



Embedded Seriality: An Anti-Stylistic Reading of Current Modes of Code, Design, and Culture

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INTRODUCTION

Technological advancements typically induce paradigm shifts that reverberate across many disciplines. Architecture is in a moment of such transition both in practice and in the academy. The past 30 years of technological progress changed the relationship between architect designer and design process at an unprecedented rate. The discipline was not prepared for such accelerated movement, and was unsuccessful at expanding its theoretical frameworks to engage with technology in a meaningful way. The unsynchronized advancement of technology and theory became the source of our present condition that is currently dominated by two camps—broadly defined here as computation-based design, and design informed by history and theory; these two camps rarely challenge or contaminate one another.

Technological paradigm shifts often result in another problem: specialism. The rapid influx of advanced technology into the field of architecture in the past two decades has produced a particular type of specialization. Knowledge that is developed in isolation risks alienating those with the most mastery over it. Consequently, the compartmentalization of code-based design operates as an impervious system—with limited meaningful pushback, dialogue, or integration with designers and

theorists engaging with visual, formal, and cultural aspects of the field. This lack of integration is an urgent problem threatening the disciplinary legitimacy of both (isolated) camps.

Technology has a tendency to advance rapidly when economic and political climates allow. Technological advancements initiate change in every field. In his “Systems Esthetics” essay, published in *Artforum* in 1968, artist, critic, curator, and writer Jack Burnham illustrates the cultural transition facilitated by technology as moving from an object-oriented model to a systems-oriented one.¹ Academic institutions have the ability to quickly assimilate new discoveries and experiment with them in a pedagogically driven environment. More specifically, over the last 10 to 15 years, the emergence of visual programming (Grasshopper 3D, originally released as Explicit History) and object-oriented programming (Processing) paradigms, open-source computing, and other accessible platforms have infiltrated the architecture school in an accelerated and at times uninformed manner.

FRAMEWORK

The subject of this paper is not grounded in the politics or economics of digital design, despite the difficulty in isolating these factors of technological advancement.

Figure 1: Narcissism of Small Differences. Kinch, M. Casey Rehm Principal 2014 - ongoing.

However, it is worth noting the radical shifts in the field from costly computers running proprietary software, to mobile technology, affordable processing power, and open-source platforms. In the 1990s, the digital was strictly available to a select few who could afford the cost of technology. Over time, computers became increasingly affordable, more powerful, and more accessible. Today, every student enrolled in architecture school is expected to own a personal computer. Parallel to the development of hardware in the late 1990s and early 2000s, software development transitioned as well—from large companies developing highly advanced computer programs to a singular person (David Rutten) developing an equally powerful environment.² The revolutionary developments in software design processes affected architects, students, and academics alike. One of the most outstanding examples of this development is the shift in the field from Bentley's Generative Components to Rutten's/McNeel's Grasshopper 3D. Individual programmers and small teams unexpectedly found themselves in a position to develop software that could become as influential and widely used as packages that used to be designed by large corporations. This wave of new software and new methods of software development was facilitated by the open-source training model that emerged from platforms such as the workshop, the blog, the online video tutorial, and most importantly, integrated development environments and web-based source code and version control platforms (such as GitHub).

Hardly 10 years after the introduction of the first open-source (architecturally oriented) digital design environments, the contemporary computation-based designer has access to over 200 free Grasshopper plugins, 60,000 forum members, 287,000 YouTube tutorials, and thousands of blogs, books, articles, and other forms of user/developer-oriented training support.

From these developments, an entire architectural genre has emerged. Computational Design, once the purview of a select few, has become a field in its own right, with a clearly delineated visual project. There now exists a litany of new Master of Science (M.S.) year-long degree programs being offered by architecture schools all over North America, Europe, and beyond. Advanced Production, Building Information & Systems, Design Computation, Architectural Technologies, Technology of Architecture, Digital and Material Technologies, and Situated Technologies are just a few typical program headings. These degrees promise students a research-oriented environment focusing on technology. However, techniques created for the sole purpose of optimization and fabrication, powerful as they may be, cannot productively engage with the discipline on an aesthetic or visual level. Most Master of Science programs are technologically oriented; they privilege computation over design, and science

over aesthetic/cultural concerns. This institutionalized confinement of code-based design practice created a camp within the discipline, an exclusive degree in architecture graduate schools, a specialized department in the architecture firm, and a new branch in the corporate office structure—in other words, a hermetic society couched in hyper-specific, self-emulating design discourses.

In the absence of a developed discourse around the aesthetics of computation design, defaults and clichés have become the norm. At present, there is an overabundance of Voronoi tessellations, hexagonal grids, minimal surface, geodesic lines, box morph, attractor point, and other codes that operate on input geometry—meaning geometry that has been 3D-modeled from parameters that have no relationship with the parameters of the algorithm. Without a deep understanding of specific parameters in both the visual modeling world and the algorithmic one, the designer becomes an operator, unable to create a comprehensive and meaningful relationship between ready-made, downloadable scripts, and independently constructed Rhino surfaces. Designing in this mode—making changes to the parameters of an algorithm that was developed independently from the geometry it is operating on—produces works that lack intentionality. The widespread popularity of this design methodology has created a specific architectural language and a new style: Computation Design. Typically, architectural movements develop theoretical concepts and evaluative criteria in tandem, but the visual project associated with Computation Design lacks a coherent theoretical and critical project.

The critical inadequacy of the computation project is a new problem, not inherent to technology. Sometime in the 1980s, Deconstructivism started to emerge in opposition to the Modernist demand for flatness and geometric purity. Aided by the emergence of computers and software, this movement focused on developing (what were at that time) complex mechanisms engineered for the production of special effects and atmosphere. The Digital Turn followed Deconstructivism in the late 1990s and lasted through the early 2000s, with the ambition of integrating digital technologies into the design process on a deep, self-conscious level, while critically engaging in philosophical discourse. This era, pioneered mainly by Greg Lynn and Bernard Cache, maintained a serious and meaningful relationship between matters of design, aesthetics, theory, and technology. In the mature period of the Digital Turn, design problems, computation challenges, and new theoretical concepts were developed simultaneously. For example, the replacement of the angled fold with a curved one drew its theoretical (or philosophical) rhetoric from Gilles Deleuze's *The Fold*.³ The evolution of the fold also tested the utility of the computer and

software environments while still addressing issues related to visual studies and aesthetic theory.⁴ More recently however (post-2010), Computation Design has been codified as a stand-alone style and an autonomous field of study. A system misinterpreted, computation was meant to service localized design and fabrication problems, not design buildings and urban projects in their entirety.⁵ Inadvertently, computation forged its agency as an architectural style with no significant relations to more general (totalizing) issues of architectural design, theory, and aesthetics.

"Gradually this strategy transforms artistic and technological decision-making into a single activity."
— Jack Burnham, *Systems Esthetics*

The artists and works that Burnham cites in his article are examples of an aesthetic impulse driving technological innovation. He argues that the aesthetic impulse must actively participate and relate to technological means of research and production. Computation Design, as it's commonly practiced today, still largely privileges scientific knowledge, while theoretically/formally-motivated designers address aesthetic issues alone. The Voronoi diagram and the nine-square grid, emblems of the two camps, are equally problematic when used as go-to design solutions. Computation, aesthetics, theory, and cultural issues must all be integrated into a new architectural discourse where each area of study informs the other reciprocally.

ABSTRACT

What follows is a diagnosis of the current state of digital design. Digital design is a problematic and contested term; it is simultaneously loose and very specific. The term is loose in that architecture and media culture no longer operate outside of the digital. It is also specific in that it indicates a particular style wedded to the use of a set of tools and commands directly associated with the computer. The term "digital" further frustrates the conversation by attaching itself to the word design, as it is already difficult to imagine a present or future world where design and culture operate outside of the digital. For the purpose of this study, let's consider Digital Design as a temporary stand-in, on its way to a more fully-realized category of architectural design, one which does not discriminate between the digital and the design aspects of a project, but rather builds on a critical and theoretical framework that accommodates and questions the consequences of the simultaneous collaboration of code and concept.

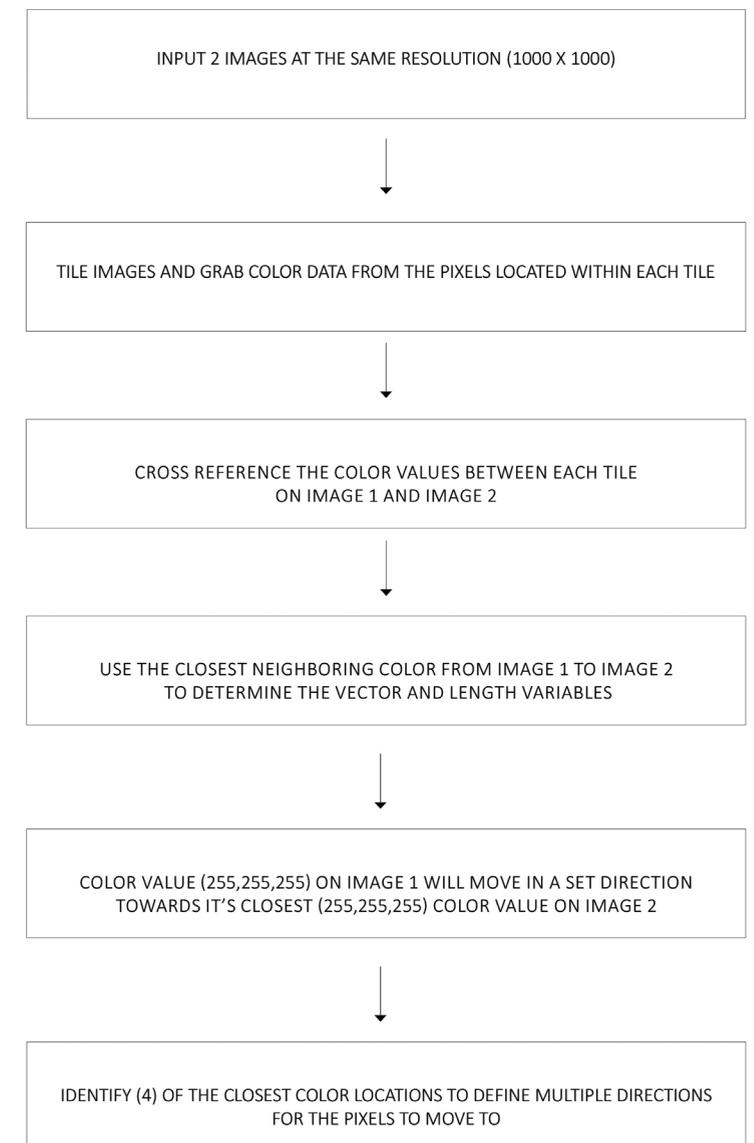
The following sections focus on three important, related ideas that could contribute to a re-theorization of computation design: the role of style; the construction of critical, evaluative metrics; and finally, the implications of design in our contemporary image-centric culture.

This analysis is illustrated by the work of architecture designers who provide digitally-informed, alternative design models. Among other players, the work of M. Casey Rehm, Gilles Retsin, and Jose Sanchez offer hybrid proposal—working strategies that engage design and computation, code and concept on equal footing.

PART 1: STYLE VERSUS ATTITUDE

In its current state, Computation Design is highly stylized, but it is uncritical about how that style has developed, how it operates culturally (outside of the field), and which disciplinary traditions it is channeling. The purpose of this section is to argue for a visually-oriented, anti-stylistic, procedural approach to Digital Design. To

Figure 2: Processing Code Diagram Based on Research Work by Casey Rehm, Viola Ago, 2017.



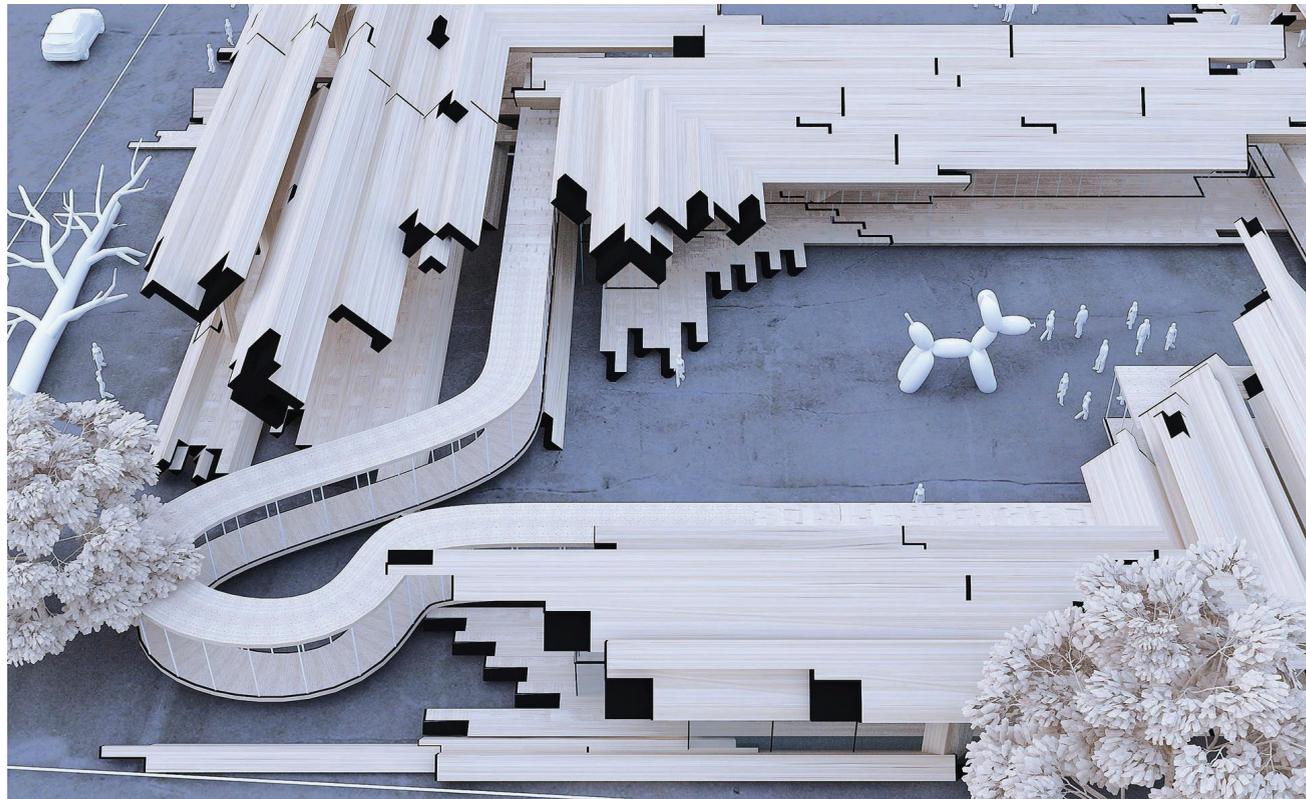


Figure 3: Gilles Retsin Architecture, Suncheon Art Platform (2016) Model View.

be clear, this essay does not advocate a complete renunciation of style; instead, it proposes a lateral shift, not unlike the way conceptual artists deviated their focus from style, beauty, and personal expression to processes, lists, and raw concepts in the 1960s and 70s.

An early pioneer of Conceptual Art theory, artist and critic Mel Bochner offers an alternative to style in his seminal essay, "The Serial Attitude" (1967). In his essay, Bochner suggests that the "serial order is a method, not a style."⁶ This is an intriguing argument if adopted by a design movement in need of a withdrawal from the pitfalls of default styles. Seriality, as a broad term, is generally defined as a number of similar or related things that are structured in a spatial or temporal sequence. For Bochner, seriality is concerned with the order of things. He further illustrates the role of the serial by separating it into two types: artists that simply work in series and artists that **embed** a series-based methodology within their work.⁷ To illustrate, Willem De Kooning's *Woman* paintings exemplify a process in which the work is based on the same theme with different variations. De Kooning paints the same subject, with slight deviations in each instantiation, to create a body of work related to a particular style. Artist Jasper Johns, on the other hand, operates in simple logics. His *Colored Alphabet* uses a well-known system—the alphabet, which has a fixed amount of elements, a beginning, a sequence, and an end. Johns' use of the alphabet embeds serial logics

within the work itself. Bochner advocates for the latter; the aesthetics of seriality employed as an attitude/method, as opposed to a style.

Appropriating this attitude, architectural designer M. Casey Rehm's work directly relates to embedded seriality, wagering an architecture of method as opposed to style (fig. 1). Rehm's algorithmic-based work is not indicative of a particular style, and it cannot be reduced to the mere demonstration of a technique either; it is a balancing act of process and form. In his ongoing research project, *Narcissism of Small Differences*, Rehm uses an image as an input, fragments it, and reorders the fragments into a new composition. There are two main components to his methodology: an image and a process. *Narcissism of Small Differences* begins with two images. Each image, like Johns' *Colored Alphabet*, is a closed system with a finite number of ordered/organized pixels. Regardless of how Rehm restructures the pixel order, the image will always maintain a deliberately organized network of pixels. Rehm's process can be broken down into three distinct operations (fig. 2). First, the images undergo a grid subdivision and cell-based (or pixel-based) color analysis. This information is used to construct a set of vector directions and magnitudes based on constructed relationships between corresponding pixel sets from the two images. After these procedures, the pixels duplicate to a new position guided by the constructed vectors from operation two.



Figure 4: Gilles Retsin Architecture, Suncheon Art Platform (2016) Parts.

This last step repeats consecutively to create a newly processed image. As a result, his work operates on the binary of process and image, movement and perception, where one cannot exist without the other.

Two other examples of serial procedures in digitally inflected design can be found in the work of both Jose Sanchez and Gilles Retsin. Sanchez's and Retsin's bodies of work plug into a similar concept that employs embedded seriality and use discrete geometries to create form by way of combinatorial systems. However, their work is also embedded within a discourse of seriality. In *Suncheon Art Platform* (fig. 3), Retsin creates families of discrete components to characterize form. The structural system here is one that is constructed from local as well as global relationships. Although at first the work may seem modular (it uses a basic unit and similar replicas of that unit), it is not the order of these units that modifies the overall form (fig. 4). Rather, Retsin appears to use sequences of units to compose form, using color to index adjacencies between units. To be clear, this illustration is not meant to argue for the designer's intention of the final appearance of the work. Retsin's work does not identify with a particular architectural camp or set of styles. Instead, *Suncheon Art Platform* fuses aesthetic ambitions and process-intelligence by creating interesting relationships within a unitized system. In this framework, the work of Retsin, Rehm, and Sanchez is anti-stylistic as it authors compositions of data and structure.

PART 2: EVALUATIVE CRITERIA – AESTHETICS OF EVIDENCE

The lack of engaged criticism—criteria developed for the assessment of new work—opens the door for arbitrary and circumstantial mass influences to take on that role. The exponential user growth of Instagram, Facebook, design blogs, Vimeo, and other image-dissemination platforms propagates numerous, unaccounted-for styles very rapidly. This is a status of veritable crisis in contemporary architectural discourse. In this critical moment, the serial attitude can provide an alternative to disorienting plurality, a critical lens for architecture as it relates to current optically saturated modes of social media and image culture. The work of Retsin, Rehm, and Sanchez is not symptomatic of a particular style, and it is not a simple, straightforward response to a technique either. So how does one develop a coherent rhetoric of evaluation for this work?

Here, cultural theorist and critic Sianne Ngai offers another model based on Conceptual Art practice from the 1960s and 70s: an aesthetic of difference. Ngai describes this aesthetic of difference as belonging to variation, information, and forensic evidence.⁸ To illustrate, Eleanor Antin's *Blood of the Poet Box* contains blood samples from 100 poets in a wooden box and an associated specimen list. Antin's work has an evidence-based approach that results from the collection of data. Similarly, Ed Ruscha's work addresses the format of inventory-based work. *Stains* is a collection

Figure 5: Jose Sanchez, *Block_hood* Video Game, 2016.



of 76 mixed media stains created from water, beer, blood, juice, and other substances. It is important to note that both of these artists' works exist as a type of collection, thematically unified as series through the use of forensic information. This inventory-focused method of working was the premise that comprised the Conceptual Art movement. This new paradigm arose from artwork, criticism, and theory that was no longer based on the merits of virtuosity and personal expression, but rather on the neutral, matter-of-fact qualities of lists of data, everyday objects, actions, tasks, performances, and so on.

Lists and other types of data organization comprise the base logics of any type of (architecturally-related) computer programming activity. For example, a digitally-constructed surface is understood and stored by the computer as a list of numerical values. At an abstract level, Conceptual Art strategies are not unlike scripting logics. Comparisons of this nature productively equate works like Sol Lewitt's *Cube Series* to working algorithmically in a permutation-based method. This method of working favors the production of series (composed of many possible variations), as opposed to singularities (one instance of a variation). A contemporary architectural example, Jose Sanchez's architectural

video game "Block'hood" (fig.5), operates within a framework of embedded seriality, where the global composition is a unitized system with local moments of novelty and formal interest. Block'hood's system, combinatorial and permutative in nature, operates on a sequence-based methodology. The system Sanchez creates is a game environment, comprised of over 200 different types of units. The game structure is designed as a network of units which rely on a two-phase connection mechanism. In the game, the architectural units contain a finite amount of built-in connectors that differ from one unit to the next. Users are invited to arrange these units, based on their connecting capabilities into localized assemblages that can sequentially build as the permutation logics of the game permit. The ordered approach of the work is one that functions under the varying characteristics of units and the varying localized combination of such units to create larger forms over time. In this sense, the game is inherently mathematical and spatial. Block'hood's serial modes provide the field of architecture with a model for an aesthetic based on permutation and combinatorial logics. In Block'hood, the user engages the city through the cube, the banal, while interrogating global compositions, the city, the interesting.

Sianne Ngai argues that variation in a unitized system has a particular kind of aesthetic agency. The serial method lends itself to Ngai's premise. Seriality offers a platform for the generation of interesting relationships of units based on their information. Ngai further defines the aesthetic of variation as a play between typicality and difference, or, in her words, "standardization and individuation" (terms with capitalistic connotations that refer to logics of industrial production). The image-driven pixel-based organizations in Rehm's work can be understood as a visual analogue to this notion of difference and typicality. *Control* (fig. 6), for example, is made of two systems, one that remains the same and one that changes and generates difference. The final output of *Control* retains original data from the first (of the two) input images. Traces of the untouched, original image (the existing pixels) register a typical condition. However, the work also consists of new or "novel" clusters of pixels (evidence of transformations). These new pixel clusters are transformed by the vectors generated from the initial analysis of the two original input images (similar to those found in Figure 1). *Control* is simultaneously a typical image and an inventory of the work's transformation vectors.

Control productively collapses code and concept, difference and typicality, geometry and image, or in Ngai's words, individuation and standardization. Ngai's theory relates the interplay of seriality and "the interesting" to the rise of new media and communications technology.

In her view, new norms of communication have created a sensorially overloaded society in constant need of the next new thing (fig. 7):

Low or indeterminate affect, stylistic pluralism and hybridity, and the seemingly endless pursuit, in the felt absence of any totalizing vision, of the next new thing and then the next one after.

– Sianne Ngai, *Merely Interesting*

In his book *The Reality of Mass Media* (2000), systems theorist Niklas Luhmann offers a similar theoretical model. Like Ngai, Luhmann describes the media-driven social condition as having a paradoxical relationship to novelty and repetition. He argues that the economic and industrial influences on everyday culture produce a consumerist climate that depends on two opposing things: redundancy and variety. In Luhmann's view, redundancy is integral to the creation of fast relationships between users and products via familiarity, and variety is equally as important in its affirmation and celebration of new things that are always better, shinier, and necessary, in order to sustain a continuous culture of purchased goods.⁹ Both Ngai and Luhmann contend that this condition results in a specific type of production cycle. Such cycles depend on short-lived recursive products, with slight variations introduced at each moment of reproduction.

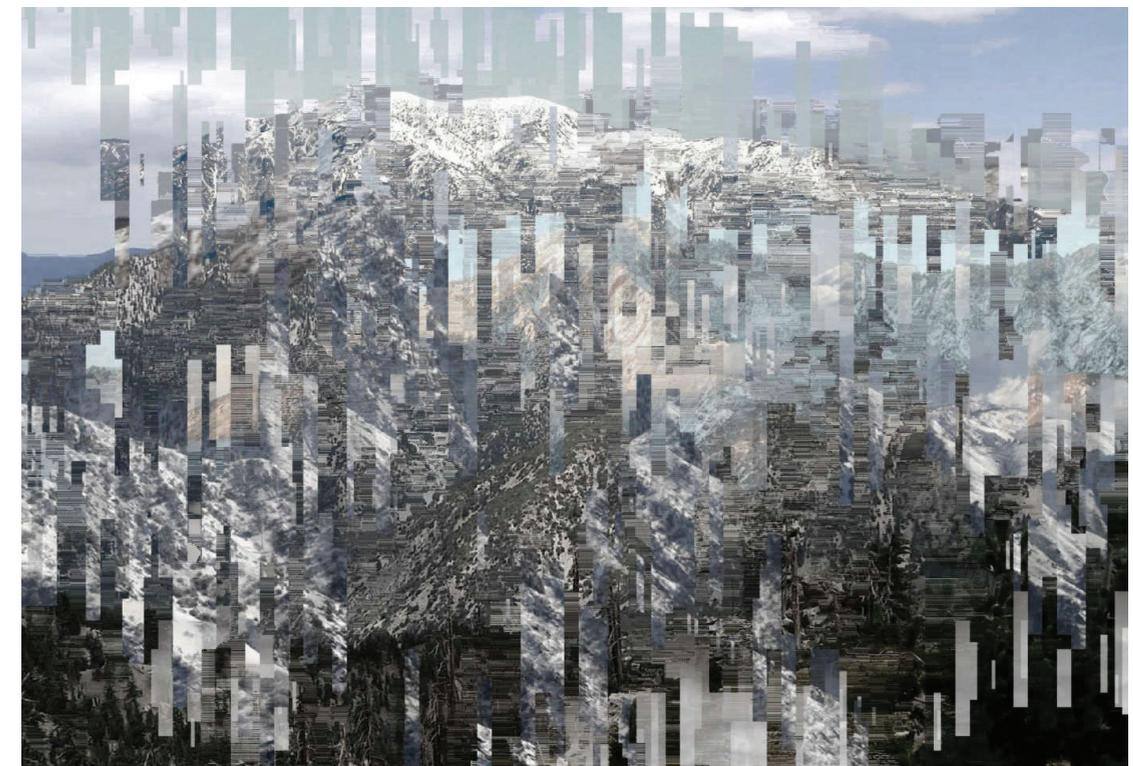


Figure 6: Media Still From *Control*, Kinch, M. Casey Rehm Principal, SCI-Arc Gallery, 2016.

Figure 7: Diagram for Sianne Ngai's Theory of the Interesting, Viola Ago 2017

Aesthetics of the Interesting	
Variation of Information	
Interesting Relationships	
Difference	Typicality
Individuation	Standardization
New	Familiar
Variety	Redundancy

Figure 8: Diagram for Current Architectural Practices Camps.

Split Discipline	
Camp 1	Camp 2
Form/Theory Participants	Computation Participants
Incremental Change	Abrupt Change
Medium	Content
Image	Process
Culturally Accepted	Forged Acceptance Over Time

PART 3: CULTURAL IMPLICATIONS – THE ROLE OF THE IMAGE

Postwar consumer culture favors small incremental changes over abrupt avant garde paradigm shifts. Anticipating Ngai and Luhman by several decades, philosopher and media theorist Marshall McLuhan, in his book "The Medium is the Message" (1967),¹⁰ describes a media-induced society psychologically conditioned to depend on a visual apparatus informed by old configurations:

Innumerable confusions and a profound feeling of despair invariably emerge in periods of great technological and cultural transitions. Our "Age of Anxiety" is, in great part, the result of trying to do today's job with yesterday's tools—with yesterday's concepts.

– Marshall McLuhan, *The Medium is the Message*

The expediency and suddenness with which computation design flaunted its technological flare and procedural expertise when it entered the architectural stage did not account for its reception as a design language. The computation proposal was abrupt, foreign, and purged any previously familiar precedents of architecture. The architecture community, still operating within larger social norms, casually disregarded the emerging computation community and continued to operate with familiar and comfortable design procedures, repurposing old ideas and image-washing (photo filtering) them with temporal digital aesthetics.

It goes without saying that our field is split, with marginalized computational designers on the one side, and history/theory-based designers on the other (informed by the visual history of the discipline and theoretical concepts borrowed from other disciplines). Mainstream designers currently also produce culturally embedded design artifacts at high speeds. The work, generally speaking, occupies the medium of computer-generated images, and post-processed model photographs, declaring a new-found desire for architectural representation. In a similar fashion, this camp, like the computation one, established a style which exclusively produced architectural ideas in service to the image. Baudrillard argues objects lose meaning when they are represented by images. Images are of the aesthetic domain and are evaluated as such.¹¹ Reducing the evaluation of an object through the utility of the image therefore eradicates meaning from the object. He argues that the image encouraged the common desire to aestheticize form, consequentially removing content from the object that the image is representing (fig. 8).

As this history/theory camp proliferated an endless cache of illustrations of architectural ideas, the computation design group surged into advancing (zoomed-in) problem-oriented techniques and processes; it was all about content. The hyper-focused method of this camp overlooked the importance of representation in architecture, and inadequately replaced it with screen captures of lines of code and grasshopper definitions.

The image-medium binary of the first group, and the content-process binary of the second one, developed at different speeds, and in almost complete isolation from one another. While the former immediately proclaimed its role into the cultural landscape of architecture, the latter forged its position over time. The obvious indifference of the two groups to one another led to a hard divide in the discipline—even though what one lacked the other one provided.

There is precedent for work that merges this disciplinary division. The architecture designers previously discussed fuse process, representation, and logics of operation within their work, thereby creating artifacts wedded to the aesthetic, visual, cultural, and procedural modes of architecture. The argument is for progressive collaboration, using modes of seriality, evidence, and image-object connotations as drivers of an alternative project in architecture.

ENDNOTES

1. Jack Burnham, "Systems Esthetics," *Artforum* 7, no. 1 (1968): 30–35.

2. "The Grasshopper Primer (EN)," <http://grasshopper-primer.com/en/0-about/1-grasshopper-an-overview.html>.

3. Greg Lynn, "Folding in Architecture (1993)," in *The Digital Turn in Architecture: 1992–2012*, ed. Mario Carpo (2015): 28–47, <https://doi.org/10.1002/9781118795811.ch2>.

4. Mario Carpo, "The Digital: From Complexity to Simplicity – and Back," *SAJ* 6, no. 3 (2014).

5. Designalyze, "Ep: 033 David Rutten," podcast, 2016, <http://designalyze.com/blog/podcast/episode-033-david-rutten>.

6. Mel Bochner, "The Serial Attitude," *Artforum* 6, no. 4 (1967, Dec. 01): 28–33.

7. Ibid.

8. Sianne Ngai, *Our Aesthetic Categories: Zany, Cute, Interesting* (Cambridge: Harvard University Press, 2015), 110–73.

9. Niklas Luhmann, *The Reality of the Mass Media* (Polity Press, 2007): 49–50.

10. Marshall McLuhan, *The Medium Is the Message: An Inventory of Effects* (Penguin, 2008).

11. William Stearns and William Chaloupka, *Jean Baudrillard: The Disappearance of Art and Politics* (New York: St. Martin's Press, 1992): 9–26.