Convergent Canopies: The Huckleberry Trails Pavilion

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Material comprehension for design students must evolve and respond as the need for efficiency in material consumption and the means of digital fabrication tools permeate mainstream practice. The introduction of fabrication technologies has manipulated and fragmented what was until recently a stable and established material palette. A primary charge of this project included challenging students to explore material properties and the limits of manipulation in order to ultimately discover the tectonic realities of the full scale construction of an ambitious parametric form the likes of which are so often digitally represented with ambiguity regarding materiality and constructability.

In this twelve week design-build studio, 3rd year students worked with the municipal parks department to mark a pedestrian trailhead through the creation of an entry sign and a small pavilion for a neighborhood park. Understanding the project as the entry sequence from a cleared street edge into the canopied forest, the design draws its formal and conceptual underpinnings from the Voronoi patterns occurring naturally in park at the micro-scale of leaf veins as well as the macro-scale of the vegetated forest ceiling. The structure emerges as a heavy solid form tracing an adjacent creek embankment creating seating, signage and a path edge. The structure becomes more porous as it reaches up, visually and physically merging the constructed and natural canopies. Structural and material efficiency found in the site vegetation are reflected in the careful arrangement of structural folds allowing the use of lighter gauge steel, in the graduated perforations reducing the weight of taller mid-span components and in the reuse of the cut steel shapes to create concrete relief patterns and assembled bench forms near the creek.

Through the course of the project, students with minimal construction experience were able to create multifaceted, sculptural concrete footings and a complex armature of custom fabricated steel panels via CNC plasma cut patterns and structural folds. Critical understandings were gained in the areas of wood structure, formwork, flexure, mitering and milling, in cutting and welding steel with consideration for expansion, contraction, bending and tolerances, as well as in the lessons surrounding pouring, vibrating, patching and finishing concrete. By engaging in the full-scale construction of digitally native forms, invaluable learning took place as the students employed both traditional and digital means of material manipulation, experimenting and innovating as needed to realize their design.

At the end of the project the collective student experience clearly facilitated an expanded understanding of three major material families, and a heightened awareness of the pitfalls in the translation of form from digital to physical. As these students complete their education and begin practice, these experiences will prove invaluable as the tectonic and material processes necessary to realize ambitious and performative designs will be within their reach.