# DIGITAL FABRICATION

## Manufacturing Architecture in The Information Age

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The basic premise of this graduate-level elective course, offered for the first time in the spring of 2001, is that the Information Age, like the Industrial Age before it, is challenging not only how we design buildings, but also how we manufacture and construct them. The guiding notion was that the generative and creative potential of digital media, together with manufacturing advances already attained in automotive, aerospace and shipbuilding industries, is opening up new dimensions in architectural design by allowing production and construction of very complex forms that were until recently very difficult and expensive to design, produce, and assemble using traditional construction technologies. The proposition was that the consequences of these changes are likely to be profound, as new digitally driven processes of design, fabrication and construction are increasingly challenging the historic relationship between architecture and its means of production.

The course set out to challenge the established understandings of design and production processes and their material and economic constraints. A wide range of themes was covered, such as mass-customization, digital generative design processes, fabrication technologies and processes, CAD/CAM in related fields and their impact on AEC, digital "continuum" from design to construction.

Students had to digitally fabricate a model of an object with complex, "freeform" geometry using introduced technologies and processes, present a research study on a selected theme and participate in ensuing discussions.

**Digital Fabrication Project**

For the fabrication project students had to choose an object with a "freeform" geometry and devise a strategy of tectonic translation to produce a scale model of that object directly from digital data using introduced fabrication technologies and devices, such as a laser cutter, a CNC milling machine, and an FDM system.

For the review students had to describe in their presentations

(1) what the modeled construct is, (2) how its geometry was generated, (3) how that geometry was analyzed for the fabrication, (4) the translation strategies used (contouring, triangulation, unfolding, etc.), (5) the fabrication processes used (2D fabrication, 3D subtractive/additive fabrication, reproduction, etc.), (6) the assembly process and the techniques/procedures used (coding if any, sequencing, etc.), (7) problems encountered in any of the previous steps, and (8) their observations and conclusions.

The fabrication project was an enabling exercise. In the weeks that followed students had to present the results of an independent research study and submit a paper at the end of semester summarizing their findings.

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