

Innovations

Algae to take center stage at EXPO Milano 2015

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The Urban Algae Canopy by ecoLogicStudio (M. Poletto, C. Pasquero) is the world's first bio-digital canopy integrating microalgal cultures and real time digital cultivation protocols in a unique architectural system.

Algae is being discussed at the heart of EXPO Milano 2015, the

international event that has existed since 1851, spawning world shaping themes and icons, such as the Eiffel Tower, built for the 1889 version of the event. This coming year's theme is "Feeding the Planet/Energy for Life" and as part of the Future Food District project, being developed by Carlo Ratti Associati at the central crossroads of the EXPO site, the pavilions' façades and canopy utilize new systems of micro-algae, designed by Cesare Griffa and ecoLogicStudio.

Two prototypes – full scale models of the façade and canopy – are being previewed this week as part of INTERNI's Exhibition-Event "Feeding New Ideas for the City." These prototypes constitute a revolution in the conception of building integrated farming and urban agriculture.

"The functioning principle of the prototypes is based on the exceptional properties of microalgae organisms, which are ten times more efficient photosynthetic machines compared to large trees and grasses," explains Carlo Ratti, curator of the Future Food District. "The façade and canopy currently being developed for EXPO Milano 2015 develop a natural man-made ecology and explore the use of algae as an integrated architectural cladding and urban agriculture system."



MILANO 2015
1 MAY • 31 OCTOBER

FEEDING THE PLANET
ENERGY FOR LIFE

"Microalgae open up an incredible potential for new renewable energy resources, and hope for a greener future," says Cesare Griffa. "Building and architectural surfaces are an incredible resource of space. Urban façades and roofs represent billions of square meters that instead of being made of an inanimate material such as concrete, could become clever photosynthetic surfaces that respond to the current state of climate warming. Microalgae could add to the green urban system

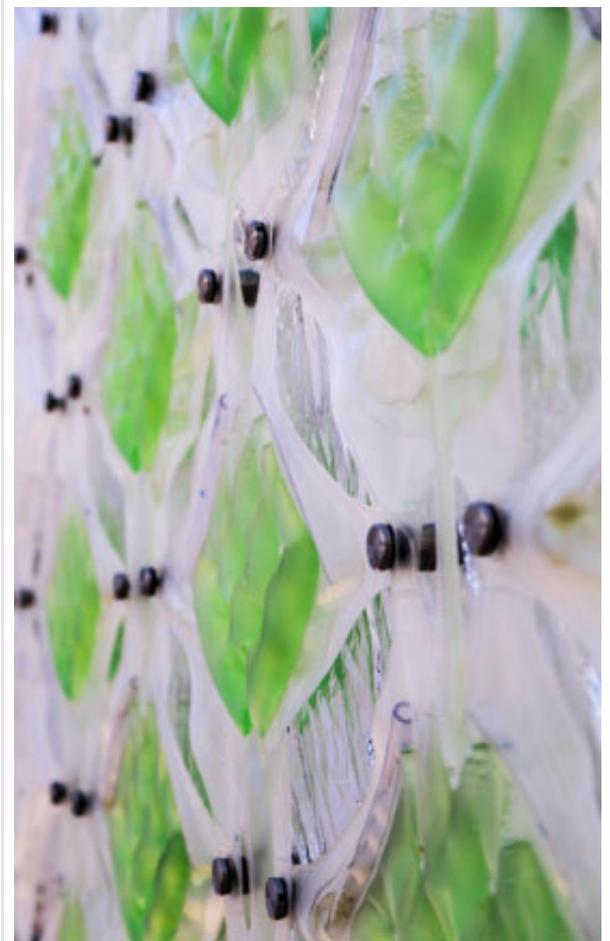
that exists already, intensifying carbon dioxide fixation activity and acting as cladding for buildings, increasing their passive performance.”

The Urban Algae Canopy – based on ecoLogicStudio’s ‘HORTUS’ system – will be presented in Milan with a 1:1 scale prototype of the world’s first bio-digital canopy, integrating microalgal cultures and real time digital cultivation protocols on a unique architectural system.

The potential of microalgae have been integrated within a custom designed four-layered ETFE cladding system, while the flows of energy, water and CO₂ are controlled and regulated in real-time and made to respond and adjust to weather patterns and visitors’ movements. Once completed, as part of the EXPO Milano 2015 Future Food District, this special edition of the Urban Algae Canopy will produce the equivalent amount of oxygen as four hectares of woodland, and up to 150kg of biomass per day – 60% of which are natural vegetal proteins.

The Urban Algae Façade – based on Cesare Griffa’s “WaterLily 2.0” system – is the prototype of a microalgae vertical farm to be implemented as an architectural skin. The intention is that, integrated into the green system of the cities, microalgae can help in absorbing carbon dioxide and producing oxygen, while acting as a second skin of buildings, boosting passive cooling and increasing shading of the façade.

“It is now time to overcome the segregation between technology and nature typical of the mechanical age, to embrace a systemic understanding of architecture,” says Claudia Pasquero of ecoLogicStudio. “In these Urban Algae prototypes the boundaries between the material, spatial and technological dimension have been carefully articulated to achieve efficiency, resilience and beauty.”



Cesare Griffa’s “WaterLily 2.0” system is the prototype of a microalgae vertical farm to be implemented as an architectural skin.