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Professor John Bridgeman BEng, MSc, PhD, CEng, CSci, FICE, FCIWEM

Professor of Environmental Engineering
Director of Research and Knowledge Transfer, College of Engineering and Physical Sciences

School of Civil Engineering (/schools/civil-engineering/index.aspx)

Contact details

Telephone +44 (0) 121 414 5145 (tel:+44 121 414 5145)

Fax +44 (0) 121 414 3675

Email j.bridgeman@bham.ac.uk (mailto:j.bridgeman@bham.ac.uk)

School of Civil Engineering
Civil and Mechanical Engineering Building
University of Birmingham
Edgbaston
Birmingham
B15 2TT
UK

About

John Bridgeman is Professor of Environmental Engineering and Director of Research and Knowledge Transfer in the College of Engineering and Physical Sciences. Prior to his appointment at Birmingham in 2005, John spent 15 years working in the water industry on planning, feasibility and detailed process and hydraulic design of water and wastewater treatment systems.

He now delivers lectures and workshops at postgraduate and undergraduate levels on topics associated with water treatment processes and water quality, hydraulics, numerical modelling and asset management, and is an active researcher in these fields.

Qualifications

- FICE 2013
- PhD in Water Chemistry and Fluid Dynamics, 2007
- CSci, 2005
- FCIWEM, 2004
- MSc in Water and Wastewater Technology, 2000
- MCIWEM, 1995
- MICE, 1994
- CEng, 1994
- BEng in Civil Engineering, 1989

Biography

John Bridgeman joined the academic staff at the University of Birmingham in 2005 following a 15 year career in the water industry. Since then he has been actively involved all aspects of academia including research, teaching, administration, conference organisation and technology transfer, and has developed an international profile for his contributions to research in water management and, in particular, the areas of numerical modelling and water quality assessment.

He has secured research grant funding from the Engineering and Physical Sciences Research Council (EPSRC), the Natural Environment Research Council (NERC), the Environment Agency, the Institution of Civil Engineers (ICE), as well as fully funded industrial research contracts from a range of industrial organisations. In addition John has undertaken a range of consultancy contracts for clients such as Yorkshire Water, Severn Trent Water, Scottish Water, Mott Macdonald and Safe Training Systems.

John has undertaken a wide range of external activities and appointments. These include invitations to provide Keynote lectures at high quality international conferences (e.g. 13th International Conference on Civil, Structural and Environmental Engineering Computing, Chania, Crete, 2011; 8th International Symposium on Water Supply Technology, Kobe, Japan, 2009; Annual Conference of the Operational Research Society, York, UK, 2008; International Water Association Particle Separation, Toulouse, France, 2007). He is Editor-In-Chief of the Water and Environment Journal, and an Editor of Water Asset Management International.

John is a Chartered Civil Engineer and a Chartered Scientist. He is a Vice Chair of the ICE's Expert Water Panel, Secretary of the International Water Association (IWA) Specialist Group on Design Operation and Maintenance of Drinking Water Treatment Plants and a Committee Member of the IWA Specialist Group on Disinfection.

Teaching

Teaching Programmes

Civil Engineering BEng / MEng

- Floods and River Systems
- Water Management

Water Resources Technology and Management MSc

- Water and Wastewater Treatment
- Water and Wastewater Design
- Groundwater
- Research Skills
- Research Project

Postgraduate supervision

John is interested in supervising doctoral researchers in the following areas:

- fluid mechanics and computational modelling
- water quality, water and wastewater treatment
- infrastructure asset management

If you are interesting in studying any of these subject areas please contact John on the contact details above.

Research

RESEARCH THEMES

Water quality, water and wastewater treatment, numerical and computational modelling, infrastructure asset management

RESEARCH ACTIVITY

1. **Water Quality, Water and Wastewater Treatment**
   Potable water treatment and supply, natural organic matter characterisation, disinfection, disinfection by-product formation and the links to health. Use of fluorescence spectroscopy to assess water and wastewater treatment works performance and water quality in distribution systems, and to assess water quality in areas of poor sanitation and disaster relief.
2. **Numerical and computational modelling**
   Computational fluid dynamics (CFD) modelling of water and wastewater treatment processes, including raw water storage, flocculation, service reservoir disinfection and digester mixing.
   Development of a methodology and software tool to minimise operational cost of water treatment according to performance characteristics, raw water input and risk acceptance, using a genetic algorithm and Monte Carlo based simulation.
   Coupled CFD / discrete element models (DEM) and coupled lattice Boltzmann / DEM to solve the complex fluid flow and fluidization processes to examine the leakage of flow from buried pipe networks.
   Physical and numerical modelling of turbulent flow structure on boundary shear stress distributions in homogeneously roughened channels.
3. **Infrastructure Asset Management and Sustainability**
   Assessment of historical approaches to design and uncertainty, and influences on current approaches to design in terms of sustainable infrastructure development.
   Integrated modelling of infrastructure and serviceability indicators for the development of an optimum capital maintenance strategy.
   Determination of future extreme multi-seasonal meteorological drought events with the use of a stochastic weather generator and modelling the consequential water resource impacts.

Other activities

- External Examiner: PhD - Loughborough University, 2013; National University of Ireland (Galway), 2012; Cranfield University, 2012; Cardiff University School of Engineering, 2010 and 2011; University of Sheffield, Civil and Environmental Engineering, 2010 and 2012; MSc by Research – Cranfield University, 2009 and 2013
- Editor-in-Chief, Water and Environment Journal
- EPSRC College Member
- Vice Chair ICE Water Expert Panel

Publications

Harris, C.N.H, Quinn, A.D. and Bridgeman, J., 2013, “Quantification of uncertainty sources in a probabilistic climate change assessment of future water shortages”, Climatic Change, doi:10.1007/s10584-013-0871-8.

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Bridgeman, J., 2011, Hydrodynamic and physico-chemical process simulation in the water industry, Computational Technology Reviews, Volume 4, Y. Tsompanakis and B.H.V. Topping, (Guest-Editors), Saxe-Coburg Publications, ISBN 978-1-874672-54-8, ISSN 2044-8430.

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Brown, D., Bridgeman, J., and West, J.R., 2011a, "Understanding data requirements for trihalomethane formation modelling in water supply systems" Urban Water Journal, 8, 1, 41-56.

Brown, D., Bridgeman, J., and West, J.R., 2011b, “Predicting chlorine decay and THM formation in water supply systems”, Reviews in Environmental Science and Bio/Technology, 10 (1), 79-99 DOI 10.1007/s11157-011-9229-8.

Bieroza, M., Baker, A. and Bridgeman, J., 2010b, “Classification and calibration of organic matter fluorescence data with chemometric methods and artificial neural networks: an operational tool for improved drinking water treatment”, Environmetrics, DOI: 10.1002/env.1045.

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