

- **Las Américas:** the Spanish urban art group Boa Mistura made a landscape intervention at La Colonia de las Américas, in Mexico

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Algae is the seemingly unlikely term that is being discussed at the heart of EXPO Milano 2015.

The London based ecoLogicStudio, (Claudia Pasquero and Marco Poletto) has proposed a new vision of future bio-digital architecture powered by microalgae organisms as part of the Future Food District project, curated by Carlo Ratti Associati at the central crossroads of the EXPO site. This vision is about to become reality as a large Urban Canopy roof in the central square of the district.

A full scale mock-up has been previewed during last Fuorisalone 2014. This prototype, which constitutes a revolution in the conception of building integrated farming and urban agriculture, has evolved from ecoLogicStudio's six years long research on building integrated bio-digital systems and is the result of a collaboration with specialist contractor Taiyo Europe.



ecoLogicStudio, Urban Algae Canopy

The 1:1 scale mock-up presented in Milan prefigures the world's first bio-digital canopy integrating micro-algal cultures and real time digital cultivation protocols on a unique architectural system. The exceptional properties of microalgae organisms are enhanced by their cultivation within a custom designed 3 layers ETFE cladding system. Such system represents a radically new interpretation of the possibilities of the traditional ETFE cladding system. A special CNC welding technology is at the core of it and enables ecoLogicStudio to design and control the morphology of the cushions under stress as well as the fluid dynamic behaviour of the water medium as it travels through it.



ecoLogicStudio, Urban Algae Canopy

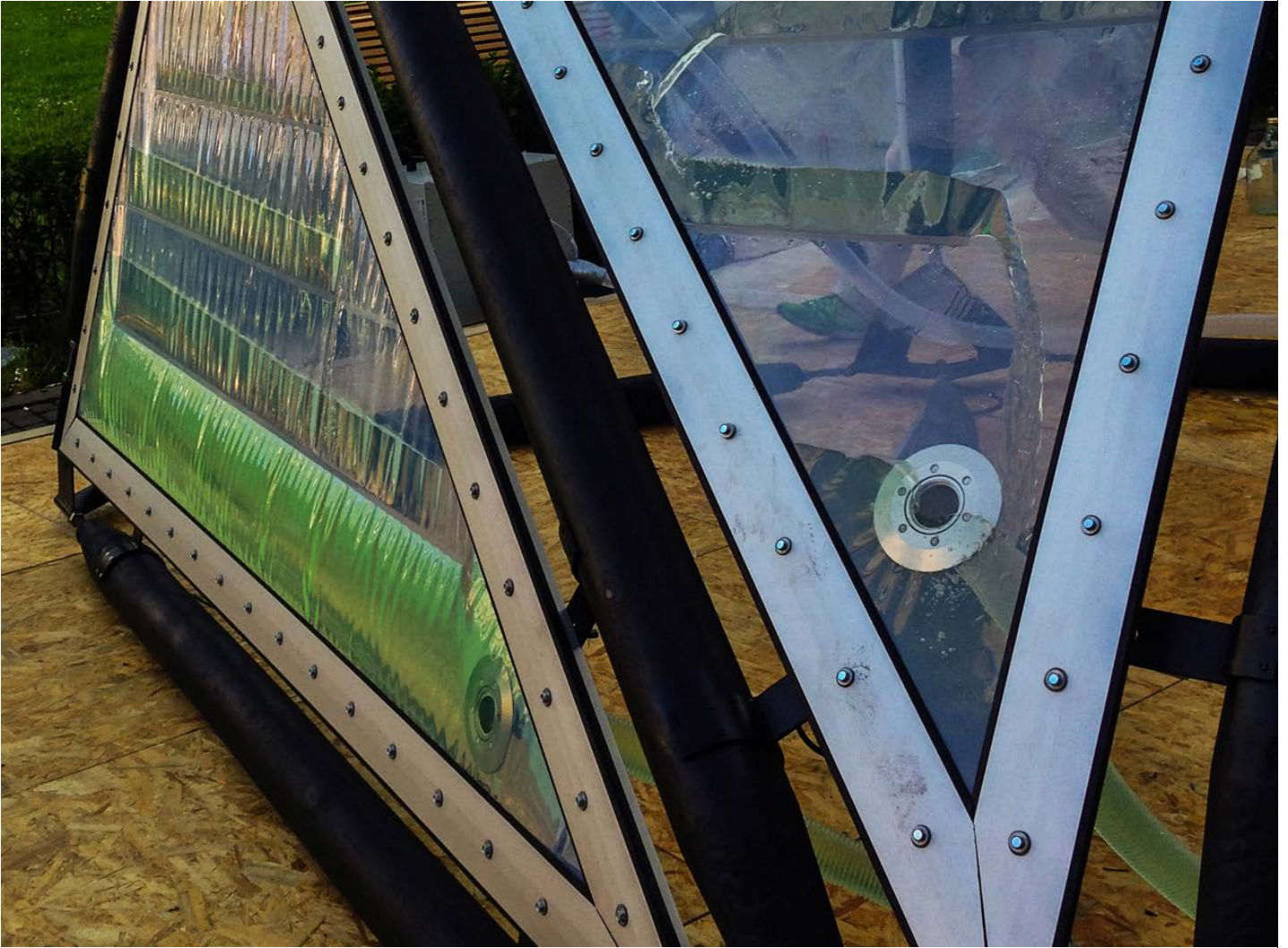
The flows of energy, water and CO₂ are therefore regulated to respond and adjust to weather patterns and visitors' movements. As the sun shines more intensively algae would photosynthesise and grow thus reducing the transparency of the canopy and increasing its shading potential; since this process is driven by the biology of micro-algae is inherently responsive and adaptive; visitors will benefit from this natural shading property while being able to influence it in real-time; their presence will trigger electro valves to alter the speed of algal flow through the canopy provoking an emergent differentiation across the space. In any moment in time the actual transparency, colour and shading potential of the canopy will be the product of this complex set of relationships among climate, micro-algae, visitors and digital control systems.



ecoLogicStudio, Urban Algae Canopy

In ecoLogicStudio we believe that it is now time to overcome the segregation between technology and nature typical of the mechanical age, to embrace a systemic understanding of architecture. In this prototype the boundaries between the material, spatial and technological dimensions have been carefully articulated to achieve efficiency, resilience and beauty.

Once completed as part of EXPO2015 Future food District the Urban Algae Canopy will produce the oxygen equivalent of 4 hectares of woodland and up to 150kg of biomass per day, 60% of which are natural vegetal proteins.



ecoLogicStudio, Urban Algae Canopy

Urban Algae Canopy

Project: ecoLogicStudio - Marco Poletto and Claudia Pasquero (London, UK), part of the H.O.R.T.U.S. series. Special edition for Expo 2015 developed with Carlo Ratti Associati (Turin, Italy)

Responsive system consultant: Alt N – Nick Puckett

ETFE design support and manufacturing: Taiyo Europe GmbH

Wood structure design support: The Ne[s]t – Paolo Scoglio

Wood structure manufacturing: Sullalbero srl

Evolution biologist: Catherine Legrand

Microbiologist: Mario Tredici



Vista aerea del Future Food District per Expo2015 Milano, con il progetto Urban Algae Canopy di ecoLogicStudio

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