

Editorial

This issue is divided into two parts with four papers in the first and two in the second. The first part deals with Design Economies, and the second with Digital Guides and Aids. They are described more fully below.

Part I: Design Economies | the Collaborative Context

The proliferation of computational models both in practice and in the academy has led many designers and architects to participate in formative and often, entrepreneurial collaborations involving an array of disciplines and allied industry partners. The measurable and effective impact of these partnerships has produced both virtual and real prototypes at a variety of scales and contexts. While the initial influence of these outcomes is visible within the global context of the design studio and is evident in the work of leading-edge practitioners, a range of opportunities centered on exploring the seams between ideation, innovation, and invention suggest an emerging design trajectory rooted not only in the moral imperatives of our time, but in developing intersections that undoubtedly will reframe future generations of educators and practitioners.

Architects, designers, and engineers consistently bring built and un-built scaled innovations to market in the form of ideas. The digital research presented herein proposes an integrated and applied research model that continues this path to inform not only ideation, but expands to include new materials, processes, and products. Ranging from installations to inhabitations to software design and material-based research, these permutations vary according to their macro- or the micro drawn or actualized contexts. As the complexity of issues related to digital design continues to develop, current design thinking-based research has shifted towards an inspiring practical reality – one that simultaneously purports balance and agility – a pioneering collaboration that bridges between theory, practice, industry, and finance.

Innovation as Mechanism

New models linked to systems thinking approaches have emerged as mechanisms for investigation that produce integrated feedback loops aimed at transformative research applications. With increased efficiency, synergistic design teams investigate the underlying aspects of the science-side of their research, the results of which predicate emerging trends of digital and architectural production. The four papers presented in this *Design Economies Special Issue*, reflect various forms of partnership that articulate a deeper understanding of this confluence. Collectively, they represent initiatives in

North America (Canada and the United States) and in Europe (Netherlands and Switzerland) where the link between the academy and industry has developed. These linkages are enabling a reciprocal context of applied research where mutable frameworks for the rapidly expanding, networked-base of distributed learning and engagement exist. The projects discussed by the contributors respond also to the accelerating pace of technological, social, and other change across both specialized and mass markets, which in turn, produces curriculum that impacts not only design education but also informs new methods for professional engagement.

In her paper, *Heavy Design*, AnnaLisa Meyboom calls for a repositioning of engineering and architectural knowledge ultimately calling into question the traditional roles of professional architects and engineers. This critical realignment has both cultural and theoretical implications linked to multi-disciplinarity and presents a method for amalgamating diverse sources of knowledge that could lead toward a physically integrative and site responsive architectural model. In their paper, *A Case Study of a Collaborative Digital Workflow in the Design and Production of Formwork for 'Non-Standard' Concrete Structure* Nicholas Williams, Hanno Stehling, Fabian Scheurer, Silvan Oesterle, Matthias Kohler, and Fabio Gramazio, present a systems-based, design thinking tactic for the design and implementation of concrete formwork. The case studies within the paper articulate an integrated “lessons learned” strategy that offers a glimpse into an inventive and scalable feedback loop between the fabrication process and the resulting concrete structure. The results demonstrate an inherent “flexibility” for pursuing subsequent small-scale prototyping and formwork planning projects. In his paper, *InfoMatters: a Multi-agent Systems Approach for Generating Performative Architectural Formation*, Nimish Bioria articulates a clear link between digital information, parametric integration, and material-related, urban scale systems thinking. Through varied examples, Professor Bioria moves freely from referential networks to data gathering to layered assemblies to varying combinations of information, that result in architectural derivatives ranging from formal analysis to schematic site design to façade system design, and to automated modeling and fabrication. In his paper, *Design Economies of Surface*, Emmanouil Vermisso situates the interaction of architecture pedagogy in the context of automotive design. The author contends that within that context, curricular activity bridges between the designer and the engineer. By operating systematically within the quad-partite processes of design, prototyping, simulation, and fabrication, the embedded complexities of the multi-disciplinary project become both stand-alone categories and necessary venues for collaboration.

Collectively, the papers selected for the *Design Economies* Special Issue offer a glimpse into the creative potentials inherent in the collaborative contexts

of digital design today. Issues related to material selection, fabrication, and formation; building sustainability and product performance; gravitational forces and scripting; physical testing and virtual simulation; and market integration and consumer acceptance work to form integrated feedback loops that simultaneously demonstrate and question the multivalent roles of architects and engineers and their collective influence on the design processes. These projects serve as departure points for future design processes and educational inquiry working together to validate emerging synergistic design processes. These processes are not just a result or a means to an end, but rather, they ultimately serve as mechanisms that blur the line between a design and its implementation, branding, and performance.

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Part 2: Digital Guides and Aids

The two final papers in this issue provide insight into the use of digital modeling of built environments enhanced through interaction with a range of associated technologies. In the paper by Martens and Peter the better understanding of the historic buildings in a city is addressed. The future proofing of technologies to store information of buildings not constructed or destroyed is discussed and reconstruction of lost built artifacts is addressed. In the second paper in this section, by Cheng, the enhanced understanding of University campus environments is addressed. Techniques for the delivery of educational material and information with 3D representation as a core visual aspect of the interface is described.

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