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## Preface

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**Biographical notes:** Darrell Alec Patterson is currently a Senior Lecturer in Chemical and Materials Engineering at the University of Auckland, New Zealand, having joined the Department in August 2005. He completed his BE at the University of Auckland (1996) and completed his PhD (2001) on the wet air oxidation of surfactant wastewaters and postdoctoral research (2003–2005) on membrane separated catalytic chiral reactions, both at Imperial College, London. His teaching and research interests centre on green process technologies, in particular membrane fabrication and novel membrane separations, catalytic reaction engineering, and enhanced advanced oxidations for waste and wastewater remediation.

Guohua Chen is a Professor of the Department of Chemical and Biomolecular Engineering at the Hong Kong University of Science and Technology, HKUST. He obtained his Bachelor Degree from Dalian University of Technology (PR China) in 1984, Master and Doctorate Degrees from McGill University in 1989 and 1994, respectively. He has published over 100 journal papers and made more than 80 presentations at international conferences, industrial forum, or universities. He is an Editor of *Separation and Purification Technology*. He is a member of International Advisory Committee, the 8th World Congress of Chemical Engineering.

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CHEMECA 2006, the *34th Annual Australasian Chemical and Process Engineering Conference*, was held from the 17–20 September 2006 in the city of sails and volcanoes, Auckland, New Zealand. The conference was organised by the University of Auckland (UoA) and the Society of Chemical Engineers New Zealand (SCENZ). The theme for CHEMECA 2006 was Knowledge and Innovation and the research presented in this issue embrace this theme. Knowledge and Innovation were chosen as the theme since they are key to ensuring that a world-class winning edge is sustained in the industries

utilising Chemical and Process Engineers, be they from New Zealand, Australia or the rest of the world.

Overall, CHEMECA 2006 offered more than 220 papers, including plenary lectures, oral presentations and posters. This issue contains the best from the oral and poster sessions of the environmental engineering stream at the conference. To get into this issue, these papers went through a lengthy process. They were initially culled from the abstracts submitted to CHEMECA 2006, after which the authors were asked to submit full papers. Once these papers were received, Professor Guohua Chen, the environmental stream chair, had each paper independently reviewed by two different researchers. These reviews were then collated by both Professor Chen and the CHEMECA 2006 technical committee chairs Dr. Darrell Patterson and Dr. Brent Young. One paper was rejected, the remaining 24 papers were revised and then published in the conference proceedings. The authors were then invited to submit an extended and reformatted version of their papers for publication in this issue. These papers were editor reviewed one more time and after some further revision now appear in this special issue.

These papers demonstrate the breadth of environmental process engineering research conducted in the Australasian and Asia Pacific regions where most of this research has been conducted. The research investigates methods of treating waste streams, either by biological processes, chemical processes or adsorption processes. Consequently, this issue is divided to reflect these three different approaches to waste treatment.

The first half of the issue deals with engineering biological treatment processes. Here, industrial applications and improvements to bioreactors are evaluated. A wide range of research was presented at CHEMECA 2006, which is reflected by the range of bioreactors covered in this issue: a membrane bioreactor, several activated sludge reactors, and a granular-activated carbon-supported bioreactor. Research on a related topic – bioleaching – is also featured.

The next section in the issue covers two different chemical waste treatment technologies. First, the effects of hydrochloric acid and magnetic fields on the emulsion breaking of palm oil mill effluent is detailed, followed by a paper on the ultraviolet (UV-A) oxidation of winery wastewaters.

A major topic at CHEMECA 2006 was the use of adsorbants for the separation and treatment of waste streams. There were so many papers that they had to be split between both the environmental and separations streams to accommodate them all. Consequently, the final section in this issue includes some of the papers presented in the environmental engineering stream. A number of different adsorbants were trialled and mathematically modelled: activated carbon from waste tyre, sago waste, sewage sludge and industrial sludge based carbonaceous adsorbents, and natural and synthesised zeolites.

The diversity of research presented in this issue demonstrates that Chemical and Process Engineers make excellent contributions across the wide field that comprises environmental engineering. This diversity in addition to the fine efforts by authors, presenters and organisers meant that the environmental engineering sessions were well received at CHEMECA 2006. Special thanks to the rest of the CHEMECA 2006 committee whose tireless efforts also made the conference a success: Chairs Dr. Brent Young (UoA) and Professor X. Dong Chen (now at Monash University, Australia), Dr. Tim Dobbie (SCENZ), Professor Mark Taylor, Professor Mohammed Farid, Professor W. George Ferguson, Professor Geoffrey Duffy, Professor John Chen, Dr. Mark Jones, Professor Margaret Hyland, Professor Wei Gao, Dr. Monwar Hossain and Jenny Roper (all from UoA) as well as conference organisers

Miranda Harrison, Lynda Booth, Caroline Wright and Mary Niumata (UoA). Thanks also to Professor Gordon McKay (Hong Kong University of Science and Technology) and Dr. Marjorie Valix (University of Sydney) who chaired sessions in which many of this issue's papers were presented. A big thank you to the conference sponsors, without whom none of this would have been possible: Auckland Uniservices Ltd, The University of Auckland Faculty of Engineering, New Zealand Trade and Enterprise, CSIRO Light Metals National Research Flagship, New Zealand Steel, Beca Amec and the Centre for Advanced Composite Materials at the University of Auckland.

Finally, we thank the contributors and reviewers of this special issue. It is their devoted efforts that have ensured the high quality of the papers presented here. Through these papers, we hope you too will enjoy the environmental engineering knowledge and innovation shared at CHEMECA 2006.