judson university
bachelor of arts in architecture

benjamin.L.scholten

2010
portfolio

urban transducer

view from state st. west of the train line

Globally, cities suffer from many types of pollution that tarnish their own quality as well as the planet's. One of the most prevalent forms of pollution in cities comes from noise; energy which is not lost to nothingness upon absorption, but is transformed into new energy. This resultant energy is usually heat, which is potentially contributing to the rising issue of global warming. As the amount of noise production continually increa ses, so will the amount of resultant heat, furthering the increase of Earth's average temperature. This issue is headed towards greater severity as population increases result in louder living.

Each year, Evolo offers a professional competition in which applicants seek to redefine the skyscraper. This project was entered by a group of four students outside the school studio. Each member contributed to the concept, form, and representation of the project using Revit, Rhino, and Photoshop.

The urban transducer takes advantage of city noise pollution in Chicago by capturing airborne sound, converting it into usable energy, and using that energy to help power the skyscraper. **Why lose sound energy to unwanted heat gains when it can provide energy for essential building functions?** This skyscraper's screen system captures sound energy present in its city setting. This is done through acoustic panels that perceive present frequencies in the immediate context which tune themselves to accommodate these specific frequencies' wavelengths. Changing the bands' natural frequencies allows them to capture the maximum amount of energy from the noise. The urban transducer also has the ability to remember the most commonly occurring frequencies and their locations, allowing it to preemptively adjust to produce maximum efficiency.

In addition to its sustainable ideas using sound, the urban transducer utilizes wind forces present in the urban environment to produce energy for the building. Integrated among the acoustic panels, similarly composed wind panels contain miniature turbines that harness any available wind power, no matter how minute. They are fully integrated throughout the skyscraper but are concentrated in areas of greatest efficiency: on the top of the tower where wind forces are the strongest and most constant, along the train tracks, and above the roads.

evolo skyscraper_urban transducer

aerial night view of the Urban Transducer from down Michigan Avenue

evolo skyscraper_urban transducer

hub_public area

michigan avenue_night view

Beyond the idea of energy collection, sound inspired the form of the urban transducer. When produced, sound is pure and unaltered in its form, but human perception of that pure sound is distorted and warped by interacting with the environment. The urban transducer reflects this relationship in its appearance; it is composed of six primary hubs and numerous pods around its core, all of which are pure, simple forms. A viewer's perception of these components is altered by the exterior screen systems [sound & wind] that obscure them, thus distorting their pure nature visually as happens audibly with sound.

urban transducer_southwest aerial
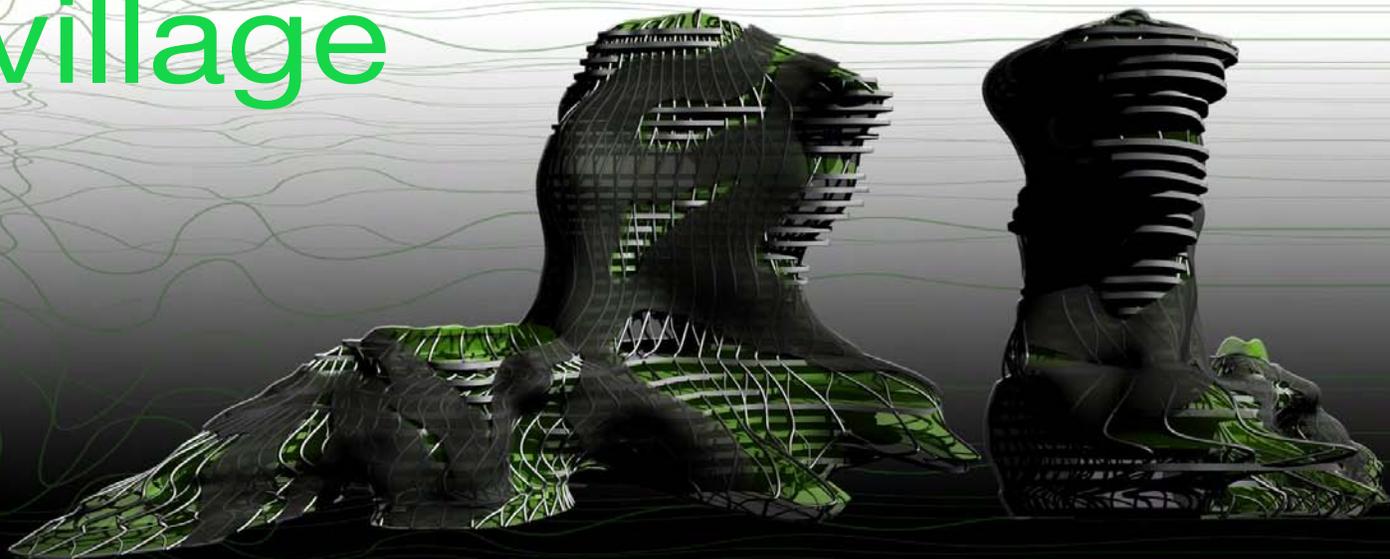
TKeloo

master plan

The master plan design was inspired by the distinct visual separation of the site. The train lines were a barrier with organic lakefront and parks on the east side and the structured city grid on the west side. The site spanned the tracks and therefore inspired a pull of the organic nature from the water morphing into the city grid. Both the appearance and the experience of the site would follow this morphing nature. The name of the project, Tkeloo, reflects this idea. The letters of the title are strong and ordered in appearance and sound to the left and shift into more natural letters to the right, much like the architecture on the site.

The three members working on the master plan phase represented the idea with a clay model to fully express the organic nature of the complex, which was then used for renders of the building masses. The project was then split between the three members, each working on different elements: transit center, aquatic center, and Olympic village.
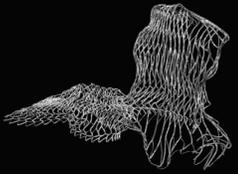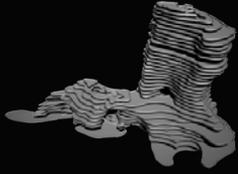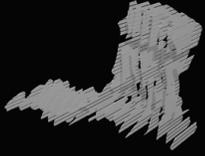
chicago olympic village

interior structure I

interior structure II
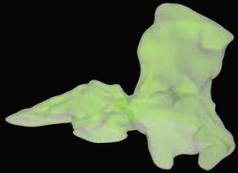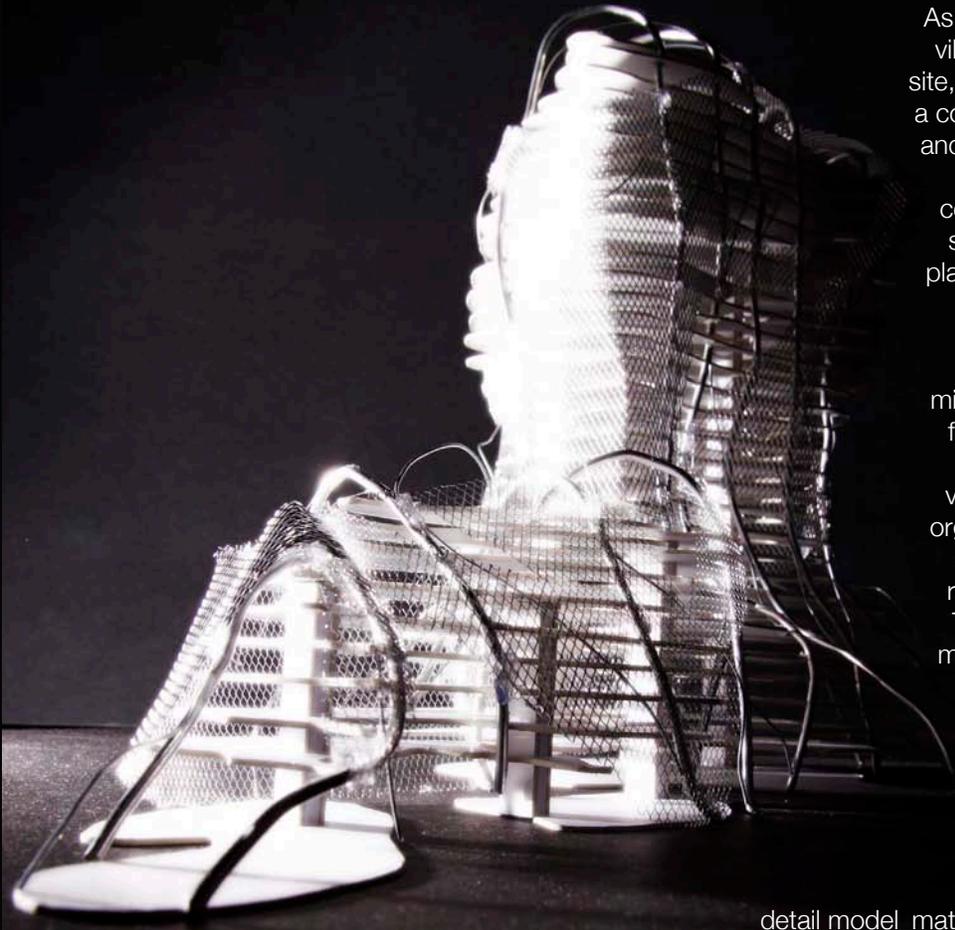
floor slabs
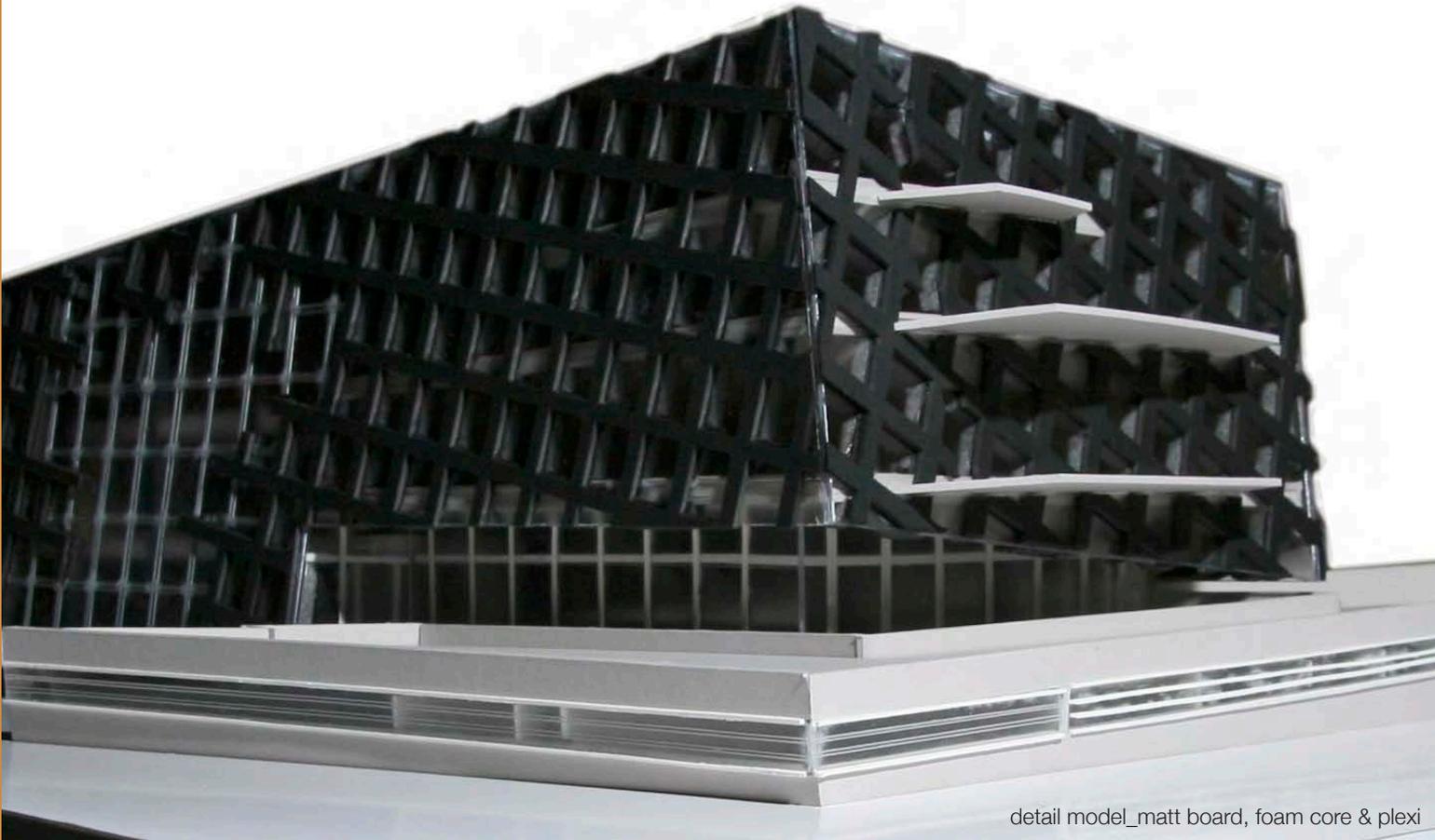
exterior structure

skin

screen

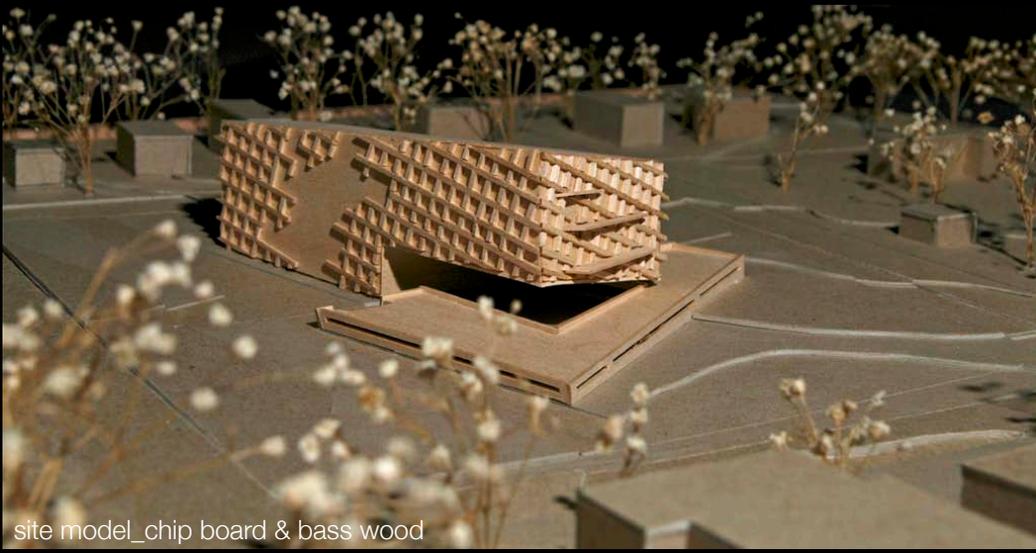As one of the residential villages on the Olympic site, this tower expresses a combination of organic and rectilinear elements. Its location is in the center in the morphing scheme of the master plan and therefore must express half of both elements. It utilizes free-flowing structure mixed with ordered, flat floor plates. The other residential buildings vary on both the more organic side to the east as well as completely rectilinear to the west. The presentation was modeled and rendered with Rhino.

detail model_matt board, mesh & wire

public library
geneva, illinois

The program of the library required a mix of private library uses and public areas including meeting rooms, lecture halls, and community rooms. The two separate masses delineate between the program types. The large, structured mass holds the programs for the public library. The lower, glass section in the intersecting area of the masses contains the gallery. It is accessed from the interior of the library but can be seen after hours from the exterior. The smaller mass holds the public uses and may be open at separate hours than the library making the two uses compatible. The project was done individually and was modeled with SketchUp and Revit, while rendered with Revit and Photoshop.

public library

december 2008
third year studio

detail model_matt board, foam core & plexi

public library

site model_chip board & bass wood

computer/study area

judson university

bachelor of arts in architectural studies

benjamin.L.scholten

2010

portfolio

benjamin. L. scholten

scholtenportfolio.com