

# Foreword to the tribute issue for Dr Graeme Batley

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**Environmental context.** This special issue is a tribute to Graeme Batley's career and his many contributions to the field of environmental chemistry.

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As one of Graeme's close colleagues for over 30 years, it is my pleasure to write the foreword for this special issue of *Environmental Chemistry* that honours his achievements. Graeme Batley is a well-known figure in the Australian science landscape, having been a major influence on environmental and analytical chemistry research for several decades. Graeme's research interests are expansive and cover broad areas of analytical and environmental chemistry, most notably focusing on trace contaminants in natural water systems, with particular emphasis on metals and their chemical speciation, fate, transport, bioavailability and ecotoxicology in waters and sediments. Graeme has authored hundreds of highly cited papers in analytical and environmental chemistry. He is author of 460 research papers, book chapters and reports and author/editor of eight books. These publications have been cited over 19 100 times (Google Scholar h-index: 65).

Graeme Batley was born in Young, New South Wales, moving early to Sydney. At high school, he developed an interest in chemistry and went on to obtain a BSc (Hons 1) degree in 1962, an MSc in 1964 and a PhD in 1967 in analytical and inorganic chemistry, all from the University of New South Wales (also a DSc in 1994). Following a 2-year post-doctoral appointment at the University of Illinois, Graeme joined the Australian Atomic Energy Commission (AAEC) at Lucas Heights in 1969 as a research scientist. Lucas Heights was to become his scientific home for the remainder of his career, aside from a year at the Canada Centre for Inland Waters on an AAEC Development Training Award in 1980. In 1981, following a restructure, he was transferred to the CSIRO Division of Energy Chemistry, Lucas Heights, which, through several reorganisations and name changes, eventually became CSIRO Land and Water. Owing to his scientific achievements, Graeme rapidly rose through the ranks to the position of Chief Research Scientist, along the way picking up various management responsibilities including leadership of the Energy and Environment Theme in CSIRO. In 1990, with Mark Florence, he established the Centre for Advanced Analytical Chemistry, later becoming the Centre for Environmental Contaminants Research, which he co-directed for many years.

The springboard for Graeme's scientific success was a highly productive partnership with the late Mark Florence. Their research initially focused on electroanalytical chemistry applied to trace metals (e.g. [Batley and Florence 1974, 1976a](#); [Florence and Batley 1977a, 1977b](#)), evolving into studies of environmental chemistry and bioavailability of contaminants in natural water systems with a focus on metal speciation (e.g. [Batley and Florence 1976b](#); [Florence and Batley 1976](#); [Batley and Gardner 1978](#); [Florence et al. 1980](#); [Batley 1989](#)). His publications with Mark in the 1970s and 1980s were at the forefront of the then rapidly developing area of dynamic metal speciation. As is testified by their high citations, these papers were critical building blocks in this important area of science, with Batley and Florence being recognised worldwide as its formative leaders. Graeme's later work diversified into other areas of environmental chemistry and ecotoxicology, most notably covering topics such as tributyltin antifoulants (e.g. [Batley and Scammell 1991](#); [Scammell et al. 1991](#)), sediment quality (e.g. [Simpson et al. 2000](#); [Wenning et al. 2005](#); [Simpson and Batley 2007, 2016](#)), nanomaterials in the environment (e.g. [Franklin et al. 2007](#); [Klaine et al. 2008](#); [Rogers et al. 2010](#); [Lead et al. 2018](#)) and water quality guideline development (e.g. [Batley et al. 1999, 2018](#); [Golding et al. 2015](#)).

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Graeme's visionary leadership of the Lucas Height's group, including a 'sixth sense' for picking fertile areas of research, created a flourishing research team of over 20 chemists, ecotoxicologists, microbiologists and ecologists, plus a host of students. Coupled with state-of-the-art research facilities for chemistry and ecotoxicology 'under one roof', the successful integration of chemistry and ecotoxicology was achieved. Graeme was a strong role model and mentor for staff and students over many years. The high morale and productivity of the group was a result of its core values engendered by Graeme: teamwork, respect, equality, informality and minimal hierarchy. Over the years, the laboratory culture was enriched and stimulated by a steady stream of high-profile visiting scientists, including Peter Campbell, Jamie Lead, Jacques Buffle, Dan Schlenk, John Hamilton-Taylor and Lesley Warren.

Aside from his research activities, Graeme has been involved in many applied studies throughout the Asia Pacific region, which themselves have been a model to others on how to use cutting edge science to solve real world problems for the mining, chemical, resources and water industries. He is an exceptional networker, collaborating with scientists within Australia and across the world. He remains a trusted advisor to governments, state agencies, industry and the community on a broad range of environmental issues and has served on many advisory committees. Graeme has also contributed substantially to the development of water and sediment quality guidelines. He has been a leader in the development and uptake of water and sediment quality guidelines for Australia and New Zealand. A major research focus has been on weight of evidence approaches, risk assessment, and the development of regulatory guidelines for both organic and metal contaminants.

Honours and contributions to professional societies are in abundance. He is a Fellow of the Royal Australian Chemical Institute (RACI) and former NSW RACI past president and pioneered the formation of the RACI Environment Division. Since 1994, he has been an active member of the Society of Environmental Toxicology and Chemistry (SETAC). He is known as the 'Father of SETAC Asia/Pacific' for his efforts as the Foundation President of SETAC's Asia/Pacific geographic unit from 1997 to 2003. He was a foundation member of the editorial board and now a senior editor of the SETAC journal, *Integrated Environmental Assessment and Management*. He also chaired the SETAC World Congress in Sydney in 2008. Graeme has received numerous national and international awards including the RACI Analytical Chemistry Medal (1991) and the RACI Environment Medal (1995). In 2011, he was made an Honorary Life Member of RACI. Graeme is also a Fellow of SETAC. In recognition of his work for SETAC, in 2016 he was awarded the SETAC Asia/Pacific Lifetime Achievement Award and received a SETAC Presidential Citation for Exemplary Service. In 1996, he was a co-recipient of the CSIRO Chairman's medal for his major role in the 4-year, Port Phillip Bay Environmental Study. His work in the area of sediment quality assessment was

recognised in 2006 when he was joint winner of Australia's Eureka Prize for Land and Water Research and co-recipient of the CSIRO Medal for Research Achievement. And finally, in 2022, the crowning glory, he was appointed a Member of the Order of Australia (General Division) for his significant service to environmental toxicology and chemical science.

The contents of the special issue reflect Graeme's broad research interests. Trace element speciation and its influence on bioaccumulation is a theme explored by five papers (Boily *et al.* 2022; Cheng *et al.* 2022; Cossart *et al.* 2022; Glabonjat *et al.* 2022; Hourtané *et al.* 2022). The topics of water quality guideline development, risk assessment and regulatory science are covered by Fox and Batley (2022), Yeung *et al.* (2022), Price *et al.* (2022), Golding *et al.* (2022) and Bowles and Beyer (2022) and finally, applied environmental chemistry exploring real world problems is represented by four papers (Gissi *et al.* 2022; Kong *et al.* 2022; Maher *et al.* 2022; Yan *et al.* 2022).

In conclusion, I suspect I may be writing an update to this Foreword in 10 years' time. Graeme's energy and enthusiasm for science have remained undiminished. He is still publishing papers, consulting to various organisations and making significant contributions to guideline development. Long may he continue to do so.

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