



Flat Crush

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ABSTRACT

Flat Crush is an object installation that deals directly with the problem of fabrication and representation in a post-digital era. In recent years, the tools for architectural representation have proliferated and evolved as never before, and some have become commonplace, losing their original novelty. Some of the most widely used tools of representation have generated a real revolution in the perception of architecture, not only among professionals but also among the rest of society. This post-digital condition has influenced how representation in architecture has been able to become a concept for contesting ideas; a proposal for a tender, almost photographic impression; and a combination of playful, quasi-cinematographic scenarios that document projects in 2, 2.5, and 3D, wherein the technique of collage has made it possible to face the digital architecture frustrated reality.

ABOUT THE POST DIGITAL

Post-digital culture is the culture produced by a society that has assimilated the digital into the “natural” world in such a way that the digital ceases to be the supreme medium of the arts or an artistic goal in itself, spontaneously hybridizes with the analogical, and, from that moment, disrupts the analog-digital duality.

Part of the term “flat crush” refers to the classic digital notion of surface, which is not superficial but instead represents the idea of “flatness” as an unstable condition. Flatness refers to the paper or screen onto which architectural images have been projected. The relationship between flatness and surface refers to the combination of conditions of the architectural product and its means of production. *Flat Crush* uses the principle of a simple vertical blind system. The notion of how digital technology has modified global culture is that of flattening real space into horizontal codes of digital technology.

Projects like *Flat Crush* belong to a post-digital discourse in terms of representation and in terms of combining analog with basic digital techniques. However, the post-digital is deeply digital; it simply recognizes our current moment to be different from previous periods of digital preoccupation.¹

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The concept of “post-digital” was introduced in a 1998 article by Nicholas Negroponte in *WIRED* magazine:

Terabit access, petahertz processors, planetary networks, and disk drives on the heads of pins will be... they'll just be. Face it—the Digital Revolution is over. Yes, we are now in a digital age, to whatever degree our culture, infrastructure, and economy (in that order) allow us. But the really surprising changes will be elsewhere, in our lifestyle and how we collectively manage ourselves on this planet.²

Years later, in 2010, when Russell Davies referenced this idea, it was couched in a half-hearted apology:

*Post Digital was supposed, if anything, to be a shout against complacency, to make people realise that we're not at the end of a digital revolution, we're at the start of one. The end game was not making a website to go with your TV commercial and it's not now about making a newspaper out of your website. Post Digital was supposed to be the next exciting phase, not a return to the old order.*³

The question then, is, what does it really mean to be post-digital in architecture and beyond? Gradually, it seems to mean recognizing more clearly that the origins of the essence of this sensibility are increasingly remote in time, but that the computer is the tool that has allowed

the reordering of these canons from form to image. The repository of the utopias of each epoch preserved in the depths of culture is transformed into the invigorating and obsessive element that unleashes a revolution, while at the same time providing it with its *raison d'être*. We must leave behind all those architect gurus of the 1990s who wanted to evangelize architecture and convert it to its postulates by force because that digital project actually failed. This failure can be recognized in the architecture of the last years of the 20th century and the beginning of the 21st century, which seemed only a contingency in an emergency created by professionals worried about raising experiments with techniques, technology, and processes of contemporary design and thought. Some of those aspects continued, but the actual shift occurred when we realized we were all doing very similar common digital operations.

If early digital processes were loud and disruptive, initiating a flood of revolutionary thinking, current technologies spread quietly, without the attention and intellectual development of mainstream digital design. To combat this, this project carefully considers the digital processes we take for granted. Though seemingly trivial, such processes constitute the foundations of architectural design today. The post-digital culture is not a Ludditic disavowal of computation, nor an ironic detachment from it; rather, it's a bid to explore the idiosyncrasies and aesthetics of digital mediums while considering larger cultural questions that have been under-addressed in digital design discourse to date.

FABRICATION/REPRESENTATION

The digital is no longer synonymous with technology, but is instead considered a zeitgeist, or spirit of the current time. When thinking about what approach to take for a particular project, one's methods can be offline, or a combination of digital and traditional methods. Everything belongs to the same reality of small interrelated tendencies that explain a global post-digital context to which organizations of today and tomorrow must respond to rather than fight against. The digital transformation, in this sense, must be increasingly focused on this new scenario. This is the context from which *Flat Crush* emerged.

Digitally fabricated objects have gained a largely technophobic fandom in mass media that harbors little criticality toward the actual objects but an infatuation with the fabrication process. The predominant digitally fabricated "tech aesthetic" in architecture merges sleek minimalism with parametrically subdivided surface logics. *Flat Crush*, on the other hand, responds to a different aesthetic.

Applying a more humanistic rather than artistic tone, this project attempts to rethink the relationship between human beings and technology, now understood through post-digitalism. We reject the implicit reductionism in digital processes while distancing the digitalism of

technology; that is, we reject the acceptance of technology while denying the logic that digitalism entails. In contrast, we speculate about a post-digital logic that gives continuity to the human-technology relationship through the integration of the physical and drawing representation, which in a certain way gives unity to our perception of the world. The critical point is not to be dazzled by digital technology, since that will not allow us to link it with its analog counterpart and appreciate them as a continuum that enriches the experience instead of reducing it. *Flat Crush* is a vertical blind that looks at its own representation as a digital reality, its own bump map. The collective engagement in the creation of our surrounding reality will reach philosophy and science, thus resulting in a new understanding of ontology; our reality becomes an ongoing collective project, populated not by static objects but by the immanent process of producing complex assemblages.⁴

This object/drawing goes full circle, going through various iterations of dimensional status and quality of line work and removing from the object its familiarity without sacrificing its integrity as a sort of post-digital abstraction. These low-fi operations or post-digital shifts produce a kind of reconstruction of the object, a drawing machine. These are motivated completely by the vertical planes/drawings as an object, despite the suggestion of the seemingly sculptural end product.

Flat Crush's pivotal moment in the process is the translation from the digital world of a 2D representation to the physical through the CNC. These translations are not merely previous iterations of the former object or representations; they mark the creation of a new object through a restructuring of data, material, and formal qualities. Thus, the typical notion of a linear process, as

Figure 1: Process



Figure 2: 2.5D installed

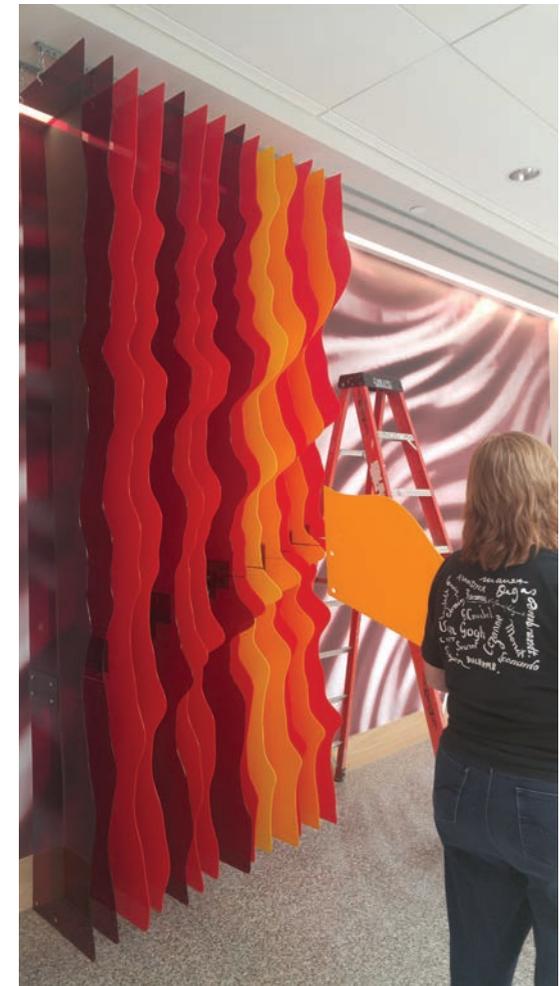


Figure 3: Side View

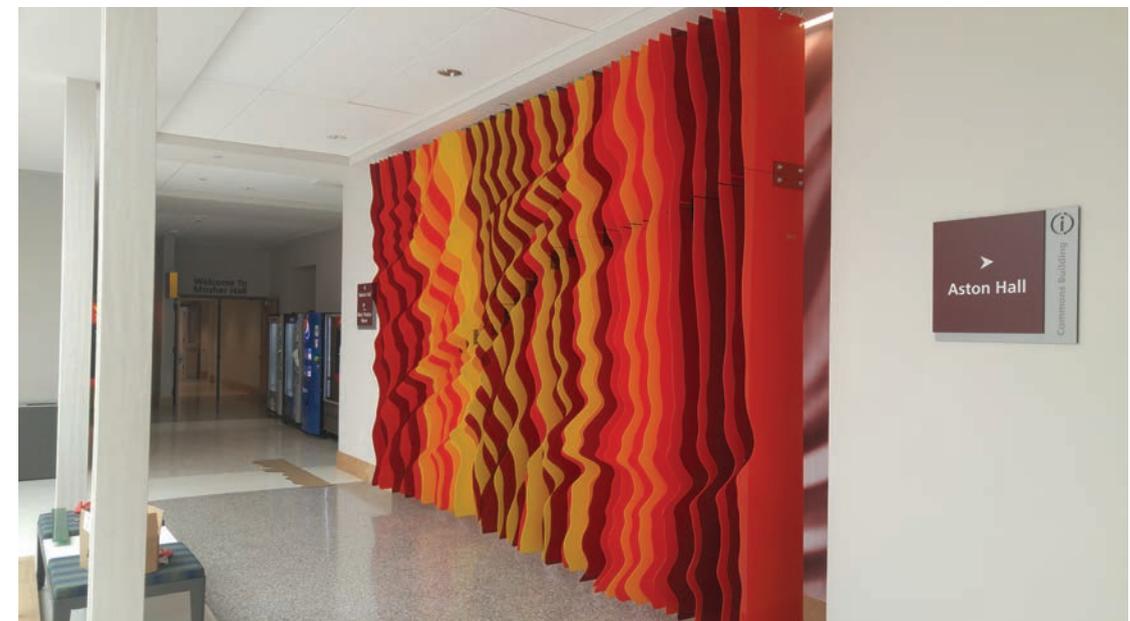
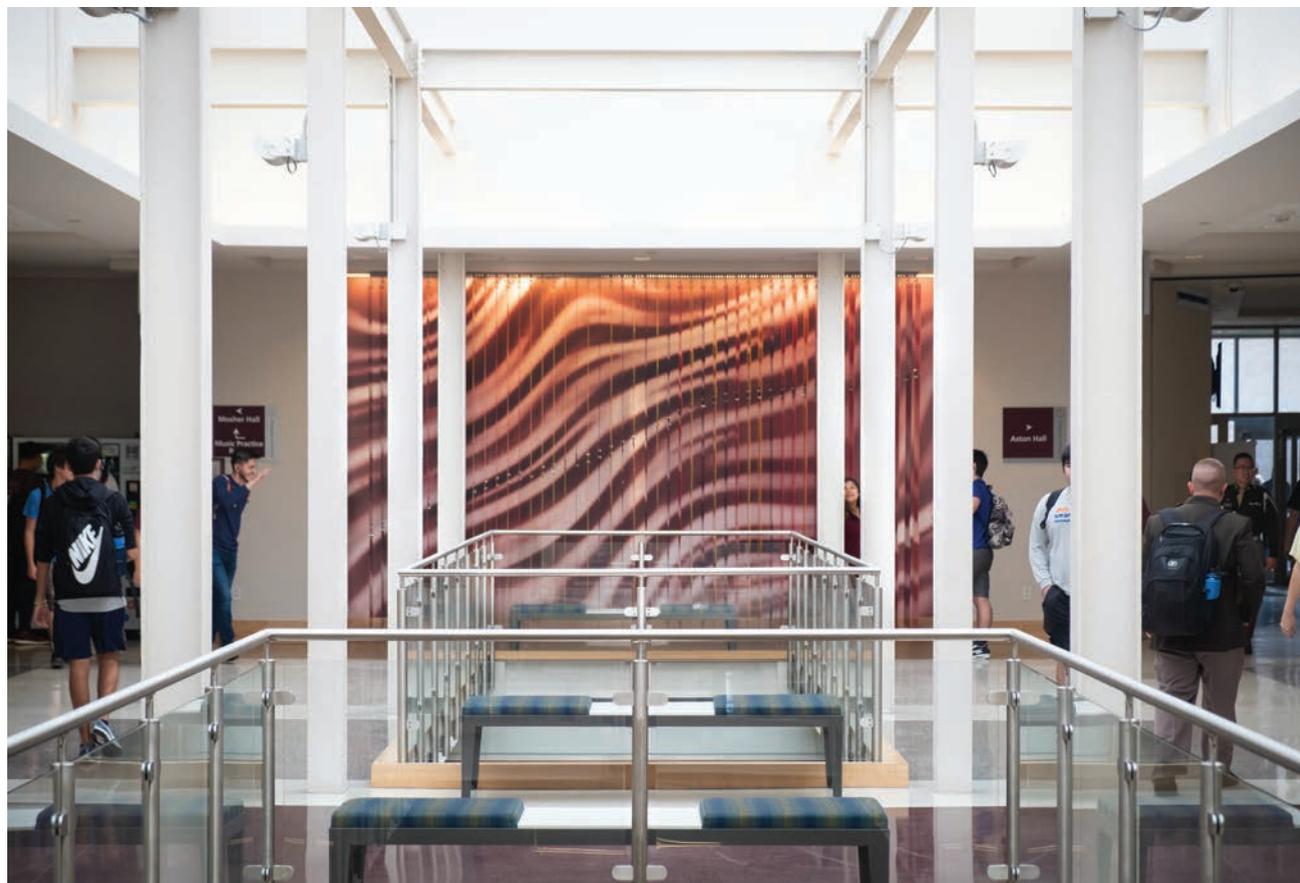




Figure 4: From object 3D to drawing 2D.



well as representation, is changed. Post-digital design discourse calls for a critical examination of the tools and technologies we take for granted, while simultaneously connecting what we do to larger cultural shifts occurring globally. This is about more than design.

TECHNICAL DESCRIPTION: DIGITAL

This project negotiates the relationship between 3D objects, 2D surfaces, and perception. *Flat Crush* is generated using a digital logic to produce a common object like a vertical blind. The installation was created through three phases. The first phase explored how a 2D image could be transformed into 3D objects. The second phase created an algorithm that transformed the generated 3D objects from Phase One into 2D successive strata. The last phase transformed the 3D objects that were used to create successive strata into an image that could be placed behind the installation.

Phase One: Sculpting Using Displacement Mapping

Displacement mapping is a computer graphics technique that was first introduced by Cook in 1984. Unlike bump mapping, this technique affects the actual geometric position of each point on a surface. The displacement direction is the local surface normal.⁵ The term “mapping” refers to the use of a texture map, or 2D image, to manipulate the displacement effect. ZBrush, a digital sculpting tool, was used in this project to perform displacement mapping. A grayscale image of abstract curves was used to create an Alpha map for displacement. A 2D plane, in ZBrush, was subdivided to create high-resolution mesh. The Alpha map of the grayscale image was used to displace or pull each point in or out according to the black-to-white intensity variations in

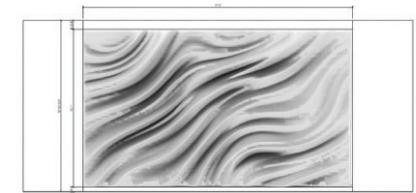


Figure 5: Layers

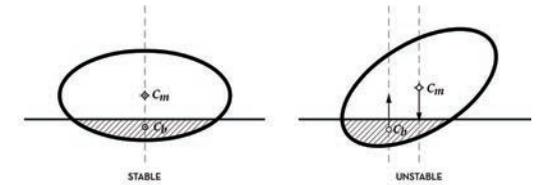
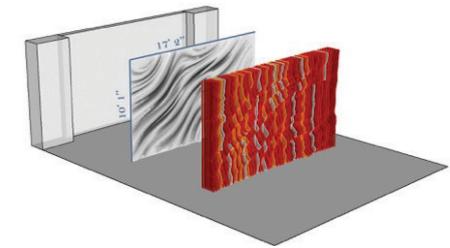


Figure 6: Displacement mapping of a 2D plane using alpha map.

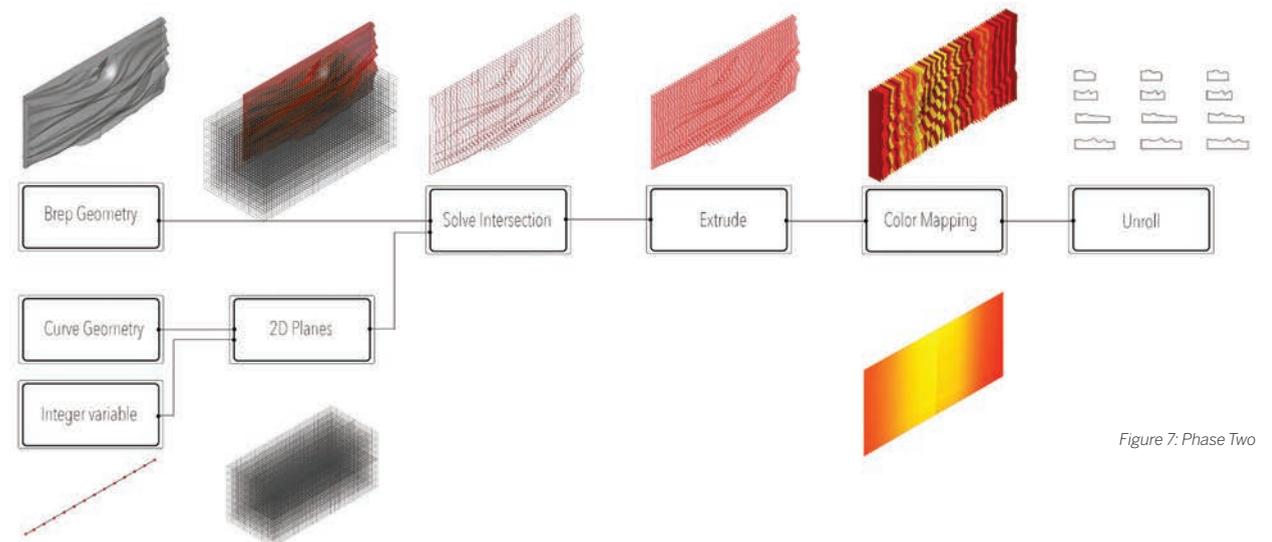
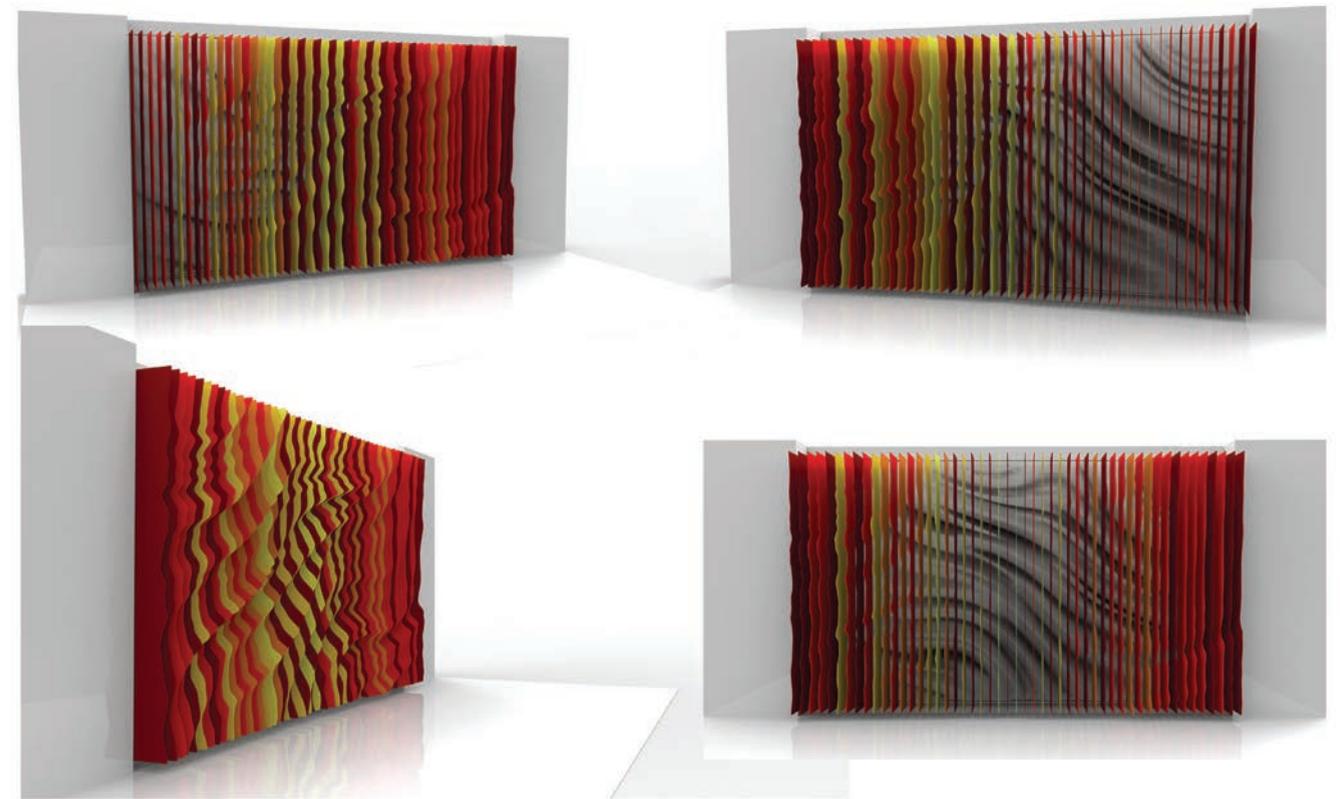


Figure 7: Phase Two

Figure 8: A rendered image of the B-rep geometry.



Figure 9: People's interaction with the installation.



the Alpha map. As a result, the 2D plane was sculpted into a 3D object through a 2D image, or an Alpha map.

Phase Two: Stratification and Unroll Algorithm

The 3D object from Phase One was imported into Rhinoceros, a computer-aided design tool. Then it was loaded into Grasshopper, a visual programming language, as boundary representation (B-rep) geometry. In addition, a 2D line or a curved geometry was created to define the direction of stratification. A number of equally spaced, perpendicular planes along the curve were generated and controlled through an integer variable. Next, the section algorithm in Rhinoceros was used to create a 2D profile, or lines at each intersection, between the B-rep geometry and the 2D planes. These profiles were extruded to create a 2.5D panel of a Plexiglass sheet. Using a color-mapping algorithm, a red-to-yellow color scheme was used to change the color of each panel. Finally, an unroll script was created to unroll all panels and lay them out for laser cutting.

Phase Three: Rendering (Image Synthesis)

In Phase Three, a rendered image of the B-rep geometry, or the 3D object, was created. This image was printed and placed behind the installation in order to imply a different reading of the same geometry.

ENDNOTES

1. Adam Fure, "What does it really mean to be 'post-digital' in architecture and beyond?" *The Architect's Newspaper*, May 22, 2018. <https://archpaper.com/2018/05/postdigital-for-the-record/>. Accessed October 2018.

2. "Negroponte," *WIRED*, December 1, 1998. <https://www.wired.com/1998/12/negroponte-55/>. Accessed October 2018.

3. Germán Bacca, "La era Post-Digital." <https://www.germanbacca.com/la-era-post-digital/>. Accessed October 2018.

4. Sandra Álvaro Sánchez, "Postdigital city: aesthetics and politics in the space of embodied virtuality," (PhD diss., Universitat Autònoma de Barcelona Departament de Filosofia, 2016).

5. Robert L. Cook, "Shade trees," in *SIGGRAPH'84: Proceedings of the 11th Annual Conference on Computer Graphics and Interactive Techniques*, ed. Hank Christensen (New York: Association for Computer Machinery, 1984), 223–31.

Figure 10: The dynamic experience of moving around the installation.