Faculty Development Grant Fall 2015

Chava Danielson
Adjunct Professor, Department of Architecture/Landscape/Interiors

Project begun: December, 2015:

The project is an investigation into the capabilities of a new generation of desktop 3-D printing technology to allow designers to move past employing the technology in the creation of illustrative models, and to instead produce full scale, structurally sound, materially performative artifacts.

In the Fall of 2015 I applied for a Faculty Development Grant to purchase a LulzBot TAZ5 3D desktop printer. The particular printer would allow my office to undertake the proposed research in that it has a large print bed, interchangeable tool heads able to accept a variety of new materials such as translucent plastics and runs on open source software. The printer would be used to produce a full-scale cat shelter exhibited by Architects for Animals at the Herman Miller Showroom and auctioned off to benefit a non-profit dedicated to helping spay, neuter and find homes for homeless cats, Fix Nation.

Architects for Animals held its first West Coast Benefit auction of cat shelters in September of 2014, and DSH // architecture (the firm of which I am a Principal), participated in that benefit event. The shelter we donated then was the result of a design process using traditional methods of 2-D projective geometry and a meticulous process of hand-crafted construction. We decided to use the invitation to participate in the second event – to be held in March of 2016 – as an opportunity to investigate a digital design methodology and engage 3-D printing for the fabrication of the shelter.
The scale of the cat shelter occupies an interesting space somewhere between 1:1 scale and that of an architectural model. Its size, and therefore the issues of fabrication, are closer to that of a model and yet, on account of the requirements to provide shelter, it must have the performative qualities of a 1:1 object. We set up the problem for ourselves of producing the entire structure and all its connections on the bed of a design-office size 3-D printer, which we purchased once I was awarded the Otis Faculty Development Grant.

The solution we produced is a conical shape of nine rows of interlocking diamond-shaped shingles that diminish in size as the rows ascend. Each shingle is angled to the ground, but has a turned-down edge that meets its neighbor in a level and parallel connection in the center of that edge. The geometry was calculated in Rhinoceros; the eccentrically shaped shingles were each produced on the 3-D printer, complete with turned-down edges and pre-drilled holes. The connecting pegs were also produced on the printer and the object was assembled in our office.

Project Description: Spiral Kitty

Like the famous land art sculpture, our cat shelter is best experienced moving around it. Nine bands in three colors twist together in a dynamic helix, creating a "cat cone" that provides shelter, rain cover and ample ventilation for L.A. Cats.

Made entirely of 3D-printed components and using no framework or adhesives, Spiral Kitty uses the geometry and aggregation of "structural shingles" to produce a lightweight, interlocking, reciprocal structure. At night, one third of the shelter glows luminous blue to provide a beacon for nighttime wanderings.
The event was a great success for Fix Nation and the work of all the participating architecture firms received mentions in a number of design and architecture websites and blogs including the Architects Newspaper and Curbed LA:

http://archpaper.com/2016/03/201603201603los-angeles-cat-itecture-cause/


http://www.contemporist.com/2016/03/24/12-los-angeles-architecture-firms-have-designed-cat-shelters-for-charity/


http://www.fastcodesign.com/3058183/what-happens-when-you-let-architects-design-cat-houses

This project has been important for the work of my office far beyond the professional recognition. This investigation into a purely digital design methodology as well as the production of an object with this level of complexity and intricacy was a breakthrough for DSH // architecture. I feel it is important as both an Architect and an instructor to incorporate new technologies in my design work and to push the boundaries of those technologies where feasible. As a result of this project I have a new understanding of the interface between design theories we discuss in studio and their realization through new methods of fabrication, and I am confident this will be evident when I return to studio instruction in the Fall. I want to thank, again, Otis and the Faculty Development Committee for helping make this research possible.