Uncertain Material Engagements

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Material Engagement Theory frames materials as extensions of human intelligence and active participants in social exchange (Malafouris & Renfrew 2010; Hodder 2013). This socialization prompts questions of ethical material engagement: as equal participants, what are material's 'rights and responsibilities'? How might they facilitate ethical social exchange? The contemporary production of architectural components and assemblies requires an ethics of scale where energy is conserved, the social imagination is stimulated, and context is pre-eminent.

Eva Diaz in the Experimenters (2015) cites Josef Albers's pedagogical experiments with intrinsic and extrinsic material properties as cultivating an ethic of perception. Through actions of close looking and the suspension of preconceptions students were expected to foster enlightened perceptions of cultural and social exchange. Tim Ingold's Making (2013), rooted in the Deleuzian schema of 'morphogenesis,' engages a related project, extending it to a time-based model of material engagement. Pedagogical encounters under his guidance embrace the intrinsic uncertainty of material behavior over time: such as describing a penny not just as an embossed copper disc, but a metallurgical event founded in ores, imbued with energies, and subject to transformations wrought by environment and human mis-use.

The work presented here, from an introductory digital design and fabrication seminar, blurs the lines between computational certainty and material uncertainty. The tactility of materials grounds the learning of computational methods while their uncertainty enriches this learning with an experience of complex digital-analog relationships. In this process "computation" becomes more than a tool to realize form, it becomes a way to think about and orchestrate networks of activities.

The rubric of material engagement challenges students to design and evaluate material encounters which inform algorithmic patterns of computational design and fabrication. Released from preconceived form, by looking at tools and methods they take on thinking while making: allowing knowledge discovered during the process to inform its development they discover it through experimentation. By working through intrinsic properties students develop solutions which are novel, efficacious, and adaptive. Because the experiments are rooted in intrinsic properties their outcomes have a high degree of efficacy, foregoing energy typically wasted working against what a material 'wants' to do. As the tests are algorithmic – establishing frameworks of constants and variables – they can adapt to various contexts and conditions.

This process teaches students to listen to materials and observe their 'rights.' Students learn the steps in designing a process, as opposed to an object, and thus, understand their ability to intervene in larger processes of manufacturing and material production. This ultimately provides alternative models for thinking about built form not as a projected image, but as the outcome of a carefully choreographed set of relationships in space and time: a confluence of human activity, material performance, and environmental forces rather than a preconceived idea.

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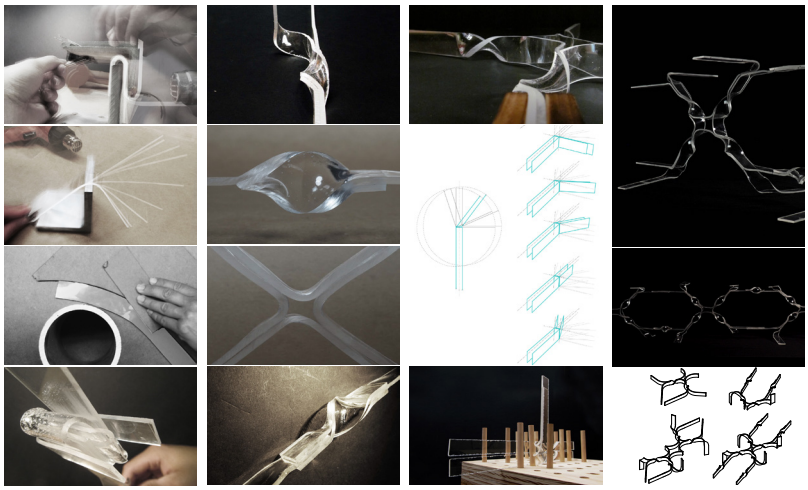
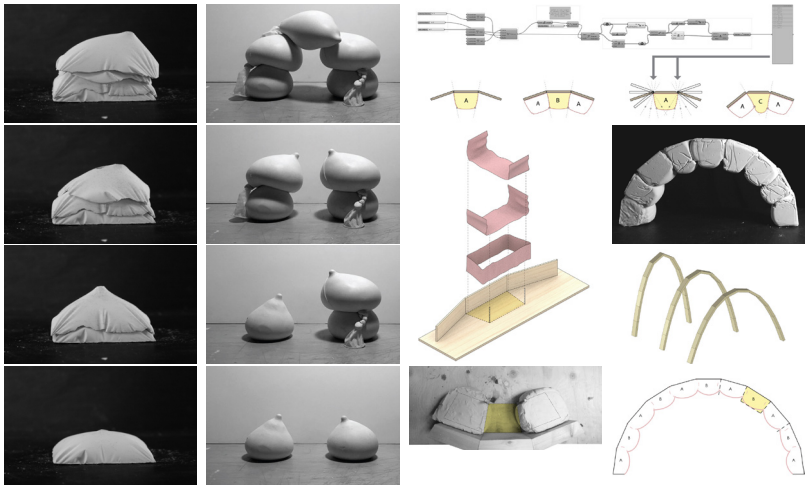
TWISTED EXPRESSIONS
Claire Fontaine, Adam Sparkes

The thermoplasticity of acrylic is exploited as a lapped twist, developing a transparent interlace. The twist and orientation of the joint inform the overall geometry of the assembly creating an intimate link between detail and final form.



STATIC FLUID
Mattei Rau, Larissa Roque

The viscosity of plaster and the process of shape deposition informs a study of reciprocal casting. Each cast builds on its neighbor in a targeted choreography of rigid and dynamic surfaces. The reciprocal cast locks each block to its neighbor. A jig links the individual cast to an overall form; dynamically adjusting the angle of individual units as the overall form changes.



STEEL BRAIDS
Lewis Gallacher, Patrick Spelliscy

The ductility of steel rods when twisted is explored as a braided joint, developing a semi-rigid lattice. A custom designed braiding machine was used to braid twelve rods into a single assembly.