Background

As we have moved on to the era of digital design and manufacturing, it has become possible for us to view the relationship between the design concept and the information we collect in a whole new way. Digital computation has created opportunities for architects to access the geometrical space with precise mathematics, and has been replacing traditional design process in every aspect. Meanwhile, as being in the Information Age, it is possible for us to digitally track and record the information that our society produces, via tools such as geographic information system and urban mapping techniques, forming a part of big database that increases everyday.

Behind the scene, new discoveries in the 70s to 80s in the fields of mathematics, physics, meteorology and biology have developed complexity theory, where simple algorithmic systems with a few initial inputs can create enormously complex phenomena. Ever since this has been a very strong tool to understand, model and simulate complex systems, which we now call algorithm modelling. With the advent of a few revolutionary software packages, architects and artists have quickly adopted the tool to experiment new generative patterns and forms, verbalising them in a new formal language – digital tectonics. With all these conditions, the patterns and forms we create can now be systemically associated with the data gathered and engineered mathematically, providing architects with a powerful tool that can control the complexity and test variations with ease.

Objectives

The studio will focus on this generative algorithm modelling as an effective tool for exploring complex form in urban context, to harmonise underlying conditions and mitigate potential contradictions. By understanding and researching the tectonics of digitally generated parametric patterns, students will identify, reconstruct and eventually invent digital systems that define architectural solutions. Keywords such as digital tectonics, optimisation, nonlinearity, versioning will support this exercise.

Students will also investigate how digitally generated complexity can induce indeterminacy, which enables architectural propositions to work as soft, flexible articulations in the urban context. With this perspective we will try to understand architecture as a type of open narrative, more susceptible of continuously changing conditions.
The course for 1st semester will mainly comprise of three phases: first we will concentrate our resources on learning the basics of digital algorithm modelling through a series of intense workshops, supported by reading and discussion sessions. Then we will move on to the next phase by researching systems in the precedents both from nature and built environment, and proposing a non-site specific prototype pattern. In the last phase students will choose a small urban site under certain conditions, and develop the prototype into an actual architectural project. The course detail for 2nd semester will be confirmed later.

The main software platform throughout the course will be Rhino 5 + Grasshopper plug-in, and advanced 3D visualisation skills will be required to achieve a certain level of output.

References

Wassim Jabi, Parametric Design for Architecture, Laurence King, 2013
Neil Leach (Editor), David Turnbull (Editor), Chris Williams (Editor), Digital Tectonics, John Wiley & Sons, 2004
Roland Barthes, "The Death of Author", in Image Music Text, Fontana Press, 1997
Arturo Tedeschi, Parametric Architecture with Grasshopper, Le Penseur, 2011
Programme

Week 1  
Course introduction  
Student introduction

Week 2  
Lecture 1: Generative Algorithm Modelling  
Generative algorithm modelling workshop 1  
Reading & discussion 1

Week 3  
Generative algorithm modelling workshop 2  
Reading & discussion 2

Week 4  
Generative algorithm modelling workshop 3  
Reading & discussion 3  
Task 1: Identifying a System

Week 5  
Task 1 pin-up / Joint workshop

Week 6  
Task 1 Wrap-up  
Task 2: Controlled Complexity & Indeterminacy

Week 7  
Lecture 2: On Flexibility  
Workshop: developing task 2

Week 8  
1 to 1 tutorial: developing task 2

Week 9  
Task 2 pin-up / Mid-term critic

Week 10  
Task 2 wrap-up  
Task 3: Open Narrative Project

Week 11  
1 to 1 tutorial: developing task 3

Week 12  
Cross-critic

Week 13  
1 to 1 tutorial: developing task 3

Week 14  
1 to 1 tutorial: developing task 3

Week 15  
Final critic

Week 16  
Final submission