GCRF Cities & Infrastructure Programme

The British Academy supports 17 interdisciplinary research projects through its *Cities & Infrastructure Programme*, as part of the UK Government's £1.5 billion Global Challenges Research Fund.

Title: Towards Inclusive Health Systems and Infrastructure Access: Enhancing the Well-Being of Refugees in East African Cities

PI: Dr Diane Archer, Senior Researcher, International Institute for Environment and Development
Co-Applicant: Professor Blessing Mberu, Head of Urbanisation and Well-Being Research Programme, African Population and Health Research Center

Cities: Kampala, Nairobi

Abstract: Although 60% of refugees and asylum-seekers live in cities rather than camps, studies rarely consider their challenges in accessing healthcare, shelter, and infrastructure. This new project will analyse urban refugees' health vulnerabilities, health-seeking practices, barriers to care, and access to water, sanitation, and other vital infrastructure. It recognises that urban refugees' well-being depends not only on healthcare, but also upon shelter and infrastructure. Via case studies of Kampala and Nairobi, it will offer South-South learning opportunities and lessons for other cities facing humanitarian crises. It will explore variations among urban refugees, shared challenges with residents of informal settlements, and ways to foster inclusion and well-being. This multidisciplinary study can inform future collaborations between public health and city planning officials; civil society; and humanitarian agencies. Its findings will encourage farsighted, inclusive responses that will better address urban humanitarian crises, benefiting both refugees and low-income host populations.

Title: Mexico's Megalopolis as a Model for the Key Role of Watershed Protection to Sustainable Cities

PI: Dr Diana Bell, University of East Anglia
Co-Investigator: Professor Roger Few, Professorial Research Fellow, School of International Development, University of East Anglia

Cities: Mexico City, Puebla, Toluca and Cuernavaca

Abstract: This project combines expertise in UK and Mexican universities/ NGOs with that of in-country stakeholders to determine how endemic grassland and forest can be sustainably managed for watershed provision in four major urban centres which form a megalopolis in Central Mexico, namely Mexico City, Puebla, Toluca and Cuernavaca which supports 30 million people. The key research issues to be addressed are to: 1) establish the

status and trends of both the native grassland/forest cover (1950´s to present) in terms of distribution and species composition in the 350,000 ha of volcanic montane watershed, 2) analyse the relationship between changes in this watershed ecosystem and hydrological balance, in particular as related to aquifer recharge, 3) analyse the impact of different management policies and practices carried out by indigenous communities and municipalities, 4) propose robust scientifically-based guidelines for sustainable long-term native grassland/forest watershed management to promote urban resilience and serve as a global model

Title: Implementing Creative Methodological Innovations for Inclusive Sustainable Transport Planning (I-CMIIST)

PI: Dr Steve Cinderby, Senior Research Leader, Stockholm Environment Institute, University of York
Co-Applicant: Professor Michael Wilson, Associate Dean for Research, Professor of Drama, School of the Arts, English and Drama, Loughborough University

Cities: Nairobi, Kampala

Abstract: Typically half of East African cities' urban residents walk to work (60% Kampala daily commute trips are on foot), yet infrastructure provision for non-motorised transport remains mainly aspirational. Inclusion of vulnerable communities in the development of streetscape infrastructure to support their journeys is rare; but considering their livelihood and social interaction needs in planning is even less common. Addressing sustainable mobility for developing country cities is a key urbanisation challenge. Building upon a completed GCRF network grant that explored with artists, practitioners, planners and policy makers the potential benefits of using more creative methods to co-design urban infrastructure to enhance mobility, this project will compare the outcomes of deploying such approaches on: inclusion; co-benefits including unexpected improvised opportunities; and outcomes - with current standard planning practices. The project will evaluate the longer term learning legacy encouraged by this interdisciplinary action research on key decision makers to assess if belief changes have occurred.

Title: Reducing Disaster Risk to Life and Livelihoods by Evaluating the Seismic Safety of Kathmandu's Historic Urban Infrastructure.

PI: Professor Robin Coningham, UNESCO Chair in Archaeological Ethics and Practice in Cultural Heritage, Durham University
Co-Applicants: Professor Ian Simpson, Professor of Biological and Environmental Sciences, University of Stirling; Dr Andrew Wilson, Senior Lecturer of Archaeological and Forensic Sciences, University of Bradford; Professor David Toll, Professor of Engineering, Durham University; Dr Paul Hughes, Assistant Professor of Engineering, Durham University; Dr Vasilis Sarhosis, Assistant Professor of Civil Engineering, Newcastle University; Dr Sean Wilkinson, Reader in Structural Engineering, Newcastle University

Cities: Kathmandu

Abstract: Kathmandu's medieval cities and shrines are exceptional architectural and artistic achievements with traditions of seismic adaptation. They host urban infrastructure of tangible and intangible value and play vital roles of cohesion in the life of thousands and

represent portals where the heavens touch earth and people commune with guiding deities. Generating 7.6% GDP through tourism, Kathmandu's iconic skyline was dramatically altered by the Gorkha Earthquake in 2015. Losses included 9,000 killed, 20,000 injured and the destruction of 500,000 homes. A total of 691 historic monuments across Nepal were damaged, of which 131 collapsed causing death and injury, with an associated 32% cancellation of tourist visits. This interdisciplinary North-South partnership contributes to SDG17 by co-producing and disseminating a methodology to assess, evaluate and improve the seismic safety of historic urban infrastructure within Kathmandu's World Heritage sites, reducing direct risk to life and livelihoods and damage of gains towards SDG11, while preserving Kathmandu's authenticity and traditions.

Title: Disconnected Infrastructures and Violence Against Women (VAW): Innovating Digital Technologies in Low-Income Neighbourhoods to Produce Safer Indian Cities

PI: Dr Ayona Datta, Reader in Urban Futures, King's College London
Co-Applicants: Dr Don Slater, Associate Professor (Reader) of Sociology, London School of Economics; Dr Joanne Entwistle, Reader of Culture, Media and Creative Industries, King's College London; Dr Rakhi Tripathi, Associate Professor and Head, Centre for Digital Innovation, Fore School of Management, Delhi

Cities: Kochi, Thiruvananthapuram

Abstract: Continuous and widespread Violence Against Women (VAW) in urban India highlight the challenge of delivering SDGs 5 and 11 - gender equality and safe, sustainable, inclusive cities. In particular, women in low-income urban neighbourhoods face increased sexual and physical assaults during access to and use of connected infrastructures (eg. water, toilets, transport, walkways), which also highlight the challenge of delivering SDG 6 – clean water and sanitation to all. Combined with this is an acute information and skills gap in technology use amongst these women that impedes their knowledgeable and empowered engagement with social and material assemblages of urban infrastructures. This project will take a rights-based approach to the challenge: How to address VAW by improving women's knowledge of and safe access to urban infrastructure in the Indian city. The project will use innovations in digital technology and open source mapping, co-produced with societal partners, to collect big data on infrastructural blindspots, and deep data on VAW through participatory mapping of infrastructure use.

Title: Religious Urbanisation and Infrastructural Lives in African Mega-Cities: Moral Economies of Development in Kinshasa and Lagos

PI: Dr David Garbin, Senior Lecturer of Sociology, University of Kent
Co- Applicants: Dr Gareth Millington, Senior Lecturer of Sociology, University of York; Professor Simon Michael Coleman, Chancellor Jackman Professor of Religion, University of Toronto

Cities: Lagos, Kishasa

Abstract: This interdisciplinary project addresses one of the most pressing challenges of contemporary African mega-cities: how to tackle social, moral, strategic and economic issues raised by often spectacular processes of religious urbanisation. Urbanisation and development are usually conceptualised through secular frameworks. No research to date

has examined the socio-economic and development impact of extensive urban infrastructures provided by religious actors in African Sub-Saharan contexts. Taking as case studies Lagos and Kinshasa—the most populated and fastest growing cities in Sub-Saharan Africa—this project will explore how religious socio-spatial models and strategies engage with challenges of infrastructural development, urban social cohesion and inclusion, safety and sustainability. The project will provide recommendations aimed at promoting civic urban culture in context of growing inequalities and widespread informalisation of urban life in cities where religious actors play significant infrastructural roles.

Title: Vulnerability to Extreme Weather Events in Cities: Implications for Infrastructure and Livelihoods (VEWEC)

PI: Professor Katherine V. Gough, Professor of Human Geography, Loughborough University
Co-Applicants: Professor Paula Griffiths, Professor of Population Health, Loughborough University; Professor Robert Wilby, Professor of Hydroclimatology, Loughborough University; Professor Samuel Nii Ardey Codjoe, Director of the Regional Institute for Population Studies, University of Ghana; Professor Paul William Kojo Yankson, Professor of Geography and Resource Development, University of Ghana; Dr Sam Kayaga, Senior Lecturer of Civil and Building Engineering, Loughborough University; Dr Raymond Kasei, Senior Lecturer and Researcher of Climate Change and Food Security, University for Development Studies

Cities: Accra, Tamale

Abstract: Many cities in the global South are increasingly experiencing extreme weather events, which are having devastating impacts on infrastructure and human lives. VEWEC brings together an expert, interdisciplinary team to investigate the impacts of flooding and extreme heat on urban infrastructure, and the resultant consequences for the livelihoods of poor urban residents in Ghana. The main aims are to: refine methods for mapping 'hotspots' of vulnerability and predicting flooding and extreme heat in cities by drawing on existing climate data; examine the impact of flooding and extreme heat on water, electricity and health services; analyse the impact of reduced service levels during extreme weather events on the income-generating activities of the urban poor; co-produce adaptive strategies to extreme weather events with residents, service providers and policymakers. The cities of Accra and Tamale, with their differing climates, urban form and size, infrastructure and governance systems, will provide contrasting cases within one national context.

Title: Energy Innovation for Low-Cost Housing in India and South Africa: Strategies for Interdisciplinary and Cross-Institutional Dialogue

PI: Dr Charlotte Lemanski, Senior Lecturer of Geography, University of Cambridge
Co-Applicants: Dr Ruchi Choudhary, Reader of Architectural Engineering, University of Cambridge; Dr Minna Sunikka-Blank, Senior Lecturer of Architecture, University of Cambridge; Dr Jaideep Prabhu, Professor of Marketing and Jawaharlal Nehru Professor of Indian Business, University of Cambridge; Dr Jiska de Groot, Group Leader of Energy, Poverty and Development, University of Cape Town; Dr Amir Bazaz, Senior Consultant of Practice, Indian Institute for Human Settlements Bangalore

Cities: Bangalore, Cape Town

Abstract: This research explores how low-income communities, private energy entrepreneurs, and government (at various scales) work in contestation and collaboration to devise and deliver affordable domestic energy that meets the long-term needs and aspirations of low-income households in two rapidly urbanising cities, Bangalore (India) and Cape Town (South Africa). The primary focus is on the role of the three key stakeholders, investigating how government and industry plan and implement energy innovation in government subsidised housing, and the role of low-income households' needs and aspirations in this process. The research has two overarching aims: firstly, to implement an interdisciplinary approach that delivers learning across the physical and social sciences; and secondly, to propose strategies that enable divergent stakeholders and institutions to work collaboratively in producing and implementing innovative energy solutions that are technically-, financially- and culturally-appropriate for government-subsidised housing (in terms of both people and product).

Title: Public Services and Vulnerability in the Lebanese Context of Large-Scale Displacement

PI: Professor Henrietta Moore, Director of the Institute for Global Prosperity, University College London
Co-Applicants: Dr Nikolay Mintchev, Research Associate of Global Prosperity, University College London; Professor Nick Tyler, Chadwick Professor of Civil Engineering, University College London; Dr Camillo Boano, Senior Lecturer of Development Planning, University College London; Dr Andrea Rigon, Lecturer of Development Planning, University College London; Professor Nasser Yassin, Professor of Public Policy and International Affairs, American University of Beirut

Cities: Beirut, Zahle, Tripoli

Abstract: This project aims to improve the design, quality and inclusiveness of public services in Lebanon in areas with large numbers of Syrian refugees. The arrival of over a million Syrians in Lebanon since 2011 has put enormous strain on economies and services, particularly in poor areas in cities such as Beirut, Zahlé and Tripoli. Current approaches to planning in Lebanon are based on a top-down approach which does not reflect the changing circumstances of communities and which has forced increased reliance on an informal sector that is approaching its absorbing limit. In contrast to a top-down approach, this project begins by identifying the multiple forms of vulnerability, resilience and agency of both refugees and Lebanese hosts, and the ways in which people's experiences are structured by inequalities embedded in infrastructure and service provision. The project focuses on small research areas to produce fine-grained qualitative and ethnographic data in order to understand how people's concrete experiences link to larger policies and inequalities at the municipal and national levels.

Title: Capability Building for Infrastructure Delivery

PI: Professor Paul Nightingale, Professor of Strategy, University of Sussex
Co-Investigators: Dr Dzidziso Samuel Kamuriwo, Senior Lecturer in Strategy, Cass Business School, City University of London; Dr Rob Byrne, Lecturer, Science Policy Research Unit, University of Sussex

Cities: Urban and rural areas in South Africa, Zimbabwe, Botswana, Kenya, Ghana and Tanzania (tbc)

Abstract: Infrastructure in sub-Saharan Africa plays a key role in generating economic growth and supporting resilient societies. However, it is difficult to deliver: projects are often contested, are technically, organisationally and managerially complex, and can require large, upfront, illiquid investment. International investors often demand higher rates of return because of the higher political, currency and project risks involved in developing countries (with soft currencies). Because projects are temporary, often unique, and typically infrequent, the capabilities needed to deliver infrastructure services effectively are difficult to build. This project aims to deepen understanding of (1) the capabilities that public and private sector organisations need to effectively deliver infrastructure projects that maximise benefits for local communities and (2) how such capabilities can be enhanced and shared to reduce risks and costs. The research is co-produced with local partners to enhance existing peer-to-peer learning networks and build new capability building collaborations.

Title: Strengthening Urban Engagement of Universities in Asia and Africa (SUEUAA)

PI: Professor Michael Osborne, Professor of Adult and Lifelong Learning, University of Glasgow
Co-Applicants: Dr Lavinia Hirsu, Lecturer in Applied Linguistics, University of Glasgow; Dr Katarzyna Borkowska, Lecturer in Education, University of Glasgow; Dr Muir Houston, Senior Lecturer of Education, University of Glasgow; Dr Neil Burnside, Lord Kelvin Adam Smith Research Fellow of Engineering, University of Glasgow

Cities: in Iran, Iraq, Philippines, South Africa, Tanzania, Zimbabwe (tbc)

Abstract: This proposal addresses a core problem in emerging economies of strengthening the urban engagement role of universities, and ways in which they contribute to developing sustainable cities in the context of the major social, cultural, environmental and economic challenges facing the global South. It uses a set of well-proven benchmarking tools as its principal method, and seeks to strengthen the capacity of universities to contribute to city resilience towards natural and human-made disasters. Examples of urban engagement include supporting the development of physical infrastructure, ecological sustainability, and social inclusion (including of migrants). It calls upon contributions from science and engineering, the arts, environmental sciences, social sciences and business studies. It assesses the extent to which universities in 6 countries (Iran, Iraq, the Philippines, South Africa, Tanzania and Zimbabwe) respond to demands of society, and how through dialogue with city stakeholders this can be enhanced and produce impact on policy; it uses a collaborative team from the UK and emerging economies.

Title: The Governance of Infrastructure Interfaces: Cities, Technical Systems and Institutional Connections

PI: Dr Philipp Rode, Associate Professorial Research Fellow, LSE Cities, London School of Economics & Political Science
Co-Investigators: Professor Jo Beall, Director, Education and Society, British Council; Dr Marco Di Nunzio, Urban Age Research Officer, LSE Cities, London School of Economics & Political Science; Dr Nuno da Cruz, Assistant Professorial Research Fellow, LSE Cities, London School of Economics & Political Science

Cities: Addis Ababa and Dire Dawa

Abstract: This project investigates the governance of urban infrastructure interfaces in two Ethiopian cities, the capital Addis Ababa and the second largest city Dire Dawa. The interfaces or connection points bring together different technical characteristics (e.g. large/small scale), governance regimes (e.g. formal/informal) and disciplinary expertise (e.g. engineering/social policy). Understanding the boundaries between infrastructure interfaces tends to be neglected in urban praxis and research. Yet it is here where many critical questions for cities arise: who governs, who decides, who funds? Based on comparative case study methods, this project will examine two interfaces: transport (rail/local transport) and sanitation (city-wide/local) infrastructures in each of the two case study cities. Combining socio-spatial analysis with institutional analysis of infrastructure governance, it aims to better understand the relationship between development goals and the contribution made by infrastructure roll out, and also generating a typology of infrastructure interfaces across sectors.

Title: Optimal Investment Strategies to Minimize Flood Impact on Road Infrastructure in Vietnam

PI: Dr Maria Paola Scaparra, Reader in Management Science, University of Kent
Co-Investigators: Dr Trung Hieu Tran, Leverhulme Research Fellow in Urban Modelling and Optimisation, University of Nottingham; Professor Paul Nathanail, Professor of Engineering Geology, University of Nottingham; Dr Hiep Nguyen, Director of Applied Geophysics Centre, Vietnam Academy of Science and Technology

Cities: Hanoi

Abstract: Vietnam is ranked globally as the country with fourth highest exposure to flooding. Between 1985 and 2010, more than 80 major floods affected Vietnam. The national Institute of Meteorology, Hydrology and Environment (IMHEN) recorded over 5000 people killed and 25 million impacted by floods during the last 50 years (IMHEN-UNDP 2015). Fast urbanization, aging drainage systems and climate change impact exacerbate the problem of floods on transport infrastructure in the cities. To solve this problem, there is a need for a science-driven approach to investment planning. Our proposed multi-disciplinary project aims to address this by developing optimized investment strategies that minimise flood impacts on road infrastructure in Vietnam, focusing on urban areas like Hanoi. We will achieve this by working closely with an established network of local authorities, researchers and communities. By working in partnership with key stakeholders, we are confident that the research findings will be integrated into future infrastructure investment plans and inform policy making and implementation.

Title: Co-Production of Landslide Risk Management Strategies Through Development of Community-Based Infrastructure in Latin American Cities

PI: Dr Harry Smith, Associate Professor, School of Energy, Geoscience, Infrastructure and Society, Heriot-Watt University
Co-Applicants: Dr Gabriela Maluf Medero, Associate Professor of Infrastructure and Environment, Heriot-Watt University; Dr Maria Soledad Garcia Ferrari, Senior Lecturer of Architecture and Landscape Architecture, Edinburgh College of Art / University of

Edinburgh; Professor Francoise Coupe, Emeritus Professor of Habitat, Facultad de Arquitectura, Universidad Nacional de Colombia sede Medellin; Professor Alex Abiko, Professor of Construction, Universidade de Sao Paulo

Cities: Medellin, Sao Paulo

Abstract: The project aims to explore the scope for upscaling and transnational transfer of participatory landslide risk-reducing strategies for informal settlements in Latin America. Drawing on lessons from a pilot experience in a single small informal settlement in Medellin, Colombia, the project will roll out and evaluate the use of community-based participatory monitoring and mitigation of landslide risk across the city in Medellin, as well as in another city within a different Latin American country – São Paulo in Brazil. The overall aim is to develop bottom-up approaches to dealing with landslide risks in cities around the global South, in a way that optimises the collaboration between communities and relevant governmental bodies, as well as the collaborative use of 'soft' and 'hard' infrastructures.

Title: Rebuilding Kinship and Care after Dislocation in Urban South Asia: Colombo and Lahore Compared

PI: Professor Jonathan Spencer, Regius Professor of South Asian Language, Culture and Society, University of Edinburgh
Co-Applicants: Dr Ammara Maqsood, ESRC Future Research Leaders Fellow/Junior Research Fellow of Social and Cultural Anthropology, University of Oxford

Cities: Lahore, Colombo

Abstract: The project is a multi-disciplinary study of the consequences of dislocation for poor communities in Lahore (Pakistan) and Colombo (Sri Lanka). In both cases, families living in low-income settlements have been forcibly relocated in the name of development. This study will focus on the underexplored implications of relocation for everyday relations of kinship and care, which are vitally important for the resilience of poor communities in Asia. Anthropological research on networks of kinship will be complemented by planning expertise to produce maps of displacement. The project is based on many years' experience of research in the two cities and the team will draw on a wide pool of collaborators at different points in the research. In particular, the team will use evidence in engagements with local activists, art practitioners, lawyers, architects and planners, and policymakers. Within both settings, the project will develop new approaches to the built environment that minimise the negative effects of dominant infrastructure and displacement interventions on community resilience.

Title: Safer Self-Recovery: Promoting Resilient Urban Reconstruction after Disasters

PI: Professor John Twigg, Principal Research Fellow of Risk and Resilience, Overseas Development Institute
Co-Applicants: Dr Susanne Sargeant, Senior Scientist of Earthquake Seismology, British Geological Survey; Professor Tiziana Rossetto, Professor in Earthquake Engineering and Director of EPICentre, Civil, Environmental and Geomatic Engineering, University College London

Cities: Kathmandu, Tacioban

Abstract: Most urban families in developing countries recover from disasters using their own resources, knowledge and initiative ('self-recovery'). Yet, self-recovery is poorly understood; there is a lack of evidence on how to best support it, particularly in urban environments. This project examines self-recovery processes with a focus on the safety and durability of self-built homes after rapid-onset disasters in marginal and informal urban settlements. Findings will inform design of guidelines and tools for urban governments, policy makers and the international humanitarian shelter sector to better promote and support self-recovery, leading to more resilient recovery and reconstruction. There is almost no research on self-recovery from the perspective of affected families. This project addresses this knowledge gap and develops a model for supporting affected people to make informed decisions about their own recovery and future resilience.

Title: NutriCities: Building Urban Resilience Through Grassroots Nutritional Infrastructures

PI: Dr Antonis Vradis, Lecturer and Vice-Chancellor's Research Fellow of Geography, Loughborough University
Co-Applicants: Dr Oonagh Markey, Vice Chancellor's Research Fellow of Sport, Exercise and Health Sciences, Loughborough University; Professor Richard Pithouse, Associate Professor for the Humanities, Rhodes University

Cities: Rio de Janeiro, Durban

Abstract: Food security is one of the key markers of global inequality, rightly featured as a key UN Sustainable Development Goal. Individuals with poor nutritional access increasingly concentrate in the rapidly expanding cities of the global South. They overcome barriers in growing, sharing and consuming sufficient and safe food by building their own Grassroots Nutritional Infrastructures (GNIs), which are nevertheless overlooked in policy. NutriCities will conduct an interdisciplinary ethnography of GNIs in the Mare favela complex (Rio de Janeiro, Brazil) and will employ a multiple-scale research model grounded in human nutrition, human geography and political science. Research findings will be shared and compared with grassroots infrastructures in Durban, South Africa, aiming to 1) measure the impact of GNIs on urban population well-being; 2) develop an interdisciplinary model to research social infrastructures that enhance urban resilience; and 3) provide a model for grassroots-informed policy interventions at the urban, regional and national level.