12th British Hydrological Society
National Symposium

BHS 2014

Challenging hydrological theory and practice

University of Birmingham

2nd – 4th September 2014

#BHS2014

British Hydrological Society

UNIVERSITY OF BIRMINGHAM

Contents

Conference programme

Keynotes poster pitches and the welcome addresses with take place in lecture theatre 1. Sessions on the left column will also take place in lecture theatre 1. Sessions in the right column will take place in lecture theatre 2. Each talk is indicated by an identifier. For example 5-2L. The first number indicates the session number, the second the talk number within that session. The descriptor L or S denotes the length of the talk. S or short talks are 15 minutes in length, composed of a 12 minute talk with 3 minutes of questions. L or long talks are 20 minutes in length and are composed of a 15 minute talk and 5 minutes for questions.

Day 1

08:30	**Registration and coffee**	
10:00	**Welcome and Formal Opening of the Conference by President of BHS**	
10:10	**Keynote by Christina Tague and Ross Woods**	
11:10	1-1 L **Ecohydrology**	7-1 L **Measurement methods**
11:30	1-2 L	7-2 L
11:40	1-3 L	7-3 L
12:00	**Poster Pitch**	
12:30	**Lunch and posters**	
14:00	1-4 S **Ecohydrology**	7-4 S **Measurement methods**
14:15	1-5 S	7-5 S
14:30	1-6 S	7-6 S
14:45	1-7 S	7-7 S
15:00	5-1 LL **Urban Hydrology**	7-8 S
15:15	(joint 30 minute invited talk)	7-9 S
15:30	**Coffee**	
16:00	5-2 L	6-1 L **Water governance**
16:20	5-3 S	6-2 S
16:35	5-4 S	6-3 S
16:50	**Poster Pitch**	
17:20	**Beer and Poster**	
19:30	**Birmingham city centre food**	

Day 2

09:00	2-1	L	**Hydrohazards**	4-1 L	**Water quality**
09:20	2-2	L		4-2 L	
09:40	2-3	L		4-3 L	
10:00	2-4	S		4-4 S	
10:15	2-5	S		4-5 S	
10:30	2-6	S		4-6 S	
10:45	**Coffee**				
11:30	**Penman Lecture by Mike Waddington**				
12:30	**Lunch and posters**				
14:00	**Demonstration pitch**				
14:20	**Advanced Hydrological Methods; demonstrations**				
17:00	**Free**				
19:30	**Gala Dinner**				

Day 3

09:00	2-7	S	**Hydrohazards**	4-7	S	**Water quality**
09:15	2-8	S		4-8	S	
09:30	2-9	S		4-9	S	
09:45	2-10	S		3-1	S	**Water resources**
10:00	2-11	S		3-2	S	
10:15	2-12	S		3-3	S	
10:30	2-13	S		3-4	S	
10:45	**Coffee**					
11:30	**Keynote by Glen Watts**					
12:30	**Lunch and posters**					
13:00				**BHS AGM**		
14:00	2-14	L	**Hydrohazards**	3-5	L	**Water resources**
14:20	2-15	L		3-6	L	
14:40	2-16	L		3-7	L	
15:00	2-17	S		3-8	S	
15:15	2-18	S		3-9	S	
15:30	2-19	S		3-10	S	
15:45	**Plenary Session, Conference Review and Formal Closure**					

Penman Lecturer: Prof. Mike Waddington

School of Geography and Earth Sciences, McMaster University, Hamilton, ON, L8S 4K1

Mike Waddington is a professor in the McMaster University School of Geography and Earth Sciences (Ontario, Canada), an associate director of the McMaster Centre for Climate Change and co-founder of the journal Ecohydrology. With his research foundation firmly in hydrology and by adopting a watershed ecosystems framework he uses innovative field experimental manipulations and ecohydrological modelling to understand watershed interactions of water, vegetation, soil and greenhouse gas exchange. His research examines the effects of drought, wildfire and resource extraction on watershed ecohydrology with a focus on ecosystems, such as peatlands, that may be sensitive to changes in hydrology. He is also developing new hydrological and modelling tools for resource managers, fire managers and industrial partners.

Ecohydrology by thinking outside the bog: Shifting paradigms in an era of shifting peatland ecosystems

Abstract: Large shifts in vegetation distributions are occurring worldwide and at unprecedented rates. The most extreme of these regime shifts are expected to occur at ecosystem boundaries of both semi-arid and semi-humid landscapes. Despite extensive hydrological research assessing the ecohydrological resilience of semi-arid ecosystems, research in peatlands, which occupy the wet end of ecosystem continuum, has been “bogged down” (pun fully intended) by the traditional paradigms of peatland hydrology and ecology. Given that northern peatlands provide important global and regional ecosystem services (carbon storage, water storage, and biodiversity), the consequences of this “thinking” are far-reaching. This is especially true because peatlands face increases in the severity and frequency of climate-mediated (*e.g.,* wildfire, drought) and land-use change (*e.g.,* drainage, flooding, and mining) disturbances placing the future security of these critical ecosystem services in doubt. I use the word doubt because while ‘traditional’ modelling studies predict peatland regime shifts, these models are unable to capture stabilizing negative hydrological feedbacks that are prevalent in peatland ecosystems, enabling them to be more resilient to disturbances than anticipated. In this lecture, I suggest that there is a need for a new “thinking outside the bog” in order to solve this discrepancy and to understand the ecohydrological consequences of transformative landscape change caused by potential peatland regime shifts. Specifically, I argue for the implementation of a resilience framework within a holistic ecohydrological conceptual model as a scientific approach to examine, mitigate and manage peatland ecosystems and watersheds in an era of regime shifts.

Keynote presentation: Dr. Glen Watts

Evidence Directorate, Environment Agency, Horizon House, Bristol, BS1 5AH, UK.

Glenn Watts works in the Evidence Directorate of the Environment Agency, leading a research team of 11 specialising in climate change and resource efficiency. His special interests are in climate change impacts and adaptation in the water sector, particularly concentrating on water supply and drought management. In previous roles for the Environment Agency he was responsible for water resources planning and drought planning and management. He led the development of the Environment Agency's 2001 water resources strategy and introduced the approach to water supply and drought planning that is still used by water companies in England and Wales. Most recently, Glenn led the development of the LWEC water climate change report card.

From complexity to certainty: how does hydrological science inform decision-makers?

Abstract: Water is so much a part of everyday life that most people take it for granted until there is a problem – and then everyone has an opinion on the better management that should have avoided this situation. An understanding of hydrological science should underpin many important decisions at scales from the river reach to national and international policy, and stretching to areas that are not obviously water-related, such as energy and food security. But how does this happen? Where do decision-makers obtain their hydrological knowledge and advice? How does the latest research help to improve catchment management? Understanding the complexity of the hydrological system and translating this into effective management decisions is a multidisciplinary problem that requires not only expertise in hydrology but also an understanding of the many other dimensions of decision-making. This paper explores the use of scientific hydrological advice in decision-making, considering not only the flow of information and ideas but also the roles and responsibilities of different players – researchers, practitioners and decision-makers. There is a particular tension between the scientist's desire to understand fully and the decision-maker's need to act swiftly. All those involved should work to understand the needs of others and the conflicting pressures that affect different groups at different times.

Keynote presentation: Dr Christina Tague

Bren School of Environmental Science and Management, University of California, Santa Barbara, US.

Christina Tague is an associate professor of hydrology at the University of California, Santa Barbra. Her research is focused on the interactions between hydrology and ecosystem processes and, specifically, how eco-hydrologic systems are altered by changes in land use and climate. Much of her work involves developing and using spatial simulation models to integrate data from multiple field-based monitoring studies in order to generalize results to larger watersheds. Reflecting that emphasis, she is one of the principal developers of the Regional Hydro-Ecologic Simulation System (RHESSys), an integrated model of spatially distributed carbon, water, and nitrogen cycling. RHESSys is designed to provide science-based information about spatial patterns of ecosystem health and vulnerability in terms of water quantity and quality. She is currently modeling the impacts of climate change on stream-flow patterns in the western United States and examining how urbanization alters drainage patterns and associated biogeochemical cycling in watersheds in Baltimore, Md., and Southern California.

Consequences of warming temperatures and shifts in precipitation regimes for snow-dominated mountain systems.

Abstract: Mountain snow-dominated catchments span a range of geo-climatic settings that support a broad diversity of hydrologic and ecosystem processes. Much of the current research on climate impacts in these systems has focused on spatial-temporal patterns of snow accumulation and melt as important drivers of streamflow. Changes in the timing of snow melt however may also have important implications for forest productivity including both evapotranspiration and primary productivity – and ultimately the impact of these changes on streamflow. The physical structure of the catchment - how its geology, soils and topography control the routing of water and distribution of atmospheric controls (radiation, temperature, humidity), influence the how climate can influence ecologic function. Modeling these responses requires convolving relatively fine scale information about precipitation and snowmelt response to warming with estimates of subsurface geologic controls on drainage and vegetation water use. Using a model of coupled ecosystem hydrologic and carbon cycling processes, we demonstrate that soil moisture drainage characteristics exert a significant control on how coupled eco-hydrologic systems respond to spatial and temporal variation in precipitation and temperature. Further we show that warming, and shifts from snow to rain do not necessarily lead to increases in forest water use and in fact can in some cases lead to significant declines in forest water use with consequences for both productivity and vulnerability to fire and other disturbances. These modeling studies provide an expanded perspective on landscape-level sensitivities to climate warming, and can provide guidance in strategic design of data assimilation and monitoring strategies.

Keynote presentation: Dr Ross Woods

Department of Civil Engineering, University of Bristol, Bristol, UK, BS8 1TR

Ross Woods is a lecturer in water and environmental engineering at the University of Bristol. Ross Woods' primary research interests are in catchment classification, hydrological similarity, and global hydrology. He uses a range of approaches to catchment hydrology research, including theoretical and analytical models, numerical modelling, comparative statistical analysis of hydrological data from a wide range of environments, and field measurement of hydrological processes. The goal of his research is to produce theories that can be used to make reliable predictions of catchment hydrology directly at the scale of the catchment, anywhere on the planet.

A Warming Climate Will Reduce Streamflow from Snow-Dominated Catchments

Abstract: In a warming climate, precipitation is less likely to occur as snowfall. A shift from a snow-dominated regime towards a rain-dominated regime is currently assumed to change the seasonal distribution of stream flow, but not to influence the mean stream flow significantly. Contradicting the current paradigm, we argue that mean stream flow could indeed change for catchments that experience significant changes in the fraction of precipitation falling as snow. Snow-fed catchments often function as water towers for society. With more than one-sixth of the Earth's population depending on melt water for their water supply and ecosystems that can be sensitive to stream flow alterations, the socio-economic consequences of a change in stream flow can be substantial.
We apply the Budyko water balance framework to a large number of catchments in diverse environments, and demonstrate that a higher fraction of precipitation falling as snow is generally associated with higher mean stream flow, compared to both catchments and years with little or no snowfall. This study is limited to introducing these observations; although we can hypothesise a number of possible causes for the sensitivity of mean stream flow to snow, a full process-based understanding at the catchment scale is not yet available. Using the empirical results, we can make initial estimates of this climate change impact on streamflow; these effects are greatest in arid snow-dominated catchments. Given the importance of stream flow for society, further studies are required to respond to the consequences of a temperature-induced precipitation shift from snow to rain.

Session 1: Hydrology on the edge: research at the interface between hydrology and ecology

Ecohydrological research is growing in international prominence and is critical for tackling some of the most pressing environmental challenges currently facing society. This session will focus on this developing field, examining the bi-directional feedbacks and interactions between ecological and hydrological processes within both river and terrestrial ecosystems.

Oral Presentations

Talk #	Authors	Title
1-1L	R.G. Death, I.C. Fuller, A.M. Death and A.J. Neverman **INVITED**	Bringing hydrology, geomorphology and ecology together in the age of climate uncertainty: lessons on what not to do, from the land of 100% pure (New Zealand)
1-2L	P.J. Wood and M.J. Hill	The ecohydrology of temporary aquatic systems: the influence of hydroperiodicity on management and conservation value of macroinvertebrates.
1-3L	M.S. Lorang and J.A. Stanford	Froude space: An aquatic “currency” for assessing aquatic habitat abundance and spatial distribution across gravel-bed rivers.
1-4S	R. MacKenzie	A new multi-disciplinary institute of forest research and its new ten-year+ experiment in environmental resilience
1-5S	M. Acreman	Natural or designer environmental flows for a changing world?
1-6S	C. Broderick, N.A. Chappell, W. Tych, T.D. Jones, K.J. Beven, B. Surridge, J.N. Quinton andG. Pereira	Quantifying the hydroclimatological controls on diurnal ecological responses
1-7S	C.L.R Laizé, M. Acreman and M. Klaar	Predicting physical habitat sensitivity to abstraction.

Poster Presentations

Poster #	Authors	Title
1-1P	D. Archer	Contrasts in water and wave travel times and dispersal from Kielder releases and implications for salmonid migration.
1-2P	M.J. Dunbar, N. Birkby, R. Chadd, J. England, C. Extence, J. Hall, C. Howarth, M. Morgan, M. Warren	Ecological response to flow change and water abstraction: evidence-based models from monitoring data
1-3P	J. England, S. Bentley D. Mould H. Reid C. Wallis A. Large and C.Bithell	Catchment measures to improve the low flow environment in rivers.
1-4P	J. Garbe, L. Beevers, G. Pender	Using habitat models to demonstrate how low flows affect Brown trout (*Salmo trutta*) populations in a UK river
1-5P	B. Gillespie, P. Kay and L. E. Brown	Ecosystem responses to artificial floods from a reservoir in Britain
1-6P	C. Howarth, M. Dunbar, M. Warren and P. Humble	Developing technical resilience in hydroecology within the Environment Agency: a hydroecology training programme
1-7P	L.Rose, S. Krause and D. M. Hannah*	Multiple Scales of Hot Spots and Hot Moments of nutrient attenuation in streambed and riparian zones
1-8P	T. Kriechbaumer, K. Blackburn, T. Breckon, A. Gill, N. Everard, R. Wright, M. Casado	Towards simultaneous mapping of 3D water velocities, bathymetry and the river bank environment with a single remote control sensor platform
1-9P	J. Ledingham, T. and E. Wren	An integrated assessment of hydrologically sensitive upland habitats
1-10P	E. Willmott[1] & R. Gosling[2]	Deriving flow building blocks to meet good ecological potential (GEP) in a complex water resources system

Session 2: Hydrohazards; hydrology of the extremes (droughts and floods)

Water-related hazards (hydrohazards) are the results of complex interactions in the ocean atmosphere-land system process cascade. Despite serious impacts on the environment and socio-economic life, grand challenges remain in understanding, predicting and managing such floods and droughts.

Oral Presentations

Talk #	Authors	Title
2-1L	C. Woolhouse **INVITED**	Flood hydrologists – thoughts for the future
2-2L	P. J. Smith and K. J. Beven	Local flood forecasting – From data collection to communicating forecasts
2-3L	A.R. Young, E.J. Stewart, T.R. Kjeldsen, G.M. Vesuviano and T.H. Haxton	Updating the ReFH flood hydrograph method: reconciling flood hydrograph and statistical estimates of design peak flows
2-4S	I. Prosdocimi, L. Stewart and G. Vesuviano	Overdispersion in peak over threshold (POT) flow data and its effect on flood frequency practice
2-5S	T. R. Kjeldsen	Localism: new endorsement of an old paradigm for flood frequency estimation
2-6S	L. Stewart, I. Prosdocimi and G. Vesuviano	The new FEH rainfall depth-duration-frequency model: results, comparisons and implications
2-7S	N. Vissa, M. Bonell, N.A. Chappell, W. Tych, J. Krishnaswamy, R.S. Bhalla and V. Srinivas	Effect of extreme rainfall characteristics within differing monsoon synoptic systems on flood response in headwaters
2-8S	M. J. McLaughlin	Mapping Scotland's flood hazard and flood risk to inform flood risk management
2-9S	L.Speight, M. Cranston, R.J. Moore, S.J. Cole, B. Golding, C. Pierce, B. Wright, N. Roberts, S. Ghimire and S.Dunn	Development of a pilot surface water alerting tool for Glasgow and operational use during the Commonwealth Games
2-10S	D. Archer G. Parkin and H.J. Fowler	Assessing risks of flash flooding using historical information – three examples from northeast England
2-11S	C. Clark	Resistance to the use of historic floods in order to estimate extreme floods
2-12S	D. Yu, J. Yin, J. Chen, S.	A simplified approach to modelling surface water flood

	Xu, Z. Yin.	risks during extreme precipitation events at the city-scale: model development and spatiotemporal validation using crowd-sourced data
2-13S	L. McLean, L. Beevers,. M. Wilkinson and G. Pender	Field methods for testing the theory of small scale riparian hydrology: implications for flood risk management and modelling
2-14L	J. Hannaford, J.P. Bloomfield, I.P. Holman, B. Lange, R. J. Ledbetter, M.P. McCarthy, T. McEnery, R.Pearce, S. D. Wade	What do we talk about when we talk about drought?
2-15L	M.Sterling **INVITED**	Measuring the flow in a small irregular river using LS-PIV
2-16L	S. J. Cole, R. J. Moore, P. S. Mattingley, T. Aldridge, J. R. Millard and S. Laeger	Real-time modelling of surface water flooding hazard and impact at countrywide scales
2-17S	A. Lennard and S. Clark	Analysis of drought characteristics from 1880s to 2012 for improved understanding of a water resource system
2-18S	R.J. Davis and K.James	Operational groundwater level and river flow ensemble projections for national assessments
2-19S	V. Janes, I. Holman, G. O'Donnell, S. Birkinshaw and C. Kilsby	Modelling the influence of flood event clustering on catchment scale bank erosion

Poster Presentations

Poster #	Authors	Title
2-1P	C. Beales	A climate change perspective on the recent flooding
2-2P	T. Beskeen, P. Ede, J. Chan and S. Sung Woo	The importance of hydrological extremes for the Xepon III run-of-river hydroelectric project, Laos: Bringing confidence to local suspicions
2-3P	D. Burbidge, S. Cook, T.Schnetler	Recent application of ensemble projections for water resources management, flood forecasting and carbon reduction
2-4P	C. Clark	New Guide to Flood Estimation: application to an historic event

2-5P	C. Clark	Battle of the rainfall extremes: four theories and three specific tests
2-6P	V.L. Coates, I. Pattison	Changes in field size over the last 120 years and possible implications for flooding
2-7P	J. Dent and C. Clark	Are hydrologists superfluous to flood management in the Environment Agency?
2-8P	C. Duangyiwa, D. Yu, R. Wilby	Coastal Flood Risks in Bangkok: combined impacts of land subsidence, sea level rise and storm surge
2-9P	S. Ghimire, S. J. Addy and M. Wilkinson	Application of a 2D hydrodynamic model in a dynamic upland river system in the Scottish Boarders.
2-10P	T. Jerry and T. R. Kjeldsen	Flood frequency analysis for the River Avon at Bath
2-11P	T. R. Kjeldsen and I. Prosdocimi[2]	A bivariate extension of the Hosking and Wallis goodness-of-fit measure.
2-12P	L. Mediero, D. Santillán & L. Garrote	Identification of flood-rich and flood-poor periods in flood series
2-13P	K. Muchan, M. Lewis, M. Kendon, S. Parry and J. Hannaford	The 2013/14 Winter Floods in the UK
2-14P	I. Prosdocimi, Lisa Stewart and Gianni Vesuviano	An analysis of high intensity, short duration, annual and seasonal rainfall maxima
2-15P	N. W. Quinn	'Future Flows' and future floods: an exploration of the implications of climate change for high flows in the UK.
2-16P	A.C. Rudd, A.L. Kay, S.M. Crooks and V.A. Bell	Use of very high resolution climate model data for hydrological modelling in southern Britain.

Session 3: Water resources management within an uncertain climate

Increasing pressure is being placed on global water resources. Providing the necessary water for homes and business whilst limiting impacts on the wider catchment under a changing climate requires a detailed understanding of catchment hydrological function, its future response to a changing climate and innovative approaches to maximise water extraction.

Oral Presentations

Talk #	Authors	Title
3-1S	T. M. Hess and I. P. Holman	Modelling the effects of rural land use and management change on hydrologically effective rainfall under climate change.
3-2S	S. Padula and J.J. Harou	Capacity expansion optimisation for water supply investment decisions in England – limitations and extensions of current approaches
3-3S	M. Zaidman, A. Wallis and R. Critchley	Quantifying the impact of water company drought measures on water demand during the 2012 drought.
3-4S	M. Tanguy, V. D. J. Keller, I. Prosdocimi, J. A. Terry, O. E. Hitt, S. J. Cole, M. Fry, D. G. Morris and H. Dixon	Presentation of the new CEH-GEAR dataset: fine resolution daily and monthly areal rainfall estimates for the UK for hydrological use.
3-5L	W. Buytaert, Z. Zulkafli, A. Dewulf, D. Hannah, J. Clark, B. De Bievre and L. Acosta **INVITED**	Citizen science for water resources management and poverty alleviation: experiences from data scarce mountain regions
3-6L	K. Beven	How far can we have a detailed understanding of catchment hydrological function?
3-7L	R. Remesan and I. Holman	Influence of choice of Global Precipitation Products on hydrological modelling of a Himalayan river basin
3-8S	I. Huskova, J. J. Harou, J. R. Kasprzyk, P. M. Reed, E. S. Matrosov	Many-objective scenario optimization of regional water resource systems under uncertainty
3-9S	M. Spencer and R. Essery	A review of Scottish snow cover related to the North Atlantic Oscillation index.
3-10S	H.A. Houghton-Carr, D.B. Boorman[1] and K.M. Heuser	Can land use and land management make a difference to water availability?

Poster Presentations

Time	Authors	Title
3-1P	S Child, M. Dibley and N. Whalley	The use of acoustic flow determination devices and velocity index ratings – a hydrometrist's delight or another potential source of uncertainty in the hydrological record!
3-2P	S. Folegot, D. Hannah, W. Buytaert & S. Krause	Thermal patterns in a lowland stream during seasonal and supra-seasonal droughts in the UK using Fibre-Optic Distributed Temperature Sensing
3-3P	R. T. Geressu, J. J. Harou	The Sizing of New Dams Affects Food-Energy Security Trade-offs – Application to Blue Nile infrastructure investment
3-4P	S. Javadinejad; S. Krause and D. M. Hannah	Vulnerability of water resources to climate change and human impact: a scenario analysis of the Zayandeh-Rud river basin, Iran.
3-5P	F. Mhenga, H. Fowler and R. Gaulton	Using remotely sensed products for improved hydrological models in high mountain hydrological regimes
3-6P	D. J. Mould and M. Wells	Canal & River Trust's Water Resource Strategy: delivering long term security of water supply to our canals
3-7P	E.K. Weatherhead and C. Henriques	Modelling abstractor behaviour under weather and climate uncertainty.

Session 4: Water quality responses to environmental change?

Contamination pressures on water quality are increasing with global environmental change, providing substantial risks for water resource management and ecosystem services. Hydrologists, regulators and industry today have to manage water quality threats resulting from a complex legacy of (often interacting) point source and diffuse pollution as well as the emergence of new contaminants such as pharmaceuticals and human care products or the contamination risks associated with unconventional energy sources. These new challenges require innovative solutions to monitor, model and predict water quality responses to changing environmental conditions, including changes in water demand and resource management.

Oral Presentations

Time	Authors	Title
4-1L	K. Hiscock **INIVTED, A.** Lovett, F. Outram, S. Dugdale, Z. Al-Hama, N. Garrard, and L. Noble	Reducing diffuse nitrate pollution in an intensive arable catchment: an interdisciplinary approach
4-2L	K.Khamis, D. C. Bradley, D.M. Hannah and R. Stevens	Monitoring urban water quality using a tryptophan-like fluorescence sensor platform
4-3L	G. Garner, I.A. Malcolm, J.P. Sadler and D.M. Hannah	Longitudinal Water Temperature and Heat Flux Patterns within a Semi-Natural Forested Stream Reach
4-4S	S.J. McGrane, M. Hutchins, J.D. Miller, T. Kjeldsen, S. Dadson and G. Bussi	Assessing the water quality response to the UK winter 2013/2014 floods in contrasting urban catchments
4-5S	Lloyd, C. E.M., Freer, J.E., Collins, A.L., Johnes, P. J., Coxon, G.et.al.	Developing a framework for including uncertainty analysis in the evaluation of high frequency data to estimate catchment nutrient fluxes and behaviour.
4-6S	M.Z. Bieroza and A.L. Heathwaite	Diffuse pollution in groundwater-dominated agricultural catchments
4-7S	M.C. Ockenden, P.M. Haygarth, C.McW.H.Benskin, K.J. Beven, et al.	Phosphorus transport under extreme events: analysis of high-frequency data from the River Eden catchment, Cumbria
4-8S	J. Crossman, M.C. Eimers, S.A. Watmough, P.J. Dillon	The use of dynamic models to investigate the driving processes behind long-term fluctuations in P-export
4-9S	T.D. Jones, N.A. Chappell M.Z. Bieroza and A.L. Heathwaite	Modelling water quality in UK upland streams using high-frequency observations Diffuse pollution in groundwater-dominated agricultural catchments

Poster Presentations

Time	Authors	Title
4-1P	J. Brammer, Z. Todorovic	Investigation of industrial estate surface water outfalls: Monitoring, modelling and site management to mitigate pollution sources.
4-2P	G. Garner, I.A. Malcolm, J.P. Sadler and D.M. Hannah	Influence of riparian shading scenarios on stream heat exchange processes and water temperature dynamics
4-3P	M. G. Hutchins, T. R. Kjeldsen, S. T. Khu, S. Dadson, J. Miller, C. Rowland, S. McGrane, M. Loewenthal, J. Jones, G. Bussi	Predicting future change in water flows and quality in the River Thames basin
4-4P	F.L.Jackson, I.A.Malcolm H.L.Anderson and D.M.Hannah	A novel approach for the design of large scale river temperature monitoring networks
4-5P	P. Metcalfe	Broadening the applicability of flux and solute transport models: a semi-distributed approach integrating Lagrangian and Eulerian frameworks. Applications to modelling the impacts of environmental change.
4-6P	Mindham et al.	DOC dynamics using a newly developed Multiple State Dependent Parameter Model (MSDP) applied to synchronous streamflow and temperature data
4-7P	C. P. Millar, I. A. Malcolm, K. M. H. Kantola, D. M. Hannah and R. J. Fryer	The influence of forest harvesting on stream temperatures
4-8P	J. Wang, Q. Liang and David Werner	Identify the dominant hydrodynamic characteristics of horizontal mixing in a shallow lake: Numerical simulation of the transport process of waterborne material in Tai Lake, China

Session 5: Urban hydrology

Urbanisation has a profound effect on the hydrological cycle with significant implications for the quantity and quality of urban river flows. This session will consider recent research on urban river flow extremes and river- water quality, looking at the importance of surface-water – groundwater interaction and opportunities for urban river and floodplain restoration.

Oral Presentations

Time	Authors	Title
5-1LL	A. Jefferson, S. McMillan, and S. Clinton **INVITED**	Evaluating the success of urban stream restoration on hyporheic exchange and nutrient retention
5-2L	S. Clinton, S. McMillan, G. Noe and E. Turner	Nutrient Processing and Floodplain Connectivity Following Restoration in Urban Streams
5-3S	C. Bell, S. McMillan and S. Clinton	Identifying controls on stormflow, nutrient and carbon export from urban watersheds in the Southeastern U.S. with Sustainable Drainage Systems (SUDS).
5-4S	E.N. Looper and S.K. McMillan	Influence of stormwater management structures on denitrification activity in urban streams in Charlotte, North Carolina, USA.

Poster Presentations

Time	Authors	Title
5-1P	Muhammad Afzal, Alexandre S. Gagnon, and Martin G. Mansell	Characteristics of trends of daily and annual precipitation total across Scotland
5-2P	Alejandro Dussaillant, Ruth Quinn	Predicting Infiltration and Pollutant Retention in Bioretention Sustainable Drainage Systems: Monitoring, Modelling and Design.
5-3P	D. Green, D. Yu, I. Pattison	Understanding pluvial flooding – coupling numerical and physical modelling techniques
5-4P	J. Miller	Impacts of urban land-use and imperviousness upon hydrological response – observations from field monitoring in two urbanised catchments

Session 6: Water governance

Despite increased recognition that patterns of water use and extraction often extend beyond national and regional boundaries, there remains little consensus on how water governance should change to address what are invariably shared hydrological challenges. This session invites contributions on this topic, as well as papers more broadly conceived addressing the political, administrative, and socio-economic processes and institutions by which decisions are taken to manage water resources in the developed and developing worlds.

Oral Presentations

Time	Authors	Title
6-1L	G. Gooch **INVITED**	Governance, hydrology and catchment science – what's the connection?
6-2S	Julien J. Harou, Tohid Erfani, Olga Binions	Investigating water allocation policies using hydro-economic models – Applications to English water abstraction licensing reform
6-3S	K. J. Millidine, I. A. Malcolm and R Fryer	Challenges in assessing river flow requirements for juvenile Atlantic salmon

Poster Presentations

Time	Authors	Title
5-1P	C. Clark	Building trust with communities: where did the Environment Agency go wrong?
5-2P	I. Lynch	Water governance challenges presented by nanotechnologies: tracking, identifying and quantifying nanomaterials in our waterways (the ultimate disperate source)

Session 7: Hydrological data; advances in its collection, analysis and distribution

Considerably advances have been made in the collection analysis and distribution of data which provides the foundation of hydrological research, offering the potential to advance our understanding of key hydrological systems.

Oral Presentations

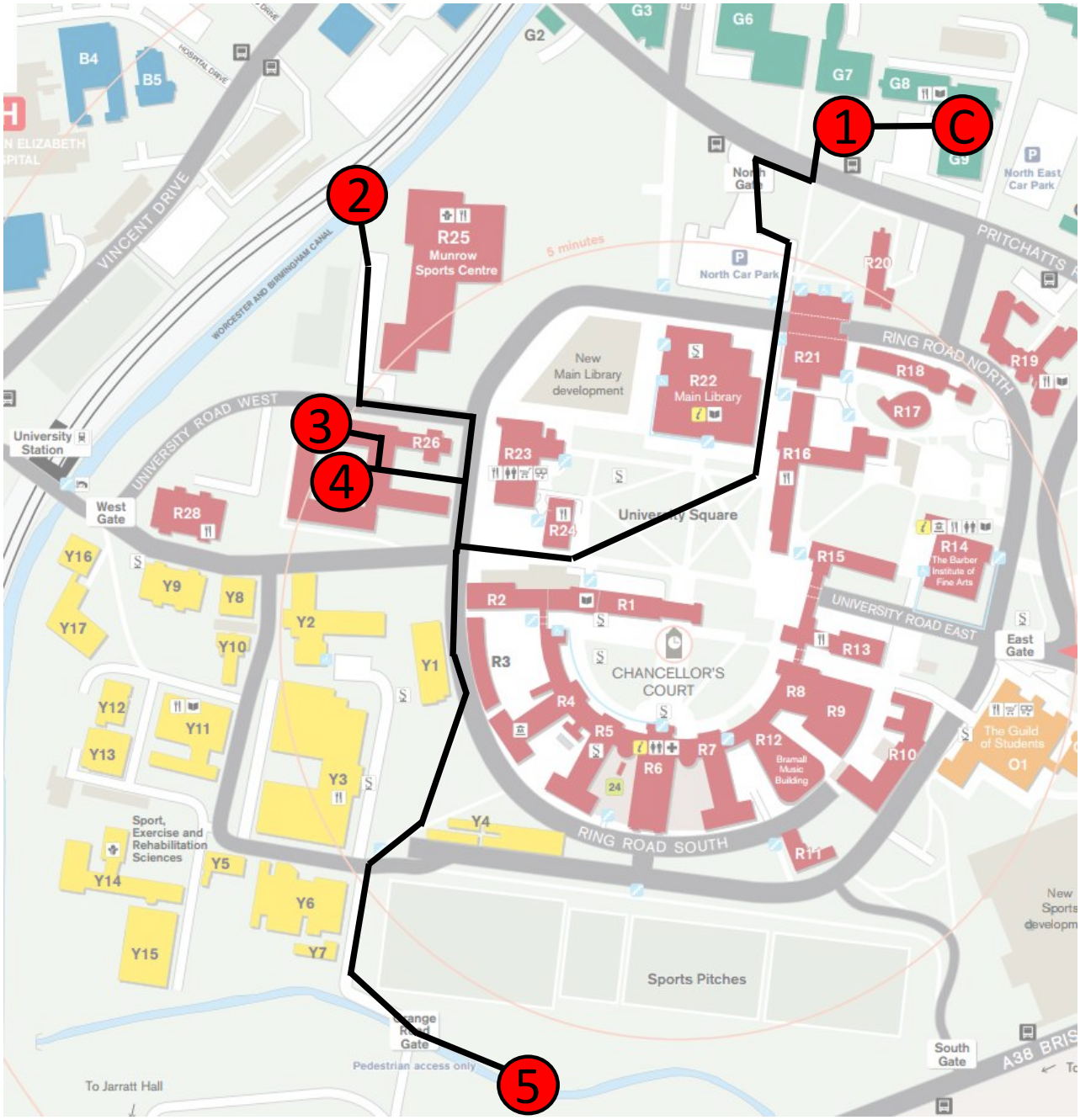
Time	Authors	Title
7-1L	I.A. Malcolm, R.J. Fryer, Bacon, P.J. and Stirling, D.	The influence of logger bias on reported temperature trends: implications for the development of stream temperature networks
7-2L	N. Martin and L Pimble,	Hydrology data – Transect or run of river? Using the latest data collection methods to understand the basic structure and functioning of river ecosystems to help establish the inter-relationship between hydrology and ecology.
7-3L	S. Krause, L. McMillan, Tom Read, S. Folegot, N. Kettridge, R. Leonard, D. Hannah, M. Klaar, L. Rose, A. Vivanco, T. Blume, J. Lewandowski, K. Meinikmann, J. Weatherill, N. Cassidy, S. Taylor	Capabilities, limitations and new horizons of Fibre-optic Distributed Temperature Sensing in ecohydrological and hydrogeological research
7-4S	N. Everard	Winter 2013/14: The 'Remote Control' Flood, and other tales of the advancement of hydrological science through technology
7-5S	N. Goody	Is this the end for traditional gauging station design?
7-6S	M Fry, O Swain and H Dixon	How do we want to access hydrological data over the web?
7-7S	K. Muchan and H. Dixon	Ensuring UK hydrometric data is fit-for-purpose through a national Service Level Agreement
7-8S	I. K. Westerberg, H. K. McMillan	Uncertainty in hydrological signatures
7-9S	A N Mandeville	Theoretical and practical insights gained from applying a four component hydrograph separation technique

Poster Presentations

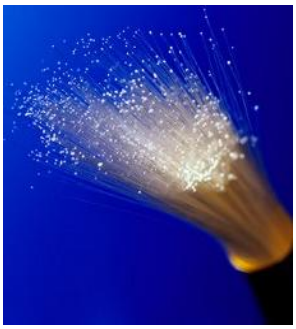
Time	Authors	Title
7-1P	A. J. Chiverton	The power of the variogram for characterising catchment responses to climate variability
7-2P	R. Dara, S. Krause and M. Rivett	Combining geophysical and environmental tracer approaches for identifying shallow subsurface aquifer-river exchange
7-3P	R.J. Davis and D.Cobby	Calculation of gridded rainfall datasets for improved operational assessment and visualisation
7-4P	H. Dixon, J. Hannaford, M. J. Fry, K. Muchan, O. Swain	National Peak Flow Data – what next?
7-5P	Kretzschmar et al.	Reversing Hydrology: estimation of sub-hourly rainfall time-series from streamflow
7-6P	N. J.Mount, R.J. Abrahart, C.W. Dawson & D.M. Hannah	Data-driven, hydrological models: doing more than advanced curve fitting?
7-7P	I. Pattison	Controls on Flood Risk: An assessment of changes to Stage-Discharge relationships at UK gauging stations through time and associated causal mechanisms.
7-8P	M. Spencer, R. Essery, L. Chambers and S. Hogg	The Historical Snow Survey of Great Britain: Digitised data for Scotland.
7-9P	R. Stevens	A revolution in open channel flow measurement – the LaserFlow
7-10P	C. Svensson	Seasonal river flow forecasts for the UK

Session 8: Advanced Hydrological Methods: demonstrations

This session will provide the opportunity to showcase the latest innovative measurement tools during informal, interactive, demonstration sessions. There will be a three minute pitch by each of the demonstrators highlighting the technology to be demonstrated. Demonstration locations (1-4) are indicated on the map below. The conference centre is marked with a C. You can go to as few or as many demonstration for as long as you wish over the afternoon. If you wish to visit each demonstration, the black line presents the most efficient way of getting to the different locations.

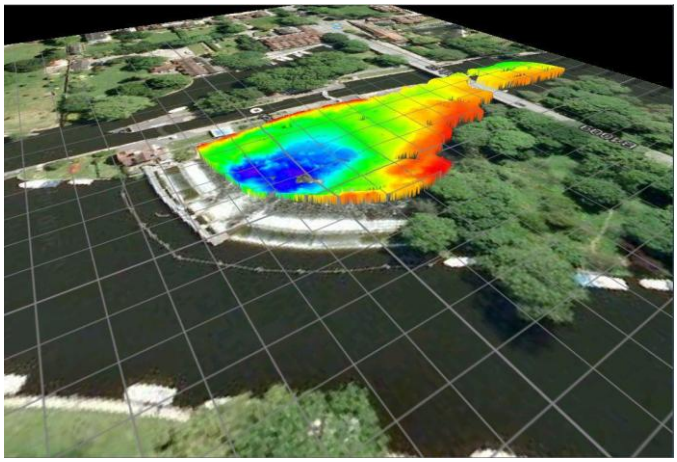


Location 1) Fibre optic distributed temperature sensing (FO-DTS): SILIXA/Stefan Krause University of Birmingham



Location: the grass lawn outside of the conference centre
Fibre-optic Distributed Temperature Sensing (FO-DTS) has seen a rapid growth in technological development and interdisciplinary applications across the hydrological sciences. This workshop provides an introduction into practical FO-DTS application, experimental design, monitoring modes, calibration methods, cable installation and splicing in different setups, instrument and c able selection and demonstrates some of the technical capabilities and limitations of FO-DTS for temperature tracing.

Location 2) ARC-Boat remote control ADCP boat; Nick Everard (Environment Agency) and Adam Comerford (Canal and River Trust)

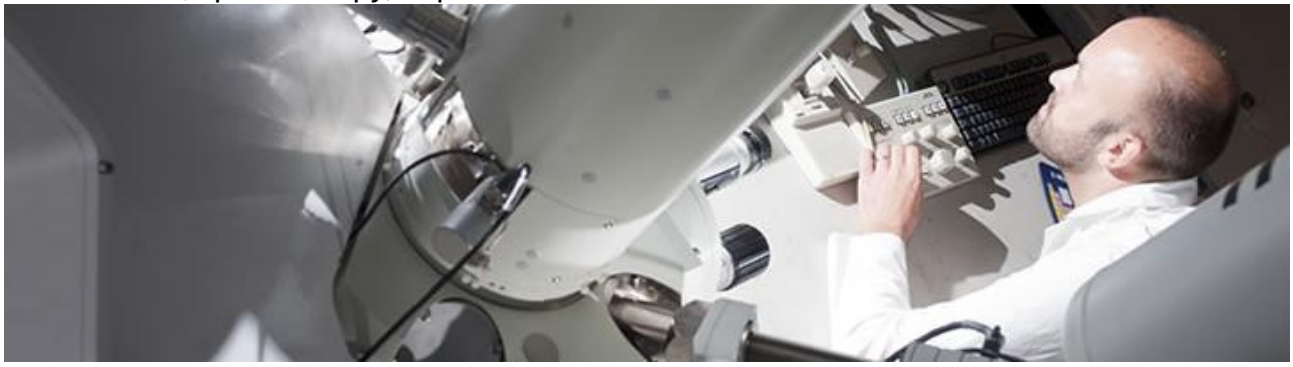


Location: The east side of the canal, from the University of Birmingham mooring. Note the demonstration is also visible from the tow path of the west side of the canal.
Environment Agency river flow measurement capability has been transformed by the introduction of the ARC-Boat remote control ADCP boat. The boat, developed in conjunction with HR Wallingford, allows the measurement of river flows far quicker, safer and with a higher degree of accuracy than ever before. Furthermore, the combination of the ease of deployment of the boat and the introduction of high precision (but low cost) GPS kit on the boats has opened up a whole new world of 'survey' work with the ADCPs. There are rapidly growing demands for ADCP surveys of river reaches, weirpools, lakes, estuaries etc as awareness of this capability spreads.

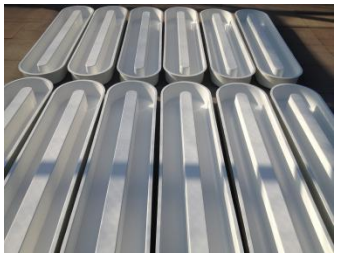
Location 3) Facility for Environmental Nanoscience analysis and Characterisation (FENCA)

FENAC
FACILITY FOR ENVIRONMENTAL NANOSCIENCE ANALYSIS AND CHARACTERISATION

Location: School of Geography, Room W1.
Based within The School of Geography, Earth and Environmental Sciences, this facility aims to produce reliable data analysing nanoparticles under realistic environmental conditions (including aquatic, marine and soil milieu) for the better understanding of biological and environmental impacts of manufactured nanoparticles and nano-enabled products. FENAC provides a number of services for the analysis and characterisation of nanoparticles. These include; spectroscopy, separation methods.



Location 4) Recirculation stream systems: Dr Mark Ledger, University of Birmingham



Location: School of Geography quad

Drought Impacts on Stream Ecosystem Functioning – uses novel mesocosm experiments to explore the resilience and vulnerability of freshwaters ecosystems to drought and water scarcity, with a view to understanding and predicting the ecological impacts of future climate change, including more extreme events.

Location 5) LaserFlow Non-contact Velocity Sensor; RS Hydro

Location: Birmingham/RS hydro hydrological monitoring station of the Bourn Brook river.

The new ISCO LaserFlow is the first non contact open channel flow meter to use doppler velocity technology with integrated ultrasonic level sensor to measure flows in culverts, sewers and open channels. The LaserFlow uses a laser beam to measure velocities below the water surface at either single or multiple points. The obvious advantages of this new technology are set to completely revolutionise the world of flow measurement in wastewater and open channel flow applications.

Information for presenters:

Oral presentations
There will be a PC available running PowerPoint 2010 for oral presenters. Each presenter will arrive in time to upload their presentation onto the PC before their session. Those before lunch will upload presentations before the start of the day's sessions. Afternoon presenters can upload slides either before the morning sessions or during the lunch break. In addition to the PC facilities, there will be the potential to hook up your own Mac computer (you will need to provide your own adapter for the projector). However, for the smooth running of the presentations, can you all please make use of the PC facilities and use your own Mac computers only as a last resort.

There are two talk lengths for non-keynote presenters. Short talks are 15 minutes in length, composed of a 12 minute talk with 3 minutes of questions. Long talks are 20 minutes in length and are composed of a 15 minute talk and 5 minutes for questions. Your talk length is designated in the conference programme by the letter S or L (short or long). A traffic light system will be employed to keep talks to time.

Short talks, Green light up to 9 minutes, amber light up to 12 minutes, red light up to 15 minutes, red flashing light (talk and questions end)
Long talks, Green light up to 12 minutes, amber light up to 15 minute, red light up to 20 minutes, red flashing light after 20 minutes (talk and questions end)

Each conference presentation will be converted to a pdf and made available through the BHS website after the conference. If you do not wish for your presentation to be made available then please indicate this to your session convener when you upload your presentation. Alternatively, if you wish to provide an edited version of your presentation, with specific slides or figures removed, please provide this edited version to the session convener.

Poster presentations
Posters are limited to 1.13 m across and 1.72 m in height. Poster presentations will be presented throughout the conference during the coffee and lunch breaks. However, specific times are designated to the presentation of posters on the first day of the conference. Posters will be exhibited over lunch and from approximately 5pm during a 'beer and posters' session where free beer will be provided to all delegates. Further, there will be two 30 minute poster pitch sessions on the first day of the conference. Presenters will provide a 1 minute pitch of their poster during these sessions to the entire conference. The one minute time slot will be strictly enforced. Each delegate should provide a single PowerPoint slide to aid their pitch. This PowerPoint slide should be emailed to bhs2014abstract@gmail.com by 9am on the 1st September (the day before the conference). If a PowerPoint slide is not received, it is assumed that you do not wish to take part in the poster pitch session.

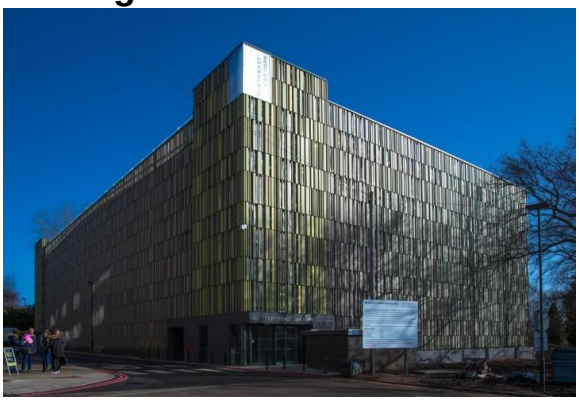
Special Issue
As a presenter at BHS2014 you will be invited to submit an article to a special issue of Hydrology Research. We will contact you after the conference to provide further information.

Prizes
Three separate prizes will be awarded for the best oral presentation of the conference, the best 'early career' hydrologist oral and poster presentations (early career is defined as <2 years after PhD completion or <2 years into first post within organisation; whichever is sooner). The early career hydrologist prize winners will be presented with **Wiley book vouchers for £150,** courtesy of Wiley publishing.

Conference Venue

The conference will be held in the Gisbert Kapp building. The Keynote presentations will be undertaken in Lecture theatre 1 on the second floor of the building. Parallel sessions will take place in Lecture theatres 1 and 2 on the second floor. These are adjacent lecture theatres and will enable delegates to move easily between different sessions as required. The presentations will be held both outside the lecture theatres and on the first floor within the 'Link' room. Exhibitors at the conference will also be located within the Link and it will be where coffee, teas and lunches will be served. The BHS AGM will be held within lecture theatre N225 on the second floor of Gisbert Kapp Building. On the ground floor there is a quite room available and a shop that services sandwiches and refreshments.

Parking



Day parking is available at the North East car park on the University of Birmingham Campus, adjacent to the Gisbert Kapp building. Please see associated maps. Parking is available from 6 am to midnight each day. No overnight parking is permitted. Parking is charged at; up to 1 hour £2, 1-3 hours £3, 3-5 hours £4, 5 hours plus £6. Please note that free and overnight parking is available at the conference accommodation for delegates that have booked a room.

Train station

The University of Birmingham is served by its own railway station. All aspects of the conference are within walking distance from the railways station with trains into and from Birmingham New Street station running every 10 minutes.

Internet

You will receive a personal username and password with your conference pack to give you access to the University's UOBGUEST wireless network, which is accessible anywhere on campus. This will also provide you access to the computers within the link room where posters and lunches are being served. Alternatively you can obtain Internet access on campus if you are already registered with eduroam.

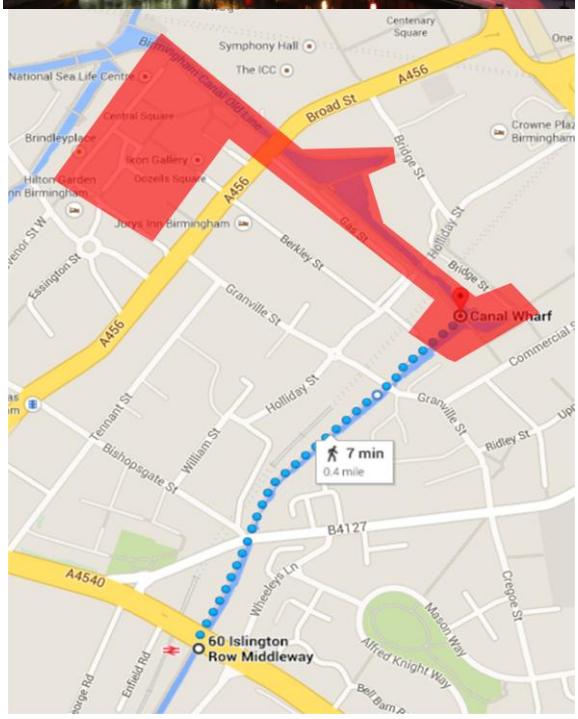
Accommodation

Accommodation booked with your registration is for Mason halls of residence (pictured). The residence is within 15 minutes walk from the conference venue. Please see conference maps for the detailed location. Further details can be found at www.birmingham.ac.uk/undergraduate/accommodation/halls/vale.aspx

Social Programme

Three social events are planned as part of the conference programme.

1) **Beer and Poster session** – This will be held within the link room of the Gisbert Kapp building. Beer will be available free of charge to all conference delegates. Those delegates presenting posters should spend a proportion of this time at their poster.
2) **Birmingham city centre food** – This is an opportunity for conference delegates to head into Birmingham city centre for the evening. This is not an organised event. However we recommend the delegates head to Brindley place/the Mailbox. Alongside the Birmingham canal, this area offers of a wide range of restaurants and bars. Further details can be found at www.brindleyplace.com/leisure/bars and www.mailboxlife.com/dining-nightlife. The restaurants are a 45 minute walk from the conference centre, or 30 minutes from the accommodation. You can reach the restaurants by catching a train from University station (see conference maps) for one stop to Fiveways railway station. Then walk for 7 minutes along the canal as shown in the adjacent map. Alternatively a taxi can be taken from the university to Brinley place for upto £10. Firms include Castle Cars 0121 472 222, T.O.A taxis 0121 427 8888, Ace Taxi 0121 442 5000.
3) **Gala Dinner** - The Gala dinner will be held on the second night of the conference. This will be held in the Nobel room on the second floor of Staff House. Please see conference maps for detailed location. Staff house is within walking distance of the conference centre.



Exhibitors

The following companies/organisations will be exhibiting at BHS2014. You will find their exhibits within the link room on the first floor of the Gisppert Kapp building

BIFOR
BIRMINGHAM INSTITUTE OF FOREST RESEARCH

CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

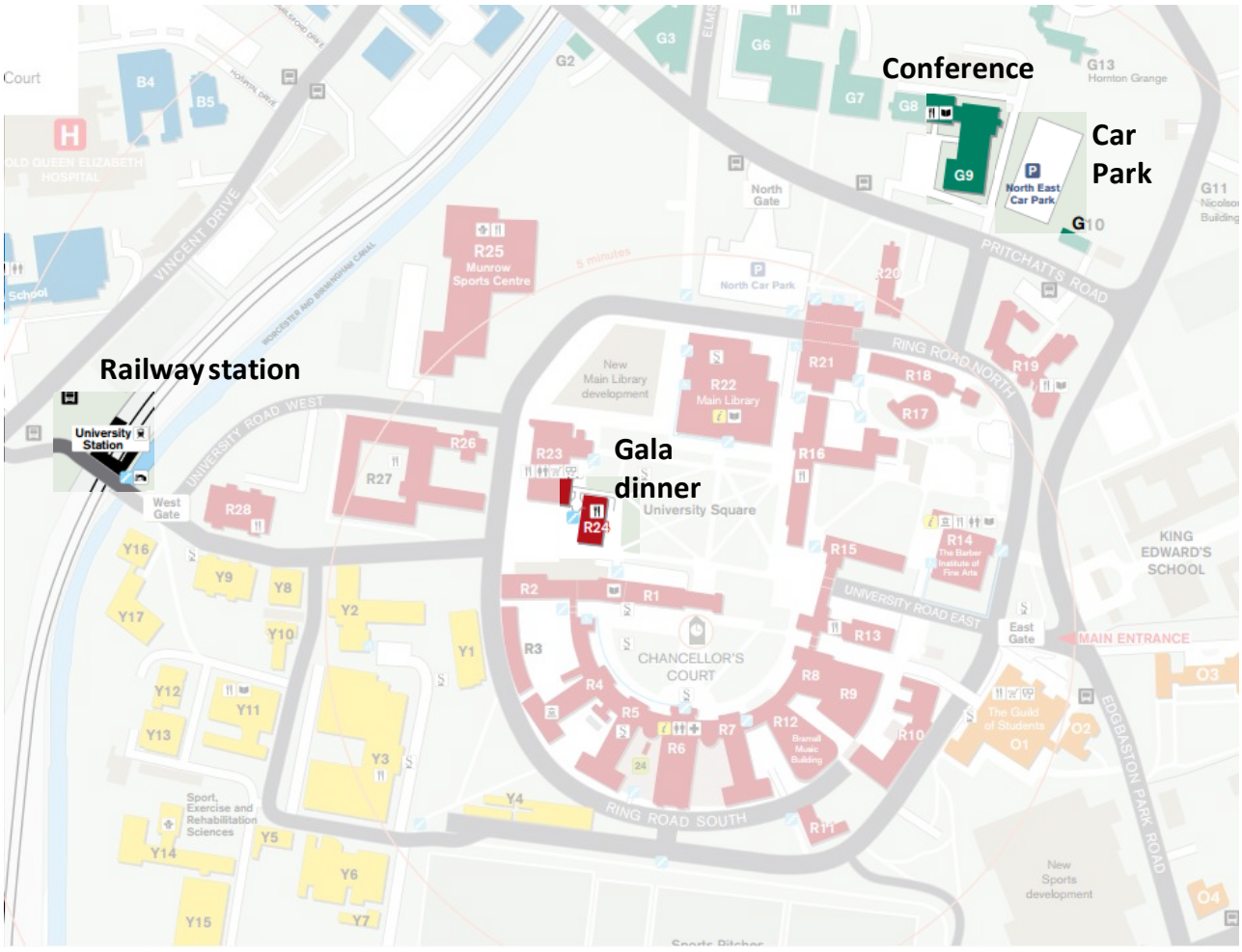
CEH Centre for Ecology & Hydrology
NATURAL ENVIRONMENT RESEARCH COUNCIL

ISODAQ

rshydro

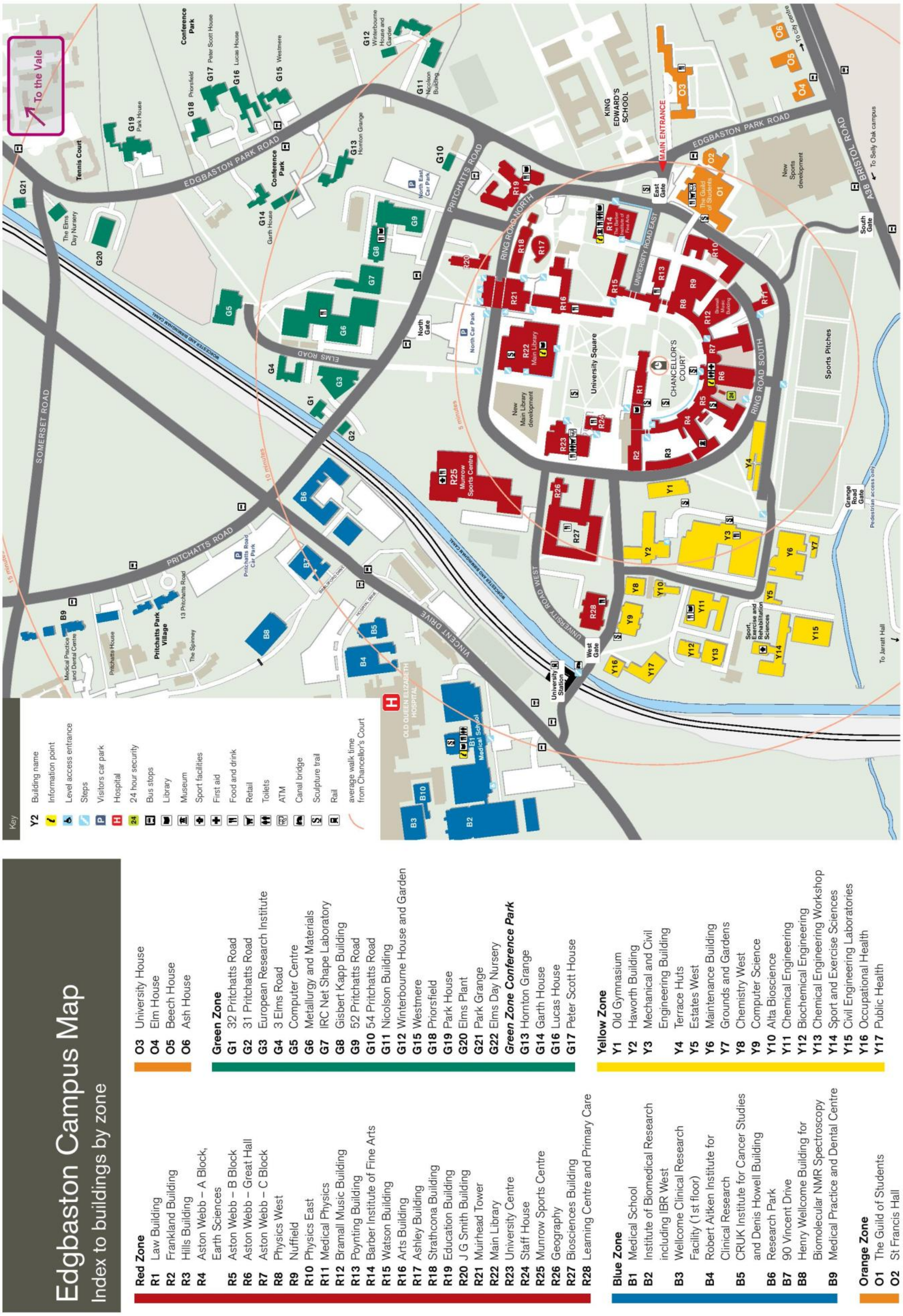
xylem
Let's Solve Water

Conference maps



Accommodation Map

Campus Map


Edgbaston Campus Map
Index to buildings by zone
Red Zone
R1 Law Building
R2 Frankland Building
R3 Hills Building
R4 Aston Webb – A Block, Earth Sciences
R5 Aston Webb – B Block
R6 Aston Webb – Great Hall
R7 Aston Webb – C Block
R8 Physics West
R9 Nuffield
R10 Physics East
R11 Medical Physics
R12 Bramall Music Building
R13 Poynting Building
R14 Barber Institute of Fine Arts
R15 Watson Building
R16 Arts Building
R17 Ashley Building
R18 Strathcona Building
R19 Education Building
R20 J G Smith Building
R21 Muirhead Tower
R22 Main Library
R23 University Centre
R24 Staff House
R25 Munrow Sports Centre
R26 Geography
R27 Biosciences Building
R28 Learning Centre and Primary Care
Blue Zone
B1 Medical School
B2 Institute of Biomedical Research including IBR West
B3 Wellcome Clinical Research Facility (1st floor)
B4 Robert Aitken Institute for Clinical Research
B5 CRUK Institute for Cancer Studies and Denis Howell Building
B6 Research Park
B7 90 Vincent Drive
B8 Henry Wellcome Building for Biomolecular NMR Spectroscopy
B9 Medical Practice and Dental Centre
Orange Zone
O1 The Guild of Students
O2 St Francis Hall
O3 University House
O4 Elm House
O5 Beech House
O6 Ash House
Green Zone
G1 32 Pritchatts Road
G2 31 Pritchatts Road
G3 European Research Institute
G4 3 Elms Road
G5 Computer Centre
G6 Metallurgy and Materials
G7 IRC Net Shape Laboratory
G8 Gisbert Kapp Building
G9 52 Pritchatts Road
G10 54 Pritchatts Road
G11 Nicolson Building
G12 Winterbourne House and Garden
G15 Westmere
G18 Priorsfield
G19 Park House
G20 Elms Plant
G21 Park Grange
G22 Elms Day Nursery
Green Zone Conference Park
G13 Hornton Grange
G14 Garth House
G16 Lucas House
G17 Peter Scott House
Yellow Zone
Y1 Old Gymnasium
Y2 Haworth Building
Y3 Mechanical and Civil Engineering Building
Y4 Terrace Huts
Y5 Estates West
Y6 Maintenance Building
Y7 Grounds and Gardens
Y8 Chemistry West
Y9 Computer Science
Y10 Alta Bioscience
Y11 Chemical Engineering
Y12 Biochemical Engineering
Y13 Chemical Engineering Workshop
Y14 Sport and Exercise Sciences
Y15 Civil Engineering Laboratories
Y16 Occupational Health
Y17 Public Health
Key
Building name
Information point
Level access entrance
Steps
Visitors car park
Hospital
24 hour security
Bus stops
Library
Museum
Sport facilities
First aid
Food and drink
Retail
Toilets
ATM
Canal bridge
Sculpture trail
Rail
average walk time from Chancellor's Court
To the Vale
EDGBASTON PARK ROAD
PRITCHATTS ROAD
SOMERSET ROAD
ELMS ROAD
VINCENT DRIVE
RING ROAD NORTH
RING ROAD SOUTH
UNIVERSITY ROAD EAST
UNIVERSITY ROAD WEST
A38 BRISTOL ROAD
MAIN ENTRANCE
KING EDWARD'S SCHOOL
University Square
CHANCELLOR'S COURT
Sports Pitches
North Gate
East Gate
South Gate
West Gate
University Station
OLD QUEEN ELIZABETH HOSPITAL
To city centre
To Selly Oak campus
To Jarratt Hall