Book Review

Paradigms in Computing: Making, Machines, and Models for Design Agency in Architecture
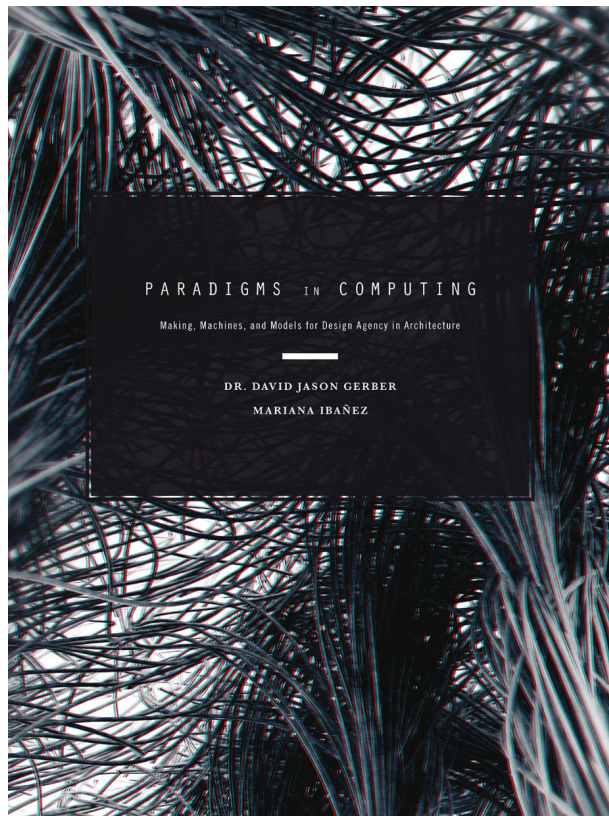
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PARADIGMS IN COMPUTING

Making, Machines, and Models for Design Agency in Architecture

DR. DAVID JASON GERBER

MARIANA IBAÑEZ

In the introduction to *Paradigms in Computing: Making, Machines, and Models for Design Agency in Architecture*, Dr. David Gerber and Mariana Ibañez compare the current state of design computation to the Cambrian explosion of genetic diversity. We are in an period in which our digital technology is advancing so rapidly that it perhaps outpaces both theory and individual practice, and as a result we have an unprecedented diversity—an 'arborescence'—of uses to which it can be put. More importantly, we have an unprecedented variety of opinions about the significance and future of architectural computing. This book is an attempt to catalogue them at this particular moment, just as the Burgess Shale recorded the fossil form of the proliferation of species 500 million years ago.

The attempt succeeds. The book is an edited compilation of 34 chapters contributed by design practitioners and academics connected with the 2014 ACADIA conference on Design Agency. These cover innovations in practice, from structural and geometrical examples exemplified in small built works like Mark Fornes' 'Nonlin/Lin' or Alvin Huang's 'Pure Tension' pavilion, to new applications of data such as Kyle Stanfield's crowdsourcing of design decisions, to the design of or with proto-biology by Philip Beesley or Dr.

Rachel Armstrong. They also include several reflections on, or projections of, the political and economic significance of changes to the way we manufacture or inhabit the built environment, but these too are by active practitioners like Jose Sanchez and Philippe Morel.

Of course it is impossible to catalogue everything. The views of large scale engineering, optimization and Building Information Modelling are represented proportionally less here than in practice and industry, perhaps because their mainstream use was not considered to contribute significant variety. Some quite specific but established computational niches, like shape grammars, network analysis or machine learning, don't appear, perhaps because they are too specialized. But the compilation does include a range of leading figures among the computational innovators who would class themselves first and foremost as practitioners of design and architecture, and it is on this same audience that the book will probably have the greatest impact. The work of many of these contributors will be familiar to those in this field, if not yet the particular views they express here.

The book might be classed as theory, or technology, or design. In fact the majority of chapters are not really either of these, but fall somewhere in between. Some fascinating technical detail is given, as Orkan Telhan describes bio-computation with liposomes or Nick Puckett details the manufacture of shape memory polymers, but these are typically only because the materials are otherwise so unfamiliar. The chapters don't offer a 'how-to' account of the algorithms or processes involved, but are pitched at a somewhat higher level, presupposing the reader's familiarity with a variety of computational techniques. Instead, the emphasis is on the paradigms that the title suggests: as a whole the articles tend describe how the authors see the field of computation in architecture.

Gerber and Ibañez have clearly composed with editorial intent, but have maintained a light touch. The organisational structure ostensibly consists of longer critical or theoretical pieces of about 10-20 pages that frame and often contextualize shorter descriptions of projects or recent built work. This is not made explicit by means of book sections or chapter introductions, however, and the table of contents is a simple list giving each article equal voice. This serves to highlight that the field may be more heterogeneous than expected, but more so in the paradigm than the computing. The links appear strongest at the level of shared technology, while many of the authors appear to have made assumptions of shared theoretical background that is never made explicit. Instead, theoretical positions variously include cybernetics, biological analogy, political philosophy, complexity science, semiology, and as many diverse backgrounds as there are chapters. The accounts are often personal or idiosyncratic:

sometimes without a formal conclusion, or sometimes even without formal text, as in Casey Reas's stripped down code-like presentation of generative processes. All of this fits the central metaphor of Cambrian diversity, suggesting the energy of an community of practice in rapid expansion.

If read sequentially, the editors' ordering of text in some parts highlights similarities between contributors, while in other sections the juxtaposition of articles appear to frame an opposition. The work of Kathy Velikov and Geoffrey Thün, Alexander Robinson, Bradley Cantrell and Tom Bessai is all acutely concerned with actively monitoring the data produced by building occupants, changing landscapes or structural prototypes, and so builds a loose but cogent case for the importance of feedback, the model as prototype, and the virtue of real-world complexity over virtual simulation. Elsewhere, Patrik Schumacher's assured position that all design is fundamentally communicative and expressed in the language of the parametric contrasts with Neil Leach's opinion that 'digital design' doesn't (and shouldn't) even exist. No single argument dominates across the whole text, however, either in the authored contributions or the editorial composition. Gerber's own chapter finishes the book, but is not given any distinction above others. It is here that the idea of editorial theme arborescence is summarized in context, but not presented as the final word. Ultimately this is not a book that needs to be read in sequence, but may be found equally useful by dipping in at random.

What the authors don't mention is that while the Burgess Shale reveals the beginning of the major animal phyla we have today, the vast majority are notable for having died out in later mass extinctions. Fossils of Wiwaxia and Hallucigenia are so fascinating to our eyes primarily because they look so unlike modern species. Undoubtedly some of the computational paradigms represented here will become the basis for the future practice, and some will look archaic in a decade or so. We might speculate as to which. Will the diversity of current approaches be pruned away like our Cambrian biota, resulting in a more clearly defined theoretical field, or will the arborescence continue? There is no way to know for certain, and Gerber and Ibañez make no judgement. This is the beauty of a snapshot that catalogues this particular moment of computational practice, and its value over a determined polemic on the future of the discipline. It presents a multiplicity of views against which the individual reader can determine their current position, or find inspiration for the immediate future. So, while our technology goes on increasing according to Moore's law, new forms of practice and new paradigms will be, and are being, evolved.

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