



## Sustainability through passive energy systems in Architecture: Origami solar tent

C Dikou<sup>1,2</sup>

<sup>1</sup>Ministry of Education, Greece

<sup>2</sup>School of Applied Arts and Culture, Department of Interior Architecture,

Postgraduate program:

Sustainable and social design, University of West Attica, Athens, Greece

- Following as a design methodology the structural logic of folding, our goal is to create a space for vulnerable social groups, e.g., flood patients, creating a space of high environmental quality by ensuring comfort conditions. We were therefore led to the choice of using synthetic fabric fibers with built-in photovoltaics in order to harness solar energy. The entrance to our construction will have a south orientation, while the windows will be covered with a flexible coating material based on amorphous nanomaterials which can control the transmission of heat and light. At the same time, a bamboo flooring will be placed in the interior of the construction, as well as furniture with the rough finish of natural bamboo.

- The solar tent has special photovoltaic fibers and collects solar energy which it stores to be used later, whenever necessary. It can power lamps, laptops, fans, fridge and kitchen. The coating material of the glass surfaces enables adjusting the brightness of a window and the glass ceiling, depending on the needs of the construction. Switching the degree of opacity is faster and requires just 4 volts to illuminate or darken the surface. When the smart window is bright, infra- red passing that generates heat is allowed, resulting in the heating of the interior. When the window darkens, the radiation is blocked and therefore the heating, offering comfort in the interior and reducing the cost of air conditioning. Bamboo: withstand extreme weather conditions, have a low weight, are antifungal, antibacterial, absorb the high amount of carbon dioxide, are resistant to fire and most importantly have rapid growth, 40mm/h.