Architecture, Systems Research and Computational Sciences

Abstract. *NNJ* editor-in-chief Kim Williams introduces the papers in *NNJ*/vol. 14, no. 1 (Spring 2012).

One of the most interesting developments in the Nexus community since its inception in 1996 involves the way information technology has entered both the theory and the practice of architecture. When Nexus began, most of the research involved what I have now begun to think of as “traditional” relationships between architecture and mathematics: geometrical constructions and systems of proportions, for example. At Nexus 2010 in Porto, where the first two groups of papers in this present issue were presented, it was abundantly clear that today computer science is an integral part of even strictly historical investigations, such as those concerning the construction of vaults, where the computer is used to survey the existing building, analyse the data and draw the ideal solution. What the papers in this issue make especially evident is that information technology has had an impact at a much deeper level as well: architecture itself can now be considered as a manifestation of information and as a complex system. This is the fulfillment of prophecies made by voices crying in the wilderness as far back in time as the 1930s and 1940s.

This issue opens with Gonalo Furtado’s introduction to “Architecture, Systems Research and Computational Sciences”, in which he outlines some of the ideas that he has been working with for a number of years, and focuses especially on the little known work of Gordon Pask. Pau de Solà-Morales examines “Information, Architecture, Complexity”, showing how the study of patterns of relationships can provide the key for understanding of architecture as organization. In “After the Paradigm of Contemporary Physics in Architecture: Spatial Possibilities and Variations” Lora Dikova discusses the representation of informational flows via organizing spatial systems and the transformation of different informational modes into spatial structures. Suzanne Strum takes us back to a crucial and fascinating period in the relatively recent history of architectural theory. In “Informational Architectures of the SSA and Knud Lönberg-Holm” she shows the genesis of ideas about architecture as organization.

Nexus 2010 also included a roundtable discussion moderated by Celestino Soddu, concerning new methods of design. As an outgrowth of that discussion, here Marie-Pascale Corcuff presents a discussion of “Modularity and Proportions in Architecture and their Relevance to a Generative Approach to Architectural Design”, while contemporary artist Philip Van Looke uses his own work as a vehicle for discussing “Counterpoint in the Visual Arts”.

Two of the papers presented at Nexus 2010 concerned the very important theme of didactics: the question of what and how to teach students about relationships between architecture and mathematics. Maycon Ricardo Sedrez and Alice T. Cybis Pereira describe a project entitled “Fractal Architecture” aimed at introducing students to the concepts of self-similarity and iterative processes while they are becoming familiar with computer-aided design and rendering. Mathematician Jürgen Bokowski and architect Heike Matcha joined forces for “Möbius Strip Segmented into Flat Trapezoids: Design-

Build Project by the Departments of Architecture and Mathematics of the Technische Universität Darmstadt”, in which students from the two departments collaborated to conceive, design and carry through to completion a kiosk in the form of a Möbius strip.

This issue also includes four other research papers. Ute Poerschke presents “Architecture as a Mathematical Function: Reflections on Gottfried Semper”, in which she discusses the attempt made by the nineteenth-century thinker Semper (1803-1879) to connect architecture with infinitesimal calculus, his mathematical background, and his desire to give architecture a scientific foundation through methods of systematic comparison and classification. In “From Drawing to Technical Drawing” Adriana Rossi looks at how progress in drawing techniques and the capacity to conceive forms before they were built led to the emergence of a new role for the architect in the Middle Ages. Two papers, “Domes in the Islamic Architecture of Cairo City: A Mathematical Approach” by Ahmed Ali Elkhateeb and “The Vault of the Chapel of the Presentation in Burgos Cathedral: Divine Canon? No, Cordovan Proportion” by Tomás Gil-López, form an interesting counterpoint, in that each takes a different approach to a similar problem: the analysis of systems for covering space (domes and vaults).

The papers presented at Nexus 2010 have formed the basis of the past four issues of the *NNJ*. Now we are looking forward to Nexus 2012, to take place 11-14 June of this year in Milan, hosted by the Department of Industrial Design, Art, Communication and Fashion (INDACO) and the Department of Mathematics of the Politecnico di Milano. I am looking very forward to seeing what new developments this ninth edition of the Nexus conference will show us. Stay tuned!

About the author

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