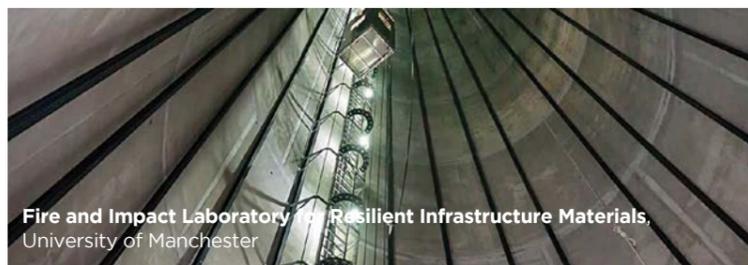
National Distributed Water Infrastructure Facility, University of Sheffield



National Infrastructure Laboratory, University of Southampton



National Research Facility for Infrastructure Sensing, University of Cambridge



Fire and Impact Laboratory for Resilient Infrastructure Materials, University of Manchester



National Buried Infrastructure Facility, University of Birmingham



National Green Infrastructure Facility, Newcastle University

## A world-class suite of infrastructure laboratories

UKCRIC's network of infrastructure laboratories is available for use by researchers and industry alike. The network comprises a series of bespoke, dedicated laboratories for research into the many aspects of infrastructure design and development.

- **The National Distributed Water Infrastructure Facility (NDWIF) at the University of Sheffield** provides a unique laboratory for research into the performance of distributed urban water infrastructure.
- **The National Research Facility for Water and Wastewater Treatment at Cranfield University** supports research on the inter-dependencies between treatment and distribution processes, condition monitoring and performance of technologies.
- **The National Green Infrastructure Facility at Newcastle University** is a 'living laboratory', underpinning research into Sustainable Drainage Systems, Green Infrastructure approaches, and making urban centres more resilient and sustainable for future generations.
- **The National Infrastructure Laboratory (NIL) at the University of Southampton** aims to find new and innovative ways to improve the efficiency of maintaining and upgrading existing infrastructure as well as developing more cost-effective ways of designing and constructing new infrastructure.
- **UKCRIC National Centre for Infrastructure Materials: Laboratory for Infrastructure Materials Ageing at the University of Leeds** aims to provide a networked suite of facilities to research the ageing and deterioration of a whole suite of infrastructure materials.
- **Advanced Infrastructure Materials Laboratory at Imperial College London** has state of the art equipment to undertake fundamental analysis, processing, imaging and testing of infrastructure materials.
- **The Fire and Impact Laboratory for Resilient Infrastructure Materials at the University of Manchester** consists of two facilities to enable investigations of the mechanical properties of materials exposed to extreme loading conditions caused by fire, impact and blast.
- **The Person-Environment-Activity Research Laboratory at University College London** is based in East London. PEARL is designed to enable fundamental and applied research on the ways in which people interact with infrastructure and cities.
- **The Soil-Foundation-Structure Interaction Laboratory at the University of Bristol** aims to integrate structural and geotechnical engineering for soil structure testing.
- **The National Research Facility for Infrastructure Sensing (NRFIS) at the University of Cambridge** focuses on the research and application of advanced sensor technologies for infrastructure monitoring and assessment.
- **The National Buried Infrastructure Facility at the University of Birmingham** is a 'one of its kind' facility for research, education and training in buried infrastructure-ground interaction.
- **The Centre for Future Infrastructure at the University of Edinburgh** will be an intellectual hub for ideas, and a workshop for forging those ideas into practical opportunities and applications, bringing together stakeholders from across the University sector, industry, government and beyond.

While some of the laboratories are still under construction, there are many up and running. Visit [www.ukcric.com/facilities](http://www.ukcric.com/facilities) for full details.

 CASE STUDY

## Innovative concrete design has potential to revolutionise permeable pavement

Dr Alalea Kia, Dr Hong Wong and Professor Chris Cheeseman at Imperial College London have devised a new form of permeable concrete that solves many of the problems that occur with conventional permeable concrete infrastructure. Their new innovation, Kiacrete, is much stronger, has higher permeability, is clogging resistant and is easier to deploy on site than existing permeable concrete. The project has benefitted from UKCRIC and EPSRC funding of the new UK Centre for Infrastructure Materials, based in the Civil and Environmental Engineering Department at Imperial College London.

Impermeable infrastructure is a major cause of local flooding, as an abundance of impermeable surfaces means that the excessive water has nowhere to go. The water therefore ends up channelling into spaces without drainage and is retained by these impermeable surfaces.

Surface flooding in urban areas is already being addressed by existing permeable concrete solutions, but these have a few problems. As they are made of large aggregate particles stuck together to create a pore structure, they are not very strong and this limits applications to driveways and pedestrian footpaths. Due to the tortuosity of the materials microstructure, the water must make its way through many twists and turns to flow through the concrete, and this encourages clogging by sediment particles and other debris in the water. Once clogged, the material is difficult and expensive to clean.

Recognising an opportunity to redesign permeable concrete, the team have come up with a solution that solves these problems by creating permeable concrete containing straight channels, eliminating the problem of tortuosity. Their design has other advantages as it is much stronger, easier to clean and simpler to install than existing permeable solutions, which require considerable expertise to implement. It can be poured on site or supplied as pre-cast tiles for use as pavers and flags. The team is currently working towards large scale delivery of the design and pursuing commercialisation opportunities. For more information see [www.permiapave.com](http://www.permiapave.com)

Permeable concrete created by researchers at Imperial College London. Photo by Hong Wong.



## UKCRIC's Urban Observatories: monitoring the UK's cities

The Urban Observatories network is a pioneering initiative which is capturing over 50 different types of data via a growing network of sensors located throughout the UK. As the UK's largest set of publicly available real time urban data, it represents the often invisible elements impacting our everyday lives. The network, comprising sites overseen by the universities at Newcastle, Sheffield, Bristol, Manchester, Birmingham and Cranfield, has witnessed the largest sensor deployment in the UK to create the largest set of open environmental monitoring data in the world.

The network records over 5,000 observations every minute and has collected 4 billion records to date, measuring over 60 environmental indicators from air quality and flooding to urban biodiversity. This benefits not only the individual cities, but the UK as a whole, as the data enables researchers to identify trends and patterns that underpin infrastructure investment and operational decisions.

Collaboration with local authorities and organisations is a key part of the Urban Observatories project, and the Universities of Newcastle, Birmingham and Manchester all work with local schools where they have installed air quality monitors. Newcastle University worked with Newcastle City Council to deliver a workshop on how to access and use the data from the air quality pods outside their schools, building a portal for schools to easily access this data. Manchester University has worked on testing air purification equipment in schools, alongside partners Philips Foundation and Global Action Plan. Campbell Scientific has supported the Birmingham school-based weather station deployment.

The data has even been used for artistic applications, with air quality data from the Observatories included in the art visualisation project FLUX by NOVAK, a creative studio producing innovative and ambitious art and design projects. The project was displayed in Newcastle in May.

Several hackathons were organised in collaboration with DAFNI colleagues to bring together data from separate observatories to make it comparable. A hackathon with local businesses was successfully held in Sheffield and a second DAFNI Hackathon took place in Cranfield with the aim of connecting the UKCRIC Water Hub Pilot Hall sensors with the flow cytometers and water quality network.

Visit [www.ukcric.com/facilities](http://www.ukcric.com/facilities) for further details.

The achievements of the project were recognised when the Newcastle Urban Observatory won Digital Leader 100 smart city of the year 2019. The team was also nominated for the **Times Higher Education - Research Project of the Year: STEM 2019.**





## CASE STUDY

### Making informed infrastructure decisions

The Newcastle Urban Observatory has contributed to a key infrastructure change in Newcastle City Centre by providing valuable data to the City Council relating to the pedestrianisation of one of the city's busiest shopping streets, Blakett Street.

Blakett Street is expected to be permanently closed to traffic in 2020 following a public consultation. The data was collected by the Urban Observatory at Newcastle University from a network of sensors placed across the city. The Urban Observatory has a partnership with the Newcastle City Council, to help the Observatory understand the sorts of questions the Council were interested in when it came to long term changes to infrastructure. Blakett Street is the main East-West bus corridor across the city.

There has been interest in pedestrianising the area for a long time, as it is an accident blackspot due to the surrounding pedestrianised areas and the volume of bus, taxi and delivery traffic along the street.

As the street is closed at various times during the year, for example when Christmas markets and other events are on, it has given the Observatory the opportunity to understand baseline information about the area when it is both open and closed to traffic: vehicle counts, people count and air quality, to mention a few. Having this information was of great benefit to the City Council, who then had quantitative data to better understand the impacts that closing this street to traffic would have, on not only Blakett Street specifically, but other streets in the vicinity that would be affected by the displaced traffic.

Access to comprehensive data of this kind has helped the City Council to quantify the benefits of the road closure and has the potential to help make more informed decisions about city infrastructure changes in the future.



## Consolidating data on national infrastructure: DAFNI

DAFNI (Data & Analytics Facility for National Infrastructure) will transform the use of data, modelling and simulation in infrastructure research and decision-making by providing a new centralised hub for infrastructure data and unique computational capabilities. DAFNI facilitates collaboration by sharing data, enabling the coupling of system simulation models and informing decision-making through advanced visualisation. It provides a central point for data and offers large scale analysis, specialised software tooling to support single and multi-component models, novel ways of visualising the outputs, and aims to support wider factors like resilience planning, air quality impacts, and environmental well-being.

DAFNI provides a central location for data, a means for researchers to upload models and link to other models. Its aim is to provide a test arena for different research scenarios. It provides more compute than usually available to researchers, not only enabling them to scale up their research but providing real-time savings when processing large amounts of data. Through its workflow management system it also allows researchers to scrutinise data to finer levels than previously experienced, and provides the means to process real-time data to understand the impact of real-time events and start to understand what is happening with our services and how they affect one another.

This year has also seen pilot integration of a number of models from UK institutions into DAFNI. A series of DAFNI demonstration events have been held in Bristol, Cambridge, Cranfield, Edinburgh, and London. DAFNI has also started to support a number of Centres for Doctoral Training in the area of water modelling and cyber security with researchers from Bristol, Cranfield, Newcastle, and Sheffield.

Visit [www.DAFNI.ac.uk](http://www.DAFNI.ac.uk) for full details.

This year, DAFNI has released a pre-production Bronze version, developed using Agile processes by the Scientific Computing Department based at the Science and Technology Facilities Council. The functionality was launched at an event at The Royal Society in June 2019 to over 200 attendees from academia, government and industry.


 Q CASE STUDY

## DAFNI on track with railway station demand planning

According to Network Rail, 1.7 billion people per year travel by rail in the UK. With ever-increasing demand for the rail network to be as efficient and wide-reaching as possible, improvements or additions must be thoroughly considered before spending the limited budget available.

A key question facing Network Rail and local authorities alike is where to locate new stations to best serve business and community needs. Answers need to be supported by evidence-based predictions formed from in-depth analysis of projected future station use.

The Transportation Research Group at The University of Southampton has developed the Station Demand Model to help answer this question. This DAFNI-hosted service generates a demand forecast – predicted trips per year – for one or more proposed local railway stations. It can also analyse the potential number of passengers who would change to new stations and what net impact a new station would have on rail use. The model is flexible in that it can perform forecasts for multiple stations at once. These can be treated either independently, involving the assessment of alternative station locations, or concurrently, whereby the proposed new station will coexist with ones currently in operation.

The model, developed by Dr Marcus Young and Dr Simon Blainey at the University of Southampton, goes beyond the limits of existing models to better represent real-

life travel behaviour, making the resulting predictions more accurate. Rather than having unrealistically-rigid ‘zones’ and assigning each zone to its nearest station, it uses probabilities derived through station choice models to determine how many passengers would likely choose each of the stations being analysed. This takes into account the competition which is known to exist between stations, particularly those that are situated relatively close to one another. As well as looking at whether a location would be viable based on the number of travellers in the vicinity, the model can be adapted to enable a user to look at a variety of factors which may impact station use. The configuration options include station-specific information, such as available parking spaces or train service frequency, and variables from the surrounding environment, for example additional housing or jobs in the local area.

There is a web interface which allows users to interact with the model for their specific requirements, and can produce map-based visualisation of the results. The interface is easy to use and does not require any specialist technical knowledge. Hosting this model on the DAFNI platform will enable it to be linked with other models as the platform grows, improving the efficiency of nationwide infrastructure research on a holistic level.

Full information is available at DAFNI Pilot 3: [\*\*DAFNI on Track with Railway Station Demand Planning.\*\*](#)

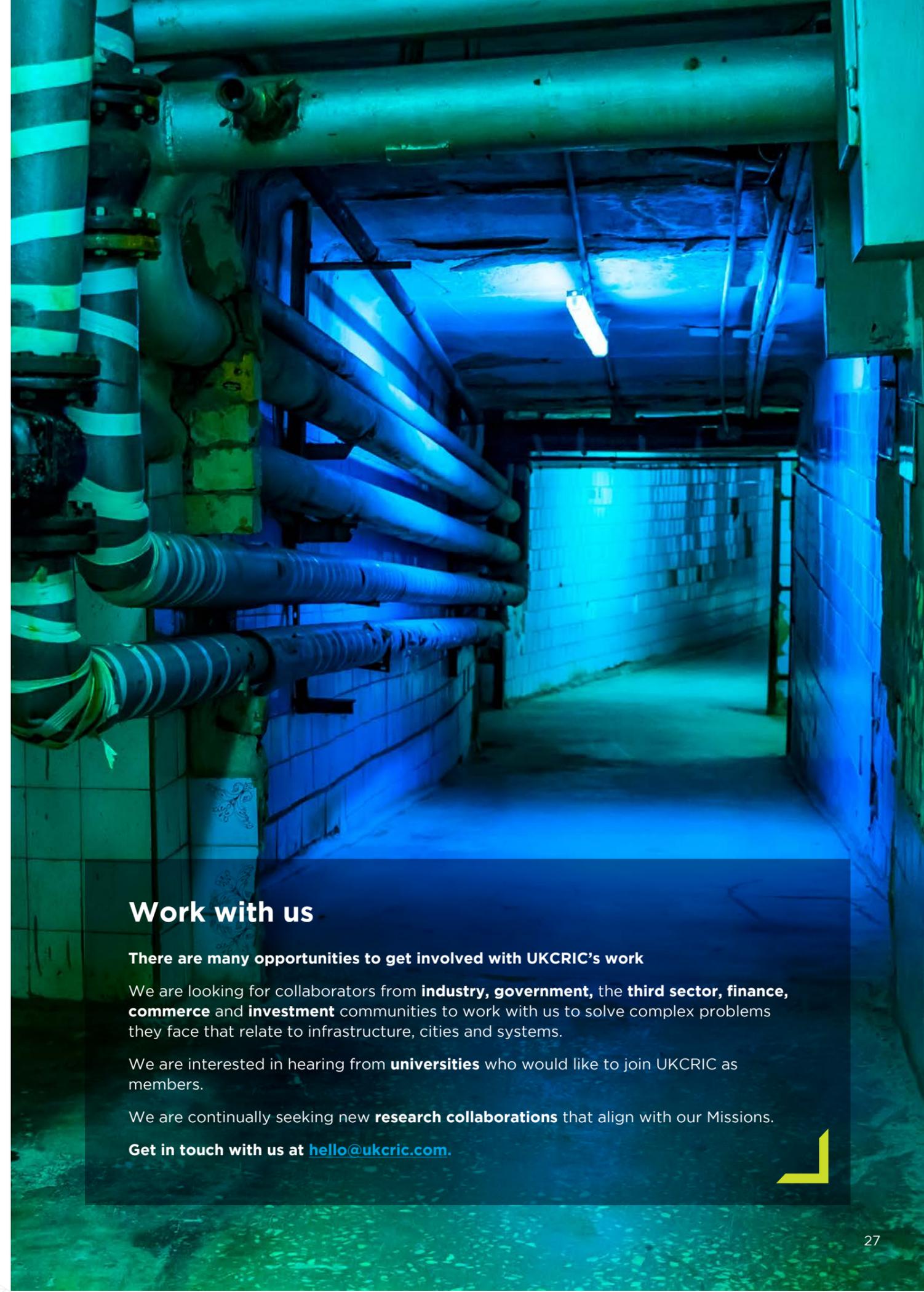
## Coordination Node outreach at the Urban Transitions conference in Barcelona 2018

Members of UKCRIC's Coordination Node (CN) attended the Urban Transitions conference in 2018 to network, raise awareness of UKCRIC and share relevant research with the community. Dr Tom Dolan from University College London presented on Resilience Impacts of the Digital Transformation of Infrastructure Systems. He was joined at the conference by CN members Professor Chris Rogers from University of Birmingham and Professor Paul Jeffrey from Cranfield University. The conference brought together different disciplines working within cities including world leading experts on urban and transport planning, architecture, environmental exposures, physical activity, and public health and governance to discuss current challenges and solutions.

## Building a Net Zero Economy

UKCRIC joined Mott Macdonald, Anglian Water, Skanska, Transport for London, and the UK Green Building Council to become a founding member of the Net Zero Coalition in 2019. The coalition aims to identify and address key transformational challenges faced by the infrastructure industry, to support realisation of UK Net Zero targets. The coalition released its first [report](#) in July 2019.

Net Zero will co-ordinate its activities with the Committee on Climate Change, National Infrastructure Commission, Department for Business, Energy & Industrial Strategy, Treasury and the Infrastructure & Projects Authority, as well as the Aldersgate Group, Green Construction Board, Energy Systems Catapult and Major Projects Association.



## Work with us

**There are many opportunities to get involved with UKCRIC's work**

We are looking for collaborators from **industry, government, the third sector, finance, commerce** and **investment** communities to work with us to solve complex problems they face that relate to infrastructure, cities and systems.

We are interested in hearing from **universities** who would like to join UKCRIC as members.

We are continually seeking new **research collaborations** that align with our Missions.

**Get in touch with us at [hello@ukcric.com](mailto:hello@ukcric.com).**

## A look to the future of UKCRIC

Successive governments over recent years have indicated their willingness and commitment to invest in next generation infrastructure that will be fit for the 21st century. It is clear that impacts of climate change, changing demographics, an ageing asset base and emerging threats such as resource security provide some urgency to this commitment. Estimates of the level of investment required suggest expenditures of £600 billion over the next few decades; a programme of change that is widely viewed as both expensive and risky.

In order to achieve the objectives laid out by not only the Government (e.g. on net zero, electric road transportation, improved productivity and prosperity), but also by the Infrastructure and Projects Authority, the National Infrastructure Commission, and utility regulators, it is clear that considerable research and development will be required to deliver the required technological, economic, governance, and business model innovations. We will need to develop improved understandings of the interdependencies between infrastructure systems and the communities they serve. Such challenges span multiple areas of society, have no single owner, and cannot be effectively addressed by focusing on traditional industrial sectors or single knowledge generation disciplines.

Our collaborative model and convening power across multiple sites and establishments can mobilise world-class research to tackle these complex, systems-level challenges. We are uniquely positioned to accelerate our contribution to national goals through advanced research on all aspects of the nation's infrastructure. As we grow in stature, outreach and impact in response to evolving national and global priorities, we will adapt our own structures and governance to match our ambitions to advance world-class research applied to real-world problems, and to provide decision-support for the reshaping of our infrastructure systems so that they work for both people and planet.

## Partners



Imperial College  
London



## Governance and structure

### Management Board

**Julie Alexander**, Chair of Management Board, Places For People  
**Prof. William Powrie**, Convenor, University of Southampton  
**Prof. Brian Collins**, Deputy Convenor, University College London  
**Prof. Jordan Giddings**, Director of Operations and Stakeholder Relations, University College London  
**Prof. Chris Rogers**, Director of Research Integration, University of Birmingham  
**Prof. Paul Jeffrey**, Director of Research Impact, Cranfield University  
**Prof. David Richards**, Director of Research Strategy, University of Southampton  
**Prof. Gordon Masterton**, University of Edinburgh  
**Prof. Stephanie Glendinning**, Newcastle University  
**Prof. Simon Tait**, University of Sheffield  
**Prof. Leon Black**, University of Leeds  
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**Prof. Jim Hall**, University of Oxford  
**Prof. Sergio Cavalaro**, Loughborough University

### Directors and Coordination Node

**Prof. William Powrie**, Convenor, University of Southampton  
**Prof. Brian Collins**, Deputy Convenor, University College London  
**Prof. Jordan Giddings**, Director of Operations and Stakeholder Relations, University College London  
**Prof. Chris Rogers**, Director of Research Integration, University of Birmingham  
**Prof. Paul Jeffrey**, Director of Research Impact, Cranfield University  
**Prof. David Richards**, Director of Research Strategy, University of Southampton  
**Prof. Gordon Masterton**, University of Edinburgh  
**Dr. Tom Dolan**, Senior Research Associate, University College London  
**Dr. Anne Stringfellow**, Senior Research Fellow, University of Southampton  
**Dr. Joanne Leach**, Coordination Node Manager, University of Birmingham  
**Kasia Ladds**, Communications Manager, University College London  
**Rod Anderson**, University of Southampton  
**Dr. Barbara Pizzileo**, Senior Programme Manager, University College London  
**Frances Benson-Cooper**, Coordination Node Administrator, University College London  
**Michele Miller**, Cranfield University

### Advisory Board

**Dist. Prof. Cynthia Mitchell (Chair)**, Deputy Director ISF, University of Technology Sydney  
**Prof. William Powrie**, Convenor, UKCRIC  
**Prof. Brian Collins**, Deputy Convenor, UKCRIC  
**Prof. Stephen Flynn**, Founding Director, Global Resilience Institute, Northeastern University  
**Asim Gaba**, Director, Trustee and Fellow, ARUP  
**Peter Ho**, Chairman, Urban Redevelopment Authority of Singapore  
**Prof. Thomas D. O'Rourke**, Professor, Cornell University  
**Prof. Pascal Perez**, Director, SMART Infrastructure Facility, University of Wollongong  
**Bridget Rosewell**, Commissioner, National Infrastructure Commission



# UKCRIC

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UK Research  
and Innovation

**EPSRC**

Engineering and Physical Sciences  
Research Council