Mixing Processes in Pipes, Sewers & the natural Environment from Theory to Practice

18th & 19th April 2023, University of Sheffield

Register to Attend @ https://www.iahr.org/index/detail/818

The management of water quality in rivers, urban drainage and water supply networks is essential for ecological and human well-being. Predicting the effects of management strategies requires knowledge of the hydrodynamic processes covering spatial scales of a few millimetres (turbulence) to several hundred kilometres (catchments), with a similarly large range of timescales from milliseconds to weeks.

Predicting underlying water quality processes and their human and ecological impact is complicated, as they are dependent on contaminant concentration. Current water quality modelling methods range from complex three-dimensional computational fluid dynamics (3D CFD) models, for short time and small spatial scales, to one-dimensional (1D) time dependent models, critical for economic, fast, easy-to-use applications within highly complex situations in river catchments, water supply and urban drainage systems.

Mixing effects in channels and pipes of uniform geometry can be represented with some confidence in highly turbulent, steady flows. However, in many water networks, the standard 1D model predictions fall short because of knowledge gaps due to low turbulence, 3D shapes and unsteady flows. This 2-day event will present recent findings from around the world, from laboratory and full-scale field measurements and numerical models, covering aspects from fundamental research to end-user applications.

This free-to-attend meeting provides a unique opportunity for research students, academics, researchers, environmental regulators, engineering consultants and water utilities to hear the latest international research on mixing processes, in an excellent networking opportunity.

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Supported by Spain Water and IWHR, China

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18th April 2023

Pipe flow & Urban Drainage

09:30 hrs Session 1 – Chair – Professor Ian Guymer

Longitudinal Dispersion in Pipes for Steady and Unsteady Flows
Dr James Hart, Coventry University, UK

Quantifying Cross-sectional concentrations in Accelerating Flows
Dr Zhangjie Peng, University of Sheffield, UK

Modelling Longitudinal Dispersion in Premise Plumbing – is it needed?
Prof. Steve Buchberger, University of Cincinnati, USA

Break

11:30 hrs Session 2 – Chair – Professor Gabriele Freni

EPA's Research into Premise Plumbing Systems, Dispersion, and Applications
Dr Jonathan Burkhardt, Dr Feng Shang, US Environmental Protection Agency, USA

A Novel EPANET Integration for the Diffusive–Dispersive Transport of Contaminants
Dr Stefania Piazza, University of Kore, Italy

Applications to managing distribution networks
Dr Mirjam Blokker, KWR Water, Netherlands

Lunch

14:00 hrs Session 3 – Chair – Dr Ole Mark

Advection-Diffusion Solver Suitable for Fluid Circulation in Drilling
Dr Johnny Petersen, formerly IRIS, Norway

Manhole mixing and modelling
Dr Fred Sonnenwald, University of Sheffield, UK

Sewer modelling for Wastewater-based Epidemiology
Mr Joe Shuttleworth, Arup, UK

Break

16:00 hrs - Session 4 – Chair – Professor Virginia Stovin

Travel times for in-sewer treatment
Dr Ole Mark, Kruger, Denmark

Non-invasive measuring system for the dynamics of FOG deposits
Prof. Francois Clemens, **TU**Delft, Netherlands

17:00 hrs – End of presentations

Opportunity to visit the unsteady pipe flow laboratory facility.

Reception @ Heartspace, E Floor Atrium

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19th April 2023

Environmental Flows

09:30 hrs Session 1 – Chair – Professor Ian Guymer

Quantifying the Spatial Variation in On-/Off-shore Mixing in the Surf Zone
Ms Inez Plugge Porter, Imperial College, UK

In-situ assessment of hydraulic roughness in a vegetated channel
Prof. Jean Lacoursière, EA-International Ltd, Sweden

The spatial routing procedure for estimation of dispersion coefficient
Dr Inhwan Park, Seoul National University of Science and Technology, South Korea

Break

11:30 hrs Session 2 – Chair – Dr Alan Cuthbertson

Influence of Vegetation on Pond Residence Times
Prof. Ian Guymer, University of Sheffield, UK

CFD Study of Mixing within Random Cylinder Arrays
Prof. Virginia Stovin, University of Sheffield, UK

Characterization of Hydrodynamics and Mixing Processes in Obstructed Flows
Dr Leo Corredor Garcia, University of Sheffield, UK

Lunch

14:00 hrs Session 3 – Chair – Professor Mick Whelan

Transverse Dispersion in a Compound Channel
Dr Kevin Spence, Sheffield Hallam University, UK

Longitudinal dispersion affected by willow patches
Dr Kaisa Västilä, Aalto University, Finland

Influence of vegetation coverage on mixing in the reach scale
Dr Monika Kalinowska, Polish Academy of Sciences, Poland

Break

16:00 hrs - Session 4 – Chair – Professor Jean Lacoursière

Integrated monitoring of water quality and water quantity
Dr Jungsun Oh, Korea Institute of Civil Engineering & Building Technology, South Korea

Point Source Contaminant Exposure and Impacts
Prof. Mick Whelan, University of Leicester, UK

17:00 hrs – End of presentations

Opportunity to visit the RandoSticks laboratory facility

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