Dynamic Skins: Exquisite Chimeras

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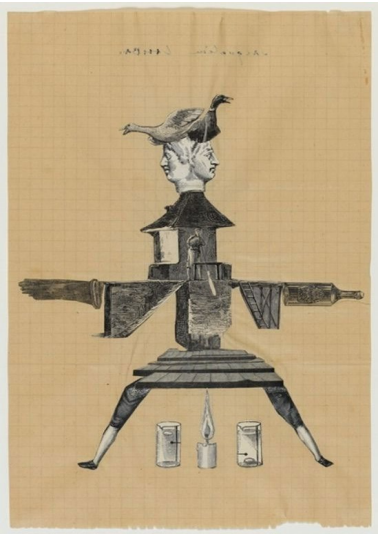

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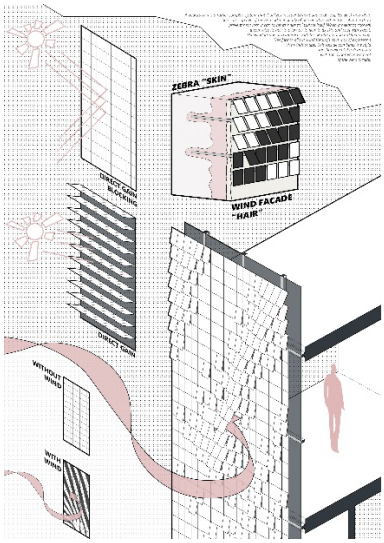

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1 Cadavres exquis byAndré Breton, Jacqueline Lamba, Yves Tanguy. 1938
2 Zebra Wind Façade by Sean Flannery and John Dye. 2021
3 Le crabe et le papillon by Marque Paul Frellon. 1st Quart of XVII.

Course Description

Transformation or change is often resisted in the production of buildings for pragmatic reasons, in opposition to the inherent properties of materials, like their tendency to weather, thermally expand and contract, and potential for movement. Whereas the status quo in building envelopes tends toward the static, immutable, and easy to maintain, the goal of this workshop is to explore the potential of *dynamic skins*. As systems that change based on specific inputs, *dynamic skins* fulfill an intended function, yet their ability to transform holds great potential for communicating narrative-based content by revealing and enabling the exchange that occurs at the façade/face of buildings. We will consider their performance as both the numerically quantifiable functional characteristics – such as heat transfer, daylighting, or solar energy harvesting – as well as their social and communicative characteristics.

In the workshop, we will explore *dynamic skins* using the notion of exquisite chimeras to propose new hybrid skins. Initially, students will study biological and architectural skins, re-examining how each of these original skins perform and the opportunities that emerge when

joining them. Chimeras have the potential to leave behind some characteristics while highlighting others to create a cohesive whole out of seemingly incongruous aspects. For instance, a minotaur is a hybrid that consists of a man's body and a bull's head. The same pairing of creatures, though, could lead to a man's head with a bull's body with completely different performance characteristics.

Afterwards, students will translate the principles that their hybrid-skin embodies into the design of an architectural skin. They will articulate the kind of transformation enacted by their building skin and the stimuli that trigger it relative to the context in which it exists. These investigations will be materialized through physical scaled prototypes that may include low-tech and high-tech responses, considering variations pertaining to scale, occurrence cycles, and reaction time, in conjunction with the cause of transformation, be it environmental, human, or digital.

As part of exploring the dynamic nature of skins and the spatial implications on either side of them, students will create an animated sectional axonometric drawing that will document the transformations of the designed skins and beyond, addressing the response to environmental fluctuations and to the interaction of humans or other species over time.

Professor Olga Mesa and Professor Nathan Fash are Co-Directors of the Architecture Program in the School of Architecture, Art, and Historic Preservation at Roger Williams University. They have collaborated to investigate the performative capabilities of dynamic building skins. Their internationally recognized research encompasses both speculative investigations and grounded prototypes where narrative, poetics of construction, and sustainable practices are integrated into design proposals.

At their university, they teach undergraduate and graduate level design studios as well as courses in Construction Materials and Technology, Digital Representation and Fabrication. With more than 20 years of experience practicing Architecture, Nathan Fash is a principal of the renowned Cambridge-based firm Supernormal and Olga Mesa is a research associate at the Harvard Material Process and Systems Group (MaP+S) investigating innovative material systems applied to Architecture.

Previous Knowledge Expected

The use of your imagination and your commitment to engage in a rigorous iterative creative process is required. Some drafting and model making knowledge using digital or analog means is required. Knowledge of digital modeling using Rhino and Grasshopper as well as the ability to fabricate models digitally or using the woodshop are a plus, but not required. No previous knowledge on making animations is required.

Objectives

- Students will develop an understanding of the potential of dynamic skins and their capacity for dual performance in the development of an integrated architectural solution that addresses not only the performance of the building skin from a quantitative perspective, but also from a qualitative one that may encompass perception, engagement, or species integration.

- Students will utilize the technique of hybridization to generate innovative designs of dynamic skins, drawing inspiration from biological and architectural skins.

- Students will generate a body of work that at times is speculative and provocative and at others, aims to materialize viable solutions for architectural skins.

- Students will use a diverse range of skills to think about and convey architectural design ideas, including writing, investigating, speaking, drawing, modeling, and animating. Special emphasis will be placed on the development of representation that conveys temporal cycles and transformations as they relate to environmental and human factors.

- Students will develop technically clear drawings, and construct models illustrating and identifying the assembly of materials, systems, and components appropriate for a building skin design. They will develop building envelope systems based on fundamental performance, aesthetics, moisture transfer, durability, and energy and material resources. Students may consider active and passive heating and cooling, solar orientation, daylighting, natural ventilation, indoor air quality, solar harvesting systems, and acoustics.

- Students will document and prepare a portfolio of work. Their chimera drawings, physical prototypes and an animated drawing will be part of an exhibition of Dynamic Skins.

Language of Instruction

English

Teaching and Learning Method

- Delivery of content will include a combination of brief presentations, assignments, conversations with students, group reviews, brief tutorials and an exhibition of the final work.

- Student work will be evaluated based on their approach to the assignments, their critical thinking through the investigations, the engagement in rigorous iterative processes and the results of the final design.
- Students will respond to prompts that guide them in the design of innovative dynamic building skins. They are expected to communicate their designs through drawings, constructed axonometrics, wall sections and animated drawings. Students will also design and build a physical prototype of dynamic skins to scale.