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ACADIA 2013
ADAPTIVE ARCHITECTURE

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CNC SPONGE-FORMING AND PARAMETRIC SLIP CASTING
A Hybridization of Computation and Craft for Architectural Ceramics
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ACADIA 2013 Adaptive Architecture, the 33rd International Conference of the Association for Computer-Aided Design in Architecture, focuses on computational design of environmental, responsive, intelligent, interactive, and reconfigurable architecture. Organising this conference we perceive new intellectual territories opening, arising both from technology and from our nature inventiveness. In 2013, humankind benefits from millennia of cultural continuity while it faces profound challenges and opportunities. Fuelled by potent new research tools and techniques the discipline of architecture is ripe with potential. New modes of practice offer models where research, design and development are seen as one, and where knowledge passes with extraordinary fluidity, as if by osmosis, from practice to academia, from teacher to pupil and from the future architect to the architect-academic. The future is now.

Sir Peter Cook opened the first Adaptive Architecture Conference at the Building Centre, London, on 3 March 2011. He addressed Adaptive Architecture with a body of work that included the inspirational teaching of over three generations of future architects. We have yet to see Archigram’s visions fully realised, yet the pen-and-ink drawings by Cook and his collaborators present a future with such veracity that looking at them in a magazine or gallery one cannot help dreaming of a more flexible and adaptive future for architecture and humankind.

New roles for architectural environments are emerging that transform portions of static buildings into dynamic responsive surfaces by equipping them with new living intelligent distributed computation systems and chemically active functions. Adaptation of architecture can be as simple as the windows, blinds and sliding screens of Gerrit Rietveld’s Schroder House, 1924, where the first floor transforms from spaciousness to intimacy in the hands of its occupants, or it can be as sophisticated as biomimetic gill-like adaptive shading of Ocean One by the Austrian practice of Soma.[i] New design methods and new qualitative and performance-based paradigms are needed for working with complex systems within the built environment. Adaptive architecture is as much about process as well as product and outcome. We could recall Cedric Price’s prescient mantra from his 1976 Generator project: “never look empty, never feel full”. This observation speaks to adaptation in architecture in a poignant way, addressing its unstable, liminal nature. Price envisioned an adaptive architecture perceived within dynamic, ever-changing space. Equally important would be its emotional effects on the inhabitants which he suggests could be felt in the lack: never empty, never full.

Architecture has always been inventive and adaptable. Our current era, however, is unique in its technical potential and in the formidable challenges that societies and environments face today. The built environment is becoming responsive in terms of physical, real-time changes acting under intelligent controls. At the same time, the design of adaptive architecture might invoke a dilemma that arises between searching for materials and systems to be able to do so much more and perform so much better, while at the same time dwelling on substantial concerns about the potent implications of active, regenerative systems. What are the consequences of making adaptive architecture? How might we become responsible for this expansion of the power of architecture?

The papers included in ACADIA 2013 Adaptive Architecture provide a lens into the potential for architectural adaptation within our built environment. Recurring terms run throughout these papers, offering an emerging field of qualities: self-assembling, regular, performative, aggregate, genetic, stigmergic, generative, regenerative, morphogenetic, self-assembling, irregular, performative, aggregative, genetic, stigmergic, generative, regenerative, morphogenetic, parametric, evolutionary, resilient, learning, morphing, behavioural, active, aphatic, responsive, variable, rewiring, deployable, differentiable, open-ended. These qualities seem closely aligned with the attributes of living systems. Analogues drawn from life testify to inspiration for design, and they also imply aspirations to explicit performance, analysing and implementing tangible functions.

With the range of topics presented here, material intelligence appears as one consistent focus. Here emphasis on material properties and intelligent assemblies provides opportunities for designers to explore multiple scales and exploit new optimisations. Structures that are open to environmental and climatic influence to elicit change are one of many goals of this work. Another area of interest is in the adaptive nature of energy. Banham and Dalgetty’s Environment Bubble has burnt and energy no longer requires membranes to contain it. Like materials its instability is welcomed yet made more predictable through complex feedback systems and visualization. A more precise understanding of how energy works in buildings suggests a different model of energy performance that is no longer thermodynamic but thermomorphic and evolutionary.

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Alliopolitic Architecture
The Design of an Interactive Tensegrity Structure
Brian Fein Diwaraj, Nal Lach, and Abhijit Fox
5 Tom, Syra 2006, and Accurate Position Control of Shape Memory Alloys, Palermo.

Scalar Structures and Systems
A (Smart) Material Ecology
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3 ——. Point grid pre-transformation based on the spatial curves.
3 ——. a. T op, middle, and bottom part of the graph; and b. .
3 ——. a. Point grid; and b. input Flow pattern on the point grid.
3 ——. a. Point grid; and b. input Flow pattern on the point grid.
3 ——. Surface transformation algorithm.
3 ——. Surface transformation algorithm II.
3 ——. Surface transformation algorithm.
3 ——. Physical model of the process.
3 ——. Step by step process of activation of cells.
3 ——. Surface transformation algorithm (II).
3 ——. a. Algorithm (b) in algorithm.
3 ——. a. Point grid, and; input flow pattern on the point grid.
3 ——. flock point, and; input flow pattern on the point grid.
3 ——. Each cell is set to flow eight primary directions of the flow to minimize unfavorable direction vice versa.
3 ——. a. the area covered by downward only; b. covered by both; and c. covered by either.
3 ——. a. Rationalized connected network; and b. shortest distance stream from each point.
3 ——. Step finder algorithm, a. upward direction; b. .
3 ——. stress measurements of supersetting; and; surface network graph.
3 ——. Physical model of the rationalized network based on flow direction.
3 ——. Physical model of the discrete flow pattern for another surface geometry.
3 ——. a. Area of influence; b. input point; c. distance from point grid; d. distance from height; e. transformed point.
3 ——. Different quantity of x creates different steps for the surfaces.
3 ——. Spatial point generation; a. positive; b. curve; c. and b. branches and polymers conditions; d. branches sequences.
3 ——. Break in the geometry results for direct translation plan and height changed by spatial curve.
3 ——. Superimposition of linear height change and re-arranged point grid due to spatial curve.
3 ——. Design Sample using only plan drawings of curves.
3 ——. Design Sample using only plan drawings of curves.
3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Superimposition of linear height change.
3 ——. Use of non-linear transformation in generating surface geometry.
3 ——. Linear transformation in generating from surfaces.
3 ——. ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Use of non-linear transformation in generating from surfaces.
3 ——. Linear transformation in generating from surfaces.
3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
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3 ——. Use of non-linear transformation in generating surface geometry.
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3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
3 ——. Use of non-linear transformation in generating surface geometry.
3 ——. Linear transformation in generating from surfaces.

Adaptive Architecture for Refugee Urbanism
Sanxing, Play, and Immigration Policy
Tenue
1 United States Department of Homeland Security, public domain image. TIC ‘scarcity scores at international airports.
3 2012-2015
4 Hackitecture
1 Nagpore, Thlo, 1970. Seek project.

Programming in the Model
A new scripting interface for parametric CAD systems
Mayen Kalic, Robert Woodbury
1 ——. Timelines next construction; process.
2 ——. Nest nodes become pheromone sources to create templates representing external influences.
3 ——. a. Slope and contour lines; b. ridge and coarse lines; c. .
4 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
5 ——. f. Nodes become pheromone sources.
6 ——. f. Nodes become pheromone sources.
7 ——. f. Nodes become pheromone sources.
8 ——. f. Nodes become pheromone sources.
9 ——. f. Nodes become pheromone sources.
10 ——. f. Nodes become pheromone sources.

Stigmatic Space
Sanxing, Play, and Immigration Policy
Anna Kiyoko Miyazaki
1 Miyazaki, Anna. Reviews, Dave. 2013. Tents next construction; process.
2 ——. Nest nodes become pheromone sources to create templates representing external influences.
3 ——. a. the area covered by downward only; b. covered by both; and c. covered by either.
4 ——. a. the area covered by downward only; b. covered by both; and c. covered by either.
5 ——. a. the area covered by downward only; b. covered by both; and c. covered by either.
6 ——. Yellow shade of the simulation.
7 ——. Yellow shade of the simulation.
8 ——. Yellow shade of the simulation.
9 ——. Yellow shade of the simulation.
10 ——. Yellow shade of the simulation.

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1 Blake, Bob. 2008. Screenshot from Fold It, protein folding videogame.
2 Pintor, Emma. 2009. Screenshot from Fractals, voxel base pertevision videogame.
3 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
4 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
5 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
6 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
7 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
8 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
9 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
10 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.

GameScapes
Jose Sanchez
1 Blake, Bob. 2008. Screenshot from Fold It, protein folding videogame.
2 Pintor, Emma. 2009. Screenshot from Fractals, voxel base pertevision videogame.
3 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
4 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
5 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
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7 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
8 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
9 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.
10 ——. Algorithm in process where two distinct families of agents negotiate spatial territories.

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1 ——. Timelines next construction; process.
2 ——. Nest nodes become pheromone sources.
3 ——. Nest nodes become pheromone sources.
4 ——. Nest nodes become pheromone sources.
5 ——. Nest nodes become pheromone sources.
6 ——. Nest nodes become pheromone sources.
7 ——. Nest nodes become pheromone sources.
8 ——. Nest nodes become pheromone sources.
9 ——. Nest nodes become pheromone sources.
10 ——. Nest nodes become pheromone sources.

Responsive Materiality for Morphing Architectural Skins
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3 ——. ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
4 ——. ——. Graphical abstraction of the binary strain on a two-dimensional matrix.
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Phasellus felis lacus, tempus ac consequat a, vestibulum et neque. Aenean ornare ultrices risus, at vestibulum libero pretium non. Duis vulputate interdum ante, pretium suscipit nisl ultricies et. Vivamus quam dui, convallis vel tristique sit amet, accumsan eget nibh.
Citation