



Prof. Roger A. Falconer

DSc(Eng), FREng, FICE, FCIWEM

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Profile

Roger Falconer is an Independent Water Consultant and Professor of Water Management (Part-Time) in the School of Engineering, at Cardiff University. He has extensive academic and practitioner experience in a wide range of water environmental areas. He advises consulting engineering and environmental companies, water companies, government agencies and international agencies on a range of issues relating to: water-environmental impact assessment studies, flood risk management and resilience, river and tidal renewable energy devices and structures, and global water security.

Expertise

Flood risk management and resilience	Hydrodynamic and water quality modelling
River and tidal energy and environmental impacts	Hydro-environmental model audits
Coastal reservoirs and water management	Water security and water-food-energy nexus

Academic Qualifications

BSc(Eng), Civil Engineering (King’s College, London), 1973
MSCE, Hydraulic Engineering (U. of Washington), 1974
PhD and DIC Computational Hydraulics (Imperial College, London), 1976
DEng Computational Hydraulics (U. of Birmingham), 1992
DSc(Eng) Hydro-environmental Modelling (Imperial College), 1994

Professional Recognition

Fellow of the Royal Academy of Engineering (FREng), 1997
Fellow of the City and Guilds Institute of London (FCGI), 1997
Fellow of the Learned Society of Wales (FLSW), 2011
Fellow of the Institution of Civil Engineers (FICE), 1992
Fellow of the Chartered Institution of Water and Environmental Management (FCIWEM), 1990
Fellow of the American Society of Civil Engineers (FASCE), 1993
Hon Member of the International Association for Hydro-Environment Engineering & Research (IAHR), 2017
Chartered Civil Engineer (CEng), 1983
Chartered Environmentalist (CEnv), 2004
Chartered Water and Environmental Manager (C.WEM), 2009

Career Summary

Roger Falconer Water Consultancy Ltd – Director and Independent Consultant	2016 - date
Dragon River and Tidal Energy Ltd – Engineering Director	
Cardiff University - Professor of Water Management and Founding Director of Hydro-environmental Research Centre (1997-2015)	1997 – date
University of Bradford - Professor of Environmental Hydraulics and Head of Department of Civil and Environmental Engineering (1993-97)	1986 – 97
University of Birmingham - Lecturer in Hydraulic Engineering	1977 – 86
Mott MacDonald - Graduate Engineer	1976 – 77

Key Achievements

Elected President of the IAHR (2011-15)
Appointer Vice-President of the International Association for Coastal Reservoir Research (2017)
Appointed Member of the Board of Trustees of CIWEM (2016)
Awarded the Royal Academy of Engineering Silver Medal (1999)
Awarded the IAHR Ippen Award (1991)
Awarded the Hai He Award of Honour by Tianjin Municipal Government - China (2004)
Appointed Professor of Water Engineering at Bradford University (1986)
– Head of Department of Civil and Environmental Engineering (1994-97)
– Responsible for an operating budget of £1.9M per annum and 37 staff
– Dept. Achieved 5A and 5C in 92 and 96 RAE and 7th ranking in Times League of Civil Engineering (1997)
Appointed Professor of Water Management at Cardiff University (1997)
Post sponsored by Hyder Consulting (1997-00) and Halcrow/CH2M Group (2000-15)
Dept. achieved 1st ranking in Times League of Civil Engineering Depts (2001)
Developed hydro-environmental software tools acquired by over 40 companies
– Directed two research Centre and managed research grant income to universities > £12.5M
– Consultant to industry and government departments on over 100 EIA projects
Published over 450 book chapters, journal and conference papers and technical reports
Publications cited > 3800 in Scopus and 35 h-index (Google Scholar: > 7300 cites and 50 h-index)
Delivered invited lectures to over 500 institutions or societies in 22 countries
Elected to Council of ICE, IAHR and CIWEM and served on over 80 learned society committees
Served on Scientific Advisory Committee of over 100 international conferences
Participated in numerous TV and press interviews (BBC, ITV, CNN, Times, Guardian etc.)
Member of UK RAE2008 Sub-Panel for Civil Engineering (2006-08)
Chair of UK RAE2014 Sub-Panel for Civil and Construction Engineering (2010-14)
Member Welsh Assembly Government Flood Risk Management Committee (2006-16)
Member UK Government DECC Expert Panel for Severn Estuary Tidal Power (2008-10)
Initiated change of name of IAHR from 'Hydraulics' to 'Hydro-Environment' (2009)
Presented evidence on Severn Barrage to House of Commons Energy and Climate Change Com. (2013)

Examples of Professional Experience (Full List Provided on Request)

Hendry Review of Tidal Lagoons – ITP Energised (2017):- Consultant to the independent review of the role of tidal lagoons around the UK coast. This project involved reviewing over 200 items of evidence and providing a report and assessment of the evidence submitted to the Hendry Review

Coastal Water Quality Investigation, Wales – Welsh Water (2016-17):- Provide an independent review of the computational hydro-environmental modelling studies undertaken by Mott MacDonald, and 3 partners, as part of an £8+ million in scientific investigation of 49 sites around 2700 km of the Welsh coastline. The project involved simulating coastal dynamics and pollutant transport.

Regional Coastal Model Studies for Liverpool Bay and North West Coast of England, UK – United Utilities plc (2014-16):- Technical audit of major hydro-environmental impact assessment studies for rivers and coastal receiving waters around the North West of England coast. Studies involved extensive model set-up, calibration and application of the DHI MIKE 21 modelling suite.

Jamaica Bay Wetland Creation Study, USA – Buro Happold (2013-14):- Oversee and advise on model set-up for hydrodynamic and tidal flushing studies for different bay configurations and topographies.

Three Rivers Environmental Impact Assessment, Wales – Metoc Consulting (2007-08):- Audit consultant's hydro-environmental impact assessment computational modelling work of three rivers and coastal zone.

Preston 7 Public Inquiry, England – Environment Agency (2007):- Provide and present Proof of Evidence to Public Inquiry on behalf of EA in defending against appeals by United Utilities Water Ltd. Centred on 7 major CSO impacts on the River Ribble and adjacent WFD protected bathing and shellfish waters.

Abingdon Bankside Storage Reservoir, England - Thames Water (2006-07):- Advise and oversee wide range of modelling studies undertaken by several companies for design of reservoir, inlet/outlet works and assess impact on range of water quality parameters in the river Thames.

Swansea Coastal Environmental Impact Study for Long-Sea Outfall, Wales – Hyder Consulting Ltd (2005):- Provide audit of hydrodynamic and faecal indicator organism model predictions, using Delft 3-D, for environmental impact assessment of long-sea outfall on Swansea bathing beach.

International Tribunal for the Law of the Sea (ITLOS) Malaysia v. Singapore Land Reclamation Dispute (2004-05):- Co-Chair of a Group of 4 International Experts overseeing and reporting to ITLOS on a major environmental impact assessment project, undertaken by the Danish Hydraulics Institute for both countries.

Straits of Johor, Malaysia – Department of Irrigation and Drainage (2003):- Provide expert review and evidence for modelling studies undertaken by DID for Malaysian Royal Navy to assess impact of Singapore land reclamations on coastal hydrodynamics, morphology and water quality.

Flood and Coastal Defence Research and Development Programme, UK – DEFRA/Environment Agency (2002):- Technical Advisor to the EA on prioritizing research activities by consultants on flood and coastal erosion defence around the UK.

Bohai Bay and Sea Environmental Impact Assessment, China – Tianjin Municipal Government (2000-04):- Technical advice on hydro-environmental impact modelling studies to improve water quality of the Bay.

Al Khiran Pearl City, Kuwait – Buro Happold (1999):- Assist in setting up DIVAST model for predicting hydrodynamic and flushing characteristics and design of a new city layout with optimal waterfrontage.

St. Aubin's Bay, Jersey – States of Jersey (1995):- Assist in setting up DIVAST model for St Aubin's Bay to predict hydrodynamics and faecal streptococci levels to establish cause of green lettuce algae.

Shannon Bridge Power Station, Eire – Electricity Supply Board Ireland (2000):- Provide technical assessment of computational studies of hydro-thermal environmental impact assessment for a power station.

Anglian Region Flood Forecasting Modelling System, England – Environment Agency (1998):- Provide technical assessment of the tender submissions for a new EA Flood Forecasting System.

Point Mugu Lagoon, USA – US Navy, Environment Division (1995):- Provide technical support, training and setting up of DIVAST model for predicting hydro-morphological features of Point Mugu and Tijuana Estuary.

Klang Port Dredging Studies, Malaysia – Intergroup and Bullen Consultants (1995):- Provide technical short course and assess model studies to assess sediment deposition and erosion.

Danish Agency for Trade and Development – Expert Evaluation of the Danish Hydraulic Institute (1995):- Responsible for reviewing a wide range of projects, departments and management across the global activities of DHI and reporting on the assessment to the main Danish funders.

British Nuclear Fuels plc, UK – Sellafield Cumbria (1993):- Review environmental impact assessment modelling studies for a nuclear generation feasibility study along the Cumbria coast.

Tuticorin Bay, India – Central Water and Power Research Station (1993):- Provide training and support in setting up DIVAST model to predict tidal currents and toxic waste concentrations across bay.

Castle Peak Power Station, Hong Kong (1985):- numerical modelling support and review of tidal hydrodynamic and temperature predictions from a thermal power station.

Fertilizer Plant Operation, Persian Gulf – Atkins Services (1984):- Provide technical advice and model support to predict hydrodynamics and salinity distributions in the Gulf for various plant operating modes.

Selected Publications (Full List Provided on Request)

(i) Flooding Risk Modelling

Ahmadian, R., **Falconer, R. A.** and Wicks, J. 2018. Benchmarking of flood inundation extent using various dynamically linked 1D-2D approaches. *Journal of Flood Risk Management*. 11(S1), S314-S328.

Kvocka, D., Ahmadian, R. and **Falconer, R. A.** 2017. Flood inundation modelling of flash floods in steep river basins and catchments. *Water*. 9(9), 1-16.

Kvocka, D., **Falconer, R. A.** and Bray, M. 2016. Flood hazard assessment for extreme flood events. *Natural Hazards*. 84(3), 1569-1599.

Xia, J., **Falconer, R. A.**, Wang, Y. and Xiao, X. 2014. New criterion for the stability of a human body in floodwaters. *Journal of Hydraulic Research*. 52(1), 93-104.

Xia, J., **Falconer, R. A.**, Lin, B. and Tan, G. 2011. Numerical assessment of flood hazard risk to people and vehicles in flash floods. *Environmental Modelling and Software*. 26(8), 987-998.

Liang, D., **Falconer, R. A.** and Lin, B. 2007. Coupling surface and subsurface flows in a depth averaged flood wave model. *Journal of Hydrology*. 337(1-2), 147-158.

(ii) Renewable Energy

Falconer, R. A., Angeloudis, A. and Ahmadian, R. 2018. Modelling hydro-environmental impacts of tidal range renewable energy projects in coastal waters. *World Scientific Series on Coastal and Ocean Engineering Practice*. 2(10), Chapter 55, pp. 1553-1574.

Angeloudis, A. and **Falconer, R. A.** 2017. Sensitivity of tidal lagoon and barrage hydrodynamic impacts and energy outputs to operational characteristics. *Renewable Energy*. 114, December, 337-351.

Angeloudis, A., Ahmadian, R., **Falconer, R. A.** and Bockelmann-Evans, B. 2016. Numerical model simulations for optimisation of tidal lagoon schemes. *Applied Energy*. 165, March, 522-536.9.

Zhou, J., Pan, S., **Falconer, R. A.** 2014. Optimization modelling of the impacts of a Severn Barrage for a two-way generation scheme using a Continental Shelf model. *Renewable Energy*. 72, December, 415-427.

Ahmadian, R. and **Falconer, R. A.** 2012. Assessment of array shape of tidal stream turbines on hydro-environmental impacts and power output. *Renewable Energy*. 44, August, 318-327.

Falconer, R.A., Xia, J., Lin, B. and Ahmadian, R. 2009. The Severn Barrage and other tidal energy options: hydrodynamic and power output modelling. *Science in China Series E, Technological Sciences, Springer*. 52(11), 3105-3424.

(iii) Water Quality Modelling

Bakar, A. A., Ahmadian, R. and **Falconer, R. A.** 2017. Modelling the transport and decay processes of microbial tracers released in a macro-tidal estuary. *Water Research*, 123, October, 802-824.

Huang, G., **Falconer, R. A.** and Lin, B. 2017. Integrated hydro-bacterial modelling for predicting bathing water quality. *Estuarine, Coastal and Shelf Science*. 188, 145-155.

Gao, G., **Falconer, R. A.** and Lin, B. 2015. Modelling the fate and transport of faecal bacteria in estuarine and coastal waters. *Marine Pollution Bulletin*. 100(1), 162-168.

Huang, G., **Falconer, R. A.**, Boye, B. A. and Lin, B. 2015. Cloud to coast: integrated assessment of environmental exposure, health impacts and risk perceptions of faecal organisms in coastal waters. *International Journal of River Basin Management*. 13(1), 73-86.

Angeloudis, A., Stoesser, T. and **Falconer, R. A.** 2014. Predicting the disinfection efficiency range in chlorine contact tanks through a CFD-based approach. *Water Research*. 60, September, 118-129.

Liang, D., Wang, X., Bockelmann-Evans, B. N. and **Falconer, R. A.** 2013. Study on nutrient distribution and interaction with sediments in a macro-tidal estuary. *Advances in Water Resources*. 52 February, 207-220.