DUNEHOUSE

***dune*house is based on a system that adjusts not only to the extreme conditions of the desert, but to any other surroundings with their specific topographical and climatic conditions. The skin of the building serves simultaneously as façade, load-bearing construction, and living space, and enters into a reciprocal, organic relationship with the natural surroundings. The dynamic morphology of the desert floor is integrated into the design.**

***dune*house was developed as a single-family prototype house intended for the desert regions of Nevada. Despite the inhospitable conditions of the area, with its extreme temperatures and lack of water, people still settle here in large numbers. It now houses the fastest growing population in the US. But the architecture here is predominantly monotonous and repetitive, in no way reflecting the natural surroundings, let alone trying to make use of them.**

***dune*house is a counter-concept to these uniform buildings that uses the sparse resources as efficiently as possible, conforming to the existing habitat. *dune*house is first and foremost a shell, but this building shell is not just a surface. The construction takes its inspiration from nature, in particular those plants (cactuses) and animals (lizards and other reptiles) that have adjusted to the extreme climate of the desert in an optimal way. The shell system is comprised of a simultaneously responsive surface and integral structure, thus forming the entire house, without need of any other building elements.**

Usually, the load-bearing supports and building shell (façade) are organized in a strict hierarchy: the load-bearing supports represent the primary system to which the secondary system, the facade, is attached. This practice necessarily leads to a rigid formal constellation in which the girder is the decisive factor for the entire design. In contrast, *dune*house is based on a system that allows for much more flexible planning, due to the unity of structural supports and shell. The building structure consists of many interlinked individual building elements, forming a network.

The generative software used to develop *dune*house makes it possible to adjust the building structure individually—for example, to the topography of the building site—by altering the parameters. Changing the size or shape of individual elements allows the structure's density to be varied. In the design process, the elements always react locally, directly to one another, so that by changing individual elements whole parts of the structure are also altered.

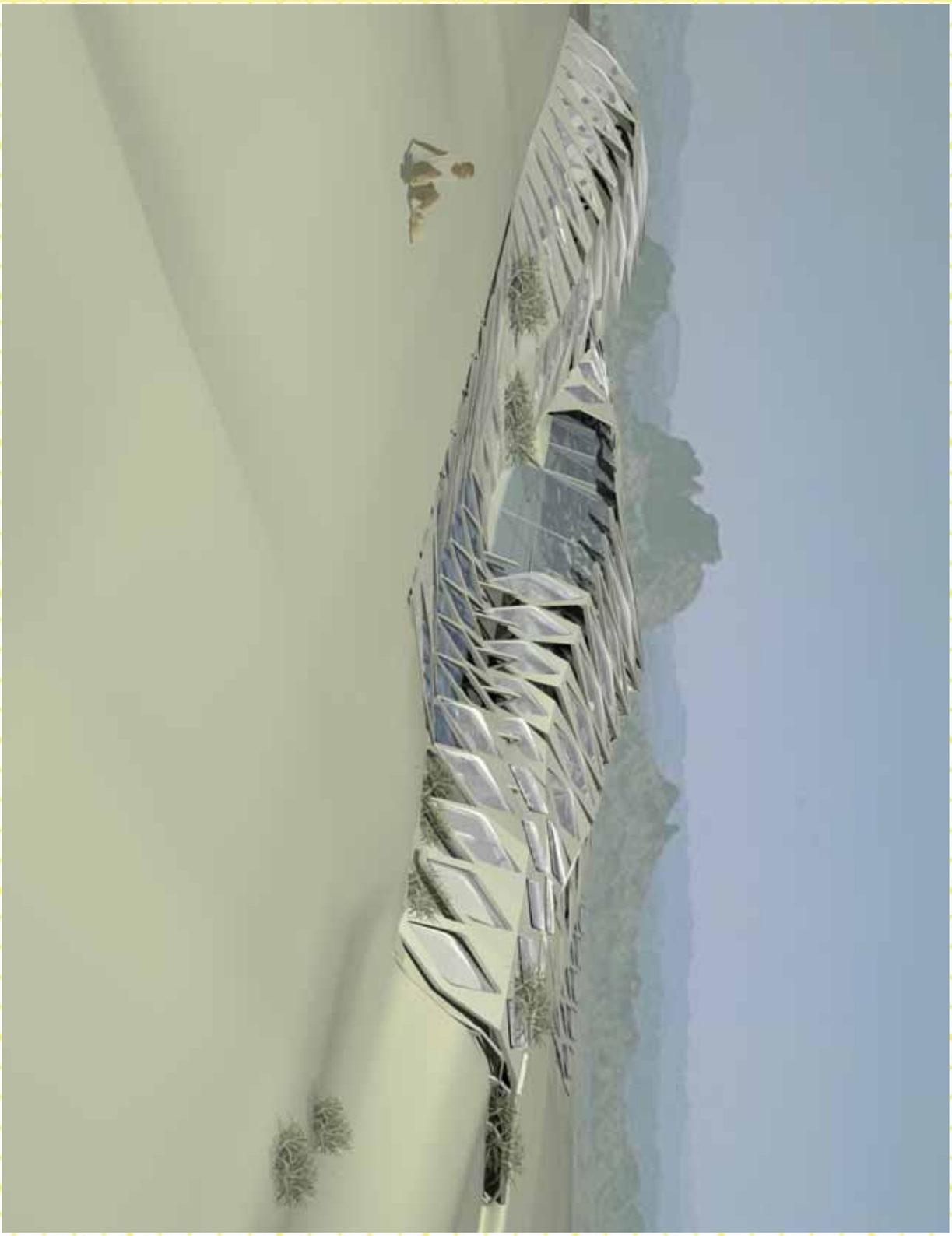
These elements can be assigned a whole range of uses, serving as panels, windows, or building technology without requiring standardization terms of form or function. The individual elements possess various plastic and spatial dimensions. They range from complex three-dimensional forms to simple two-dimensional areas.

The special planning of *dune*house takes into account two of the local conditions of the desert. A solar energy system takes advantage of the sun, and a fuel-cell system, currently still in development, will generate electricity and heat. A byproduct of the latter is water, which can be used for watering plants, for example. The visible integration of both energy systems into the building structure has consequences for the design of the house. The solar und fuel cell energy systems are not concentrated in one place, but distributed over the entire structure of the building. Pipes are built into the various elements to distribute hydrogen across the building surface, where it reacts with oxygen and produces energy.

Beside the building structure, the landscape is another important part of *dune*house. The landscape plays an essential part in the design. The building does not subject itself to the landscape, nor does the building seek to dominate the landscape. Rather, *dune*house forms transitions to the natural surroundings: streets, paths and gardens link the building seamlessly to the desert. Concrete or asphalt, which cannot react to the dynamics of the desert, are replaced by softer, more flexible materials. Geotextiles can adjust easily to the form of the landscape and enter into a symbiosis with it, without losing the characteristic features of the desert. The transitions between house and landscape that are thus created with geotextiles take up the form of the dunes, forms that are continued in the structure of the building. Landscape and building thus fuse to form a single unit, a unified space, an unlimited dunescape.

The textile skin that envelops the building and extends into the desert allows for natural plant growth; seeds are brought onto the surface by the desert winds.
Technology is often not regarded as part of the structure and the design, and thus hidden inside. This necessarily entails that technical innovations and the architecture stand alongside one another, relatively unconnected. The concept of *dune*house, in contrast, is based on the idea that innovative technology and architecture should be harmonized already during planning by using integrative, dynamic design. The principles of intelligent,

WITH ITS MOVABLE SOLAR CELLS AND SHADES *DUNE*HOUSE INTEGRATES ITSELF INTO THE SURROUNDING DESERT LANDSCAPE.



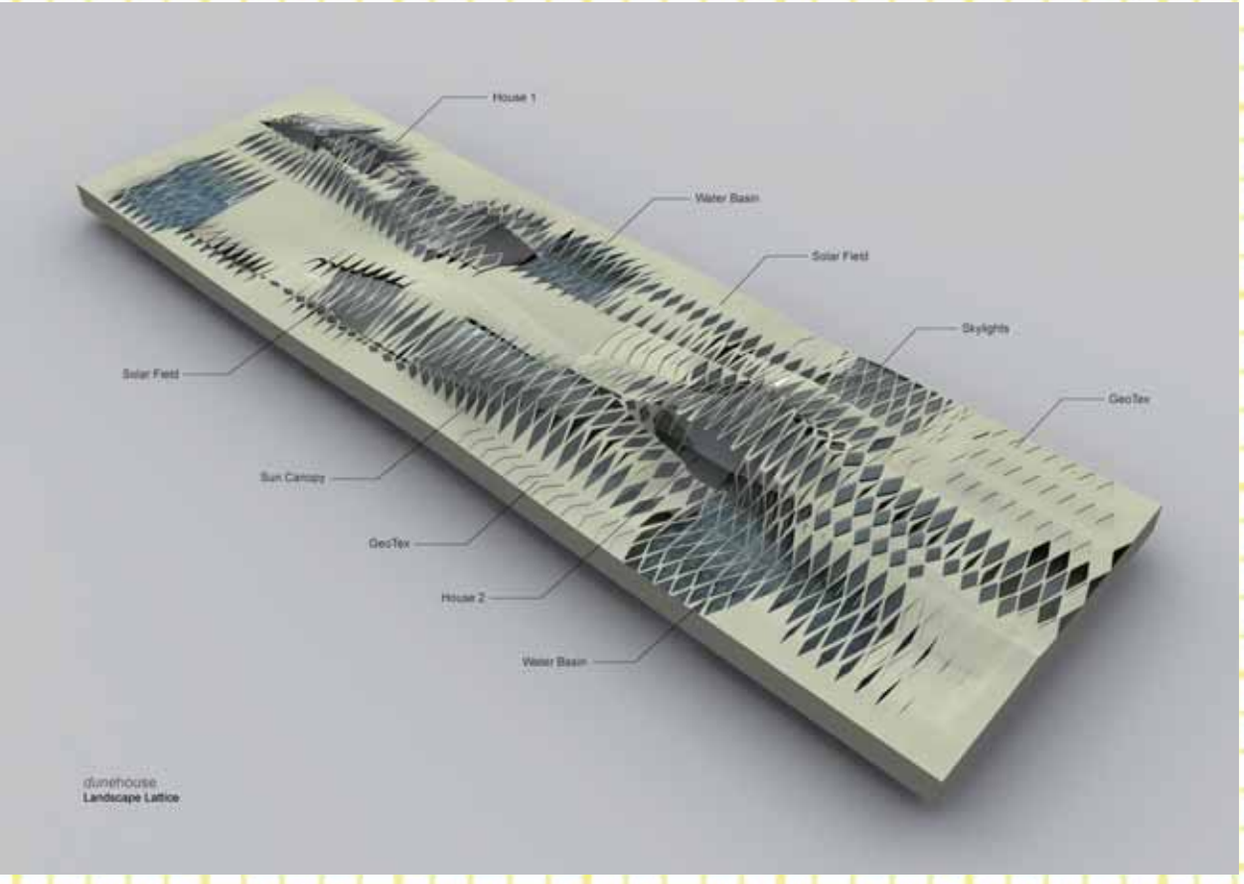
performative, or ecological architecture at work in the *dune*house thus become an integral part of an overarching aesthetic expression.

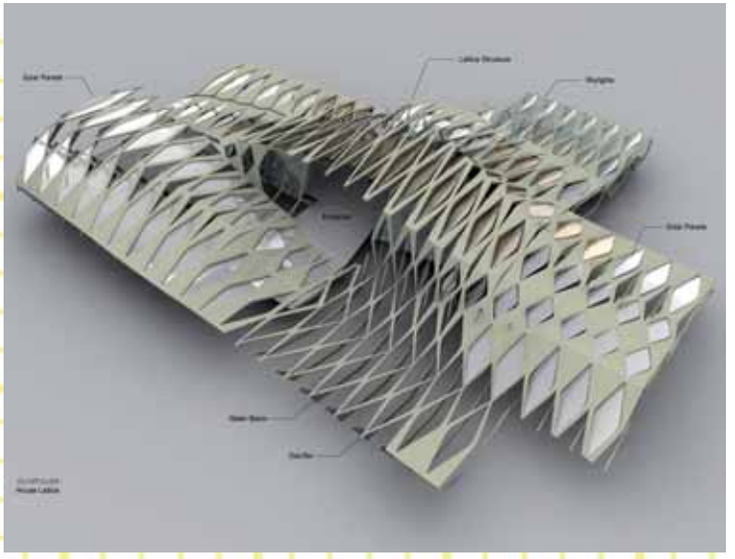
*dune*house also follows a new principle regarding the layout of the interior that contrasts with the usual way of planning. The form of the building, generated from the topography of the surrounding landscape, results in an interior space offering numerous possibilities for the inhabitant to define these in terms of structure and function according to his or her needs. This openness in the organization of the interior space is an intentional result of the design of the building's shell and leads to a fundamental creative engagement with individual needs and life habits.

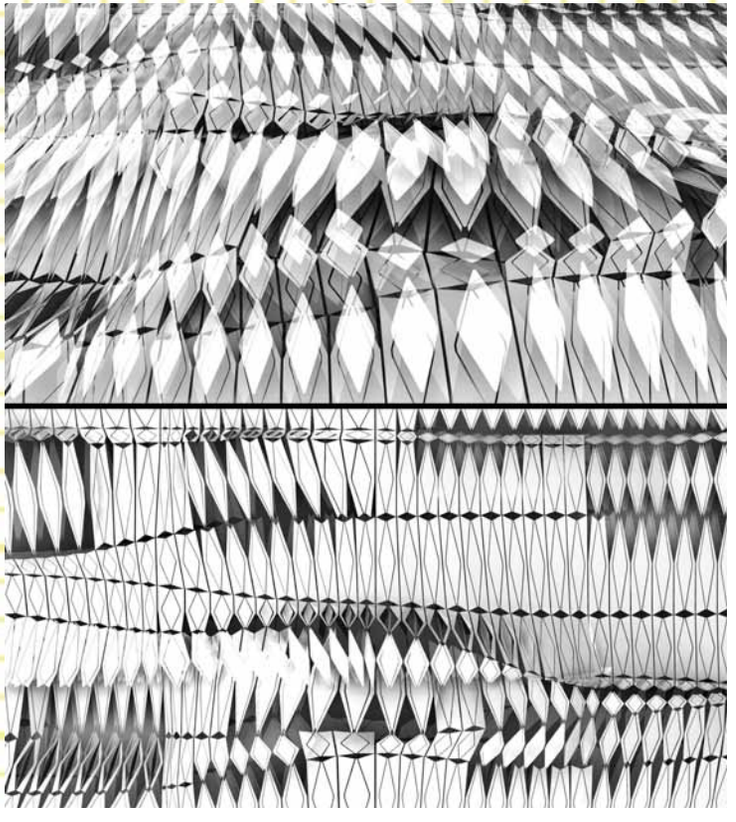
*dune*house is intended as a continuous principle between landscape and construction, thus offering a progressive alternative to the usual urban planning in Nevada. Instead of following a cooky-cutter master plan, urban space in this model "grows," in so doing generating natural forms and relationships that can react much more specifically to local conditions in reference to neighborhood and topography. The houses are built in relationship to one another and the dunescape. The direction the community "grows" in, whether it broadens or narrows, thus depends on the requirements of the inhabitants—they determine the direction and size of the buildings, for example—and the characteristics of desert topography. *dune*house has a stance of its own, stubbornly refusing to subject itself to normative design and the traditional principles of dwelling that go hand in hand with it. *dune*house can be understood as a fundamental design principle, allowing for applications to the most various building types and surroundings.

THE ARTIFICIAL *DUNE*SCAPE CONSISTS OF APARTMENTS, POOLS TO COLLECT WATER, AND PATCHES OF GREEN THAT ARE ALL PART OF THE BUILT STRUCTURE AND ARE SEAMLESSLY LINKED TOGETHER.

SAMPLES OF THE BUILDING STRUCTURE

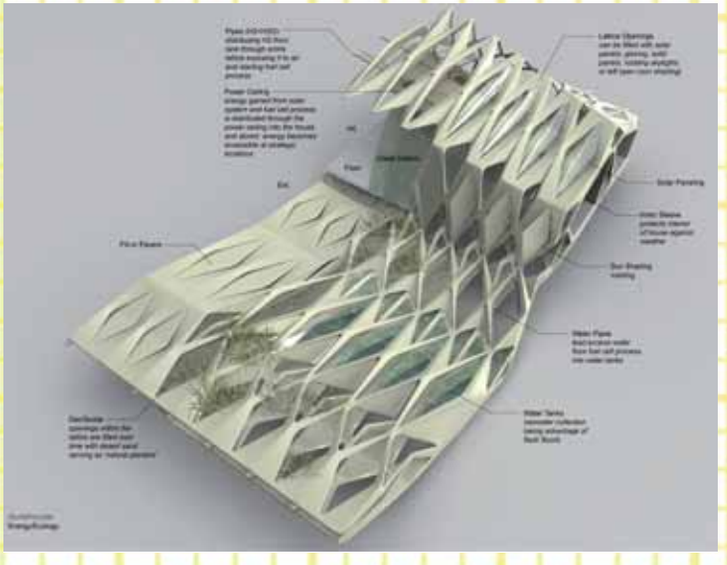

House 1
Water Basin
Solar Field
Skylights
Solar Field
GeoTex
Sun Canopy
GeoTex
House 2
Water Basin
dunehouse
Landscape Lattice





EXTERIOR VIEWS OF *DUNE*HOUSE

AXONOMETRIC DRAWING OF *DUNE*HOUSE



Su11 Architecture+Design
dunehouse

Team
su11 Architecture and Design
(Ferda Kolatan, Erich Schoenenberger)
Design Collaborators: Out-Fo
(Ezra Ardolino, Aaron White), Roly Hudson, Isaac C. Coffey, Felix Hoepner
Structural Consultant: Andre Chaszar

Su11 Architecture+Design was founded in 1998 by Ferda Kolatan and Erich Schoenenberger as a platform for conceptualizing and engaging in architecture and design. Based in New York City, su11 is interested in exploring new technologies to achieve more intelligent and adaptive design solutions.

"We approach design as a mediator between technological advances and the cultural needs and desires of the user. The accelerating effects of the digital age and their complex programmatic configurations in urban and suburban culture have resulted in a variety of routines and lifestyles. Conventional design is not able to sufficiently address these new needs, which require more versatile and adaptive strategies. Furthermore, recent advances in software design, material research, and manufacturing techniques have introduced a palette of new tools, allowing for a more seamless and responsive progression from design idea to project production. Understanding the mutual relationships between individual stages of this process is thus critical for the design of a successful project.
"We are interested in complex new phenomena and webs of relations created by technological progress. We see this as resulting in a new ecology of design and construction, and we would like that our projects also reflect this in a formal and structural away. Operating in complex field, a complex network in which many interdependent currents come together, we are not only interested in questions of performance, structure and materiality, but also in exploring a novel and emerging aesthetic."

Su11's work has been widely published and exhibited. They have participated in several conferences, including Archilab held in Orleans, France and the NSO conference held in Philadelphia. Most recently they received a scholarship to present their research work at the Smart Geometry Workshop in London. Their work has also been shown in various exhibitions, for example at Walker Art Center and the Carnegie Museum of Art. Su11 received the Swiss National Culture Award for Art and Design and the ICFF Editor's Award for Best New Designer.

Ferda Kolatan and Erich Schoenenberger also lecture and teach at various universities around the world.