

## Bridging Synthetic and Organic Materiality: Graded Transitions in Material Connections

### Abstract: Why material connections?

If mass produced parts and components are the atoms of Modern design, jointing techniques are the bonds between these atoms, the nucleus of today's built world [1]. The recent movement from mass-production to mass-customization enabled by CAD/CAM has enabled new typologies in architecture and product design. These projects take advantage of computation and typically generate components by parametrically changing shapes; they go beyond modernism's 'arrays of standard components', however parts and components are still assembled in 20th century's styles [2]. Connections of parts and components manifest as seams, joints and corners, typically resulting in visually apparent seam conditions. This paper reveals the dominance of orthogonal seams in today's living environments and product forms and proposes an alternative methodology: graded transition on material connections.

### Result

A 24" x 48" board was fabricated (Fig.2). The developed fabrication process detects the color intensity of wood grain pattern and defines cutting depth automatically for tooling by a CNC router (Fig 1), which enables to mass-customize graded transition board. A visual transition effect was achieved by leveraging the inherent material quality of the wood and its natural grain pattern. At the same time, the transparency of polyester resin emphasizes the contrast of materiality of wood and polyester resin. Since the fabricated piece presents a uniformed surface without any gap between wood and resin, the piece has a continuous mono-structure made of different materials, an essential element of graded material transition.

Left Fig. 1 The fabrication process (top 4 pictures). Pixelation and generating tool paths by Processing and Rhino Grasshopper (bottom 2 pictures)

Right Fig.2 The final built piece



### Conclusion

The built piece raises a question: What is the boundary between organic/inorganic? Since the degree of hybridization of organic/inorganic materiality varies, the boundary would blur. Apparently a tree in the forest is natural, but once cut down, is it artificial just because the human hand is involved? Further, is a 90%-10% wood-resin piece artificial? Our notion of nature will need to be transformed since artifacts and technologies would be more mediated with the symbolized natural elements in living environment. The boundary between natural and artificial would be blurred. We need to invent a new category for hybrid materials, or not distinguish them any more [3].

1. Emmitt, S., Olie, J., Schmid, P, Principles of Architectural Detailing, Wiley-Blackwell (2004).
2. O, Kas and B, Nimish, Interactions with Proactive Architectural Spaces: the Muscle Projects, Communications of the ACM, Issue No.8, Volume No.51, pp. 70-78 (2008).
3. Next Nature. (2004). Exploring Next Nature . Retrieved January 5, 2011 from <http://www.nextnature.net/2005/03/exploring-next-nature>