

The Politics of Parametricism Digital Technologies in Architecture

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Bloomsbury Academic

An imprint of Bloomsbury Publishing Plc

B L O O M S B U R Y

LONDON • NEW DELHI • NEW YORK • SYDNEY

Bloomsbury Academic
An imprint of Bloomsbury Publishing Plc

50 Bedford Square 1385 Broadway
London New York
WC1B 3DP NY 10018
UK USA

www.bloomsbury.com

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First published 2015

© Selection and Editorial Material: Matthew Poole and Manuel Shvartzberg, 2015

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British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library.

ISBN: HB: 978-1-4725-8166-2
PB: 978-1-4725-8165-5
ePDF: 978-1-4725-8168-6
ePub: 978-1-4725-8167-9

Library of Congress Cataloging-in-Publication Data

The politics of parametricism : digital technologies in architecture /
edited by Matthew Poole and Manuel Shvartzberg.

pages cm

Includes bibliographical references and index.

ISBN 978-1-4725-8166-2 (hardback) – ISBN 978-1-4725-8165-5 (paperback)

1. Architectural design – Data processing. 2. Architecture – Computer-aided design
3. Architecture – Technological innovations. I. Poole, Matthew, editor. II. Shvartzberg,
Manuel, editor.

NA2728.P65 2015

720.1'05 – dc23

2015008299

Typeset by Integra Software Services Pvt. Ltd.

Printed and bound in India

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Chapter 1

Introduction

Matthew Poole and Manuel Shvartzberg

We are in the epistemology business.

—Phillip G. Bernstein, vice president, Autodesk, speaking at the Politics of Parametricism conference, November 16, 2013.

Since 2008, “parametricism” has been a recurrent and much-debated theme within architectural discourse. Originally coined by Patrik Schumacher—who takes his work with Zaha Hadid Architects to be the ultimate representation of the term¹—“parametricism” refers to a type of design process characterized by the interrelation of design variables (or, parameters) through computational tools and techniques; a definition that allows it to encompass the work of other well-known figures and firms as well as emerging practitioners in contemporary architecture and design. Beyond this very general technical definition, however, parametricism has also accrued currency to refer to a whole variety of ideas that animate design culture today, from those concerned primarily with aesthetic questions, to others that are more philosophical, and yet others with strong political agendas. This anthology sets out to explore each of these associations of parametricism and its multiple uses with the explicit aim to shed some light on the political implications in each case. It is our strong rejection of parametricism’s most commonly assumed political credo—generally identifiable as liberal democratic “late capitalism,” and to which Schumacher’s “parametricism” is theoretically welded—that provides the impetus for this book and determines our conscious use and reproduction of the term. If we are using the word “parametricism,” it is not to validate it indiscriminately, but rather to open it up to serious critical debate.

Despite its somewhat contested and polemical definition, however, parametricism’s currency in architectural culture can be discerned through a variety of channels. It is highly apparent in the curricula of architecture schools around the world; it is frequently present in the discipline’s trade publications; and it also features prominently in discussions around architecture’s relationship to important

collateral fields like engineering and construction. Due to this general presence, parametricism appears to have attained enough popularity for it to have become a quasi-universal label that signals (either tacitly or explicitly) the transfiguration of certain digital design processes to the status of a style, while also becoming an increasingly common practical methodology. Its resonance is thus felt as much in the seemingly instrumental domains of practice—for example, through the efforts to deploy new software technology and construction protocols like BIM (Building Information Modeling) across architecture and associated industries—as much as it is in the guise of a new cultural paradigm capable of agglomerating the more diffused fashions, ideas, and forces of the second decade of the twenty-first century: social networks, big data, “cloud” infrastructures, post-Fordist horizons, global and financial technocracies, and so on.

Parametricism may thus present itself as a case study of the relation between technology, ideology, and contemporary history, where the many tropes and drivers of contemporary politics, economics, and culture—from mass customization and mass inequality, to socially networked revolutions and pervasive global surveillance—come together through and within a specific architectural imaginary. Yet, as a technical and aesthetic repertoire with undoubtedly novel and legitimate preoccupations for the discipline, it is also a highly polemical one in its more or less unconscious relations to political parameters.

This anthology is an attempt to question, map, clarify, and magnify what these political parameters of parametricism may be. Caught between the urge for utilitarian-instrumental innovation, on the one hand, and, on the other, a more unapologetically decadent feast over new aesthetic and formal possibilities, the discourse of parametricism seems to have, so far, a rather limited vocabulary to talk about politics: or, paraphrasing Godard, to “talk politically”—a somewhat puzzling limitation, given parametricism’s alignment with all manner of intensified power relations, from racialized labor exploitation to the persistent reproduction of a male-centered architecture culture. This may be, in fact, a problem of contemporary architectural discourse at large (or, the broader cultures in which it operates), but, as already highlighted, it is through the parametric imaginary that the contours of today’s powers—our Googles in the Clouds, as much as our many financial apartheid—appear to be most forcefully articulated. As such, it seems imperative to ask some serious questions about both the so-called “realist” and “speculative” deployments of parametricism in order to begin to define its implicit or explicit, actual or potential, political dimensions.

This, of course, is no easy task. Many of parametricism’s leading proponents vigorously oppose mixing politics and architecture, taking the view that the two should be construed as structurally exclusive domains of thought and action.² In

this sense, we may venture to say that most parametricists are not necessarily vocal advocates of this political status quo, but rather tacitly accept the subacent and normative processes of contemporary neoliberal democracies as their natural or inevitable playing field. Whether for actual political conviction or inertial opportunism, for this position there is little or no credibility in utopian, social, antidisiplinary, or simply noninstrumental forms of architecture, such as some critical, “projective,” or poetic spatial practices. This seems to be at least one of the central political “deficits” or interested elisions on the part of parametricism’s most ardent discursive proponents.

We might schematize this state of affairs as follows: On one end of this quasi-naturalized political-architectural spectrum lie positions that orthodoxy uphold the refusal to inscribe politics within parametricism’s design processes and broader motivations—a refusal that paradoxically makes it strongly political. On the other end of this spectrum, there are those who uphold the symmetrical position, that parametricism is indeed antipolitical, and thus may hold no clues for either understanding or changing the present status of the discourse and society at large. In other words, parametricism, in its current forms, is at a discursive stasis. Thus, beyond these polarized, negative definitions (parametricism being political in either mirrored refusal of politics), we propose exploring the spectrum itself, willing to entertain the possibility that parametricism may, in fact, contain or project other productive definitions for the intersection of architecture with politics. In order to sunder the lack of critical-imaginative potential that has, so far, hampered the possibility of this kind of investigation within architectural discourse, we suggest enriching our political vocabulary for grasping both parametricism’s most radical promises and its deep problematics. This anthology thus proposes to contribute to this effort by showcasing a variety of approaches for determining what is at stake—historically, theoretically, and politically—in parametricism’s discursive spectrum.

To a certain degree, then, we assume a certain nonspecificity to parametricism itself—or, in other words, we believe the discourse of parametricism to be sufficiently diverse, contradictory, and heterogeneous, and yet sufficiently problematic and politically substantial—even “dangerous”—to merit serious critical attention. The form we have given this attention, in these circumstances, is that of a survey that attempts to draw and clarify these various dimensions of the discourse. The positions staked out by our various contributors do not—on the whole—take the entrenched postures outlined above, but rather pose serious questions for the extant theorizing, historicizing, and practical applications of parametricism to complicate and expand its discourse. Our editorial approach has been to encourage this critical engagement through the

understanding of the actual conditions and techniques involved in parametricism, rather than through the more removed position of a purely ideologically driven critique. As the selected epigraph for this introduction suggests, we are interested in the conjugation of architecture, design, information, economics, communications, and computational technologies not simply as a means of "managing" and productively exploiting the actions, communications, knowledge, and thought of actors in a social field, but rather as powerful and active practical performative processes of remodeling and rebuilding extant theories and media of knowledge—the technical and epistemic substrates of our political realities—via the material and immaterial structures that are constructed by these increasingly overlapping industries. This materialist and posthumanist approach to the complexity of such imbricated socio-technical ecologies provides a framework to address and contest social assemblages, including nonhuman actors.

Through both historico-technical and socio-philosophical critique, we hope to begin to take some of the necessary steps toward mapping a better understanding of this complex topic: sorting what is and what is not "parametricism," as well as what its other particular histories, applications, and potentials might be—in historical, technical, and intellectual terms. This process of discourse-genealogy attempts to address parametricism from important historical vantage points that the discourse itself, as yet, is not in general sufficiently aware of, as well as opening up methodologies of practice and inquiry that strongly problematize parametricism's politics as it currently stands, while not necessarily rejecting all of its attributes, techniques, or modes of operation. In sum, we hope to capture how the current politics of parametricism was *and is* cultivated—and how it could *and should* be different.

What is "parametricism"?

A necessary aspect of this genealogy involves attempting to define more accurately what parametricism *is*, even if only in a summary fashion. Rather than definitively adjudicate on its definition, however, we will attempt to give a general introduction of what it does, and of the heterogeneous terrain it arises from, illustrating where its various lines of contention appear to be currently placed. Crucially, this involves trying to distinguish "parametricism" from the closely associated terms "digital design," "algorithmic design," and perhaps most importantly, "parametrics" / "parametric design."

As noted above, the word "parametricism" was coined by Patrik Schumacher,³ who is the strongest proponent for the word itself and for its association with

neoliberal politics and economics.⁴ We will not dwell on the purely spectacular dimensions of Schumacher's architecture and discourse, which, in their spectacularity, perform the role of commodities in an ever-more competitive global capitalist market for images and status production—a fundamental aspect which has a long and still highly relevant history within Marxian ideology critiques. However, it is important to distinguish Schumacher's "parametricism" from the more diverse field of "parametrics" in architecture. Parametricism's novelty, according to Schumacher, lies in the new formal-procedural repertoire made available by new computational tools and design processes. These formal-procedural changes in the "basic, constituent elements of architecture" signal shifts in the capabilities and ways of thinking of designers: "Contemporary (Parametricist) architects start to conceive of urban fields as swarms of buildings, continuously differentiated, yet coordinated with respect to size, distance and orientation, creating fluid swarm formations."⁵

Beyond this technical-formal definition—which constitutes, significantly, another iteration of the modernist project of purely formal rationalization rather than a departure from it—Schumacher also explicitly attempts to inscribe the term "parametricism" as the signifier of a new aesthetic and cultural paradigm—the new incarnation of the "avant-garde," which explains his use of the suffix *-ism*. Specifically, he considers parametricism to be the "epochal style" of the "post-Fordist network society" that emerges after his so-called "transitional periods" of postmodernism and deconstructivism. In this teleological scheme of styles corresponding to the "grand epochs" of Western civilization, parametricism is, according to Schumacher, poised to become the new hegemonic movement for the twenty-first century, replacing Modernism as the new contemporary "International Style."⁶ He thus considers himself and his project—and others like it⁷—to be the transformational avant-garde of the discipline that will usher in this epochal change.

"Parametrics" or "parametric design," by contrast, is not necessarily associated with a style or a movement, but refers to the adoption of a very broad series of techniques of computation in virtual modeling processes. These modeling processes are developed either through the use of custom or proprietary software where the designer uses a preconfigured user interface or "plug-in"—designed to make the manipulation of formal or other parameters easier, more intuitive or more user-friendly—or they are developed through the actual programming of algorithms that are designed to set in motion procedures for interrelating variables, parameters, or specific conditions—formal or otherwise. This second kind of process, more accurately defined as "algorithmic design," is coded through computer "scripting" by generating, inputting, or mediating parameters—hence

the common slippage between the terms “algorithmic design” and “parametric design.”

More generally, “the parametric” is a semantic pool that has its foundations in mathematics and its main applied uses in statistics, science, and computing, nowadays associated with complex systems analysis or engineering requiring the calculation of large quantities of data processing. Growing out of these underlying disciplinary fields, parametric calculation and analysis offers a tool for the representation and transformation of a variety of conditions: not only abstract or formal, but also applied to environmental, structural, energetic, or even logistical, organizational, financial, and managerial models.

Thus, we consider parametric technology, employed in different ways by Google, NASA, Bloomberg, Skanska, or Gehry Technologies, among others, as too broad and used in too many contradictory ways to constitute a unified style or movement. This is not to deny “the parametric” as a potential cultural condition—as virtual modeling and computation (including the handling of “big data”) may be considered paradigmatic of the way in which the digital permeates many aspects of our contemporary societies—but such a condition is too generic, complex, and multifarious to form the scope of an all-encompassing, single theoretical architectural project in the way Schumacher has done by transforming “parametrics” into “parametricism.” While Schumacher’s own treatises—which seek to fully entrench the term as the definitive moniker for the most relevant and historically conscious type of architecture today and in the future—have become a highly visible and much-debated body of literature on the subject, most designers elude Schumacher’s strong nominalism and theories. Rather, they tend to use “parametrics” as an umbrella term for a variety of different practices.¹⁰

Indeed, a much broader set of practices and definitions would have to be addressed should one look at the history of “parametrics” in design generally, even beyond that which we call the recent history of “digital design” of the last fifty or so years.¹¹ As many authors have noted, all design is at some level “parametric,” as Mark Burry put it: “‘Parametric design’ is tantamount to a *sine qua non*; what exactly is non-parametric design?”¹² Thus, within this necessarily broad and therefore quite generic discursive landscape, we take the term “parametric design” to refer to a type of virtual modeling that uses parametric calculation where the “shape” and morphology of “forms” (meant here in the broadest possible terms, including social forms) is determined by dynamic and recursive streams of inputs—a capability that can be explored and applied in a large number of extremely different ways.

Within the design fields, the popularization of these different digital design tools was originally driven from two apparently opposite directions. On the one

hand, the dissemination in the 1990s of engineering and animation software among designers for the first time allowed the constitution of a broader field of digital design with a particular focus on the development of digital architectural aesthetics, as represented by the notion of “blob architecture” or the work of Frank Gehry in the latter part of his career.¹³ Software packages such as Maya, produced for the animation industry, allowed architects to design models—and also aid in their fabrication—with an unprecedented degree of formal freedom, ease, and accuracy.

On the other hand, the migration of design information from the physical drawing to the “dynamic” model was identified early on by the industry as a promising way to highly increase flexibility and accuracy in the design and construction process. If changes can be simulated in the relatively fast(er) and risk-free environment of digital models rather than through the production of physical drawings and scale-models, or indeed directly on site, then design changes can be both anticipated earlier and be more easily implemented at any point in the process. Digital models thus provide opportunities for simulation scenarios (picking and choosing from available variations or options, and identifying potential risks), as well as making the design-construction “flow” more accurate and efficient.

The discretization and increased fungibility of variables associated with parametric design therefore opens up the design process for further experimentation and collaboration between all the parties involved in the design and construction phases. This constitutes a shift in the modulation of capabilities and the “palette” of concerns, practices, and approaches deployed by the designer. To describe its typology of operations and the particular kind of phenomenology it entails, we can point to some of the keywords employed within its discursive framework: procedurality, flexibility, variability, correlation, and interdependency are a few examples.¹⁴

Ultimately, therefore, the focus of design around these functions and instruments of digital computation represents a shift in the role and nature of the designer: “the tool user (designer) becomes the new toolmaker (software engineer).”¹⁵ Observing this shift, many authors have maintained that the historical turn to the digital in design is the shift from a focus on architectural typology (based on signifying rituals and conventions) to a focus on intentionally de-signified, specific formal operations (merge, connect, splay, etc.) dependent on the possibilities of the medium of operations itself. In other words, signalization replaces signification.¹⁶ This seemingly innocuous move toward de-signification or “immanence”¹⁷ through digital design, however, is (as always) embedded and imbricated with a specific history and political

the orchestrated confluence of postwar (and some prewar) sciences, technologies, and obsessions, such as the focus on cognitive-behavioral psychology and the interest in executable modes of codification, whether as pedagogical curricula, computer programs, or urban design protocols. Parametricism, to a certain degree, represents the *n*th iteration of this type of methodology, even though today it is infused with a different distribution of "sciences," tools, and motivations—from neuro-marketing to real estate, from issues of social justice to environmental collapse, and more.

There is clearly much work to be done in this realm of digital design's multiple "prehistories" beyond the limited set of case studies mentioned above, and while some of the contributors to this volume do engage with this necessary task, more thorough-going critical-historical works recounting and weighing the relative importance of these myriad technical and discursive interventions (for "parametricism" as much as for other strands of contemporary digital design) are patently yet to be written.

However, the very act of recognizing these various "programs" that both "run" and "run on" parametricism, through and beyond its literal procedural functionalities, as well as the recognition of their similarities with earlier techno-ideological paradigms and ideals of "the political," constitutes the starting point for the critical discourse we are attempting here. To this end, as well as the rigors of historical examination, there are also a variety of contemporary methods, approaches, and intellectual frameworks that we consider indispensable for the task—some of which we will now briefly introduce.

The political

You will be wondering at this point what do we mean by "the political" and "politics"? Answering this question is obviously a mammoth task, and while there are many iterations by a myriad of thinkers who have addressed it, here we can only give an extremely partial description. Yet, we believe the relation between parametricism and politics would be best served by considering, at least, the following fundamental fields and authors.

At some level, all of the humanities and social sciences—from comparative literature to anthropology, sociology, etc.—touch on the question of politics, but a common starting point into the discourse is the work of Hannah Arendt, who worked from Ancient Greek, Roman, and Modern intellectual sources to detail the complexities of the aesthetic and performative dimensions of "the political."²³ Reading Arendt would open up other political thinkers and philosophers of note, including classics from Thomas Hobbes to Karl Marx and

conjuncture—and therefore with the ideological and material determinations that make such apparently a-signifying epistemologies and proceduralities "meaningful"—in communicative, rather than ontological, terms.

In this sense, digital design histories mobilize figures that act both as performative operators in the discourse where they unfold and as legitimizing ideological principles or processes. One example would be digital design history's deeply imbricated notions of "organism" and "system," among many others. The contexts that gave rise to such material and ideological structuring figures or devices are themselves not immune to the innovations and effects generated by these same operators, as shown, for instance, in Schumacher's own theory—which attributes a central importance to the notion of "autopoiesis," a term originally coined by biologists Humberto Maturana and Francisco Varela to describe the self-regulating capacities of living organisms.¹⁸ "The idea of living systems as autonomous, self-making unities," claims Schumacher, "can be transposed into the theory of social systems."¹⁹ Sometimes, these kinds of ontological-epistemic imbrications are unintentional (embedded unconsciously), but they can also be intended and interested, such as when Schumacher poses "autopoiesis" as emblematic of the self-regulating capacities of social disciplines (i.e., architecture) in a modern society (and therefore also its assumed autonomous subjects). The "theory of social systems" referred to here is that of the German functional sociologist and systems theorist Niklas Luhmann, which Schumacher subscribes to and from which he methodically builds upon. With this transposition of the biological to the social, Schumacher's explicit aim is to reify and redefine the specific territory of the discipline of architecture against its perceived "others" to forcefully assert its "autonomy." However, such transpositions between concepts—and in particular between the fields of biology, the social sciences, and architecture—are certainly not novel or absolutely "autonomous," but have a rich cross-disciplinary history that calls for being addressed and problematized.

Similarly, we would be remiss not to highlight other key historical contexts and events to which parametricism is surely historically—though certainly not in all cases directly—indebted, such as the "design methods" movement of the 1960s,²⁰ the work of Christopher Alexander, John Frazer, and George Stiny,²¹ or the development of computation, systems theory, information theory, cognitive science, Artificial Intelligence, cybernetics, and further disciplines that authors such as Alan Turing, Norbert Wiener, Claude Shannon, Marshall McLuhan, and Marvin Minsky, among many others, developed throughout the post-World War II period.²² All of these twentieth-century figures and movements, while utterly diverse, share a particular normative and "emiricist" approach through

beyond, with the whole tradition of the Enlightenment in between. On the way, some important theorists of related fields, like political economy (i.e., Adam Smith) and law (i.e., Carl Schmitt), would also make an appearance. Among more recent political philosophers, we would count Antonio Gramsci, Walter Benjamin, Jürgen Habermas, and others, who have inspired the work of thinkers as disparate as Michel Foucault, Jacques Derrida, Claude Lefort, Ernesto Laclau, Gayatri Chakravorty Spivak, Chantal Mouffe, and many more.²⁴

Of course, this partial list is but a drop in the ocean of political thought. Yet, in its composition we can observe the historical importance of diverse themes such as ethics, abstraction, or language—and their various disciplinary offspring; law, economics, semiotics, phenomenology, etc. The contemporary political philosopher Jacques Rancière, to give just one example, draws from both post-structuralist and Ancient Greek philosophies to theorize a “logic of politics” that seeks to capture the dynamic of social change as a radically contingent historical process where administration (i.e., economy, law, security) and democracy (social movements’ concrete historical struggles for equality) are always at odds with each other. Politics is thus the very friction generated by this encounter.²⁵ Rancière’s theory is elegant for its formal logic, posing a quasi-universal yet indeterminate procedure for democratic politics, articulating an antiessentialist understanding of social actors (i.e., nonidentitarian) through a theory of epistemology *becoming* history: politics as the concrete and symbolic action of the “redistribution of the sensible”—the redefinition of what things mean in the sense of what and how societies’ different “parts” get accounted for, or not.

Yet, Rancière’s political theory, like many others from the poststructuralist tradition, rests on a legacy of semiotics whereby social processes are understood mainly as symbolic events, rather than seeing them more fundamentally as material (and thus, technical) traces and forces. In this sense, there is today a renewed interest in the role of materialities as well as techniques and technologies, to think “the political.” Media-technical and materialist theories (for instance, all those figured under the umbrella of Science and Technology Studies (STS) best represented by the work of Bruno Latour²⁶) thus provide us with an opportunity to theorize “the political” *from within* material and technical discursive formations (such as parametricism) through their particular processes of mediation, rather than as purely symbolic projections by ideological actors and forces.

An important pioneer for this theoretical method is the work of Michel Foucault, who developed an influential approach toward the historical critique of discursive formations. Among his key innovations in this area is the field of inquiry now associated with “biopolitics”—influencing, today, the work of thinkers such as Antonio Negri, Giorgio Agamben, and Judith Butler, among many others.

“Biopolitics” was originally proposed by Foucault as a lens through which to understand the history of governmental theories and techniques—reflecting States’ progressive hold over “life” in all its forms: via policies and practices around education, regimes of care and health, etc.—and also provided him with a banner-term to discuss the technical, ideological, and theoretical dimensions of liberalism, an important historical-political actant over the last three centuries.²⁷

In liberalism, Foucault finds an articulated technical and ideological program for organizing social life around economic activity. This new control over civil society’s “nature,” disclosed by the development of “economic sciences” such as statistics, makes liberalism a kind of “governmental naturalism.”²⁸ According to Foucault, the governmental principle of liberalism is to govern according to the market because the market is understood as a site of truth—the natural truth implicit in the relation of exchange between autonomous individuals whose interests cannot be externally anticipated or known, and which therefore only the spontaneous operations of the market can compute. Liberalism thus poses the principle of *laissez-faire* as the most expedient mechanism for governing—finding the right measure between governing “too much” and “too little” according to what “naturally” works in the market.

The history and theory of liberalism is important for understanding “neoliberalism,” a term already mentioned a few times in this introduction, as well as in many chapters of this anthology. Indeed, intensifying liberalism’s focus on economic scientificism over the social sphere, neoliberalism, from its early diverse formulations to the more consolidated form we see today, essentially operates by producing a political field that subsumes “political agency,” responsibilities and effects of political institutions (such as government bodies, State-run social welfare agencies, workers’ unions) into the machinations of economics at various interconnected and “nested” scales (from the personal and local to the national and global) of capitalist economies. That is to say that it subsumes political action into the operations of “the free markets” of trade and exchange between private businesses, corporations, and individual private citizens in order to attempt to increase economic efficiency and sustain growth within national economies across the globe. To achieve this, proponents of neoliberalism argue for economic liberalization via the mechanisms of free trade, privatization of public services, deregulation of financial and industrial working processes and methods, as well as through massive scaling down of government spending at all levels (except, in most cases, for national defense budgets).

The neoliberalism that is referred to most often in this book is that which is most closely allied to the work of the Austrian/British economist Friedrich Hayek

(1899–1992) and the American economist Milton Friedman (1912–2006) of the Chicago School of Economics, which have developed into the global economies that we see today reproducing, reforming, and further intensifying the types of policies that British prime minister Margaret Thatcher and US president Ronald Reagan (both heavily influenced by Hayek and Friedman) introduced and consolidated between the two nations in the 1980s.

However, the term and the concept have complex and complicated histories and iterations—ranging from the most formal and empirical (such as those that generated the highly influential Efficient Markets Hypothesis) to the more classically bourgeois, socially minded variants (such as the “ordoliberalism” of the Freiburg School, which posed a “social market economics”). All of these early incarnations of neoliberalism favored the protection of the tenets of liberalism *per se*; that is, the “inalienable rights” of the individual to liberty, private property, social and political equality and fraternity within the State; but disagreed on how these were to be achieved within the interrelationship and interoperability of public State institutions and private capitalist markets. In all cases, however, neoliberalism aims to “govern for the market, rather than because of the market”²⁸—a subtle but crucial shift from liberalism highlighted by Foucault. And, of course, the very definition of large and ambiguous concepts like “inalienable rights” or “fraternity” mobilizes radically different political imaginaries and philosophical interpretations, which is why a critical focus on specific techniques and materialities may be of particular use to confront the system that reproduces them.

Displacing questions of ontology and ideology (such as the classical questions of authentic motives or absolute fairness) to analyze, instead, neoliberalisms’ various technologies of governance is also historically appropriate. As Foucault describes, the “marketization” of society is in fact historically tied to an engagement with diverse mid-twentieth-century sciences, thus enabling the development of neoliberal rationality as a techno-epistemic project. The theorization of neoliberal economic-governmental programs (like, for instance, behavioral economics) both mobilized and depended on cognitive and behavioral psychology, systems theories, computing, as well as techniques of simulation and control of “the environment” as a whole, such as cybernetics.

In other words, the technologies of user-codification and association, now activated by subjects themselves through the full subsumption of the life process within techno-epistemic capitalist interfaces, makes the discussion of the politics of parametricism particularly relevant in this context. As parametric logics and environments continue to be deployed at ever-greater scales (from the very micro to the very macro) and across disciplines and territories, they more effectively establish fundamental characterizations of identity, citizenship, freedom,

and other relational markers of subjectivity, at the same time as they provide for new communicative and experiential possibilities—a new techno-political reality of quasi-invisible, embedded, pervasive systems of environmental modulation and control, for better and for worse.

Many of the contributors to this anthology thus refer to key figures dominant in the politico-philosophical interrogations of these conditions, such as Jean-François Lyotard, Gilles Deleuze, Félix Guattari, and Alain Badiou, among others. Lyotard’s 1979 book, *The Postmodern Condition: A Report on Knowledge*,³⁰ is especially important in this context as it outlines the impact of digital computational and networked communications technologies on the changing status and value of knowledge in postindustrialized societies, exploring and speculating upon the shift from knowledge to “information” and the possibilities and ramifications of information as a commodity form in the face of industrial “globalization.” Much of Deleuze and Guattari’s writing follows such a path also to interrogate the complex interplay of social and market forces upon the changing ecology of epistemology, aesthetics, and ontology in a technologically driven global world. Badiou’s body of work intervenes in perhaps the most militant manner in the politico-philosophical debates around technology, capitalism, and neoliberalism, where we see his recasting of ontology as a specifically mathematical function. For the issues outlined in this book, the question of the computation of numbers and the issues that develop due to the increasingly complex technologies of calculation, which are developing in and beyond the fields of architecture and design, must be addressed in order to understand their effects upon all social and political actors and actants and the forces that they exert upon one another in socio-political ecologies, which are more wide reaching and interconnected in their effectivity than ever before.

Within this sphere, the recent work of a younger generation of philosophers and theorists of technology and politics has also been instructive to the issues that are presented here. The Italian *Operaismo* and *Autonomia* theorists, including Paolo Virno, Christian Marazzi, Maurizio Lazzarato, Franco “Bifo” Berardi, and Antonio Negri, among others, present compelling problematizations of the techno-utopianism often associated with post-Fordist labor models and post-Taylorist management structures, both of which are made possible by digital networked communications and digital electronic computation.³¹ These writers explore how capitalist activity is now able to evaluate, process, and intervene within not only the semiotics of social interactions but actively embeds within the codes of the communicative, affective, and behavioral aspects of social life. Latterly, this approach has continued through the work of writers associated with “Accelerationism”; a loose grouping of theorists, philosophers, designers, and

artists all of whom are dedicated to investigating what they see as the stultifying effects of capitalism and neoliberalism upon the possible future flourishing of digital electronic technology and its potential to assist in a radical reorientation of the social and political foundations of a globally connected world.³²

These broad areas of inquiry, between technology and social organization, resonate—indirectly, for now—with architecture's role in economies and geographies at large, such as in the way architectural services are embedded in supply chains, the construction industry, the status of design as an "immaterial" service, as well as with theorizations around the possible repurposing of capitalist forms (like corporations) toward more cooperative arrangements. These theoretical and practical experiments, of which parametricism has so far been relatively disengaged, pose new challenges for the discipline as such, opening up design to a broader realm of cultural production that might be variously combined with fabrication, entertainment, community services, learning, curatorship, publishing, academic discourse, and many other activities, both in physical urban space and organized entirely through shared digital infrastructures. Most importantly, and as many of this book's contributors explore, parametrics are likely to radically affect the media of political economies *per se*—that is, the specific techno-cultural relationships between the governed and the governing, through novel entities and new complex dynamic chains of decision-making, logistics and representation. Politicizing these relationships, rather than leaving their fate to the always and already constraining ideological forces of 'markets,' is the central drive of this book and our wider project to interrogate and activate the politics of parametricism.

Indeed, it is the capacity for data and its morphologies to be embedded in all these different realms simultaneously that determines and defines its unique status as the "object" of contemporary political action and thought. Recognizing the deep consequences of seeing data processes, infrastructures, and political representations as integrally composite articulations potentially opens a way beyond techno-utopian naïveté as much as techno-phobic impassés—a move toward hybrid modes of practice and research that might one day shift, as Arjun Appadurai has recently called for, our current and ambivalent "politics of probability" to a brighter "politics of possibility."³³

Notes

1. "Parametricism as Style—Parametricist Manifesto", by Patrik Schumacher, London, 2008. Presented and discussed at the Dark Side Club1, 11th Architecture Biennale, Venice. Found at <http://www.patrikschumacher.com> [accessed October 1, 2013]. Zaha

- Hadid Architects' notable projects include the Vitra Fire Station in Weil am Rhein (1994), Praeno Science Center in Wolfsburg (2005), or the MAXXI museum in Rome (2010).
2. See, for instance, the chapter "Is Political Architecture Possible?" in Patrik Schumacher, *The Autopoiesis of Architecture. Vol. II: A New Agenda for Architecture* (Chichester: Wiley, 2012).
3. Among other articles and books, Schumacher's publications include *The Autopoiesis of Architecture* (Chichester: Wiley, 2012); *Latent Utopias* (Wien: Springer, 2002); "Patrik Schumacher on Parametricism—'Let the Style Wars Begin,'" *Architects Journal* Vol. 231, No. 16 (May 6, 2010), pp. 7–48; "Parametricism: A New Global Style for Architecture and Urban Design," *Architectural Design* Vol. 79, No. 4 (2009), pp. 14–23; and many more texts on his personal website <http://www.patrikschumacher.com> [accessed October 1, 2013].
4. Schumacher's own brand of neoliberalism is perhaps most closely related to right-wing Libertarianism. There is a wealth of volumes on the many geographical and actually implemented variants of "neoliberalism." For a brief critical introductory overview, see Jamie Peck, *Constructions of Neoliberal Reason* (Oxford: Oxford University Press, 2010). See also: Daniel Steedman Jones, *Masters of the Universe: Hayek, Friedman, and the Birth of Neoliberal Politics* (Princeton: Princeton University Press, 2012); David Harvey, *A Brief History of Neoliberalism* (Oxford: Oxford University Press, 2005). Althwa Ong, *Neoliberalism as Exception: Mutations in Citizenship and Sovereignty* (Durham, NC: Duke University Press, 2006).
5. Schumacher, "Patrik Schumacher on Parametricism," (May 6, 2010).
6. Schumacher, *Autopoiesis, Vol. 1*, p. 423.
7. Schumacher, "Patrik Schumacher on Parametricism," (May 6, 2010).
8. Schumacher, *Autopoiesis, Vol. 1*.
9. Schumacher mentions Greg Lynn Form, UN Studio, and Reiser and Umemoto as practices working along the lines of "parametricism." See, Patrik Schumacher and Peter Eisenman interview, "I Am Trying to Imagine a Radical Free-market Urbanism," in eds. Peter E. Eisenman & Anthony Vidler, *Log 28—Stocktaking* (New York: S.I. Anyone Corporation, 2013), p. 42.
10. See, for instance, eds. Peggy Deamer & Phillip G. Bernstein, *Building (in) the Future: Recasting Labor in Architecture* (New Haven, CT: Yale School of Architecture, 2010); the work of Space Syntax, UCL's spin-off company; the Spatial Information Design Lab (SIDL) and Laura Kurgan's *Close Up at a Distance: Mapping, Technology, and Politics* (Brooklyn, NY: Zone Books, 2013).
11. See, for instance, Mario Carpo, *The Alphabet and the Algorithm* (Cambridge, MA: MIT Press, 2011). Also, Luigi Moretti wrote extensively in the 1940s about "parametric architecture" as the study of architecture systems with the goal of "defining the relationships between the dimensions dependent upon the various parameters." Luigi Moretti, "Ricerca Matematica in Architettura e Urbanistica," *Moebius* Vol. IV, No. 1 (1971), pp. 30–53. Republished in, Federico Bucci & Marco Mulazzani, *Luigi Moretti: Works and Writings* (New York: Princeton Architectural Press, 2000), p. 207.

12. Mark Burry, *Scripting Cultures* (Chichester: Wiley Press, 2011), p. 18. Or, as Aish and Woodbury assert: "Parametric modelling is not new: building components have been adapted to context for centuries." Robert Aish & Robert Woodbury, "Multi-level Interaction in Parametric Design," in *Smart Graphics: 5th International Symposium*, eds. Andreas Butz, Brian Fisher, Antonio Krüger, & Patrick Olivier (Frauenwörth Cloister: Springer, 2005), p. 152.
13. See, for instance, Greg Lynn, *Animate Form* (New York: Princeton Architectural Press, 1999).
14. Procedurality: "When you model using parametrics you are programming following similar logic and procedural steps as you would in software programming. You first have to conceptualize what it is you're going to model in advance and its logic. You then program, debug and test all the possible ramifications where the parametric program might fail. In doing so you may over constrain or find that you need to adjust the program or begin programming all over again because you have taken the wrong approach." Rick Smith, *Technical Notes from Experiences and Studies in Using Parametric and BIM Architectural Software*, published March 4, 2007, at <http://www.vbtlc.com/images/VBTTechnicalNotes.pdf> [accessed September 25, 2014], p. 2. Flexibility: "Changing the order in which modelling and design decisions can be made is both a major feature of and deliberate strategy for parametric design. Indeed, a principal financial argument for parametric modelling is its touted ability to support rapid change late in the design process." Robert Woodbury, "Chapter 1," *Elements of Parametric Design* (Abingdon: Routledge Press, 2010), p. 43. Variability: "Initially, a parametric definition was simply a mathematical formula that required values to be substituted for a few parameters in order to generate variations from within a family of entities. Today it is used to imply that the entity once generated can easily be changed." Chris Yessios (founder and CEO of the modelling software FormZ), "Is There More to Come?" in *Architecture in the Digital Age: Design and Manufacturing*, ed. Branko Kolarevic (New York: Spon Press, 2003), p. 263. Correlation: "parametric modelling introduces fundamental change: 'marks,' that is, parts of the design, relate and change together in a coordinated way." Burry, *Scripting Cultures*, p. 9. Interdependency: "The challenge of building a parametric model is to untangle the interdependencies created by different requirements and find a set of rules that is as simple as possible while remaining flexible enough to accommodate every occurring case. In other words: to pinpoint the view to the exact level of abstraction where no important point is lost and no one gets distracted by unnecessary detail." Robert Woodbury, "Chapter 1," p. 11.
15. Fabian Scheurer & Hanno Stehling, "Lost in Parameter Space?" *Architectural Design* 81 Vol. 4 (2011), p. 75.
16. Lev Manovich, *Software Takes Command: Extending the Language of New Media* (New York & London: Bloomsbury, 2013); and Carlo, *The Alphabet and the Algorithm*.
17. "(...) one of the more noticeable trends in recent architecture is the turn from meta-physics to immanence. Whereas postmodern architects thought of buildings and cities as fragments of an expansive texture or fabric, contemporary spaces are mostly involutioned and introverted. The turn to immanence takes on different forms in current architectural practice. The resulting architecture in no way encodes the design process in the contours of indexical form, but sublimates it into asignifying, involutioned worlds for which new theoretical concepts are just starting to emerge. (...) The trust in the generative self-sufficiency of codes (in algorithmic and parametric processes and in the collection of big data) largely proceeded without any detours through the questions of formal meaning that played such a central role in the preceding decades." Emmanuel Petit, "Involution, Ambience, and Architecture," in *Log #29 "In Pursuit of Architecture"* (New York: Anyone Corporation Press, Fall 2013), p. 27.
18. See Humberto R. Maturana & Francisco J. Varela, *Autopoiesis and Cognition: the Realization of the Living* (Dordrecht: D. Reidel Pub. Co., 1980).
19. Patrik Schumacher, *The Autopoiesis of Architecture: A New Framework for Architecture* (Chichester: Wiley, 2011), p. 1.
20. See Geoffrey Broadbent & Anthony Ward, "Design Methods in Architecture," in *Architectural Association Paper* (New York: G. Wittenborn, 1969); and Alistair Upitis, "Nature Normative: The Design Methods Movement, 1944–1967" (PhD diss., Cambridge, MA: MIT, 2008).
21. See, for instance, Christopher Alexander, *Notes on the Synthesis of Form* (Cambridge: Harvard University Press, 1964); George Stiny & James Gips, *Algorithmic Aesthetics: Computer Models for Criticism and Design in the Arts* (Berkeley: University of California Press, 1978); and John Frazer, *An Evolutionary Architecture* (London: Architectural Association, 1995).
22. See, for instance, Norbert Wiener, *Cybernetics; or, Control and Communication in the Animal and the Machine* (New York: MIT Press, 1961); Claude Elwood Shannon & Warren Weaver, *The Mathematical Theory of Communication* (Urbana: University of Illinois Press, 1949); and Marshal McLuhan, *Understanding Media: the Extensions of Man* (New York: McGraw-Hill, 1964).
23. See Hannah Arendt, *The Human Condition* (Chicago: University of Chicago Press, 1998); *Between Past and Future; Eight Exercises in Political Thought* (New York: Viking Press, 1968); *The Origins of Totalitarianism* (New York: Harcourt, Brace & World, 1966); and *The Life of the Mind* (New York: Harcourt Brace Jovanovich, 1978).
24. For example, see Ernesto Laclau & Chantal Mouffe, *Hegemony and Socialist Strategy: Towards a Radical Democratic Politics* (London: Verso, 1985); and Claude Lefort, "The Question of Democracy," in *Democracy and Political Theory* (Minneapolis: University of Minnesota Press, 1988). Refer to the bibliography for further titles.
25. See Jacques Rancière, "Democracy, Republic, Representation," *Constellations*, Vol. 13, No. 3 (2006); Jacques Rancière, *Disagreement: Politics and Philosophy* (Minneapolis: University of Minnesota Press, 1999); and Jacques Rancière, *The Politics of Aesthetics*, trans. Gabriel Rockhill (London: Bloomsbury Academic, reprint edition 2013).

The historical pertinence of parametricism and the prospect of a free market urban order

Patrik Schumacher

Introduction

To respond to manifest societal trends, i.e., technological, socioeconomic, and political trends, is a vital capacity of architecture. However, this response must be an architectural rather than a political response. Debating politics within architecture can only concern the identification of manifest political trends. It can never be political debate, i.e., never a participation in the political process versus themselves. Architecture cannot substitute itself for the political process proper and must leave politico-economic innovations and the elaboration of radical politico-economic alternatives to the political and economic arenas. Architecture has no capacity to resolve political controversy. Political controversy and activism would overburden and explode the discipline. However, architecture can and must respond to transformative historical developments that become manifest within the economy and the political system. Architecture can only react with sufficient unanimity and collective vitality to dominant political agendas that already have the real power of a tangible political force behind them. Architectural discourse must develop innovative architectural responses to these historical transformative trends. This task raises the question of the historical adaptive pertinence of the various competing architectural tendencies, and in particular the question of parametricism's historical pertinence might be posed.

The political and socioeconomic premises of parametricism are found in the advancing processes of post-Fordist restructuring, globalization, market liberalization, and democratization. The methods of parametricism operate in line with the demands of post-Fordist flexible specialization and deliver attendant

26. For example, see Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993); and Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Clarendon Lectures in Management Studies) (Oxford: Oxford University Press, 2007).
27. For Foucault's major insights in this area, see Michel Foucault, *Society Must Be Defended: Lectures at the Collège De France, 1975–76* (New York: Picador, 2003); Michel Foucault, *Security, Territory, Population: Lectures at the Collège De France, 1977–78* (New York: Picador, 2007); and Michel Foucault, *The Birth of Biopolitics: Lectures at the Collège De France, 1978–79* (Basingstoke: Palgrave Macmillan, 2008).
28. Foucault, *The Birth of Biopolitics*, p. 61.
29. Ibid., p. 121 [our emphasis].
30. François Lyotard, trans. Geoff Bennington & Brian Massumi, *The Post Modern Condition: A Report on Knowledge* (Manchester: Manchester University Press, 1984). Originally published in France in 1979 by Les Éditions de Minuit.
31. Maurizio Lazzarato, *Signs and Machines: Capitalism and the Production of Subjectivity* (Los Angeles, CA: Semiotext(e), 2014); Michael Hardt & Antonio Negri, *Commonwealth* (Cambridge, MA: Belknap Press of Harvard University Press, 2009); Paolo Virno, *A Grammar of the Multitude: For an Analysis of Contemporary Forms of Life* (Cambridge, MA: Semiotext(e), 2003); Christian Marazzi, *The Violence of Financial Capitalism* (Los Angeles, CA: Semiotext(e), 2010); and Franco "Bifo" Berardi, *The Soul at Work: From Alienation to Autonomy* (Los Angeles, CA: Semiotext(e)/Foreign Agents, 2009).
32. Indispensable in this very recent discourse is the anthology edited by Armen Avanessian & Robin Mackay, *#Accelerate: The Accelerationist Reader* (Falmouth: Urbanomic, 2014).
33. Arjun Appadurai, *The Future as Cultural Fact: Essays on the Global Condition* (London & New York: Verso Books, 2013).