Painterly Structures

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This project presents an ongoing body of work that aims to disrupt tendencies within computationally design practices as well as highly standardized modes of sustainable design production. The project adopts a painterly attitude and workflow towards digital and material computation. In Swiss art historian Heinrich Wolfflin's seminal work, Principles of Art History: The Problem of the Development of Style in Later Art, he describes a radical shift in the development of European representational art styles between the Late-Renaissance and the Baroque. Specifically, he describes a conceptual and material shift from the linear to the painterly. Wolfflin's definition of the painterly, emerging in the early Baroque, alludes to ideas of limitlessness and merging, standing in direct opposition to the tangibility and solidity of the Late Renaissance linear style. Wolfflin describes the painterly as limitless, receding, open, lacking in linear hierarchy (ambiguous part-to-whole relationships), and finally of relative clarity, in comparison to the absolute clarity found in Late-Renaissance art (Wolfflin 1915). Thus, this ongoing body of work looks at the radical shift from the linear to the painterly within the context of computational design methodologies and digital fabrication.

The project is developed through a digital-analog workflow that moves between scavenging for natural material, 3D scanning, a computational system and resultant material constructs that exhibit painterliness through their open system logic that blurs traditional linear part-to-whole relationships. Specifically, this workflow is tested through the design of a chair that explores material assemblies in the form of reciprocal frame systems.

This project situates itself withizn the context of mass-customization, looking at the potential of scavenging fallen non-standard timber members from the deserts of the United Arab Emirates to produce an architectural material system. This project also references current work being produced at Architectural Association Design + Make programme (Self and Vercruysse 2017). However, from an assembly point of view, the project looks to avoid invasive approaches to the fallen timber member such as cutting and drilling. Thus, the project's structural principles are built on the self-supporting reciprocal frame typology that requires no mechanical or subtractive connections. The criteria used while scavenging include linear dimensions, cross sectional radii, curvature along the long axis and surface friction.

Secondly, the process includes 3D scanning the found material. The 3D scanning allows for quick sorting of elements given the three of the criteria described above. Second, a custom-designed digital workflow allows for matching same sized surfaces along the timber members based on a naturally occurring male-female joint. Finally, scanning allows for the digital testing of the stability of reciprocal frames. This results in a quick assembly that is able to withstand structural loads. Within the context of the chair, a volumetric transparent resin-cast condition is designed to further avoid thrust actions.

This system is currently being developed on two different fronts. First, the digital platform and workflow is being developed as a stand-alone package that would allow for existing 3D meshes to be input, sorted, matched and assembled based on designer criteria. This would allow for the democratization of the workflow, which in turn will provide further refinement and intelligence through iteration. The second front includes working on large scale constructs that apply the theoretical framework with the workflow to produce a spatial construct, further testing the viability of the system.

PAINTERLY STRUCTURES

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References:
- Self, Martin and Emmanuel Vercruysse. 2017. "Infinite Variations, Radical Strategies." In *Fabricate: Rethinking Design and Construction*, edited A. Menges, B. Sheil, R. Glynn and M. Skavara. London: UCL Press. 30-35.
- Wölfflin, Heinrich. 1950. *Principles of Art History: The Problem of the Development of Style in Later Art*. Dover Publications.

FOUND DESERT OBJECT

ASSEMBLIES

SCAVENGING

RECIPROCAL FRAMES

SCANNING

TESTING