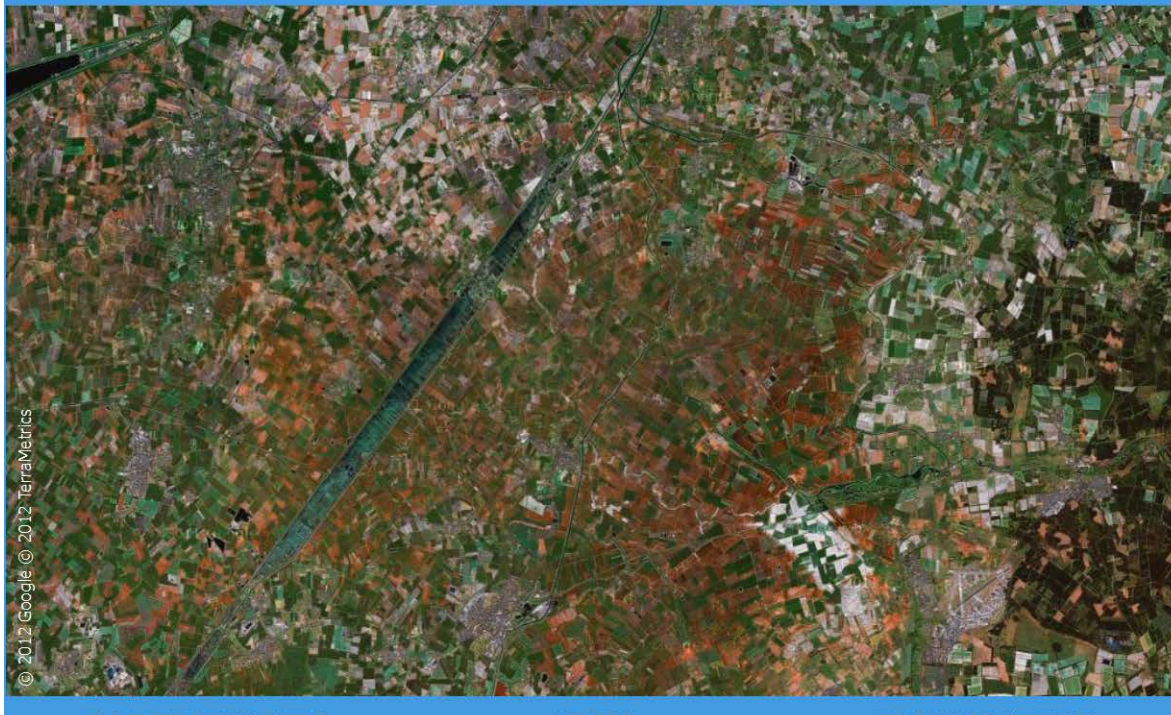
RIVER BASIN MANAGEMENT

ADAPTIVE, COLLABORATIVE, INTEGRATED... OR JUST CHAOTIC?



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TUESDAY 19 - WEDNESDAY 20 JUNE 2012
ALISON RICHARD BUILDING · 7 WEST ROAD · CAMBRIDGE

ONLINE REGISTRATION:
WWW.CRASSH.CAM.AC.UK/EVENTS/2036

CRASSH
UNIVERSITY OF CAMBRIDGE
CO-REACH CO-ORDINATION OF RESEARCH BETWEEN EUROPE AND CHINA
E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

River Basin Management: Adaptive, Collaborative, Integrated.. or just Chaotic?
CRASSH, Cambridge. Tuesday 19th-Wednesday 20th June 2012

The purpose of this Workshop is to bring together academics, practitioners and graduate students with an interest in issues of river basin and water management. The aim will be to explore the possibilities for management of these complex social-technical-ecological systems – whether integrated, adaptive or collaborative – and the continuing challenges thereof, from theoretical, multi-disciplinary and practical perspectives, and in relation to basins of varying scale from the more-or-less local to the trans-boundary. The workshop will consider multiple perspectives on basin management - ecological, social, technical and economic - to address the inherent complexities, trade-offs and multiple disciplinary approaches involved in identifying effective solutions to the need to maintain healthy aquatic environments while delivering sustainable water services.

The workshop will cover two days, in each of which there will be two themes. On Tuesday 19th June the sessions will be more theoretical; the morning will introduce the overall workshop theme of "Water management: multi-level, polycentric, adaptive, collaborative.. or just chaotic?" by considering the complex, path dependent nature of basin management, and the difficulties of generalising from case studies and experience. The afternoon will develop this theme by considering the questions of "Learning, transferring, adapting: water management across space and time". On Wednesday 20th June, the sessions will have a more practical orientation, and will cover "New methods for water management" and “New challenges, responses and institutional arrangements in urban water management"

Each theme will occupy three-and-a-half hours, and will have a similar structure. It will begin with two invited talks on the theme, each of 20 minutes with an additional 10 minutes each for discussion. There will then be 15 minutes to introduce the topics/questions for a series of related break-out groups, and after a further 15 minutes for coffee or tea, the break-out groups (c.4 in number) will convene. Each break-out group will have a convenor who will provide an introduction of 10-15 minutes, with 50-45 minutes for discussion of this, and its relation to the introductory talks. There will then be a plenary session in which rapporteurs present 10 minute summaries of each group's discussions. There will be four breakout groups with 10-12 participants in each.

The Workshop is the concluding event of a series of international Workshops held in Cambridge, Macau, Guangzhou and Beijing from 2009 on the theme of River Basin Governance (RiBaGo) in China and Europe, supported by the Co-Reach initiative of the ERA, and the ESRC. Details are available at:
http://www.geog.cam.ac.uk/research/projects/ribago/
Financial support for this Workshop from the Co-Reach initiative and the University of Cambridge is gratefully acknowledged.

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Rooms

All plenary events (Introductory Lectures and Rapporteur Summaries) will take place in **SG1**

Breakout Seminars will be in the following rooms:

Seminar B1	All four sessions - **SG1**
Seminar B2	All four sessions - **SG2**
Seminar B3	All Tuesday, and Wednesday morning - **CRASSH Meeting Room** Wednesday afternoon - **Room S3, 3rd Floor**
Seminar B4	All of Tuesday - **Room 204** (to the left, 2nd Floor) Wednesday morning - **Room S3, 3rd Floor**

Programme

TUESDAY 19th JUNE

09.15-09.45 Coffee and Registration

09.45-10.00 Introduction to the Workshop

Session 1 - 10.00-13.30
Water management: multi-level, polycentric, adaptive, collaborative.. or just chaotic?
This first session will involve two invited talks on the theme of river basin and water management, from the supra-national to the local, and on how far in different jurisdictions and at different scales it displays multi-level, polycentric, adaptive, or collaborative characteristics; or simply a chaotic self-organisation reflecting the historic evolution of a complex dynamic social-ecological system. How far are our conceptions of structural organisation in these institutions theoretical idealisations remote from the empirical reality of the path-dependent functioning of basin management?

A. Introductory lectures (20 minute talk, 10 minute discussion): (10.00-11.00)
1. Erik Mostert (TU Delft)
What can we learn from the River Rhine?
This paper will examine the key issues of this session, using one particular example: the management of the Rhine basin at the international, national (Dutch) and local level. Moreover, it will discuss the relevance of the experiences in the Rhine basin for other basins. Finally, it will sketch the outlines of a more complete empirical theory on river basin management, as well as how to develop such a theory. Detailed case studies will play a key role in this.

2. Tim Moss (IRS, Erkner, Berlin)
Researching institutional and political contexts of water resources management
This paper will summarise critiques of IWRM, set out the need for greater sensitivity to spatial and political contexts in promoting more integrated WRM, and present the methodology developed in the WaRM-In project (Strengthening Integrated Water Resource Management through institutional analysis: an analytical tool and operative methodology for research projects and programmes)

Break-out arrangements and coffee (11.00-11.30)

B. Parallel break-out seminars (15 minute talk followed by discussion): (11.30-12.30)
1. Dustin Garrick (Oxford)
The public economy of river basin governance: insights from polycentric governance and transaction costs economics
We will consider why integration and adaptation have often proved elusive in large river basins, combining analytical insights from two related theoretical traditions often examined independently: polycentric governance theory and transaction costs economics. Polycentric governance theory examines cooperation, competition and conflict across (vertical) and within (horizontal) multiple political levels. Transaction costs economics examines institutional frictions inhibiting cross-scale integration.

River basin governance reforms in Australia and the Western US will illustrate the theoretical and analytical insights from these two related fields of research.
Questions to consider:
(i) How is polycentric water governance defined in theory and practice? What are its defining features, perceived benefits and costs?
(ii) What are the nature and sources of transaction costs in polycentric water governance?
(iii) What are the dynamics of polycentric governance, transaction costs and adaptive capacity?
(iv) In a world of significant transaction costs, what are the lessons and principles for effective river basin governance?

2. Annukka Lipponen (UNECE, Geneva)
Trans-boundary rivers and international frameworks for collaboration
We will discuss implications of the trans-boundary dimension for river basin management — the constraints and opportunities. The mix of water uses in trans-boundary basins across the pan-European region varies significantly. With different requirements in terms of water quantity, quality and timing, the compatibility of sectoral uses varies. Legal and institutional bases for cooperation in managing trans-boundary waters are also very diverse. Most agreements on trans-boundary waters signed since the 1990s in the pan-European region have been modelled on the Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes of the United Nations Economic Commission for Europe (UNECE). To ensure effective implementation of agreements on trans-boundary waters, States establish joint bodies such as bilateral or multilateral commissions. These institutions serve both as forums and tools for dialogue and decision-making. The competence of joint bodies has been observed to have significantly expanded with time to include new areas and an increasing environmental mandate. Linkages amongst different water-use sectors — notably agriculture and energy — involve trade-offs which at trans-boundary level become increasingly complex to address. Moreover, meeting sectoral water needs should not result in reduced environmental flows that compromise ecosystem sustainability. Questions to cover: What benefits does trans-boundary cooperation bring in river basin management? How do the inter-sectoral and trans-boundary institutional arrangements interface? What kind of institutions and collaborative structures or processes have proven useful (or could be worth exploring) for addressing trade-offs across sectors at basin level? Could they also work in a trans-boundary setting?

3. Naho Mirumachi (King's College, London)
Trans-boundary river basin management as a political process: Understanding actors and scales
Despite the growing number of global water institutions, trans-boundary river basin management remains a complex and often contentious issue for basin states. Particularly in developing country regions, while water resources are vital inputs to various economic activities, river basin management competes with other issues on national government agendas. In addition, trans-boundary river basin management is subject to power relationships between basin states with different interests, and also displays the power differences between various ministries and departments within a state. This paper examines features such as technical capacity, financial resources, institutional memory and negotiation tactics of basin states that facilitate or hinder the establishment of trans-boundary agreements and regional institutions. Questions include:

What are the key factors that induce political will on trans-boundary cooperation when there are competing national and regional agendas?
Who is responsible for harmonising policies across national and transnational scales?

4. Hadrian Cook (Kingston University; consultant to the RELU programme)
Polycentric governance in river basins: self-organising, or just plain chaotic?
There are moves afoot in water governance towards 'bottom-up' measures that, by definition, are more inclusive of stakeholders, especially those that are community-based and involve the voluntary or 'third' sector. Yet past paradigms of water management that were more 'top-down' and even dubbed 'technocratic', remain in place around the world. The resulting governance structures have long been described as 'polycentric', more latterly in Europe as 'multi-level'. Responsibilities for water resources management and protection with associated conservation thereby rest with a range of institutions lodged in the private, public, and increasingly in the third sector.
The problem is how to make it all work, and there are no easy answers. While new institutions arising from citizen participation are appearing to fill the gaps, it is unclear how this process will develop awareness, formal and informal education and be reflected in effective action by water institutions. Points for discussion may be:
Can self-organisation work? Can models be 'exported' between jurisdictions?
How can we achieve not only organisational efficiency, but also cost effectiveness?
To what extent can devolved powers be accountable to the regulatory process?
What kind of water institutions might evolve from the present chaos – if that is what it is?

C. Plenary session: Rapporteurs outline seminar discussions (12.30-13.30)

LUNCH: 13.30-14.30

Session 2
14.30-18.00 – Learning, transferring, adapting: water management across space and time
This second session will involve two invited talks examining how history and geography are implicated in water management through processes of learning from others, and imposing on others, different forms of water management. How far is learning a one-way transfer of ideas, as opposed to a messy exchange involving accommodation and adaptation to circumstance? How often does transfer, by failing to allow adequately for contingency and context, create more problems than it solves?

A. Introductory lectures (20 minute talk, 10 minute discussion): (14.30-15.30)
1. Maurits Ertsen (TU Delft)
Colonial exchanges and post-colonial continuities in irrigation development
Taking the concept of technological regimes as a framework, this paper will discuss exchanges between colonial irrigation communities within and between colonies in Asia and Africa, both in terms of larger policy goals and design approaches. These colonial approaches will appear to have been continued well into the late twentieth century, even within a globalizing world.

2. Keith Richards (Cambridge)
Learning in Europe: the same things but (also) different
The Water Framework Directive fostered a "Common Implementation Strategy", but individual states already had their own practices, and also displayed distinctive cultural associations towards their river environment. How, then could a reasonably consistent approach to implementation of the WFD evolve? The answer may be found in the mobilisation of an army of national agency scientists at the European level. These practitioners were simultaneously constructing and adapting domestic procedures at home, while negotiating towards an invented common model of practice at meetings away with their European peers. An acceptable and approximate level of common implementation was the learned outcome of this organised subsidiarity; a model of European collaboration, albeit one that also borrowed widely (learnt) from other parts of the world?

Break-out arrangements and coffee (15.30-16.00)

B. Parallel break-out seminars (15 minute talk followed by discussion): (16.00-17.00)
1. Andre Silveira (Cambridge)
Learning processes within and between Europe and China
Catchments as complex social and ecological systems (SES) involve persistent "wicked" problems requiring "clumsy" solutions organic to regional politics and biophysical conditions. However, practitioners in different regions often adopt policies and implementation instruments derived from other countries and catchments. This discussion will explore analysis of policy transfer and lesson learning in environmental management and governance, in the EU and China and elsewhere. Some questions to address are these:
a) When two jurisdictions share the objective of enhancing adaptive capacity (involving processes of experimentation, monitoring and learning), can one learn from the other's experience? What barriers and incentives are there for learning?
b) Assuming that learning within one region is related to experimentation and monitoring that rely on good data and information flows and "good quality communication", what does this mean in the context of catchment management, and

related fields? What indicators of "good quality" could usefully be assessed? What incentives might improve communication and enhanced learning?

2. Isayvani Naicker (Cambridge)

Learning between the water and conservation sectors in South Africa

Fynbos is a vegetation category found in the Cape region of South Africa. Its high species richness and floral endemism identify it as a global biodiversity hotspot. Tree species (acacia, hakea, pinus) were introduced into the fynbos in the colonial period (1910-1948) to stabilise sand dunes and provide timber. Research in the forestry sector in the apartheid period (1948-1994) identified invasion by trees as a major problem in the fynbos, because it reduced species diversity and lowered catchment water yields. Policy to remove invasive trees was co-ordinated in a "Working for Water" programme after 1994. Support for removing trees as part of catchment management was based on modelling that showed invasive species used more water than indigenous species, reducing river flow and the water available for human use in a water scarce country. Tree removal was also labour intensive, and created jobs that contributed to poverty alleviation. In adapting to the agendas of changing governments, water management in the Cape region was based on research and management of forestry, biodiversity and water, and latterly linked to socio-economic issues, during vastly different political contexts in South Africa. Some questions to consider are:

a) Is water management a technical and scientific issue with a social dimension, or a social issue with a technical and scientific dimension?

b) What implication does the framing of issues have for research and learning in changing environmental and political contexts, and across different scales?

3. Gareth Walker (Oxford)

*An uncooperative community? Resource planning in England and Wales***;**

The paper presents empirical evidence for the failure of the English and Welsh private utility sector to deliver on government policy promoting demand side responses to water scarcity. This failure is due to an institutional structure developed under a period of supply-oriented planning which now resists demand side solutions. The recent (2006 onwards) push for regulatory reform and market mechanisms in resource planning is discussed, and the tensions and conflicting interests which the reform process has revealed are outlined. In conclusion, regulation has assumed a false market versus hierarchy distinction in its institutional design options, and has therefor overlooked the need to foster social learning. Questions to consider are:

(a) What role does the false dialectic of markets versus hierarchies play in water policy failure? What is the appropriate role of central and regional government in fostering polycentric solutions?

(b) How are learning processes affected by uneven distributions of power; economic, discursive, or otherwise? What can be done in terms of institutional design to address these effects?

(c) How does the nature of physical infrastructure and technology shape the development of institutions and social learning? To what extent can they be exchanged between water systems?

4. Li Jia (Cambridge)

From a village to a watershed: the dynamics of learning by doing

Most projects aim to be comprehensive in mapping out desirable outcomes and intervention strategies from the beginning. However reality often requires a more pragmatic approach in which each step is shaped by its preceding events, and builds on previous outcomes. This case is based on an IUCN project (for which I was the

manager) which sought to restore forest to improve watershed management (Miyun watershed, Beijing), and reflects on the learning and monitoring mechanisms within the project. Project planning started with broad goals which were gradually refined by local context and needs. Most implementation and monitoring remained similar throughout the project, but there were also major changes for various reasons: to capture new opportunities, or to deal with difficulties. The lessons learnt are to allow a level of flexibility; while there is a need to trust and rely on the on-ground level project management capacity. Questions to consider are:
a) What are the different monitoring approaches that could be used within such a project, and which offers the best potential?; and
b) What are the roles of the project sponsor in shaping the monitoring mechanisms?

C. Plenary session: Rapporteurs outline seminar discussions (17.00-18.00)

DINNER: 19.00
All participants are invited to a buffet supper at 19.00 at 46 Water Street, Cambridge, where they can pretend to be managing a river! Instructions on how to get there will be provided...

The first two sessions have implied a tension between structure and “chaos” in water management; the following sessions examine some emergent challenges. Climate change and population growth are likely to place even greater pressure on water management, and to require innovation and adaptability in balancing and managing both supply and demand, and in policies to cope with both excess and deficiencies. What are the critical new challenges, what innovations are required or are emerging, and what are their implications for existing institutions?

WEDNESDAY 20th JUNE
Session 3 – 09.00-12.30
New methods for water management
Water management will have to cope with uncertainty, and with increased public participation. This will require innovation in the methods and tools available to water management institutions; for analysing relationships between supply and demand and their non-congruent spatial patterns, for experimenting with policy options, and for representing options in communicable forms. What new methods may be emerging to provide for these requirements at the interface of science, technology, institutions and publics?

A. Introductory lectures (20 minute talk, 10 minute discussion): (09.00-10.00)
1. Tony Allan (King's College London and SOAS, London)
Water security and food supply chains and how China impacts global water security
The presentation will highlight the volumes of water managed by farmers and other private sector agents world-wide in the food supply chain. The important achievements of farmers in China and globally in vastly increasing returns to water will be identified. It will be shown, however, that wherever we irrigate we run out of blue water. It will be shown that there is now a clear imperative that farmers become good stewards of water. The role of China's demographic policy in promoting food and water security will be noted. Some as yet unanswered questions on the significance of
changes in food consumption will also be raised.

2. Sandra Junier (TU Delft)
Expertise for the Water Framework Directive (WFD) in the Netherlands, explored through the development of a Decision Support System
The pressure cooker of the timeline for WFD implementation led to an accelerated process of knowledge and instrument development in the Netherlands. Many instruments such as methods to classify water bodies and the metrics to assess the state of the waters were developed. One instrument was the "WFD Explorer", a DSS to support the decision making process by allowing an exploration of the effects of possible measures on the state of the water bodies. The WFDE was to disclose existing knowledge, bundle it and make it available in a simple to use format to support discussion among policy makers and the politically responsible decision makers. It was expected that use of a shared body of knowledge, materialised in the instrument, would contribute to standardisation of the WFD policy planning process in The Netherlands. The effect of having a common language and using the same instrument was thought to aid agreement. As it turned out the expertise itself is still very much disputed. The paper will discuss the role of expertise for the WFD, and how choices in policy and knowledge development influenced each other to give way to an implementation of the WFD that may adhere to its letter more than its spirit.

Break-out arrangements and coffee (10.00-10.30)

B. Break-out convenors (15 minute talk followed by discussion): 10.30-11.30)

1. Liz Curmi (Cambridge)

Visualisation and the water-land-energy nexus

With rapid population growth and increased awareness of potential changes in climate that may affect the demand for and supply of food, water and energy, there has been a growing need to integrate the planning decisions relating to these three resources. This paper describes a novel visualisation tool based on inter-linked Sankey diagrams, here applied in an analysis of supply and demand of water in California. A demonstration of the tool will be provided to suport a discussion of the critical questions for integrating three resources. These include the following: What are the main connections between land, water and energy resources? Should these resources be assessed on a global, regional, local or water basin level to achieve the best outcome? What effect could water policies have on the other resources? Should policy-makers view one resource in isolation from the other without considering the impacts of policy on other resources?

2. V.S. Saravanan (Bonn)

Analyzing Integration of Water Policies: Application of Bayesian Network as an Analytical Tool

Integrated water policy packages are complex and non-linear, and offer opportunities for actors to exploit in claiming competency and legitimacy. This discussion will contribute to this understanding by considering complex, non-linear integration of policies in framing a water management problem in a case study hamlet in the Indian Himalayas. By applying the Bayesian network as an analytical tool, it appears that water policies are never implemented, but are integrated through negotiation with other policies and socio-cultural settings in (re)shaping water resources management.

Questions to consider: Under what conditions can “integration” arise as a negotiated conclusion rather than an imposed ideal? How can policy formulation create a space for this integration? What learning processes are required for actors to be empowered? Given the uncertainty in water management, how far can integrated models serve as simulation and/or analytical tools?

3. Frank Sondershaus (IRS, Erkner)

Resilience - new paradigm, helpful tool or useless concept?

I will review different perspectives and understandings of the 'shimmering' concept of resilience. Then, normative implications of the concept will be pointed out, principles of the social construction of resilience will be shown (deconstructing resilience) and blind spots of the different perspectives discovered and discussed. Some questions for discussion are: What are we talking about, when we talk about resilience? What is the core of the concept?; How could resilience be transferred / translated from science to practical application?; What are the potentials and the limits of the concept, especially in the context of river basin management?

4. Laurence Smith (SOAS)

Payments for Ecosystem Services (PES) as a mechanism for water resource protection

Payments for Ecosystem Services (PES) involve a voluntary transaction in which an environmental service (often a land use providing this service) is paid for by one or more buyer(s). In short, the beneficiaries of environmental services pay for their provision and the providers of those services get paid to provide them. In the UK, and internationally, interest has grown in the potential of PES schemes given that adoption of best practices in intensive systems, and targeted reversion of land to more extensive management, may deliver ecosystem services ranging from water quality improvements to flood attenuation and carbon capture. Discussion questions include:

a) must a PES scheme meet conditions of 'conditionality' and 'additionality'? b) How best can PES schemes complement other policies and approaches for catchment/river basin management? c) Do schemes need a broker and who should this be?

C. Plenary session: Rapporteurs outline seminar discussions (11.30-12.30)

LUNCH: 12.30-13.30

Session 4 – 13.30-17.00
New challenges, responses and institutional arrangements in urban water management
This session will explore some of the practical responses required in future water management. How can functions such as Sustainable Urban Drainage Systems (SUDS) and green roofs be up-scaled and what multiple benefits can be generated from blue green corridors? Can cities be retro-fitted to achieve better water management and what inter-agency agreements and collaborations are necessary to achieve this? Discussion will focus specifically on the Cambridge region.

A. Introductory lectures (20 minute talk, 10 minute discussion): (13.30-14.30)
1. Dick Fenner (University of Cambridge, Sustainable Engineering Group)
Water-centric cities of the future
This paper will review the need to re-engineer the urban form of cities so that the infrastructure provided to deliver essential water services (supply, wastewater disposal, drainage and flood protection) adds to the healthy fabric and environmental enhancement of water sensitive cities. Case studies of best practice from around the world will form the focus of the presentation with a focus on resilient solutions.

2. Paul Jeffrey (Cranfield University)
Taking off the shackles: progressive governance to support innovation in urban water management
The significant challenges facing those charged with delivering and managing water services in urban environments has prompted a blossoming of innovative ideas and technologies. We are not short of ideas for how to respond to the problem. Maturing these new technologies and interventions and transforming them into practical actions is, however, something of a challenge in itself. Drawing on critiques of contemporary water governance arrangements as well as on developments in innovation theory this presentation will provide some insights into how governance models might be modified to provide a more hospitable environment for testing and evaluating novel interventions.

Break-out arrangements and coffee (14.30-15.00)
These final discussion groups will be led by senior professionals responsible for different aspects of water management in the UK water industry, and all are based in the Cambridge region. They each have long-standing experience in the water industry and understand the importance of involving end users and communities in decisions about water. Whilst they are all involved in providing essential service provision to standards and levels of service which customers have come to expect, they all recognise how factors such as climate change, and in particular new patterns of rainfall which seem to be emerging, require a rethinking of the traditional approaches to water supply, storm water drainage and flood management.

This raises some key questions which will form the basis for this final session:

B. Parallel break-out seminars (15 minute talk followed by discussion): (15.00-16.00)

1. Steve Kaye (Head of Innovation, Anglian Water)

Constraints on water service providers

Are the constraints on water service providers and utilities changing?
What constitutes current best practice?
How can we respond to drought and flood simultaneously?

2. Stephen Kay (Managing Director, Cambridge Water Company)

And do we have a plan B?

Are we depending too much on reducing demand to ensure we have sufficient water for the future?
How can we nudge developers into building more water sustainable communities?
Is retrofit a real solution and how can it be financed?

3. Andrew Graham (Senior Infrastructure Engineer, Mott MacDonald)

Flood risk management: who pays and who manages?

What are acceptable levels of service to protect from periodic flooding, and who pays?
Can the uptake of SuDS schemes be extended through retrofit?
Does the governance and institutional responsibilities for of urban water lack effective integration?

C. Plenary session: Rapporteurs outline seminar discussions (16.00-17.00)

Session 5 – 17.00-17.30

Summing up

The final session will involve a review of conclusions that may be drawn from the foregoing discussion, by some roving “rapporteurs”.

DRINKS: 17.30-18.30

Biographies

Professor Tony Allan Department of Geography King's College, London Strand, London, WC2R 2LS & SOAS, University of London Thornhaugh Street, Russell Square, London WC1H 0XG ta1@soas.ac.uk	Tony Allan heads the London Water Research Group. He researches water resources in semi-arid regions; global systems that may ameliorate local and regional water deficits; and how water-short economies achieve water and food security by importing water-intensive food commodities. His ideas on water security are set out in *The Middle East water question: hydropolitics and the global economy* and in *Virtual Water*. He is working on accounting systems in food supply chains, which are dangerously blind to the costs of water. He was awarded the Stockholm Water Prize in 2008.
Dr Hadrian Cook Kingston University, Faculty of Science, Engineering and Computing, Penrhyn Road Kingston upon Thames Surrey KT1 2EE H.Cook@kingston.ac.uk hadrian@salisburywatermeadows.org.uk	Dr Hadrian Cook teaches sustainable development at Kingston University and is an environmental consultant who has worked for the Rural Economy and Land Use programme since 2007. He also has experience in conservation by the voluntary sector, having worked for the Harnham Water Meadows Trust, Salisbury, 2005-2012 as Development and Education Officer. As a specialist in floodplain history and management, Hadrian has published in related areas of hydrology, soil science, and in environmental protection, landscape history and in water policy.
Dr Liz Curmi Department of Engineering University of Cambridge ec459@cam.ac.uk	Liz Curmi is a post doc in Cambridge University's Engineering Department; she is currently working on the water aspects of 'Foreseer', a visualisation tool that analyses coupled resource systems through the use of Sankey diagrams with particular reference to interlinking pathways of water, energy and land use. Before joining University of Cambridge, Liz completed her PhD at University of York, where she developed a combined hydrological and economic model to test the effectiveness of different policies in water scarce countries.
Dr Maurits Ertsen Water Resources Group, Civil Engineering & Geosciences, Delft University of Technology PO Box 5048, 2600 GA Delft, The Netherlands M.W.Ertsen@tudelft.nl	Maurits is associate professor in the Water Resources Management group at TU Delft. He examines irrigation from two perspectives: how irrigation practices emerge from many short-term actions of human agents, and how state irrigation planning is met by farmer responses. He is treasurer of the International Water History Association and an editor of its journal *Water History*; and secretary of the Dutch Association of Water History. He chairs the Working Group on Modernization of Irrigation Services of the International Committee of Irrigation and Drainage. He is now on research leave in Durham.
Dr Dick Fenner Centre for Sustainable Department, Engineering Department, Cambridge University raf37@cam.ac.uk	Dick Fenner is a Senior Lecturer in Cambridge University's Engineering Department; he is a Chartered Civil Engineer and FCIWEM. His research includes urban drainage and water treatment (asset maintenance of infrastructure; monitoring water treatment quality); the delivery of sustainable water systems (optimising existing infrastructure use; using a Simplified Climate Impact Assessment tool (SCIAT) to evaluate impacts on water treatment; and on links of water, energy and land resource pathways.
Dr Dustin Garrick University of Oxford, School of Geography and the Environment, South Parks Road, Oxford, OX1 3QY, United Kingdom dustin.garrick@ouce.ox.ac.uk	Dustin Garrick is a researcher at the University of Oxford School of Geography and the Environment specialising in comparative water policy and economic analysis. His research examines the effectiveness of policy responses to water scarcity and climate risk in large, semi-arid transboundary rivers. Before joining Oxford, Dr Garrick was a Fulbright Scholar in Australia, where his research focused at the intersection of water trading and river basin governance in the Murray-Darling Basin. He is also an associate with the Centre for Water Economics, Environment and Policy at Australian National University.
Andrew Graham Mott MacDonald Demeter House, Station Road Cambridge CB1 2RS Andrew.Graham@mottmac.com	Andrew Graham is a Senior Infrastructure Engineer at Mott MacDonald with 10 years of experience working in urban drainage and associated projects.

Professor Paul Jeffrey Environmental Science and Technology, School of Applied Sciences, Building 39, University of Cranfield, Cranfield Campus p.j.jeffrey@cranfield.ac.uk	Paul is Professor of Water Management at the Cranfield Water Science Institute and Director of the STREAM Industrial Doctorate Centre. His research interests encompass the development of sustainable water use arrangements and the relationships between human (e.g. socio-cultural, governance, economic), natural (e.g. water quality, environmental) and technological (engineering, technology & infrastructure design) dimensions of water management. His research has been funded by organisations from the water sector, government departments, charities, and the research councils.
Sandra Junier Water Resources Group, Civil Engineering & Geosciences, Delft University of Technology PO Box 5048, 2600 GA Delft, The Netherlands S.J.Junier@tudelft.nl	Sandra Junier is planning to finish her Ph.D in the Summer of 2013. Her research concerns the role of expertise in the development of decision support systems (DSS). As her case study concerns a DSS developed to support the implementation of the Water Framework Directive, she has also investigated this process in the Netherlands. Her participation in RiBaGo will lead to a joint paper on collaboration for River Basin Management. Another interest is flood risk management, as she has worked in crisis management for a water board. Currently she is also doing an analysis of newspaper coverage of floods as part of a project with Kings College, London.
Stephen Kay BSc (Eng), CdipAF, MICE, MCIWEM. Managing Director, Cambridge Water PLC StephenKay@cambridge-water.co.uk	Stephen Kay has spent almost his entire working life supplying water and associated customer service, in South Africa, Mauritius, and in the English water industry with Lee Valley Water, Thames Water and Cambridge Water. He believes water companies should be at the heart of the communities they serve, to enable them to be closer and more responsive to the customers they supply. Leading one of Britain's smallest water companies gives him the opportunity to spend time speaking directly to customers and encouraging his colleagues to play an active part in community initiatives. Stephen is a great supporter of the trade association, Water UK, and plays a full part in developing a consistent approach to technical issues across the industry as Chairman of both the Water UK [technical] Standards Board and Water Regulations Advisory Service Ltd. (the organisation that helps enforce standards of plumbing fittings and installations in buildings).
Steve Kaye Head of Innovation Anglian Water sKaye@anglianwater.co.uk	My career so far has spanned several industrial sectors including steel, manufacturing and water. During my time in the water industry I have managed the delivery of capital projects, spent time as an operational manager and in latter years I have been Head of Innovation in Anglian Water. I have learned the importance of involving the end user and keeping an open mind when delivering innovative solutions. I am passionate about helping the water industry in the UK and Europe meet the challenges of climate change, and improve the service to customers through innovation.
Dr Annukka Lipponen Environment Division United Nations Economic Commission for Europe, Palais des Nations, CH-1211 Geneva 10, Switzerland annukka.lipponen@unece.org	Annukka Lipponen is Environmental Affairs Officer in the secretariat of the Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes in UNECE. Her responsibilities include implementation of diverse interventions that assist countries in improving cooperation in Managing trans-boundary waters, in particular related to monitoring and assessment as well as capacity-building in general. The geographical focus of These activities is in Eastern Europe, the Caucasus and Central Asia. Her specialization is hydrogeology and groundwater management.
Li Jia Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK jl700@cam.ac.uk	Li Jia is currently taking the Cambridge MPhil in Conservation Leadership. She holds a Bachelor's degree from Foshan University, and a Masters in Environmental Management from New South Wales, and has worked on various environmental and conservation projects for over 6 years, first in Australia, then in Jiangsu, China, to protect a wetland of international Importance. Her most recent responsibility has been working for IUCN on sustainable forest landscape restoration in an important drinking water supply watershed for metropolitan Beijing. She has also worked on China's environmental impacts overseas. Her main interests are ecological restoration for social and environmental benefits and sustainable forest management.

Dr Naho Mirumachi Department of Geography King's College London K7.49 Strand Campus London WC2R 2LS naho.mirumachi@kcl.ac.uk	Naho Mirumachi is Lecturer in the Department of Geography, King's College London. Her main research interest is the politics of water resources management. She focuses on water allocation and river basin management issues in developing country contexts. Her recent publications have examined conceptualisations of conflict and cooperation in international trans-boundary river basins and their implication to water governance. Main field experiences are in the Orange-Senqu basin in Southern Africa, Ganges basin in South Asia, and the Mekong basin in Southeast Asia. She has multi-disciplinary training in International Relations, International Studies and Human Geography. Naho is dedicated to communicating between science and policy and currently convenes the MSc Water: Science and Governance programme at King's College, and is involved in training policy-makers on water security.
Dr Timothy Moss Leibniz Institute for Regional Development and Structural Planning (IRS), Flakenstrasse 28-31, 15537 Erkner, Germany mosst@irs-net.de	Timothy Moss is deputy director of the IRS and head of the research department "Institutional Change and Regional Public Goods". With a background in European Studies and history he has coordinated and conducted several research projects on institutional aspects of river basin management and urban infrastructure systems for the EU, German Research Council and Federal Research Ministry. On the Co-Reach project RiBaGo he is responsible for the contributions from Germany.
Dr Erik Mostert Faculty of Civil Engineering and Geosciences, Technical University of Delft, Building 23, Stevinweg 1, 2628 CN Delft e.mostert@tudelft.nl	Erik Mostert joined Delft University of Technology in 1990. He studied law and public administration and worked for two municipalities before joining the University. He teaches water law and integrated water resources management. His present research includes water law, trans-boundary water management, public participation and polycentric governance. He is an editor of the International Journal of River Basin Management and was member of the EU group drafting "Guidance on Public Participation" in the Water Framework Directive.
Dr Isayvani Naicker University of Cambridge Clare Hall, Herschel Road, Cambridge CB3 9AL in223@cam.ac.uk isayvani@gmail.com	Isayvani Naicker recently completed a PhD in the Department of Geography, University of Cambridge. Her research looked at the co-production of science and policy for natural resource management in South Africa. She has an inter-disciplinary training in computer science and geology (MSc University of Cape Town) focused on Geographic Information Systems analysis for mineral exploration, and philosophy of social science (MSc LSE) looking at the unity of science debate. Between her two Masters, she worked as an environmental scientist at the Council for Science and Industrial Research in South Africa.
Professor Keith Richards Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK ksr10@cam.ac.uk	Keith Richards is Professor of Geography in the Department of Geography at the University of Cambridge. His research has focused on hydrology and river processes; he has co-ordinated EU research on floodplain restoration, and has practical experience of the physical monitoring requirements of the WFD. He has been PI for ERC Co-Reach and ERSC projects that have supported the EU-China River basin Governance Research Network.
Dr V.S.Saravanan Center for Development Research (ZEF), University of Bonn, Walter Flex Strasse 4, D-53113 Bonn, Germany s.saravanan@uni-bonn.de	V.S. Saravanan is a Senior Researcher at ZEF, specializing in the analysis of the implications of water resource institutions for human health. He draws on theories of integrated water resources management, different 'new institutionalisms' in social science, and systems approaches to analyze risk from global environmental change in the water resources –human health interaction.

André Silveira Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK afs28@cam.ac.uk	André Silveira is a PhD student in the Department of Geography, University of Cambridge. He holds a diploma in Political Science and International Relations (Technical University of Lisbon) and MA in European Studies (University of Macau), in which he first investigated EU-China cooperation on environmental issues. His PhD project is concerned with the EU-China cooperation on river basin management and processes of institutional change in river basin management and governance. He has assisted in the coordination of the "EU-China River Basin Governance Research Network" and was involved in the policy dialogue component of the "EU-China River Basin Management Programme" as short-term consultant.
Laurence Smith Centre for Development, Environment and Policy, SOAS Thornhaugh Street, Russell Square, London WC1H 0XG ls34@soas.ac.uk	Laurence Smith specialises as an economist working on natural resource management, rural development, and water resources management. He has extensive experience of research, consultancy, education and training in the UK and developing countries, with particular expertise in South Asia. He has worked for international agencies including DFID, World Bank, FAO and the International Water Management Institute (IWMI). He has recently been PI in research on catchment management for the protection of water resources in the Rural Economy and Land Use (RELU) Programme of UK Research Councils, investigating how to control diffuse rural pollution, and the governance needed. A further RELU project is investigating innovative market-based mechanisms and networks for long term protection of water resources.
Frank Sondershaus Leibniz Institute for Regional Development and Structural Planning (IRS), Flakenstrasse 28-31, 15537 Erkner, Germany sondershaus@irs-net.de	Frank Sondershaus studied geography, political science and sociology at Erlangen University, Germany. His final thesis explored obstacles to sustainable development in administratively divided areas. After graduating he worked on a project linking precautionary flood protection to regional cultural landscape development. Since 2009 he has investigated the capability of water scarcity management in Germany, conflicts between water users, and adaptation to climate change in small river basins.
Gareth Walker School of Geography and the Environment, South Parks Road, Oxford OX1 3QY, UK gareth.walker@keble.ox.ac.uk	Gareth's DPhil research is on water scarcity in relation to resource planning and institutional reform in the English and Welsh private water sector. He has undertaken a critical analysis of demand modelling in long term resource planning, comparing historical and projected consumption trends, competing demand modelling techniques, and the role of demand model outputs in resource planning governance. He is currently researching the shift in water demand from industrial centres of in the north to housing and economic development in the south, the consequent rise of demand-induced scarcity, its role in current regulatory and political debate concerning liberalisation and market reform. Gareth has also worked in support of the Foresight Program, producing a synthesis of evidence on the links between climate change, migration and conflict, and has contributed to development of water security indicators. He has taught demand management and research methodologies to the Water Science, Policy, and Management MSc course in Oxford.

Speakers' Biographies

Professor Tony Allan Department of Geography King's College, London Strand, London, WC2R 2LS & SOAS, University of London Thornhaugh Street, Russell Square, London WC1H 0XG ta1@soas.ac.uk	Tony Allan heads the London Water Research Group. He researches water resources in semi-arid regions; global systems that may ameliorate local and regional water deficits; and how water-short economies achieve water and food security by importing water-intensive food commodities. His ideas on water security are set out in *The Middle East water question: hydropolitics and the global economy* and in *Virtual Water*. He is working on accounting systems in food supply chains, which are dangerously blind to the costs of water. He was awarded the Stockholm Water Prize in 2008.
Dr Hadrian Cook Kingston University, Faculty of Science, Engineering and Computing, Penrhyn Road Kingston upon Thames Surrey KT1 2EE H.Cook@kingston.ac.uk hadrian@salisburywatermeadows.org.uk	Dr Hadrian Cook teaches sustainable development at Kingston University and is an environmental consultant who has worked for the Rural Economy and Land Use programme since 2007. He also has experience in conservation by the voluntary sector, having worked for the Harnham Water Meadows Trust, Salisbury, 2005-2012 as Development and Education Officer. As a specialist in floodplain history and management, Hadrian has published in related areas of hydrology, soil science, and in environmental protection, landscape history and in water policy.
Dr Liz Curmi Department of Engineering University of Cambridge ec459@cam.ac.uk	Liz Curmi is a post doc in Cambridge University's Engineering Department; she is currently working on the water aspects of 'Foreseer', a visualisation tool that analyses coupled resource systems through the use of Sankey diagrams with particular reference to interlinking pathways of water, energy and land use. Before joining University of Cambridge, Liz completed her PhD at University of York, where she developed a combined hydrological and economic model to test the effectiveness of different policies in water scarce countries.
Dr Maurits Ertsen Water Resources Group, Civil Engineering & Geosciences, Delft University of Technology PO Box 5048, 2600 GA Delft, The Netherlands M.W.Ertsen@tudelft.nl	Maurits is associate professor in the Water Resources Management group at TU Delft. He examines irrigation from two perspectives: how irrigation practices emerge from many short-term actions of human agents, and how state irrigation planning is met by farmer responses. He is treasurer of the International Water History Association and an editor of its journal *Water History*; and secretary of the Dutch Association of Water History. He chairs the Working Group on Modernization of Irrigation Services of the International Committee of Irrigation and Drainage. He is now on research leave in Durham.
Dr Dick Fenner Centre for Sustainable Department, Engineering Department, Cambridge University raf37@cam.ac.uk	Dick Fenner is a Senior Lecturer in Cambridge University's Engineering Department; he is a Chartered Civil Engineer and FCIWEM. His research includes urban drainage and water treatment (asset maintenance of infrastructure; monitoring water treatment quality); the delivery of sustainable water systems (optimising existing infrastructure use; using a Simplified Climate Impact Assessment tool (SCIAT) to evaluate impacts on water treatment; and on links of water, energy and land resource pathways.
Dr Dustin Garrick University of Oxford, School of Geography and the Environment, South Parks Road, Oxford, OX1 3QY, United Kingdom dustin.garrick@ouce.ox.ac.uk	Dustin Garrick is a postdoctoral researcher in water security at Oxford University. Prior to joining Oxford in June 2011, Dr Garrick was a Fulbright Scholar (Australia) examining water trading and basin governance in the Murray-Darling Basin. His research examines the institutional economics of water security and climate adaptation in trans-boundary rivers.
Andrew Graham Mott MacDonald Demeter House, Station Road Cambridge CB1 2RS Andrew.Graham@mottmac.com	Andrew Graham is a Senior Infrastructure Engineer at Mott MacDonald with 10 years of experience working in urban drainage and associated projects.

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Dr Annukka Lipponen Environment Division United Nations Economic Commission for Europe, Palais des Nations, CH-1211 Geneva 10, Switzerland annukka.lipponen@unece.org	Annukka Lipponen is Environmental Affairs Officer in the secretariat of the Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes in UNECE. Her responsibilities include implementation of diverse interventions that assist countries in improving cooperation in Managing trans-boundary waters, in particular related to monitoring and assessment as well as capacity-building in general. The geographical focus of These activities is in Eastern Europe, the Caucasus and Central Asia. Her specialization is hydrogeology and groundwater management.
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Dr Erik Mostert Faculty of Civil Engineering and Geosciences, Technical University of Delft, Building 23, Stevinweg 1, 2628 CN Delft e.mostert@tudelft.nl	Erik Mostert joined Delft University of Technology in 1990. He studied law and public administration and worked for two municipalities before joining the University. He teaches water law and integrated water resources management. His present research includes water law, trans-boundary water management, public participation and polycentric governance. He is an editor of the International Journal of River Basin Management and was member of the EU group drafting "Guidance on Public Participation" in the Water Framework Directive.
Dr Isayvani Naicker University of Cambridge Clare Hall, Herschel Road, Cambridge CB3 9AL in223@cam.ac.uk isayvani@gmail.com	Isayvani Naicker recently completed a PhD in the Department of Geography, University of Cambridge. Her research looked at the co-production of science and policy for natural resource management in South Africa. She has an inter-disciplinary training in computer science and geology (MSc University of Cape Town) focused on Geographic Information Systems analysis for mineral exploration, and philosophy of social science (MSc LSE) looking at the unity of science debate. Between her two Masters, she worked as an environmental scientist at the Council for Science and Industrial Research in South Africa.
Professor Keith Richards Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK ksr10@cam.ac.uk	Keith Richards is Professor of Geography in the Department of Geography at the University of Cambridge. His research has focused on hydrology and river processes; he has co-ordinated EU research on floodplain restoration, and has practical experience of the physical monitoring requirements of the WFD. He has been PI for ERC Co-Reach and ERSC projects that have supported the EU-China River basin Governance Research Network.
Dr V.S.Saravanan Center for Development Research (ZEF), University of Bonn, Walter Flex Strasse 4, D-53113 Bonn, Germany s.saravanan@uni-bonn.de	V.S. Saravanan is a Senior Researcher at ZEF, specializing in the analysis of the implications of water resource institutions for human health. He draws on theories of integrated water resources management, different 'new institutionalisms' in social science, and systems approaches to analyze risk from global environmental change in the water resources –human health interaction.

André Silveira Department of Geography, University of Cambridge, Cambridge CB2 3EN, UK afs28@cam.ac.uk	André Silveira is a PhD student in the Department of Geography, University of Cambridge. He holds a diploma in Political Science and International Relations (Technical University of Lisbon) and MA in European Studies (University of Macau), in which he first investigated EU-China cooperation on environmental issues. His PhD project is concerned with the EU-China cooperation on river basin management and processes of institutional change in river basin management and governance. He has assisted in the coordination of the "EU-China River Basin Governance Research Network" and was involved in the policy dialogue component of the "EU-China River Basin Management Programme" as short-term consultant.
Laurence Smith Centre for Development, Environment and Policy, SOAS Thornhaugh Street, Russell Square, London WC1H 0XG ls34@soas.ac.uk	Laurence Smith specialises as an economist working on natural resource management, rural development, and water resources management. He has extensive experience of research, consultancy, education and training in the UK and developing countries, with particular expertise in South Asia. He has worked for international agencies including DFID, World Bank, FAO and the International Water Management Institute (IWMI). He has recently been PI in research on catchment management for the protection of water resources in the Rural Economy and Land Use (RELU) Programme of UK Research Councils, investigating how to control diffuse rural pollution, and the governance needed. A further RELU project is investigating innovative market-based mechanisms and networks for long term protection of water resources.
Frank Sondershaus Leibniz Institute for Regional Development and Structural Planning (IRS), Flakenstrasse 28-31, 15537 Erkner, Germany sondershaus@irs-net.de	Frank Sondershaus studied geography, political science and sociology at Erlangen University, Germany. His final thesis explored obstacles to sustainable development in administratively divided areas. After graduating he worked on a project linking precautionary flood protection to regional cultural landscape development. Since 2009 he has investigated the capability of water scarcity management in Germany, conflicts between water users, and adaptation to climate change in small river basins.
Gareth Walker School of Geography and the Environment, South Parks Road, Oxford OX1 3QY, UK gareth.walker@keble.ox.ac.uk	Gareth's DPhil research is on water scarcity in relation to resource planning and institutional reform in the English and Welsh private water sector. He has undertaken a critical analysis of demand modelling in long term resource planning, comparing historical and projected consumption trends, competing demand modelling techniques, and the role of demand model outputs in resource planning governance. He is currently researching the shift in water demand from industrial centres of in the north to housing and economic development in the south, the consequent rise of demand-induced scarcity, its role in current regulatory and political debate concerning liberalisation and market reform. Gareth has also worked in support of the Foresight Program, producing a synthesis of evidence on the links between climate change, migration and conflict, and has contributed to development of water security indicators. He has taught demand management and research methodologies to the Water Science, Policy, and Management MSc course in Oxford.

Delegates

Bill Adams	University of Cambridge
Abiobun Akinyemi	University of Cambridge
Rosemary Campbell	Mott MacDonald
Daniel Clarke	Cambridge Water Company
Alex Coulton	University of Cambridge
Heather Cruickshank	University of Cambridge
Luca de Mario	University of Cambridge
Siyuan He	University of Cambridge
Francine Hughes	Anglia Ruskin University
Olalekan Joda	University of Cambridge
Gant Kopec	University of Cambridge
Amrita Lamba	SOAS
Marta Lang	University of Cambridge
Claudia MacLean	University of Cambridge
Mara Makoni	University of Cambridge
Feng Mao	University of Cambridge
Stefano Mazzilli	University of Cambridge
Geoff Morgan	University of Cambridge
Geoff Parker	University of Cambridge
Mizan Rahaman	Aalto University
Veronica Rojas	University of Cambridge
Adam Ryder	University of Cambridge
Sushmita Saha	University of Cambridge
Rodrigo Sanchez	University of Cambridge
Hongthai Tan	University of Cambridge

Baasanjav Terbish	University of Cambridge
Nicolas Westenenk	University of Cambridge
Georgina Wong	University of Cambridge
Yin Yang	University of Oxford
Yan Zhang	University of Cambridge