Editorial

More than Skin deep: Early Design Evaluation Tools

Compared to many other disciplines, architects and planners make decisions that have a much greater impact and duration, sometimes affecting the environment for decades into the future. At the same time, global issues such as sustainability require architects to deal with design decisions that are now far more complex and inter disciplinary than they were in the past. And since the influence of a decision on the impact of a building is reciprocal to its project stage, all tools supporting the designers at early project stages can substantially help to optimize the quality and reduce future impacts.

So this issue of the IJAC journal focuses on a number of innovative approaches for the early design stage. Whereas applications at late project stages are mostly specialized and focused, early project stages have the open-ended quality of Horst Rittel's "wicked problems". This issue provide ideas on how evaluation tools can help quickly narrow decision options while supporting creative invention. The papers cover a wide range from structural form-finding to urban planning tools.

- Rivka Oxman analyzes recent work in performance-based design to give a framework for how form could be generated by environmental performance factors. She envisions how parametric meta-models, analysis software and human intervention could work together in a delicate balance and as a first step illustrates how animation software can simulate a dynamic building skin that reacts to wind forces, from an experimental studio.
- Markus Schein and Oliver Tessmann present performance-based structural design with a method to optimize surface-based structures using NURBS representation and genetic algorithms. The method applies to both single surface models and double surface models, including space frame configurations.
- Christian Tonn's and Frank Petzold's team from Bauhaus University describe a multi-projector Augmented Reality system that helps designers visualize possibilities for existing buildings. As part of the solution, they developed a color visualization software and compared user reactions to designing color, lighting and materials with their system versus other methods.
- Amine Benoudjit and Paul Coates are interested in how spatial representation can be used with neural networks. They test the ability of combinations of these representations and neural networks

to recognize and sort 3D shapes.

- Two teams have developed urban planning techniques for the South American context of rapid growth. Benamy Turkienicz, Bárbara Bellaver Gonçalves, and Pablo Grazziotin's CityZoom tool facilitates interactive visualization of the impact of alternative urban regulations from the scale of a small building to a large group of blocks. First developed for a city in Brazil, CityZoom incorporates CAD and GIS approaches with exports for interactive modeling and daylight modeling. Ongoing work looks at incorporation of wind analysis and artificial intelligence approaches for building form optimization.
- Luis Felipe González Böhme and Dirk Donath address user participation for single-family affordable housing in Chile with two software prototypes that visualize massing possibilities for building lots. By comparing how these programs work in two contrasting programming environments, they reveal possibilities and analytical considerations relevant to geometric constraint-solving problems more generally.

The process of writing and choosing high quality papers was not easy and involved a lot of commitment from the authors and especially from our reviewers. We thank all the authors for going through a time-consuming editing process and the reviewers who provided crucial specialist knowledge for choosing the best papers and increasing their quality.

We are especially pleased that Pablo Grazziotin and Luis Felipe González, winners of the Ivan Petrovic Prize for young researchers at the eCAADe 2007 conference, are published in this issue. It shows, that the field of early evaluation tools is attracting the upcoming generation. So this journal issue is just a snapshot of the current state and we are looking forward to a quick development in this field in the near future.

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