Digital Fabrication

Abstract. *NNJ* editor-in-chief Kim Williams introduces the papers in *NNJ* vol. 14, no. 3 (Winter 2012).

It is a pleasure to present vol. 14 no. 3 of the *Nexus Network Journal* dedicated to Digital Fabrication. It was exactly ten years ago that the first *NNJ* paper regarding this field – George Hart’s “In the Palm of Leonardo’s Hand” (vol. 4, no. 2, pp. 103-112) – was published. In the space of that decade, rapid prototyping and digital fabrication in architecture have gone from fantasy to reality. As the papers published here show, digital fabrication is changing architecture in fundamental ways in every phase, from concept to artifact. One manifestation of these changes is apparent in the way the authors refer to “making” architecture and to the architect as “maker”. To me this has the positive effect of restoring to the architect some of his original function, that is, involvement in the actual fabrication of the built object. The architect who exploits techniques of digital fabrication need no longer remain a mere overseer some steps removed from the process of execution, but can actually intervene and modify his design as it is being carried out.

On 9-10 September 2011 the ISCTE–Instituto Universitário de Lisboa hosted a symposium entitled “Digital Fabrication – A State of The Art” to discuss the current status of the field as well as its integration into programs for architectural training. The symposium organizers – Alexandra Paio, Sara Eloy, Vasco Rato, Ricardo Resende and Maria João de Oliveira – have contributed a paper to this issue entitled “Prototyping Vitruvius, New Challenges: Digital Education, Research and Practice” which serves as an overview of the field and an introduction to the other papers included here by symposium speakers, each of whom discuss a particular aspect of digital fabrication in architecture based on first-hand experience. Kevin Klinger contributes a paper on “Design-Through-Production Formulations” as implemented at the Institute for Digital Fabrication at Ball State University. Bob Sheil’s “Manufacturing Bespoke Architecture” addresses the changing roles of designers and makers in architecture as the constraints of industrial standardization are relaxed. Sheil is Director of Technology and Computing at the Bartlett School of Architecture, University College London. Tomas Diez leads the project Fab Lab at the Institute for Advanced Architecture of Catalonia (IAAC) and coordinates the Fab Academy program offered by the worldwide network of Fab Labs. His paper, “Personal Fabrication: Fab Labs as Platforms for Citizen-Based Innovation, from Microcontrollers to Cities” discusses how the generation of knowledge and the sharing of know-how will create a collective mind capable of defining the future of production in the life of mankind and its relation with the environment. In “Digital Fabrication Laboratories: Pedagogy and Impacts on Architectural Education”, Gabriela Celani, founder and director of the Laboratory for Automation and Prototyping in Architecture and Construction at the University of Campinas, examines the implications of digital fabrication for architectural education. Tobias Bonwetsch of ETH’s Laboratory for Architecture and Digital Fabrication presents “Robotic Assembly Processes as a Driver in Architectural Design”. The Lisbon symposium was completed by a workshop led by José Pedro Sousa of the Faculty of Architecture at the University of Porto (which, by the way, hosted the 2010 Nexus conference). His report of the workshop is presented

in the paper entitled “Material Customization: Digital Fabrication Workshop at ISCTE/IUL”.

Digital fabrication truly represents a leading edge of research in architecture, and I am very pleased that the *NNJ* was chosen as the venue for publication of these important papers.

This issue contains other research papers as well. In “Design and Tracing of Post-Byzantine Churches in the Florina Area, Northwestern Greece”, Aineias Oikonomou investigates the application of specific design and constructional tracing in post-Byzantine churches situated in northwestern Greece during the period from the fifteenth to the nineteenth century. This complements Oikonomou’s earlier paper on Greek houses (“The Use of the Module, Metric Models and Triangular Tracing in the Traditional Architecture of Northern Greece”, *NNJ*, vol. 13, no. 3, pp. 763-792). Farah Habib, Iraj Etesam, S. Hadi Ghoddusifar and Nahid Mohajeri, a group of authors affiliated with Islamic Azad University, Science and Research Branch of Tehran, have contributed a fine, original research paper entitled “Correspondence Analysis: A New Method for Analyzing Qualitative Data in Architecture”. Correspondence Analysis is a method primarily used in genealogy but here, for the first time, it is applied to architectural studies. The test case examines the influence of five distinct garden styles on the design of a formal garden – unfortunately no longer existing – in Tehran’s city center. The research paper by Francisco Roldán, “Method of Modulation and Sizing of Historic Architecture” presents a proportional system consisting of combined numeric and geometrical elements that he uses to analyze architecture of the past. In “Descriptive Geometry: From its Past to its Future”, Riccardo Migliari of Rome’s “Sapienza” University attempts to reconcile traditional and contemporary methods of graphic investigation, namely, descriptive geometry and CAD, to show how it is possible to give new life to the ancient science of representation and, at the same time, endow CAD with the dignity of the history that precedes it.

This issue concludes with my own review of Mark Peterson’s book, *Galileo’s Muse: Renaissance Mathematics and the Arts* (Harvard University Press, 2011). Who wouldn’t want to have the muse who guided Galileo looking over his or her own shoulder?

From ancient to futuristic: there is something for everyone in the Nexus Network Journal!

About the author

Kim Williams is the director of the conference series “Nexus: Relationships Between Architecture and Mathematics” and the founder of the *Nexus Network Journal*.