Heterotopic Speciation: Theorizing an Alternative Parametric Syntax

The part-to-whole relationship, ever since Alberti's comparison of a house to a small city and that of a small city to a large house, has not only provided architecture and urbanism with clear scalar relationships between the small and large as well as between the individual and the collective, but more importantly has installed axiomatic structures of order that maintain clear hierarchies produced by parts amalgamated within a coherent whole.

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Breaking apart the whole into constituent pieces has become, since Alberti's statement in the fifteenth century, a prerequisite for formal analysis. Thus, any critique of the part-to-whole relationship implicates the entire underpinning of the formal in architecture, which in its turn questions the whole issue of synthesis and resolution—or lack thereof. For instance, since the demise of modernism, we have witnessed a constant fluctuation of the discipline of architecture in its quest for formal theories of composition that redefine the part-to-whole relationship, alternating between two extremes: on one hand, discourses that promote disjunction of the parts in favor of the merely different, and on the other, the smoothing of the bits into a unified, coherent whole. This bipolar behavior has come to define a love/hate relationship between the discipline and modes of representation that oscillate between fragmentation and continuity. Advocates on each side of this argument have justified their quest for formal invention under the alleged promise of eschewing uniformity and favoring difference.

In this way, attempts to reconfigure the concept of "the whole" took place first via formal sensibilities such as collage and bricolage, through the arrest of internal differences—or fragments—in the form of disjunction, contradictions, or formal conflict[1]; fragmentation's exhaustion, as evidenced in the early 1990s most notably by the work of Greg Lynn and blob theories, proclaimed the other extreme: the smoothing away of discrete formal relationships in the production of a fused, unified, seamless whole.[2] More recently, parametricism has advanced the discourse of continuity in its attempt to produce what's been called 'progressive differentiation,' by introducing the concept of self-similarity, which promotes the flux of self-identical, malleable components via the infinite propagation of corresponding changes across an all-encompassing, system.

Without a doubt, all these morphological strands, within their particular historical contexts, appear to have produced representations of difference, borrowed respectively from conflict theory, calculus, nature, and others. However, the question still remains: to what extent each of these formal and spatial sensibilities, once imported into architecture or urbanism, are able to produce deterritorializations that enable difference to emerge? Along that line of thinking, this paper seeks to briefly examine the techniques and effects present in the formal devices that have recurred in the recent past (such as collage, the blob, and the intricate), not as another historical revision of formalism, but as a pretext to discuss the formal and aesthetical reasons that signal the need for a rigorous theorization of a heterotopic ordering sensibility as a new model of speciation for architecture and urbanism (a chart of these techniques is included with the submission). Navigating between the tenets of collage and the parametric model of emergence, I will argue that this new heterotopic order—one that is certainly digital—must not coagulate into another whole that promotes an idealized field of likeness, nor reassert its own parthood, but rather attempt to articulate an incongruous taxonomy; one that is able to maintain the homogeneity of its structure while at the same time yield heterogeneity of individuation of its parts at a range of scales.

Employing a series of drawings and projects (of my own production, or produced by students in my classes under my close guidance) at various scales, I will attempt to theorize the pertinence of those formal and organizational devices that recur in the work inasmuch as they are able to articulate both the discrete and the continuum at a multiplicity of scales. These will be seen as part of an experiment that both questions the aesthetics limits of parametricism's deep relationality[3] as well as advances the potential aesthetics raised by the proposed alternative syntax relying on heterotopias of deviation.

MORPHOLOGICAL STRANDS OF THE RECENT PAST

Collage, or the "Radical Assertion of Parthood"[4]

While the paper's main goal is to advance the current parametric agenda—currently characterized by the model of an emergent field of appearances—toward a more heterotopic model of the part-to-whole relationship, it is important to note that the trajectory of that work is marked by a reaction to postmodern sensibilities and their collage formalism. Therefore, it seems important to briefly examine the genesis of those techniques that utterly motivated current parametric practices to find alternatives to. Yet, even if collage as a design technique has numerous avenues of practical and theoretical exploration, some of which continue up to the present day despite some critics' proclamation of collage's exhaustion as an effective architectural design tool a decade ago, it will suffice for the purpose of this paper to only touch upon those issues that concern the part-to-whole relationship.

While most collages' disparate amalgamation of components are organized by compositional laws, their agency relies on the production of new knowledge or signification emanating from the disjunction of the parts. It is this

new meaning that deterritorializes the parts in such a way that it also suppresses their material and performative specificity. Jeff Kipnis has referred to this condition of collage and other re-assemblies as "nothing other than the celebration of the priority of the part to the whole, and the priority, in some sense, of the individual to the collective."[5] Kipnis argues that this type of composition produces such an effect in which "the whole really stands behind."[6]

Emergence, or the Search of the Irreducible Effect

The search for a new formal avenue of exploration that privileges coherence and connectivity over collage's ideals of contradiction and fragmentation was already evident in the mid-1990s. Crucial to this discussion was Stan Allen's seminal article "From Object to Field";[7] drawing inspiration from early computational thinking, flock, swarm, and crowds behavior, the work of artists such as Barry Le Va during the mid-1960s, and architectural precedents such as the Cordoba Mosque or Le Corbusier's Venice Hospital, all of which avoided classical ordering rules such as axiality, symmetry, or proportioned formal sequences and favored non-hierarchical, non-directional compositions or fields, Allen defined the formal and aesthetical tenets that would come to shape much of the architectural production in the decade that followed.

Praising what he termed as 'algebraic compositions' because of their ability to reunite large quantities of parts in a sequential but yet undetermined way, and as an alternative to the more familiar, more figural geometric order of Western classical architecture, Allen postulated a syntax of repeated parts through a logic of accumulation. In this way, Fields's intricate local rules of combination looked at mutation as a potential source of order and promoted a specific notion of repetition called 'differentiation through repetition.' It is the 'associative interconnectivity' present in a flock of birds or a swarm of fish that generates complex and allusive patterns. Allen is careful to note however, that patterns here should not be understood in terms of composition, but rather emerging from momentary and indefinite events. In other words, in a field condition, patterns are emphatic and contingent rather than rooted, which allows for a variety of readings, opening up a horizon of perceptual possibilities.

Early Parametricism: Blobs

In parallel to Allen's Field conditions, Blob theories[8] of the middle and late 1990s—epitomized in the work of Bernard Cache, Karl Chu and Greg Lynn—constituted a second morphological strand rising as an alternative to collage's arrest of conflicting forms. Fueled by calculus and animation software, early parametric discourses were initially preoccupied with topological geometries shaped by Splines and Bézier curves, and non-discrete formal relationships such as linearity, periodicity, permutation, and transposition. Compared to collage's techniques of formal juxtaposition, collisions, fragmentations, and contradiction, early parametric morphology offers a radical antithetical method of formal measurement and description characterized by the amorphous, fluid, flexible, non-eidetic, and provisional.[9]

Besides their unmistakable unified, fused, and seamless superficial aesthetic, parametric forms presented a profound alternative to classical formulations of the part-to-whole theory: because parametric surfaces' constituent parts are not fragments but relationships, they are immune to the conventional analytical thinking that studies the elements or parts to make sense of the whole. As explained by George L. Legendre, "a form shaped by parametric modulation has no discrete limbs to speak of—you cannot chop it into pieces, nor indulge in the separate application of permutation, substitution and scaling of parts."[10]

Parametric Intricacy and Algorithmic Emergence

> Instead of assembling rigid and hermetic geometric figures—like all previous architectural styles—parametricism brings malleable components into a dynamical play of mutual responsiveness as well of contextual adaptation.[11]

With the advent and successive refinement of algorithmic design tools and computer numerically controlled fabrication technologies, Allen's field theory found an unparalleled level of coherence and material fidelity in the protocol between parts and whole. By regulating the flux of matter through a common locus or structure beneath all things, as well as to fostering endless mutual responsiveness among parts or components, an intricate model of emergence can activate the exhibition of ubiquitous difference. As explained by Greg Lynn in the introduction to the 'Intricacy' exhibition at the Institute of Contemporary Art in Philadelphia in 2003, intricate compositions evoke a particular type of cohesion, continuity, and coherence, characterized by macroscopic holism, synthesis, and microscopic variation and diversity.[12]

While parametric intricacy imbued early blob morphology—characterized by voluptuous forms, but also as lacking yet material definition, or parthood—with a refined tectonic sensibility characterized by the careful attention to continuous detailing of elements or parts, it did it only to the extents—and limits—of gradient logics, which articulate the relentless continuity of self-identical cellularity across an all-encompassing system. The resulting organization is one that exhibits real difference only when scrutinized under one lens of observation or approximation—that of a close distance—and only under the scale of the component or detail.

However, those organizations become increasingly homogeneous at a distance, only promoting a smooth monolithism. To put it simply, if what we see is difference everywhere, equally distributed, at what point do we stop seeing it? At what point does that strategy backfire, becoming a new form of homogeneity?

Parametricism's deep relationality, all too often characterized by the transcoding of the so-called curvature rate of change present in voluptuous forms, into infinitesimal increments of parts, has crystalized into another top-down design approach incarnation;[13] its geometric derivatives, in the form of cross-inflected textures and fields—a direct product of the endless chain of lateral mutual responsiveness—have created a soft formalism in perpetual state of dissipation. Ironically, the omnipresent pledges

Technique	Fragmentation	Fusion	Continuous Assemblage
Examples	Collage	The Blob	Intricate Aggregations
Time Period	Late 1970s and 1980s	1990s	Late 1990s–Present
Architects	D. Libeskind, M. Graves, B. Tschumy	G. Lynn, K. Chu, B. Cache	A. Kudless, M. Hensel, A. Menges
Formal Characteristics of the 'Whole'	Disjunctive formalism of contrasting difference	Topological difference promoted by smooth continuity	Continuous tessellation of sequentially variegated components
Effect	Conflict and contradiction	Seamless, smooth plasticity	Tectonics that celebrate endless gradient effects and details of mechanically assembled parts
Logic	Juxtaposed, contrasting parts create a contradicting whole	Erasure of the seam, and therefore of visible parts, in favor of a smooth, continuous whole	Parts subservient to the ordering logics of the overly graded whole
Questions	Accumulation of the 'merely different' is the lowest expression of difference?	Too much continuity = Erasure of Difference?	Ubiquitous difference at a near proximity // homogeneous, smooth monolithism at a distance?

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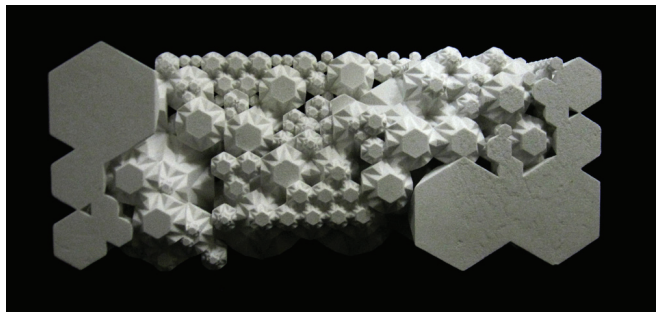
of coherence and synthetic legibility at both global—from the part to the whole—as well as local scales—from part to part—against which the treatises of both parametricism and emergence were formulated, appear to have consumed themselves by virtue of their own unyielding indexical fidelity.

Heterotopias of Deviation

Physical objects designed by participatory aggregation will most likely show some signs of the approximation, redundancy, patchiness, and disjointedness that are the hallmark of all that is designed by many hands, and resultant shapes are likely to be a far cry from polished curvilinearity and manicured smoothness till now associated with digital design".[14]

An attention to parametricism's current tendency suggests the need of a reformulation of its aesthetic principles so as to fuel new energy to disciplines of generative design, in such a way that not only genetic variations or mutations are possible but also truly changes of state of organisms within and among architectural systems. Can a heterotopic model of speciation introduce disturbances or even interruptions of their regular flow or rhythm? Could this placement of rhythmic stresses or accents and other disturbances outside common parametric norms foster the appearance of autonomous species with identities of their own, as well as the consequent advent of the space that results along the interface of their negotiated relationship?

Figure 1: Revisionist chart of formal techniques that have recurred in the recent past.



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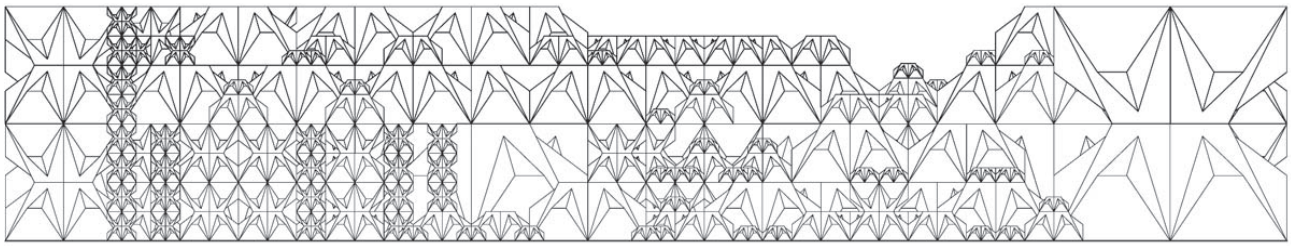
Perhaps, a workable framework to approach this problem is from the perspective of mutable, even reversible part-to-whole relationships capable of assimilating more incongruous, compound organizations. If a performative analogue is to be found in the natural world—much like the classical definition of the part-to-whole relationship found its references in the anatomical and biological body—a heterotopic design approach should rather relate to ecological models or ecosystems, which are sustained by the biodiversity[15] within their various exchange processes. In the next series of paragraphs, I will attempt to reinscribe these concepts within the disciplinary boundaries. In that way, I will lay the points that articulate the tenets of a heterotopic design approach employing a constellation of figures (full and partial), fields (flat and thick), and objects orchestrated under ideas of continuity, embodied by rhythmic and syncopated metrics; congruity or lack thereof; indexicality and heterogeneity; as well as the meta-ideas of parts and wholes. A series of drawings and other representations of projects and compositions that accompany this text will serve as a case study depository of the above-mentioned techniques.

Partially and Fully Figured

Any form of deviation from emergent parametric techniques toward a heterotopic model implicates a critique of the former's ability to produce the semblance of a legible and decidable order. The propensity of discourses on emergence towards infinity—as embodied by uninterrupted instantiation of parts—is hardly a feasible position for human endeavors, both from a performative and visual stance. Thus, this form of additive versioning needs to find its own mode of interruption of the known or decidable character of a given order. These interruptions should not be explored in their potential for disjunction or contradiction but rather as re-originations in an organization. The first form of re-origination I will explore involves the concept of partial (or incomplete) and full (or complete) figures (see Figures 2 and 3). While these formal compositions will include scalar increment of parts frequently explored in parametric practices, they will also include fractional embodiment of those parts—not in the sense of size but of completeness, or lack thereof.

In this way, volumetric cells of mutable morphology exhibiting gemstone-like configurations are 3-dimensionally aggregated following scalar and figured versioning. Here, the term 'figured' versioning is purportedly used ambiguously, accepting as much its mathematical meaning, which refers to

Figure 2: Heterotopic Composition composed of full and partial 3d figures. Student Name: Armen Sojanian, Instructor: M. Spina, Woodbury University, Spring 2011.



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a numeric value, related in this case to the fractioning of the part; its more obvious anatomical one; as well as the more informal meaning of the word, connected to the comprehension, reading, and deciphering of the formal order of the part.

The resultant organization produces a visual effect akin to a paratactic syntax that no longer leads to synthesis or resolution but to an undecidable, non-directional order. The incompleteness of the part denies any known notion of organicity to the whole, and thus opens up the visual territory for multiple figural readings of many wholes, all of which are contingent, partial, undecidable and decentralized.

The heterogeneous quality of the whole relies on the idea of figural interruptions of the regular flow—a product of the fractional presence of the elements. Interruptions, however, do not constitute another form of pattern because they articulate a range of transactions: formal (from flat to faceted or chiseled), figural (with a varying number of sides or motifs), and scalar ones. In this way, the composition's indexicality is not always obvious but implied, as the eye is forced to mentally complete the missing portion of the volumetric parts.

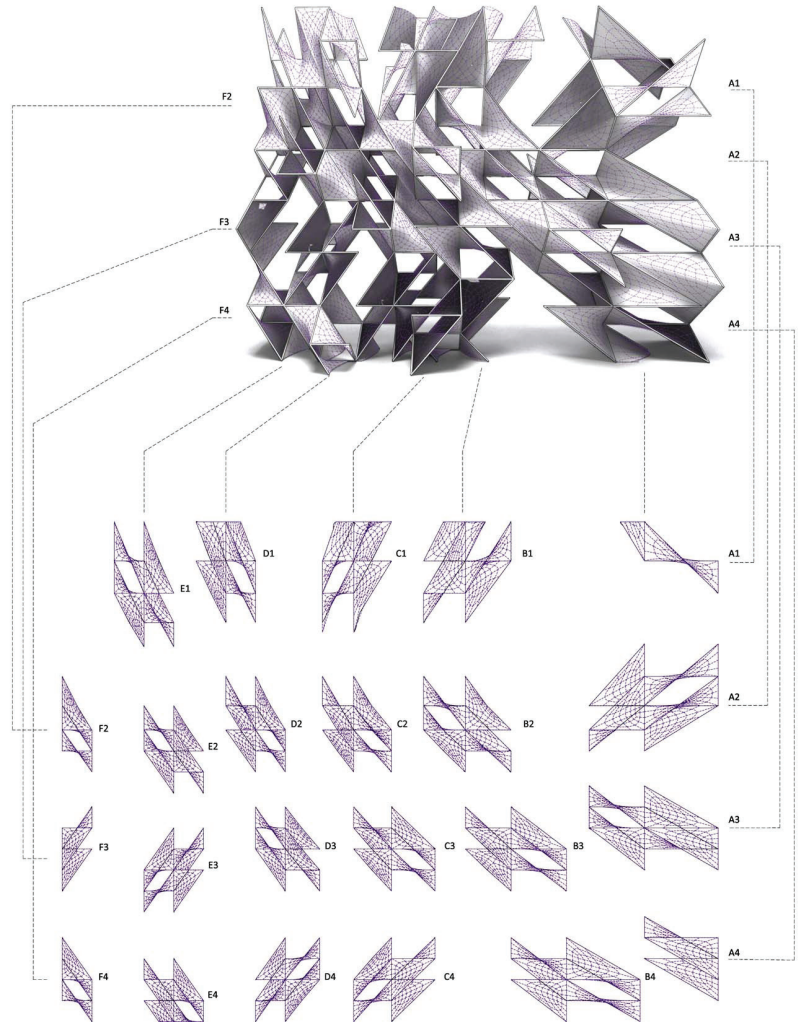
Chronic Reversions, Misplacements and other Incongruences

If the previous notion of re-origination belongs within the domain of figural interruptions, the second notion explored belongs to the realm of interruption of rhythmic qualities within parametric norms through syncopated reversions (in the form of full or partial mirroring and other formal glitches).

Along this line of thinking, this second composition explores the concept of local rhythm breaking through recurrent symmetry within the confines of a compound system that instantiates (and partially overlaps) 3-dimmensional elements inscribed within a six-sided figure at a range of scales (see Figures 4 and 5). While several of the modules follow typical elastic parametric ordering rules of non-linear scalar increments, a few others 'flip' their orientation along one of the three axes. This misbehavior of some parts occurs at a less frequent rate than the normal pace of instantiation marked by the exhibition of the obedient parts. The result of purportedly misplacing elements is not necessarily incoherent, but incongruous.

Figure 3: Heterotopic Composition composed of full and partial 3d figures. Student Name: Armen Sojanian, Instructor: M. Spina, Woodbury University, Spring 2011.

Selective asymmetry as a form of misplacement not only subverts the part, but also the contiguous space that results along the interface of the parts'



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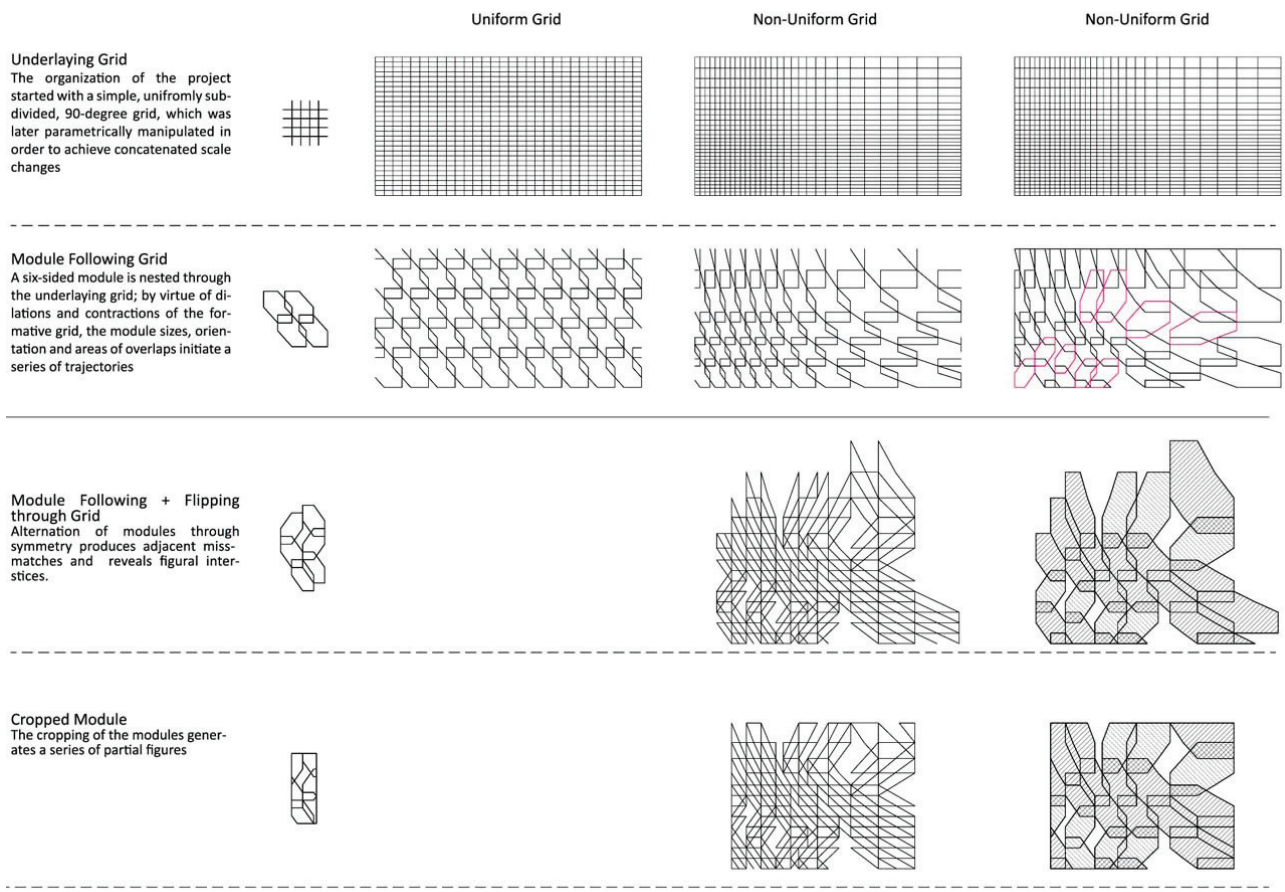
new negotiated relationship. Thus, syncopated incongruity can be exploited as an opportunity for local or contextual adaptability with clear identities; rather than jettisoning the incongruous due to its apparent contradiction or discordant form of growth, a heterotopic design technique must embrace the unfitted—and its resultant form of controlled messiness.

CONCLUSION

> [T]he forthcoming aggregatory style is likely to be characterized by visual disjunctiveness as much as by some degree of messy exuberance, and its formal randomness or ricketiness might lead to diminished visual significance, and even border on some loss of visual relevance: visual forms that change too often, widely, or casually might no longer be seen as intentional visual signs, as no one could tell what they were meant to resemble, or even if they were meant to look like something else in the first place.[16]

Figure 4: Heterotopic composition relying on syncopated mirroring and local incongruences.



FORMAL GENESIS: ORGANIZATION OF 6-SIDED MODULES BASED ON UNDERLAYING GRID

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The development of formal sensibilities for architectural production ever since collage's exhaustion in the early 1990s has undoubtedly been increasingly permeated by computation and digital themes. During this period, the propensity toward continuity—partly inherited by the digital revolution and the widespread use of calculus-based modeling, and partly ambitioned by a generation of practitioners mobilized to find clear alternatives to collage's disjunctive formalism—has played a decisive role in shaping much of the exploration of innovative part-to-whole relationships. Since then, the question of top-down and bottom-up scalar relationships, from the whole to the parts, and from part to part, has enjoyed an unprecedented level of correspondence and coherence guaranteed by an ever more precise set of digital tools and material technology. This unparalleled level of fidelity in the communication among the elements—which Stan Allen famously termed 'Field Conditions'—has fueled the search for the so-called irreducible, emergent effect—that which belongs to a medium and cannot be paraphrased

Figure 5: Process for determining position and orientation of additive components.

by another medium—[17]and has instilled in the resultant production a strong organic tone, intensely reminiscent to biological growth.

However, the blind spot of this area of architectural investigation has undoubtedly been—as I have discussed throughout the paper—the appearance of a real heterogeneous order that no longer leads to synthesis but to undecidability. Cumulative deformation (in the form of gradient logics) has served, at once and the same time, as prerequisite to—and a synonym of—parametric design, imbuing its architecture with excruciating indexicality. Thus, the young history of digital design appears to be poised for a much needed turn. Some critics like Mario Carpo argue that this turn will likely be a collective, participatory one, defined by open source software platforms and crowd sourcing.[18] Others, myself included, will argue that the forthcoming digital turn would necessitate more hierarchical curatorial—and even authorial—power than the one that collective platforms can provide.

However, these two trends would certainly coincide in the fact that the this forthcoming turn will more than likely exhibit signs (as a result of either participatory hands or heterotopic design sensibility) of incongruity rather than coherence; misplacements rather than elegance; and undecidability rather than resolution. Throughout this journey, the part-to-whole relationship should certainly be reformulated; by doing away with the axiomatic scale relationships of small-to-large and individual-to-collective, and adopting mutable relationships (some of which I have described here through the concepts of full and fractional figures, chronic incongruity, and controlled disarrays) the exploration must further navigate the zone existing between the canons of collage and emergence. ◆

ENDNOTES

1. See Collin Rowe and Fred Koetter, Collage City, (Cambridge, MA: MIT Press, 1984).
2. See Greg Lynn, Folds, Bodies and Blobs: Collected Essays (Belgium: La Lettre Volée, 1998).
3. See Patrik Schumacher, "Parametricism: A New Global Style for Architecture and Urban Design", in *Architectural Design: Digital Cities*, Vol 79, No 4, edited by Neil Leach and Helen Castle (London: Wiley, 2009).
4. Jeffrey Kipnis, Lecture at Sci-arc (Los Angeles: Sci-arc Media Archive, March 20, 2002) http://sma.sciarc.edu/video/jeffrey-kipnis/
5. Kipnis, Sci-arc Lecture, 2002.
6. Kipnis, Sci-arc Lecture, 2002.
7. Stan Allen, "From Object to Field", in *Architectural Design: Architecture After Geometry*, edited by Greg Lynn (London: Academy Press, 1998) 24-31.
8. See Lynn, "Body Matters" in Folds, Bodies and…, 135-156.
9. See Lynn, "Probable Geometries" in Folds, Bodies and…, 78-94
10. George L. Legendre, ijp: The Book of Surfaces (London: AA Publications, 2004) 2,7.
11. Patrik Schumacher, "Parametricism and the Autopoiesis of Architecture", in *Log 21*, edited by Cynthia Davidson (New York: Anyone Corporation, 2011) 63-79.
12. Greg Lynn, Intricacy, (Philadelphia: ICA, University of Pennsylvania, 2003).
13. While there needs to be a recognition of advances made in terms of composition by the discourses of parametricism and emergence in regards to the already mentioned 'lateral' mode of connectionism evident in the part-to-part relation, its definition of the part-to-whole relation continues to be as top-down as in previous modes of classical composition.
14. Mario Carpo, "Digital Style", in *Log 23*, edited by Cynthia Davidson (New York: Anyone Corporation, 2011), 50.
15. Biodiversity refers to the varieties of species in ecosystems, the genetic variations they contain, and the processes that are functionally enriched by the diversity of ecological interactions. "Ecology", in *Wikipedia,* http://en.wikipedia.org/wiki/Ecology
16. Carpo, "Digital Style", 51.
17. Kipnis, Sci-arc Lecture, 2002
18. Carpo, "Digital Style", 41-52.