
Editorial

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Biographical notes: Pascal Perez is the Director of the SMART Infrastructure Facility, University of Wollongong. He has a 20-year experience in modelling and analysing complex socio-technical systems. He is a Fellow of the Royal Society of NSW and serves on the Technical Committee of the Australian Urban Research Infrastructure Network (AURIN).

Peter Campbell is an Honorary Professor of Infrastructure Systems at the SMART Infrastructure Facility, University of Wollongong. He is a world authority on agent-based modelling and he is a former Director, Advanced Computer Applications Centre at Argonne National Laboratory in Chicago. He is a long-standing member of the International Council on Systems Engineering (INCOSE).

Tom Dolan is a Senior Research Associate at the Department of Science, Technology, Engineering and Public Policy (STeAPP), University College London. He is also the Coordinator of the International Centre for Infrastructure Futures (ICIF). His current research interests include infrastructure conceptualisation, future scenarios and performance measurement.

We are delighted to have the opportunity to edit this special issue of *IJCAST* on next generation infrastructure: from complex technological artefacts to agents of social change. We strongly support the launch of *IJCAST* as a forum to disseminate research on complex systems and complexity science, and believe that the launch of *IJCAST* creates a much needed opportunity for the publication of original multi-disciplinary contributions that embrace a ‘complex systems’ perspective.

This special issue is targeted at:

- 1 the rapidly expanding international research community seeking to understand the complex interactions between infrastructure, the population it serves, the physical and economic environments in which it functions, and the technological transitions on which it depends
- 2 complex systems and complexity science researchers who are as yet unfamiliar with the growing need for multi-disciplinary approaches to infrastructure research.

Infrastructure systems are deeply embedded, in the spatial, social and economic fabric of modern societies. How we can collectively turn infrastructure(s) systems into enablers of long-term sustainable development is a wicked problem, concerning all types of infrastructure (such as transport, energy, water, waste, telecommunications, housing, social infrastructure and green infrastructure) and the web of interdependencies and interconnections that collectively make up the physical, economic and social systems of cities and regions, and which in many ways dictate our lifestyles.

If infrastructure is to play a role in enabling responses to long term societal challenges such as the one framed above, new multi-disciplinary thinking about how to design, manage, organise and deliver infrastructure systems is needed. Furthermore, the complexity inherent in questions of how to improve performance, drive innovation, promote collaboration, encourage sustainable lifestyles, capture lessons and deliver more successful outcomes than are currently being achieved must be addressed.

With this in mind, in this special issue, we present a collection of research papers inspired by the challenge of how to design complex infrastructure systems as agents of change rather than engineering artefacts. The focus of the special issue is closely aligned with, and builds on, the grand research challenges for infrastructure addressed at ISNGI 2013 and 2014, and strongly complements the recently announced focus for ISNGI 2016:

“Given that infrastructure is not an ‘engineering artefact’ but an ‘agent of change’, is it possible to imagine infrastructure systems that can meet the needs of twice today’s population with half today’s resources while providing twice the liveability?”

“Can we imagine resilient infrastructure systems that can meet the needs of twice today’s population with half today’s resources while providing better liveability for all?”

“Beyond Utopia: Designing Infrastructure Systems as Collective Agents of Social Change”

We would very much like to thank all authors for choosing to publish their research in this special issue of *IJCAST*. As guest editors, it is a privilege to be able to trace the development of many of the papers published in this special issue from research initially presented at the ISNGI symposium series. We hope that this special issue will help to further strengthen the international infrastructure research community and to share infrastructure systems research with a wider audience. We eagerly anticipate further development of a close relationship between the infrastructure research community and the *IJCAST* journal.