

Smart Geometry Conference 2009

A gathering of some of the leading architects and engineers working in the fields of parametric and digital design, this year's Smart Geometry Conference provided an insight into just how critical these technologies are becoming to contemporary practice.

text

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images

Courtesy Bentley Systems

event

31 March – 1 April 2009

The Palace Hotel

San Francisco



IF you were to believe the critics, those who gathered together beneath the lofty, gilt edged ceilings of the San Francisco Palace Hotel last April make up the key proponents of a new architectural ideology of algorithmic abstraction and wilful form-making, all of whom share an almost cult-like belief in the transformative power of the digital. The event? The annual gathering of the Smart Geometry Group, an organisation established in 2001 to explore the potential of computation and the computer as an intelligent aid to design in the built environment, with a particular emphasis on what has come to be known as parametric design.

The aspersion of course is unwarranted, although having spent several days in attendance at the conference, I can see why those involved in the field of parametrics have developed a somewhat cult-like reputation – the attendees speak a language that would be entirely unfamiliar to most laypeople, and even most architects, peppered as it is with references to scripting, algorithms and esoteric geometric formulae. The conference itself is actually the culmination of nearly a week of workshops and training focused around parametric digital design tools, primarily Bentley Systems' Generative Components (Bentley Systems are the major sponsor of the group, and use the conference and the Group itself as something of a testing ground for their parametric tool), and the limited places available at the workshops are hotly contested for by specialists from around the world, students and practitioners both. The resultant attendees could be described as leaders in their field, and the conference is undeniably a gathering of brilliant minds – while others whiled

away their teenage years playing video games, these people were the kids busy designing them.

Likewise, it wasn't difficult to detect a definite hint of idealism in the rhetoric surrounding the conference, but while the language of "performance" and "optimisation" was fairly commonplace, it was also noticeably absent from several of the presentations. So too was the self-indulgence epitomised by the "shapely highrises" (as RMIT's Mark Burry wryly described them) so often conflated with parametric design and digital architecture. If the Smart Geometry Group could be accused of being somewhat zealous proponents of the digital, the sentiment behind the formation of both the group and the conference itself is in some respects a remarkably selfless and altruistic one. The group was established by its founding directors Lars Hesselgren of Kohn Pedersen Fox Associates, J Parrish of Arup Sport and Hugh Whitehead of Foster + Partners as what was essentially intended to be a forum for the exchange of knowledge and ideas around digital design methodologies. Perhaps as a result of this, egos seemed to take a back seat in the presentations to ideas and problem solving. This was certainly not your typical architectural show and tell, wherein beautifully realised and impossibly rarefied architectural objects are presented for bragging rights and adulation. Projects that were presented were done so overwhelmingly to illustrate the discovery of some new methodology or process, or perhaps a unique application of a digital design tool not previously explored. The emphasis, then, seemed to be overwhelmingly on systems, so to speak, rather than the architectural object, or indeed the designer

themselves. In fact it was the altogether much more selfless concept of collaboration that was the recurring theme throughout many of the conference presentations. The Architectural Association's Brett Steele based his entire address around the idea of the network based design studio, and how digital technologies were accentuating the importance of the team to the design process. Indeed, as Steele described in an interview with *AR* (see over), the network has become such a dominant paradigm that he believes it is ironically in danger of becoming reified as a "new kind of object of architectural fascination". Certainly, Foster + Partners' Martha Tsigkari did nothing to dispel this latent potential in her presentation, in which she described the building of design information systems as the new architectonics. Using her own role at Foster + Partners as an example, Tsigkari outlined what she saw as the burgeoning growth of a new kind of architect who was both scripter, development manager and a creator of integral systems – ultimately a "chef", the one individual in the team with sufficient oversight across the entire process to be able to coordinate the increasingly complex and multifarious components of the average architectural project into a successful design.

One of the great strengths of parametric software tools such as GC is their potential for multidisciplinary application – the conference is something of a multidisciplinary affair itself, with representation from architects, mechanical and structural engineers and, to a lesser extent, software developers. The Smart Geometry Group draws its membership from among both the architectural and engineering fraternities,



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Hugh Whitehead of
Foster+Partners, one of
the founding directors
of the Smart Geometry
Group.

and much of the conference was devoted to exploring how the collaborative potential of these relationships could be managed better within the design process, or how greater input from all of the stakeholders and key contributors to a design could be facilitated earlier on. Steve Sanderson of CASE Inc (formerly of the architectural practice ShoP) saw the potential of the technology as specifically related to what he described as this “Co” paradigm of “computation, co-generation and collaboration”. A relative newcomer to the Smart Geometry Group, Sanderson has nonetheless been a vocal critic of what he sees as its overemphasis on abstract geometrical formulations as a means of achieving better “performing” buildings, at the expense of the much messier, but often times much more effective, method of managing client and stakeholder relationships. Inspired by the digital social networking models of Web 2.0, as Sanderson saw it for the profession and the building industry to evolve it needs to embrace what he described as “Building 2.0”, whereby the important role that stakeholder communication has in the design process is recognised.

Sanderson was not alone in sounding a cautionary note – the Pratt Institute’s Kyle Steinfeld used his presentation as an opportunity to decry the tendency for parametric designers to see themselves as “toolmakers” facilitating a generative process, which he saw as an “a priori visualisation of design”. Instead, he pointed to the fact that design should reflect a feedback loop between these processes, whereby design becomes a dialogue, “a maker’s reflective conversation with his materials”. Steinfeld

wasn’t the only one calling for a more craft-oriented approach, either. Marty Doscher of Morphosis outlined how that practice frames its work from the perspective of “digital design and tectonics for humans”. Doscher saw the need for a human connection between design and fabrication as absolutely critical, and the practice has a process in place whereby its upcoming young stars are required to regularly spend time on building sites, to witness the crafting of their projects and better understand the design possibilities presented by these processes. As Doscher pointed out, this approach has had its revelations, not the least of which was the discovery that the use of craftspeople is often a cheaper and more effective means of realising Morphosis’ complex, digitally rendered forms than CNC fabrication. Core to Doscher’s argument was the belief that while digital tools were certainly incredibly powerful, there were some aspects of the design process where the uniquely human qualities of features recognition and intuition were irreplaceable. This observation also formed the basis of Earl Mark’s presentation, whose work for Foster + Partners has been informed by the craft of boat building. To illustrate just how powerful these two characteristics can be in their own right, Mark pointed to the fact that the b-spline curves of boat hulls have been hewn by eye for centuries. Mark saw design analysis as fundamentally beginning with intuition, but has found that many contemporary digital tools can in fact facilitate this process, pointing to his use of movie and animation software to transform and explore digitally modelled projects and discover their “sweet spot”.

As you would expect from a gathering that incorporated so many of the leading practitioners working in the field of parametrics and digital design, the Smart Geometry Conference was dumbfounding in its breadth and scope, and unfortunately we have barely scratched the surface here. The conference served as a reminder of just how prevalent these technologies have become, and how critical they have been to the development of such a huge variety of high-profile projects the world over. Perhaps the most memorable part of the conference for me was an admission made by J Parrish, architectural director of ARUP Sport, during his presentation of the Birds Nest Stadium (developed together with Herzog & De Meuron) that he was completely unable to identify which of the stadium’s multitudinous beams were providing the primary structural support for the building. It was simply too complex, even for a leader of one of the planet’s pre-eminent engineering practices. The message was simple: without parametric tools, it, along with many of the other iconic architectural projects developed in the past decade, could simply never have been built. That in itself should give pause for thought to those who would claim digital architecture remains an exclusively abstract indulgence. **ar**

Maitiú Ward attended the Smart Geometry Conference 2009 as a guest of Bentley Systems.

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SG09 Interview:

Mark Burry, SIAL

Brett Steele, Architectural Association

Distributed design, emergent systems and the architect as auteur... *Architectural Review Australia* talks with two of the keynote speakers from SmartGeometry 2009, Mark Burry of RMIT's SIAL and Brett Steele of the Architectural Association, about parametric design and what the future might hold for the practice of architecture.

interview

Maitiú Ward

images

Architectural Review Australia

MW: In many of the presentations we've seen so far at the conference, there seems to be more of an emphasis placed on the system than there does on the architectural object, so to speak. What implications do you think this presents for the practice of architecture?

MB: If that's your observation, that's very interesting because I would say that we've been preoccupied with the object for quite a while, and it's actually systems which are more interesting. The thing about systems is that they're open ended, and for the designer that's a really beautiful thing, whereas an object is rather a closed option I think. So if you're seeing systems as the dominant theme, I think that's really a helpful sign.

BS: I mean architectural discourses for a very long time have been driven by the concept of an architectural object. It's an object-oriented discipline. The object is typically acquainted with the building, buildings are self-contained worlds, and they're coherent and isolated. Network cultures generally of course have challenged that idea quite dramatically. In the middle of the 20th century everyone was talking about the perfectly manufactured object as a model for cultural production, I'm thinking of someone like Roland Barthes in the 1960s, who takes the Citroen, a perfectly manufactured automobile, as the emblem really for modern culture. Today, even if we do still live in a world inhabited by beautifully designed objects, the fact is that all of those objects are now talking to one another and it's the proliferation of networks that connect objects that I find is the dominant model for thinking about architectural space and structure. In fact, it plugs in directly to a network based design system

which distributes design really across a group of smart individuals and systems, and doesn't isolate it in a single person or object. I think the danger in fact is that the network, which is an incredibly compelling image of space or structure, in its own sense will become the new object of architectural fascination. In fact holding that back will be one of the real challenges.

MW: One of the other things I noticed was there seems to be this development of the architect as a practitioner with a tri-partite role. Martha Tsigkari from Foster and Partners discussed her role as being a combination of scripter, development manager and a creator of integral systems. I'm just curious whether you think the ideal of the architect as a singular visionary has any part to play in contemporary architecture, whether there's a future for that role?

MB: There is, because that's how we are, but the dominance of that role will, I hope, move away. I mean there's two things: with the complexity that we're now working with in terms of building systems, with what society is actually asking of the architect, how can one person claim the whole? They can't; they can be the idea person perhaps, but the other thing that I think is crucial is the role that other disciplines are playing in built environment design. There's a certain type of engineer who has to be in at the beginning at that creative level, which is something we're not used to sponsoring. Even cost consultants, a particular type of approach to cost estimating for instance will inform a project if it's done creatively, as opposed to reactively.

BS: The question has to do with how one creates

strong architectural individuals. There's actually a greater need right now for brilliant individual vision than in any recent time in architecture. I think we're facing problems of such enormity and surprise, that I do find the idea of architectural vision somehow lacking in the field generally, particularly over the past 10 to 15 years. If one makes an analogy to something like the film industry for example, where if you take a typical Hollywood blockbuster production, which has an operating budget vastly bigger than most buildings, it's being produced by a cast of thousands, not hundreds like in architectural practice, and in that vast array it is in fact the one field where the concept of the director is thriving. I would agree completely with Mark's point that in fact what we're seeing at the level of production in architecture is a shift towards absolutely collaborative and distributed projects. What I'm unsure of is where that leaves the future of the individual in the system. I'm very interested in the idea of us finding a way to argue for the need for that; that's what Hollywood does at a certain level.

MW: Just going back to the first question again, there seems to be, at least with many of the presentations I saw yesterday, a distinct, almost mechanical approach to the development of architecture where you have a problem and you have a solution, and I'm just curious as to what role expression and meaning might play in contemporary digital architecture.

BS: I would think it has the same level it's always had in architectural design, or rather that it needs to have. There has to be a capacity for not just individual expression but individual forms of discovery, experimentation,



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Mark Burry, at left, and
Brett Steele.

unexpected developments that over and over again will come out of the way in which an individual thinks about a problem, even if he or she is part of a much larger group. What's trying to be developed today are the forms of learning and working that can enable and make that possible, and then once discoveries are made, actually capture that knowledge and distribute it or retain it for another stage of the same project, or later in their careers or lives. I think it's probably a very hard project right now to imagine how we do that. I'm not sure I would characterise some of the examples you saw yesterday as mechanical as much as machinic, in the sense that design is conceived of as a kind of machine that can solve not all problems necessarily, but certain kinds of carefully described problems. There's a difference though between machines and mechanisms; mechanical things do the same thing over and over again, a smart machine can adapt itself or adjust its own performance based on the things that it learns as part of that process.

MW: Which brings up another interesting point, which is the design methodologies themselves seem to draw a lot on organic natural systems – there has been talk about emergence, talk about morphogenesis, all of these ideas that borrow or reflect processes that take place in the natural world. Likewise, one of the things that I've noticed is a lot of the formal language in some of these projects seems to draw a lot on organic, naturally occurring forms. Is that a conscious decision on the part of the architect, do you think, or does it just naturally evolve because these processes reflect processes in the natural world that create these forms?

MB: It is in part because we can, but you don't have to get too far into the books to find that there's been an interest in these relationships long before the digital age. So the instinct's been there, but the problem has become less of a problem.

BS: I think it's hard to generalise. You can certainly find architects that would make that point, the relationship

between natural form and built form is one that could be projected across by an architect looking at nature in a certain way. I think there are other architects at the extreme far end of the spectrum who would say in fact what they're interested in are evolutionary models of design, which might have parallels with natural forms of evolution, but it's only a parallel, it's not an equation between the two. There are an awful lot of people working on the way in which something like emergence could be thought of as a bridge between organic and inorganic forms of nature. If you think of architecture and the building of cities as inherently inorganic, they nonetheless can be understood as evolving too if they're modelled in the right way.

What I was trying to show in some of the images of the studio life at a school like the Architecture Association is in fact that when you look at design systems within studios today, they take on uncannily natural qualities as evolving systems that are alive, in which ideas and information are flowing between different people, different entities between computing systems and designers sitting outside them, and in fact they're evolving quite quickly by almost any description. In a way, the lifelike qualities of design aren't just the models that an architect would use to create a design, but they're a principle for how design itself is organised as an activity. It's very much the case that design has always worked that way, but through the systems that are now created to distribute information between the members of a project, that's even more pronounced a feature I think of design worlds.

MW: We've seen a lot of very big, multinational practices take up parametric design technology. I'm just curious how much you both see this technology diffusing throughout architectural practice as a whole, amongst the smaller practices. Will it become a key part of the way architects practice?

BS: What I find most interesting about these platforms is that they're evolving from forms of technical expertise into forms of communication. The language allows a

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group of people from around the world to fly into San Francisco for four days to a workshop in which they're already talking to one another before they arrive, not just because they share a skill set, but they actually share an underlying sensibility about how the protocols arrange themselves for them to make decisions about space and structure. I think that evolution to communication is one of their most interesting features today. From the office point of view, the scariest part though is that the normal relation between big office and little office is being inverted. It's no longer the case that because this software is being adopted by huge corporate offices around the world, they can install themselves as standards, in fact, they're happening in reverse. Someone who is graduating out of a program like SIAL in Melbourne with a deep expertise in these kind of systems and going out and setting up an office with one or two partners, is in fact setting a model for the large offices to look at which they have to compete with now.

MB: I absolutely agree. The interesting thing is that I started using parametric software back in 1992 with no less functionality than what we're seeing being used now, it just cost \$150,000, and I wrote in the *Architect's Journal* confidently that in five years this would just be a no-brainer, everybody would be using it. So I'm interested in the slow take up of it, but I think Brett's point about how it's being taken up is fundamental. Before, I used to regard the riskiest thing about it as the enfranchisement of the amateur – somebody with buggery all ability could start doing really cool stuff very quickly, and get a bit of a lift. And you could see all sorts of people that shouldn't have been let near a drawing board busy doing stuff and being believed, and I think that's shifting now, and that's what I find very encouraging. There is a new generation coming through, and they do look at these possibilities quite differently. **ar**

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