

# Learning from Environmental Energies and Building Form in the Gulf Region

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This project presents a recent architectural design studio experience in which students in the Middle East were asked to design a Scientific Research Facility in the desert oasis city of Al Ain in the United Arab Emirates.

Coupled with a seminar entitled, Environmental Energies and Building Form, the studio investigated vernacular habitation patterns and craft of ancient desert dwellers in order to develop techniques for inhabiting this harsh environment.

In contrast to the incredibly incongruous development patterns of contemporary Emirati urban environments such as Dubai and Abu Dhabi, students recognize and appreciate the lost cultural and building traditions that were lost due to a shift from maritime industries to oil production. These building techniques have been examined and reinterpreted to align with modern construction and ways of living.

To frame this investigation, hybrid conceptual models were created. Rooted in the process of making, the models are hybrid in nature because they are roughly the size and scale of the assigned building program but unlike an architectural model, they are not meant to represent larger architectonic assemblies.

Students are asked to imagine a construction partially authored by the site; and in so doing, create a proposal that is extremely site specific and therefore inherently sustainable. The “graining” of the landscape or the fabric of the natural context is revealed as an ordering system that is not constrained by the limitations of imagining their projects, first and foremost, as buildings.

The process allows students not only to challenge counterintuitive notions of sustainability but also forces them to make things with their hands and bodies. Students engage in craft at a large scale; one that allows them to understand the muscular memory of making something that moves beyond an intellectual exercise alone.

The vernacular techniques examined have allowed people to exist in the region for tens of thousands of years and include courtyard house typologies, Arish (palm) construction, Bedouin weaving, Mashrabiya screens, Dhow boat-making, sand baffles, sewing of lateen sails, wind towers, qanat tunnels, and falaj channels, to name a few.

Through a variety of modeling approaches such as soldering, welding, casting concrete, working with carpentry tools, or CNC routers, the students create an objet d’art that stands autonomously to reveal and reconcile site forces such as sun direction, prevailing winds, watershed and erosion, ecological patterns, and zoning/contextual constraints. The piece establishes sensibilities in solving site strategy, programmatic configuration, building systems, form, and materiality.

Beginning with orthographic projection, architectural drawings are produced that encode programmatic relationships and an architecture emerges from these sensibilities that aspires to be both environmentally sensitive while maintaining cultural authenticity.

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The vernacular techniques examined have allowed people to exist in the region for tens of thousands of years and include courtyard house typologies (خانه‌های ایرانی), Arish (نخل) construction, Bedouin weaving (خمیه بافی), Mashrabiya screens (مشبکة), Dhow boat-making (قایق سازی), sand baffles (حصان), sewing of lateen sails (بادبان), wind towers (بادگیر), qanat tunnels (قنات), and falaj channels (کانالهای آبی), to name a few.

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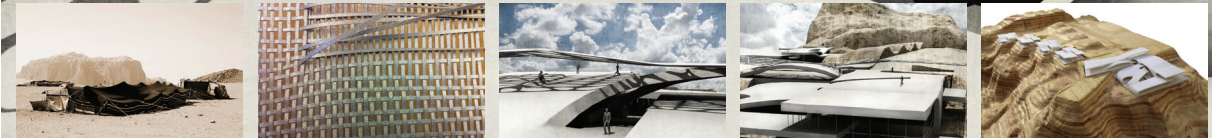
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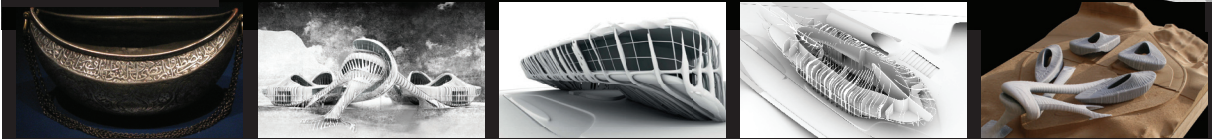
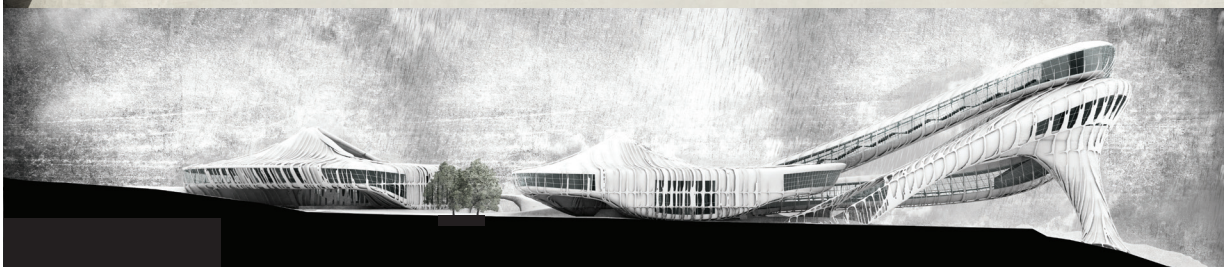
Research Facility Site, Al Ain, UAE



Site model being routed for hybrid constructions



Hybrid constructions based on bedouin tent



Hybrid constructions based on beggar's bowl