

Editorial

New Frontiers

This CAADRIA special edition of IJAC features a selection of papers expanding on topics published earlier in the Proceedings of the 15th International Conference on Computer Aided Architectural Design Research in Asia (CAADRIA): *New Frontiers*. They have been selected in accordance with the IJAC blind review system. It spans a range of sub-topics examined at the conference held at the Chinese University of Hong Kong in 2010, in particular: *modelling and process, urban modelling, collaboration and community, and education and learning*. The New Frontiers that are being confronted have a resonance of John F. Kennedy's 1960 speech: 'the frontier of unknown opportunities and perils' beyond which there are uncharted areas of science and space. In the case of the research featured in this edition of IJAC, the uncharted areas refer to the novel application of existing technologies and processes to pressing real world problems in architecture. We realise that in many ways, after five decades and despite displays of great virtuosity, architectural computing is still finding its voice in its various applications to problems of urban expansion, humanitarian relief, communicating cultural heritage and identifying the skills and knowledge with which future generations of designers need to be equipped. These papers report research into some of these applications including development through case studies.

In their paper *From abstraction to being there: mixed reality at the early stages of design* Jules Maloney and Bharat Dave explore the application of mixed reality technology to a more embodied temporal understanding of the context of design and to concurrent qualitative and quantitative evaluation in design review during early stage design. This has the potential to support firstly, better understanding by the designer of the design context, and secondly, design that is more realistically responsive to its urban and environmental context. The authors combine existing technologies in novel ways to achieve this.

Wendy Yeung and Jeremy Harkins in their paper *Digital Architecture for Humanitarian Design in Post-Disaster Reconstruction* describe the application of parametric design tools including Grasshopper for Rhinoceros™ to optimizing material use and tailoring the detailing and specifications of simple buildings to very local material availability, site conditions and building knowledge. They find a very good match between the rules and constraints systems of parametric modelling and the highly constrained contexts in which post-disaster reconstruction is possible in remote areas of developing countries.

Daniel Hii Jun Chung and Malone-Lee Lai Choo in their paper *Computational Fluid Dynamics for Urban Design: The Prospects for Greater Integration* advocate earlier, more broad-brush application of Computational Fluid Dynamic (CFD) analysis as a design support tool at the early stages of urban design in new developments in cities. This could lead to the prevention of ventilation, airflow and urban heat island problems that are currently energy consumptive and difficult, if not impossible, to ameliorate at architectural or individual building scale. They examine the prospects for easier access and workflow incorporation of CFD into design teams and design processes.

In their paper *Building-volume Designs with Optimal Life-Cycle Costs* Martin Schoch, Chakuy Prakasvudhisarn and Apichat Praditsmanont apply a multi-criteria optimization model to improve Building Lifecycle Cost analysis and response within design. Some early use cases confirm that the simplest, most compact buildings with the smallest perimeter areas to volume and low floor-to-floor heights are cheapest both to build and to run, particularly if they are fully air conditioned but Lifecycle costs are related to building orientation in ways that construction costs are not. Questions are raised about how a similar approach, using declarative programming, could result in a range of near optimal options for designers to choose between rather than a single optimum solution. How could this be combined in the same environment with other diverse architectural constraints of the design or applied meaningfully to buildings with a higher degree of morphological complexity?

Architectronics: Towards a Responsive Environment by Annalisa Meyboom, Jerzy Wojtowitc and Greg Johnson describes the exploration in education of the application of mechatronics to the possibility of a kinetic built environment. What are the new skills and knowledge that architectural and design students need in order to be able to engage with the world of electronics, control systems, sensing and actuation? How do collaborating mechatronics engineering and architecture students interact to define and realise their design goals? Education holds the key to the built environment futures that are possible.

Finally, Hafizur Rahaman and Beng-Kiang Tan in *Interpreting Digital Heritage: A Conceptual Model with End-User's Perspective* make a carefully constructed case for digital heritage that takes into consideration the end-user's unique cultural perspective and allows for a multiplicity of interpretation in place of the prevalent descriptive and didactic approaches. They suggest the application of interaction technology platforms to achieve this.

For this collection of work thanks are due for the work of the CAADRIA 2010 editorial team and reviewers, to Mark Aurel Schnabel as conference convenor, and to the IJAC reviewers for their dedicated work. Special acknowledgement should be made of the work of Andre Brown as Editor-in-Chief of IJAC for his patient guidance and direction throughout.

Hyoung-June Park,
University of Hawaii at Manoa
Honolulu

Jane Burry
Spatial information Architecture Laboratory (SIAL), RMIT University,
Melbourne, Australia

