PRINCIPALS: *designers:* KATHLEEN BRANDT, JAE CHA, ANNA DYSON, DAVID RIEBE *engineers:* DAVID BORTON - solar, ANDRE CHAZAR, structural PROJECT TEAM: PATRICIA ACEVEDO, STEPHANIE BAYARD, RANDEE CHEN, TED KOTSAFTIS, RICHARD MAGAN, EVAN MANILLO, MARTHA MERZIG, JONATHAN RIKER, VIVIAN ROSENTHAL, JESSE SEPPI, JACOB SLUTSKY

BUILT ECOLOGY

LOOM v.t. to weave (something) on a loom; v.i. to come into view in indistinct and enlarged form: the island loomed through the mist; v.i. to rise before or overhang with an appearance of great or portentous size

WEAVE v.t. to form by combining various elements or details into a connected whole: to weave a tale

PNEUMATIC adj. of or pertaining to air, gases or the wind; operated by the pressure or exhaustion of air; filled with or containing pressed air; of or pertaining to the spirit; having lungs or air cavities

An urban paradise island is considered as an independent microclimate within the city, an ecosystem that is self sufficient in terms of its ambient energy requirements, but one that is also intertwined and connected to the urban infrastructure through water. A web of high strength kevlar rope is woven through the concrete walls of the courtyard at PS1, creating a scaffolding for an array of manufactured and and natural *bio-devices* that work to filter the space, transforming it both chemically and physically. A closed loop energy cycle is created by the woven *loom,* that *floats* an inverted 'landscape' hovering above with translucent solar cell panels that track the motion of the sun, collecting and distributing the energy to power a series of water screens, LED projective lighting and an integrated sound environment. The panels slowly track the position of the sun creating a constantly shifting undulated canopy, transforming the courtyard into a giant sundial with the projection of shadows through the weave onto the surrounding walls. Plants that are suspended from the panels require only air and mist to grow, but they consume large amounts of air toxins which they store in their leaves, thereby functioning as bio-monitors of ambient air quality. As they consume air born elements throughout the summer season, they grow in size and drop offspring, emerging as veritable hovering clouds of toxic green. The cables also emerge through the walls to support a series of transparent nylon fabric structures that modulate the space the ground plane for lounging. Transparent water screens are dispersed throughout the space, bouncing reflected light throughout the space.

Founded at Rensselaer in 2000, MATERIALAB is an experimental research engine providing a forum for Architects, Engineers, Scientists and Artists to collaborate on prototyping and experimenting with new material systems.The systems emerge from challenging accepted relationships between constructed environments and our own biology, as well as that of larger ecosystems. Emphasis is placed on the prototyping of building systems in which the performance criteria for materials is closer to the behavior of natural systems that are responsive and adaptive to variable conditions rather than the wasteful autonomy that is present throughout much of our present built culture. The daunting challenge of responding to the complexities of ecological criteria compels us to eschew the conventionally hierarchical model for architectural practice which has typically engaged other fields of knowledge on a consultancy basis, rather than as a partnership in the design process from its inception. We consider Architecture as interdependent with the larger 'material loop' of society: that is, how do we choose to manipulate and organize materials throughout their 'lifetime of use' from extraction to disposal? We have chosen to consider the material loop as being a closed one, one that eliminates the option of disposal, and instead considers the potential for material to have infinite use and adapt to different functions as needed. This poses one of the most daunting challenges to society, as only some materials can be recycled and manipulated into different forms, but in many cases this option is energy intensive and 'chemically expensive', that is, leading to the ultimate impoverishment of a material's performative capability. For this reason, we are principally interested in investigating the design of systematic components and aspects that are potentially adaptive to other arrangements and life cycles.

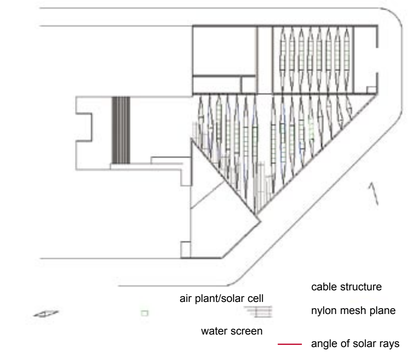
SPONSORSHIP: The following entities have generously supported this proposal:

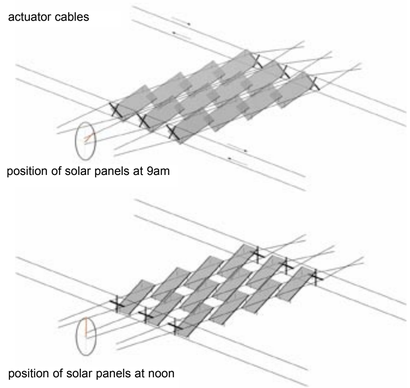
NYSERDA: New York State Energy Research and Development Authority - Rebate for Solar Cell Panels (photovoltaics)
2000 Peak Load Reduction Program

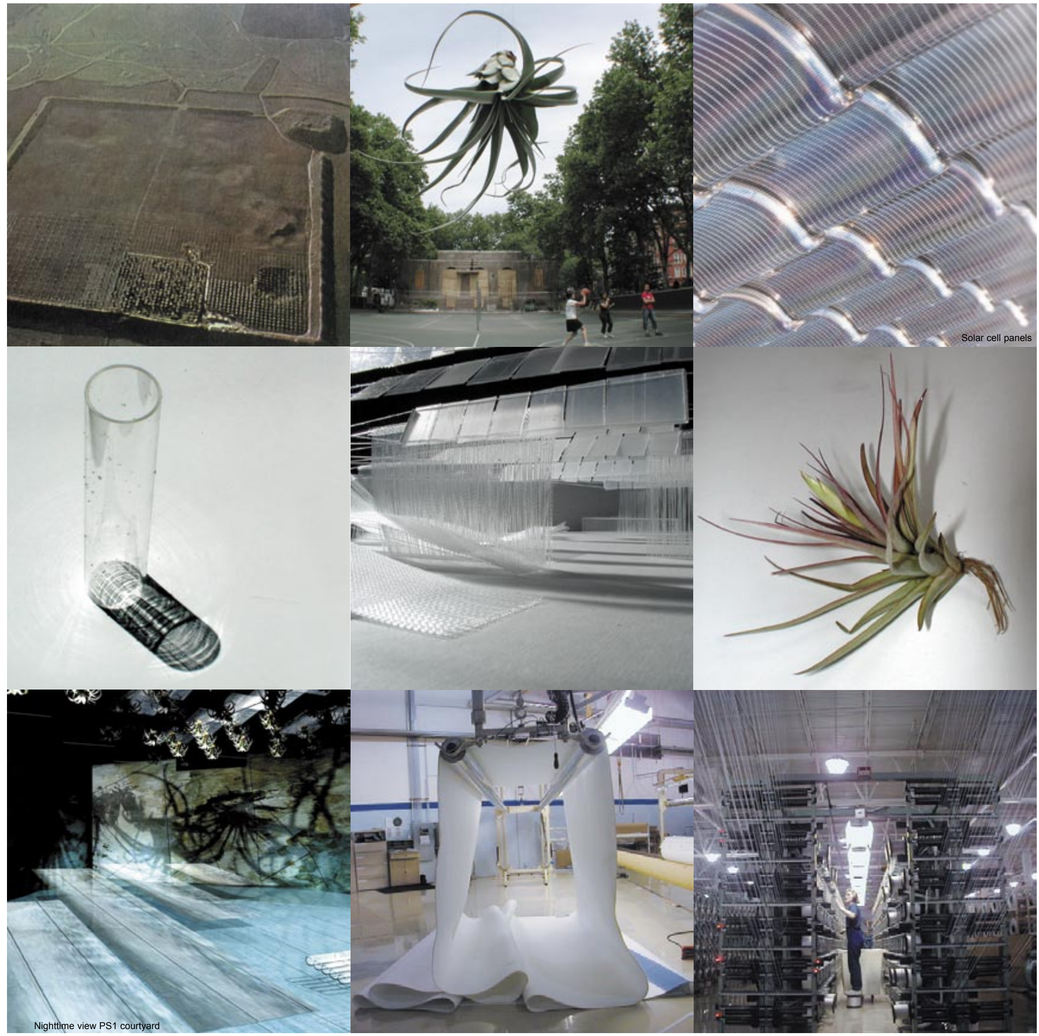
ALBANY INTERNATIONAL: Donation of all high-strength nylon mesh and Kevlar rope

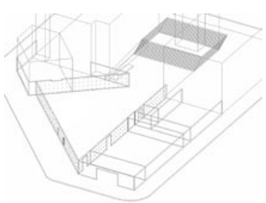
LIGHTING RESEARCH CENTER: LED -Light Emitting Diode- Projective Lighting System (Rensselaer School of Architecture-- Alan Balfour, Dean)

BURO HAPPOLD CONSULTING ENGINEERS



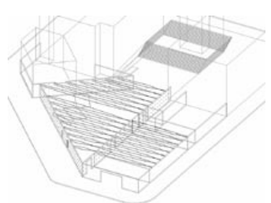






empty room

All materials on the ground begin in a completely transparent state, and develop a *milky* translucency due to the degree of manipulation in manufacturing (weave, mold, extrusion etc.) The room is layered with many spatial definers, such as translucent water screens and woven stretched fabric, but remains somewhat ambiguously *empty.* The visual fragility of the spatial elements is in tension with their actual strength, requiring a certain sensitivity in the discovery of the space as one moves through it, negotiating one's experience of the physical reality of elements with their appearance.



loom

The entire courtyard of *PS 1* is transformed into a giant weave of super high strength Kevlar rope, woven through the tie rod holes of the concrete, capitalizing on the heft of the walls to create a structure that, while appearing gossamer thin, is actually extremely strong. The direction and continual looping of the weave through the walls down to the ground generates an *impossibly* strong web that can float a giant moving canopy of solar cells and air plants above, as well as some large areas of stretched fabric that modulate the space.