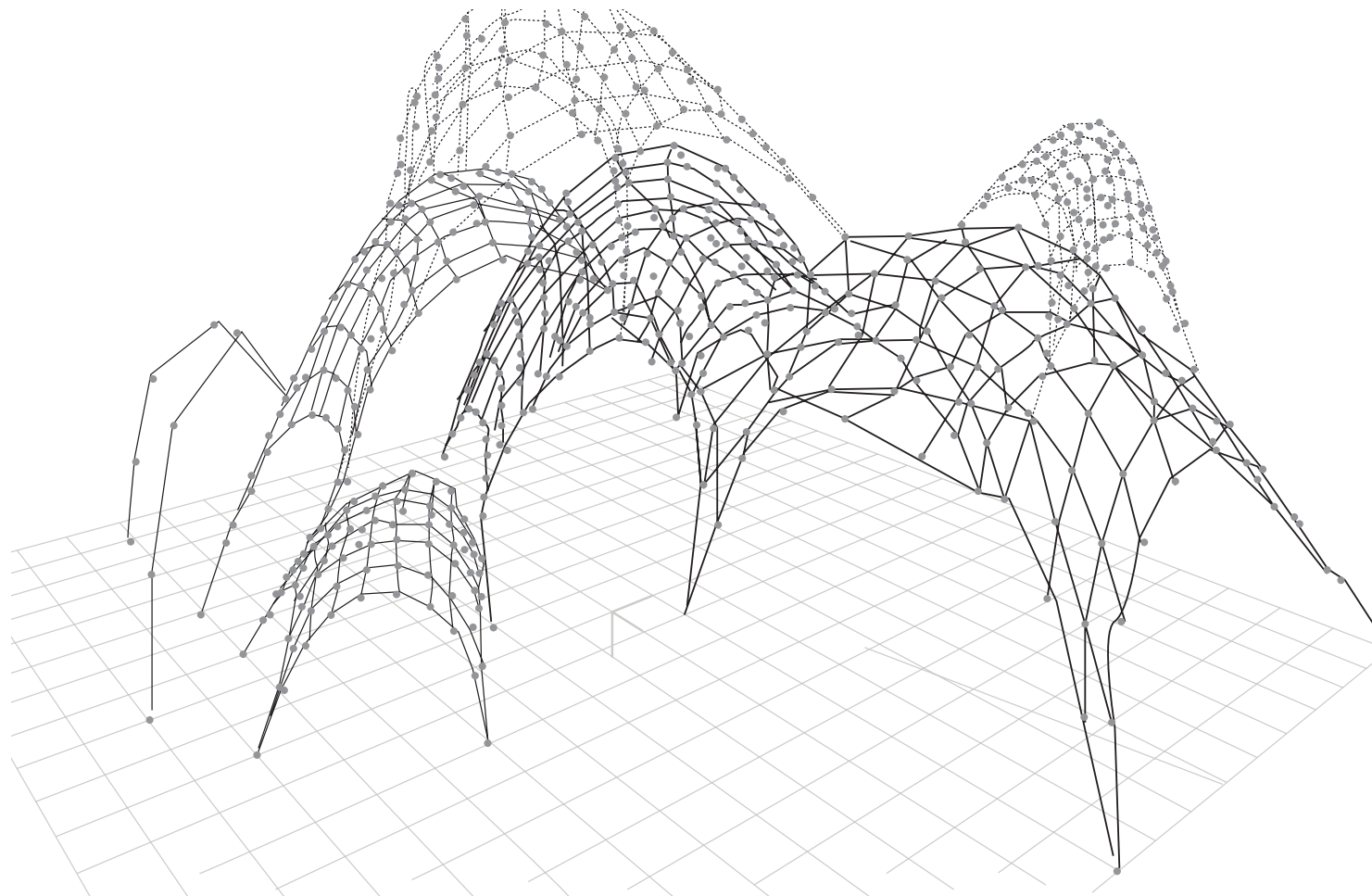
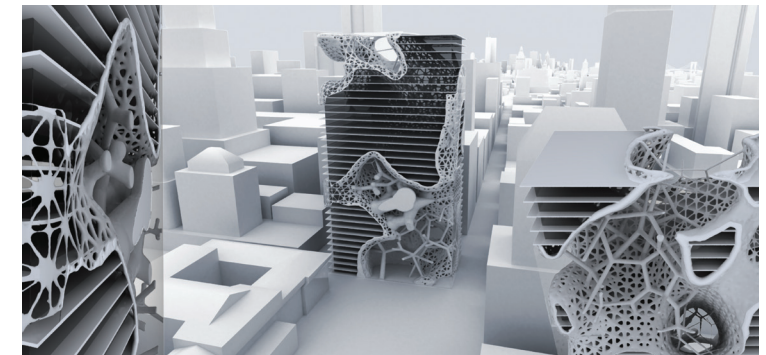


Figure 1. below: *CADenary*,
Axel Kilian

right: *Malleable AtmoSPHERE*,
Brandon Clifford

far-right: *Trabeculae*, Dave Pigram
- Supermanoeuvre



THE MALLEABLE MANIFESTO NO. 1

Brandon Clifford

Architects today are more preoccupied with variability than ever. It isn't hard to understand why: we exist in a world where we are bombarded with opportunities to build new social profiles. Each of these identities somehow performs differently. We update our status one moment and change it the next. Our culture embraces endless modification and resists resolution. The lack of terminus in contemporary digital culture removes a fear of commitment and nourishes our desire for the unique. It is no longer necessary to compromise our intentions in service of permanence. Iteration, uniqueness, and change are king. This culture is emerging in architecture as well. The profession commonly associated with permanence is becoming malleable.

Malleability is not simply a material property; it is liberation from the constraints of resolution. To describe something as malleable is to acknowledge its capacity to change in response to a force – rubber stretches when pulled, and ice melts when heat is applied. Yet architectural discourse tends to mute these changes in the pursuit of stability and permanence. Perhaps this compulsion to “solidify” is because the idea of continual (and potentially unscripted) change is antithetical to our understanding of architectural authorship: how can unscripted change be authored? Yet this compulsion to halt and stabilize is merely a conceptual act; malleability is inevitable. It has always existed, for instance, in the various iterations of the design process. It appears in the inevitable weathering and decay of buildings and the palimpsest of scars created through occupation.¹ In some projects, malleability is even taken on intentionally through the conceit of large-scale movement, as in Invernizzi's Villa Girasole. Though malleability has always existed in architecture, our discourse turns a blind eye to this truth. Now is the time to remove this unwarranted aversion to malleability. The contemporary architecture process is full of life. Why do we kill the process to construct the building?

¹ Bruno Latour and Albena Yaneva have argued that buildings are constantly transforming and being altered through weather, renovation, etcetera. It is this definition to which I am referring. Bruno Latour and Albena Yaneva, "Give me a Gun and I will Make All Buildings Move: An ANT's View of Architecture," in *Explorations in Architecture: Teaching, Design, Research*, edited by Reto Geiser (Basel: Birkhäuser, 2008), 80-89.

² These techniques are taken from the chapter titles Lisa Iwamoto uses to categorize digital fabrication techniques by distinct drawings processes. Lisa Iwamoto, *Digital Fabrications: Architectural and Material Techniques* (New York: Princeton Architectural Press, 2009).

³ Antonio Gaudi's analog catenary models are strikingly similar to the particle-spring gravity studies of both Axel Killian and Dave Pigram of *Supermanoeuvre*. The software developed by these researchers is clearly based on a larger foundation of material and physical knowledge.

In the past decade, the proliferation of digital manufacturing techniques such as tessellating, contouring, and sectioning has allowed architects to take the first steps toward a more malleable architecture.² Through automation, mass customization is able to compete with standardization in terms of manufacturing efficiency, eliminating the comparative advantage of mass production. The result is a dethroning of modernist universality in favor of a malleable construction unit; robots couldn't care less if every part is unique. Malleable architecture takes full advantage of automation to generate more specific architectural responses. The design process can be more reactive to inputs (i.e. malleable) because the results can be built through mass customization fabrication techniques.

Leveraging these new fabrication techniques, architecture is once again free from the oppressive mold of standardization. Yet the generation of complex geometry, mass variation, and the embrace of parametric alterations still produce an architecture frozen in time. While parametric and other computational models have arguably introduced more malleability into the design process, the translation of these drawings into a constructible unit freezes them. Perhaps this peculiar moment of freezing is due to the convention of transferring drawings from the architect to the contractor. The design process has traditionally been understood as a teleological progression toward this idealized state; it begins with the highly malleable sketch and becomes more "realized" – meaning static – as it approaches construction, when the phrase "change order" is a death sentence. During the design process, walls bend and flex with the click of a mouse or the change of a parameter. Once built, they become static. The dynamism and variability that played such a catalytic role in the design process are abandoned at first sight of physicality. Mass customization has become a vacuous stylistic exercise in which a static object merely evokes the effect of dynamism rather than permitting true reactivity. How did this contradiction emerge? As it turns out, it is extremely difficult to extend the malleable culture beyond the drawing process.

In recent years, a deluge of projects have introduced malleability in the form of a generative process. Such projects signal a paradigmatic shift in our perception of the design process. Take, for example, the works of Axel Killian (fig. 1), Dave Pigram of *Supermanoeuvre* (fig. 4), and Kokkugia. While these projects rely upon animation to represent and promote the malleable design process, the process itself is far removed from mere animation. Animations are linear and predetermined, while these works are real-time applications that respond to inputs, even producing varied results each time they run. This process embraces malleability and rejects the notion that authorship is defined by producing static results instead of responsive processes. Working on a foundation created by analog studies, these demonstrations of computer-aided, real-time feedback evolve the perception of authorship.³ As many of these designs rely upon mathematics as generators, singular authorship is oftentimes indefinable. The architects listed above exemplify and support such blurring every time they publish their scripts, programs, and algorithms as open-source code to the public. Anyone is welcome to re-author these works; in fact, the open-source policy itself is a vehicle for malleability. Unfortunately, the ad-

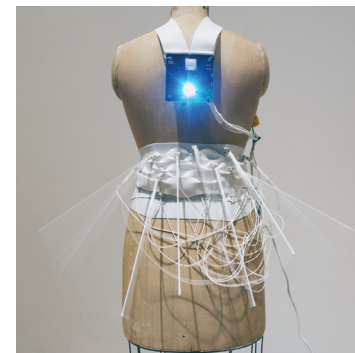
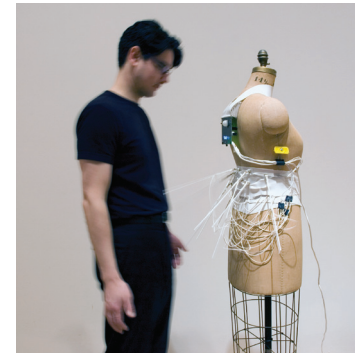
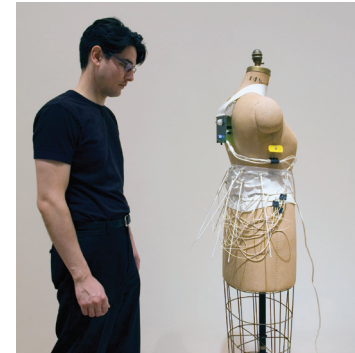


Figure 2. above: The Defensible Dress, Höweler+Yoon Architecture

vancement of malleability is halted every time the stop button is slammed and the permanent solution is selected, thereby re-inserting authorship into the equation.

Today, with the aid of digital fabrication, a paradigm shift has occurred. Change is now embraced as a collaborative opportunity. Parametric alterations in response to site-specific forces are the norm. Mass customization has not only impacted the relationship between the architect and the contractor, it has also persuaded the architect to indulge in complexity. When working with a complex figure considered impractical without the aid of digital fabrication, one applies the previously mentioned techniques to break the larger geometry down into constructible units. Previously, this process was left to the contractor in the form of shop drawings. By undermining this convention, architects have reclaimed control, but this is an ethos that has served to render our architecture embarrassingly static: novel geometries mask an otherwise conventional architectural process – design, decide, build.

On the other hand, the computational research projects introduce malleability to the design process, disturbing the boundaries of traditional architectural authorship. Yet these advancements in "process malleability" never make their way into the built form. A more developed understanding of the potential of malleable architecture must embrace its potential to extend malleability beyond the design process. Projecting to the future, physical architecture should become a continuation of this conceptually fluid process. This process does not start or end in order to create a fixed condition, but remains malleable. Continually responsive, it establishes reciprocity between the built form and its environment. Bridging the gap to physicality appears to be an insurmountable task proving difficult – but not impossible.

Like architects who embrace algorithmic techniques in service of their designs, those who apply the concept of malleability to physical objects do so by privileging feedback. It is not scripted, not predetermined. One example of a project which is malleable in this sense is the Defensible Dress by the research and design team of Eric Höweler and Meejin Yoon (fig. 2). Aided by sensors and actuators, the dress recognizes an intruder approaching through a measurement of distance. It reacts to this information by expanding and defending its host. This dress does one thing and one thing only – it defends. While Höweler and Yoon pick up where the process-driven researchers left off, the dress lacks the versatility demonstrated by the algorithmic projects. Perhaps the next dress will defend embrace, harass, or even ignore.

A slightly more dynamic example would be the Hyposurface Wall by Marc Goulthorpe of Decoi. Decoi's work straddles a fine line between the virtual and physical – the Hyposurface Wall is not only an architectural object that responds to real-time feedback, it is also operated by endlessly editable software. This wall is subjected to constraints, the most critical being the configuration of the standardized units that aggregate to make the whole. In this case, malleability operates at the level of the software and the kinetic interactions of standardized units.

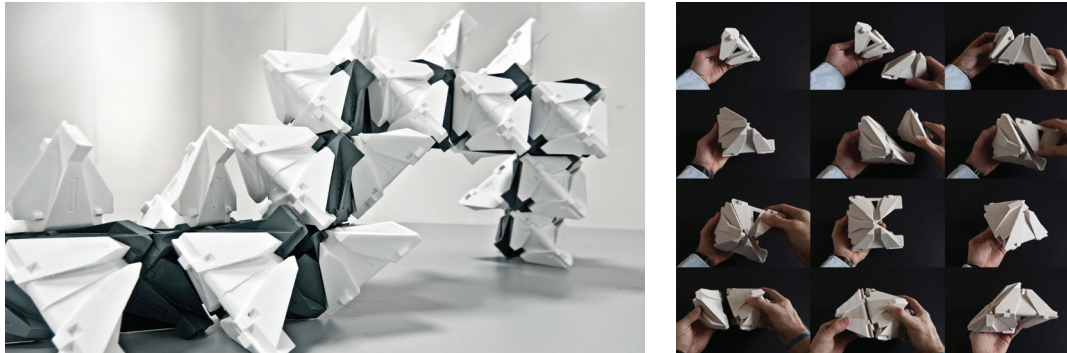


Figure 3. above: *Logic Matter*, Skylar Tibbits - SJET - MIT, 2010

Figure 4. opposite: Protosynthesis, Dave Pigram, Supermoeuvre

⁴ Mechanical and physical computing of the 1950s, begun by researchers like Charles Babbage, Lionel Penrose, and John von Neumann, is a clear departure point for Tibbits. This research has been continued by contemporary researchers like N. Gershenfeld, S. Griffith, J. Bachrach, and E. Demaine. *Logic Matter* is not simply an exercise in physical and spatial computing; it represents the extension of this research into the discourse of architecture.

⁵ Skylar Tibbits, "Logic Matter," in *Fabricate: Making Digital Architecture*, edited by Ruairi Glynn and Bob Sheil (Riverside Architectural Press, 2011), 51.

Physical malleability need not be actuated. Take *Logic Matter* by Skylar Tibbits of SJET, which extends the body of research in physical computation into the discourse of architecture (fig. 3).⁴ Tibbits claims that "[t]his system suggests a new paradigm for computing, one that materializes the capabilities of a hard drive and processor from a single sequence of inputs."⁵ Will we approach a time when the architecture itself computes? I argue that we already have; we are simply denying it.

I am not simply calling for kinetic architecture; I am calling for our discourse to admit to itself our yearning for – and the inevitability of – change. I am calling for abolition of the assumption that our profession is dedicated to permanence and stability. I am calling for an architecture where our conception of variability and response extend beyond the CAD program used to design it and the CAM process used to make it to the architecture itself. Imagine a world where architecture responds to both you and its greater surroundings. Imagine a future where the built environment and design process work in reciprocity, responding to various agents of information. Imagine a future where architecture is unshackled from its assumed allegiance to permanence. This future will house an architecture of malleability.

We are dedicated to:

Variability

Customization

Responsiveness

Reciprocity between drawing and making

Live architecture

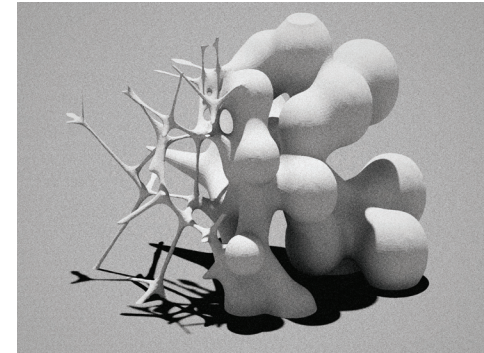
We revolt against:

Standardization

Permanence

Stasis

The death of architecture



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