Award of Distinction

Reinvention of Glass Block

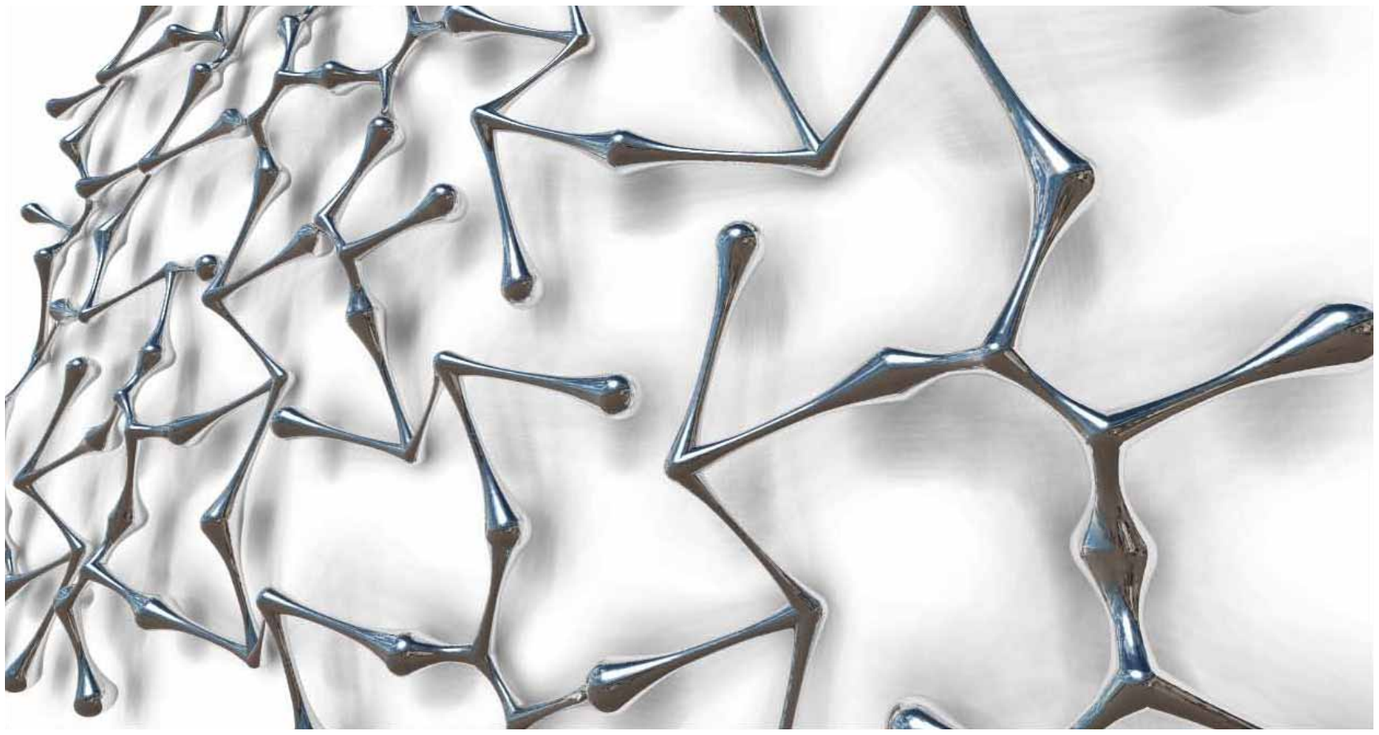
by Drew F. Weinheimer and Keith Labutta

Level	Graduate
Course	Digital Fabrication
Advisor/Instructor	David Celento
Principal Investigator	Reggie Aviles
Department/School	School of Architecture and Landscape Architecture, Pennsylvania State University

Summary description of project:

Pittsburgh Corning sponsored students in the digiFAB class to reinvent glass block. Students visited the manufacturing plant, studied the processes for making existing block and proposed new ideas that would permit Pittsburgh Corning to re-invigorate their product line, with an emphasis on creating novel and highly desirable outcomes that offered flexibility.

The class focus was creating and visualizing solutions through rapid prototyping using Zcorp printing and CNC mold making. Solfware to be utilized was of student's choice. Drew chose **form•Z** due to its capabilities and the ease of modeling and rendering that **form•Z** offered.



Reasons for the nomination:

The students' solution was the most unique proposition envisioned. **form•Z** proved a highly useful tool for visualization and rapid prototyping of a model that was presented to the Vice President of Pittsburgh Corning, Pete Atherton.

Through the use of **form•Z**, the students stretched the boundaries of what a unitized glass product might be, while still permitting production of individual units that could be aggregated in a variety of ways. His solution generated a good deal of interest and excitement a Pittsburgh Corning.

Jury comments:

Nicest design of the bunch. — ***Frank Elmer***

This project demonstrates a convincing process of research, design and fabrication. It is exciting to see students realize the potential of **form•Z** in this capacity; I hope we continue to see more pedagogic exploration in this area. — ***Susan Melsop***

This is an intriguing use of **form•Z** to investigate various concepts, generate 3D output of concept variations, and then create the mold to physically make the product. This project shows the process extremely well and creates a beautiful esthetic in the final part. About the only thing lacking is to show how the parts would be used in a typical architectural situation. Excellent Work. — ***Robert Brainard***

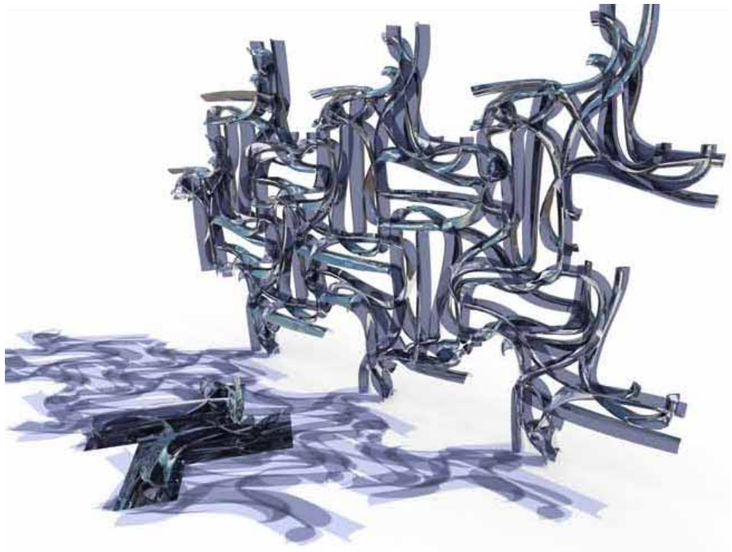
PROJECT BRIEF

Both the University an the sponsoring company were interested not only in procuring solid designs, but also in cultivating rapid prototypes while considering mass manufacturing.

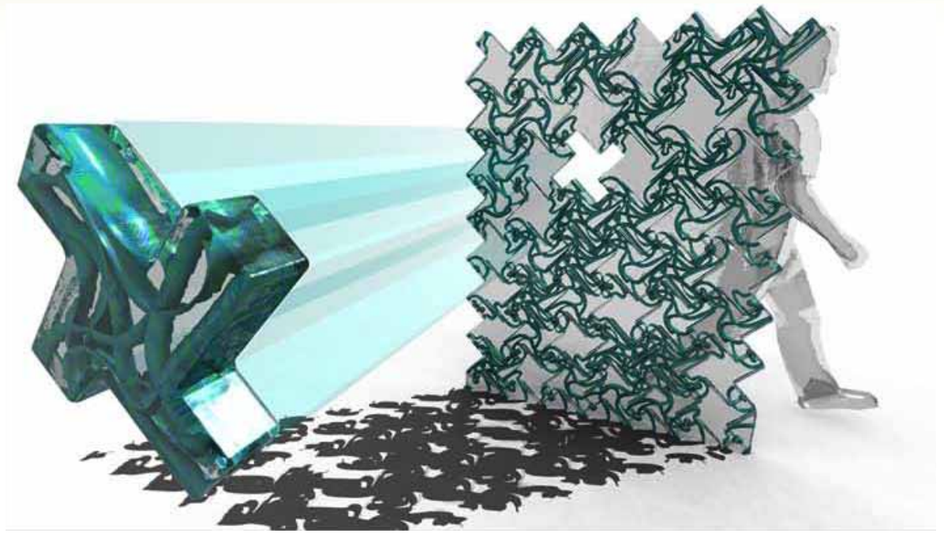
AutoDesSys' **form•Z** was the sole digital design tool throughout the iterations and became the platform for delivering physical prototypes.

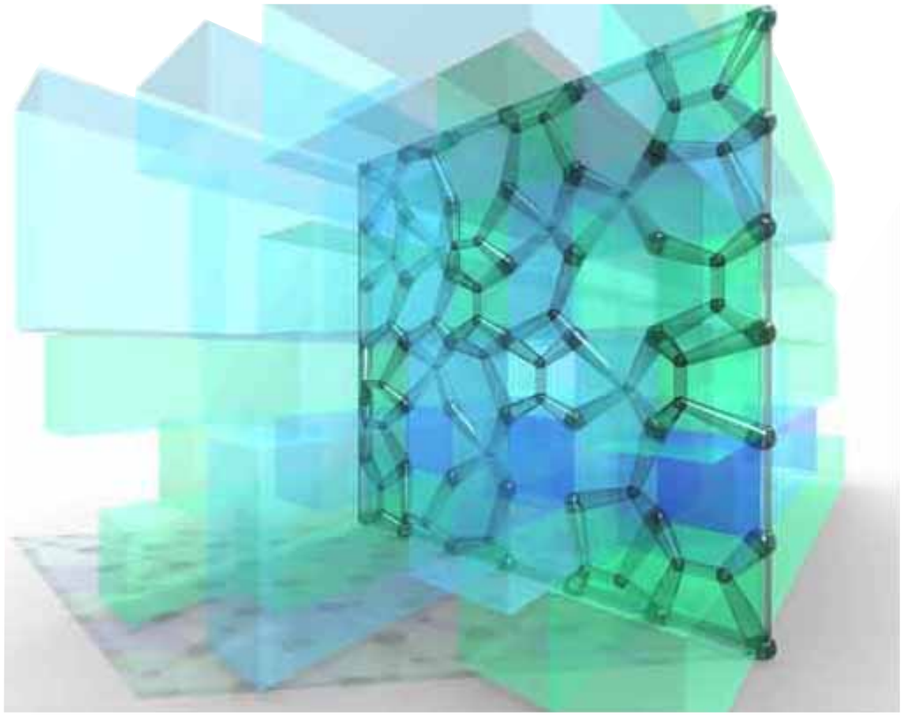
DESIGN STRATEGIES

This design sought to create a versatile block wall system that obscured its modularity. The design also considered possibilities of permeability, materiality, assembly, and utility of a block wall system.



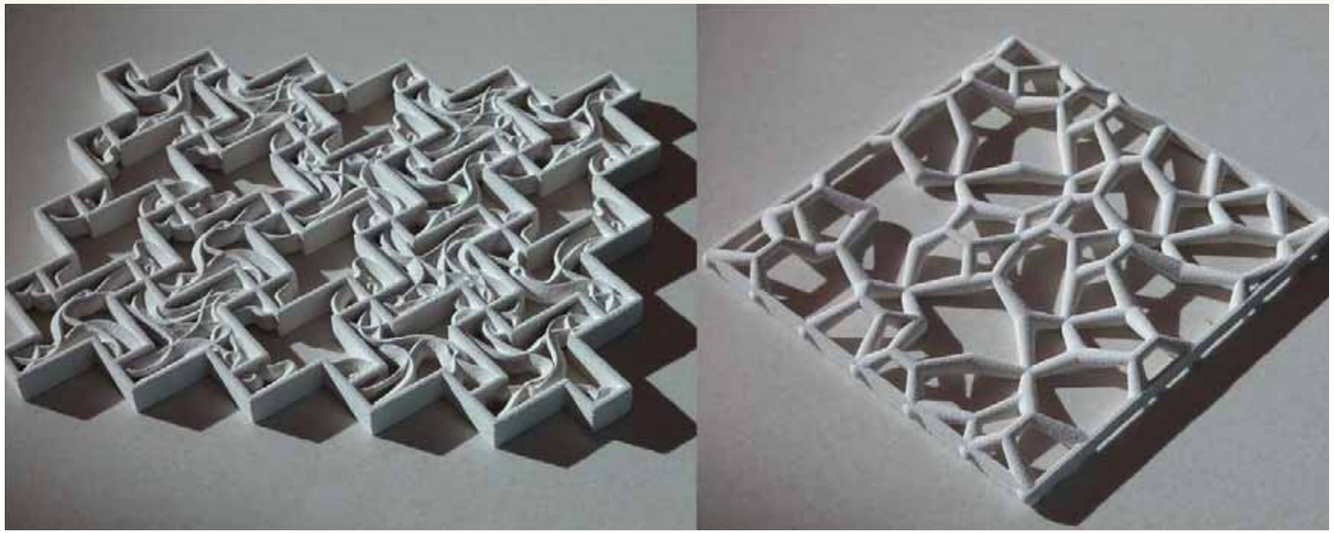
DESIGN APPLICATIONS



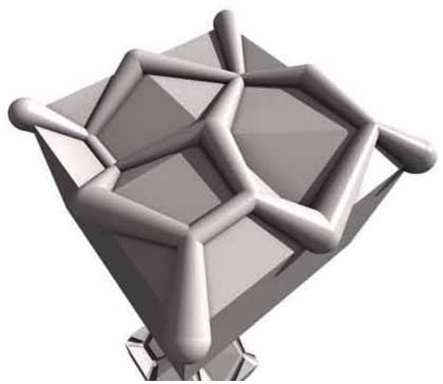


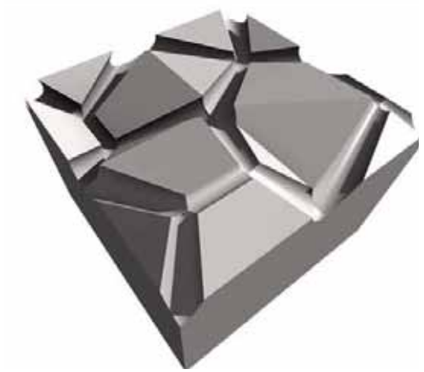
Although only one form of application was prototyped, these design principles are flexible enough to allow others.

DESIGN PROTOTYPES

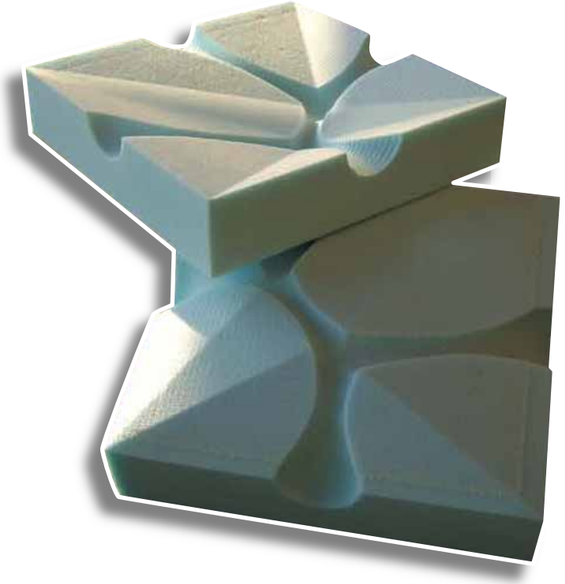


DESIGN REFINEMENT

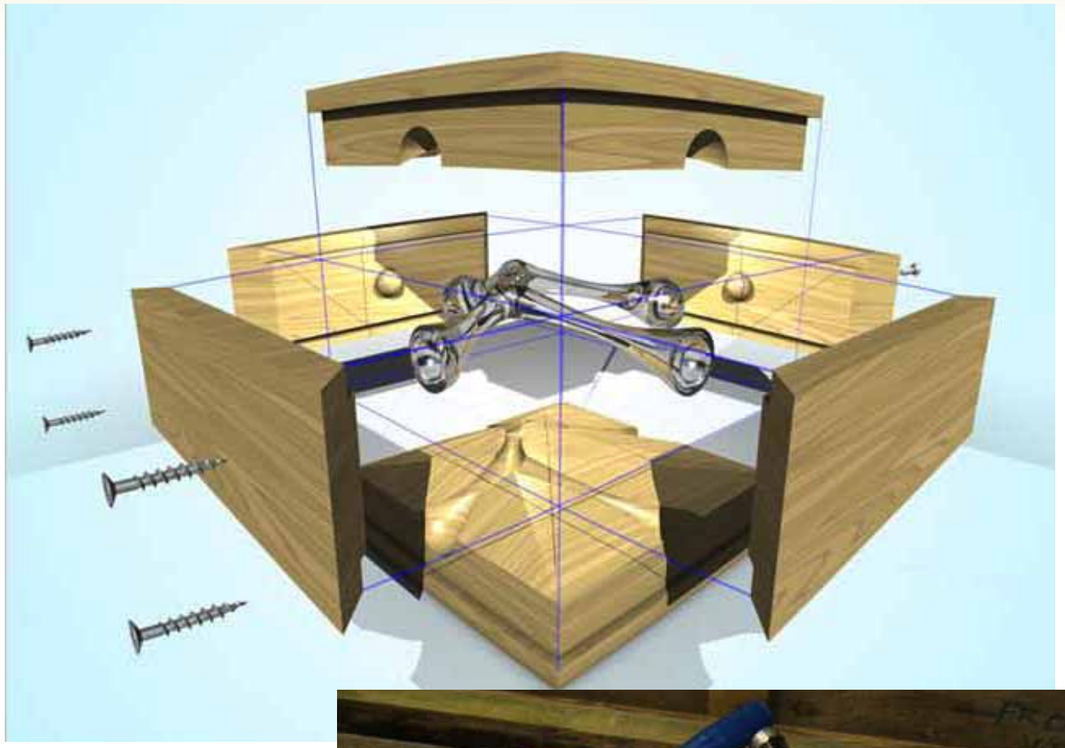




FINAL DESIGN



FINAL PRODUCT



For a single form to be cast, six mold pieces are required: a top, a bottom, and four side walls. The top and bottom pieces are fit together under pressure from several clamps. Three of the four walls are screwed into place. The open end allows urethane resin to be poured in. The last wall is screwed in and additional clamps are added to prevent leakage. After curing overnight, the mold is released and the final product is extracted.

Although the design objective was to produce a glass block wall system, perhaps this design lends itself more to plastics or metals. Glass would have a tendency to fracture at weaker points and also would not be suited for a butt-jointed socket. Synthetic materials allow more flexibility and are better suited for this type of design application.

And even though only one final version of the product was generated, the system is very open. Countless versions of walls can be generated under the design principles. The real strength of the design is its flexibility of form and application.

FINAL DESIGN