arq (2016), **20.2**, 92–93. © Cambridge University Press 2016

Can architecture embody living systems?

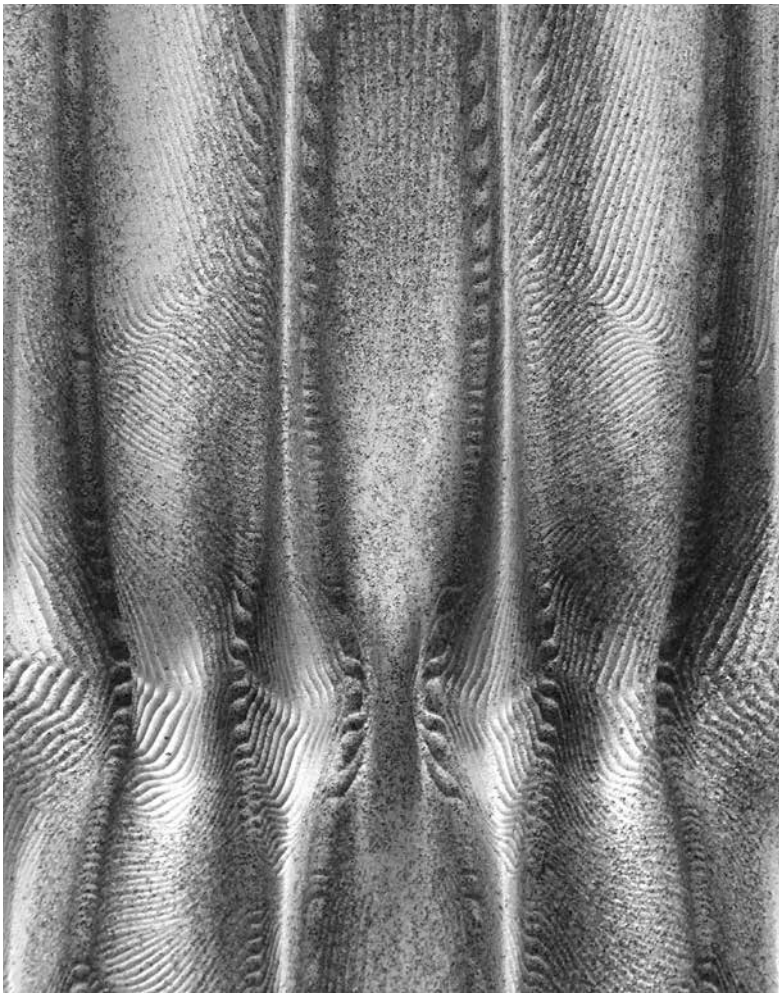
Emerging 'living' technologies and synthetic biology

Arising

[... W]e can try to help define and engage in fundamental research now, well before these technologies are 'ready'. The latter approach requires us to be speculative and to accept that these speculations may be sacrificial – a way of defining concepts rather than providing a robust solution for a particular application domain. However, it also forces us to ground those speculations in real concepts and experimentations and collaborations with people and disciplines some distance away from traditional architectural research. In this way the 'Building' in 'Building Science' will, for architecture, become a verb as well as a noun.[1]

Can architecture embody living systems? Is it possible for the concrete craft of physical architecture to transform, no longer limited to the inert stage-works and rigid floors that support human action, but instead moving ever closer to acting within life itself? These questions were addressed thoughtfully in the papers of **arq** 20.1. When the ancient Roman writer Titus Lucretius Carus recorded his observations of the origins of life two thousand years ago in his *De Rerum Natura*, his words intermixed exquisite precision and far-flung intuition. He looked into miniscule wandering specks of dust suspended within the rising air caught by a sunbeam, and described within their swerving, wavering motion the quickening of life arising. A resonance with Lucretius' timeless observations can be found amidst the multiple voices of this volume. The futurist Rachel Armstrong offers a vision of a new form-language of dissipation of energy, where systems are intimately coupled to their surrounds, constantly adapting and renewing their spaces of reaction. The Nobel laureate Ilya Prigogine carries an emphatic voice in her chapter, articulating far-from-equilibrium form-languages. Andrew Ballantyne frames values for contemporary design that lie far from pursuit of individual optimisation. He quotes Oliver Wendell Holmes:

[...] if we draw frames around entities and consider them as bounded objects then we can think of them as complete in themselves [...] If, on the other hand, we pay attention to the proper unit of survival then we find ourselves reaching for an understanding of the links across an ecology, and it is the links that are crucial. Then the concern



1 Facade panel cast with expressive tool path for slowing down water and creating grip surfaces for cryptogamic growth. EPSRC-funded project 'Computational Seeding of Bioreceptive Materials', Bartlett School of Architecture, UCL (2016).

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is not the maximisation of one value or another, but keeping everything in balance so that the unit of survival flourishes.[2]

Multiple examples of new 'living' architectural systems are illustrated in accompanying papers. Living qualities include couplings of synthetic systems and living biosystems including metabolism, reproduction, and digestion. By integrating emerging 'living' technologies in computation and synthetic biology with next-generation physical structures, a revolutionary living architecture could emerge. Human relationships with buildings could be transformed, giving buildings a kind of agency that creates active conversations and exchanges.

Framing the whole is Martyn Dade-Robertson's manifesto for renewal of architectural research (**arq** 20.1, pp. 5–8). Contrasting with a rigid linear progression of scientific knowledge-creation that traditionally begins with conceptual questions and ends with proof, Robertson argues convincingly for a transformed practice that would work with open experiments, well before values have crystallised into states of being 'ready' for implementation. The experiments set out here exist as speculations that evoke vivid material hybrids. This model of highly involved research creation has the potential to fundamentally change how we build architecture in every dimension by transforming the physical structures that support and enclose buildings, the technical systems that gather information and control our interior environments, the ideas and perceptions of the expressive aesthetics of architecture, and the diverse qualities of life that are supported by the built environment.

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Notes

1. Martyn Dade-Robertson, 'Building Science: Synthetic Biology and Emerging Technologies in Architectural Research', in *arq: Architectural Research Quarterly*, 20.1 (2016), p. 4.
2. Andrew Ballantyne, 'The Unit of Survival', in *arq: Architectural Research Quarterly*, 20.1 (2016), p. 44.

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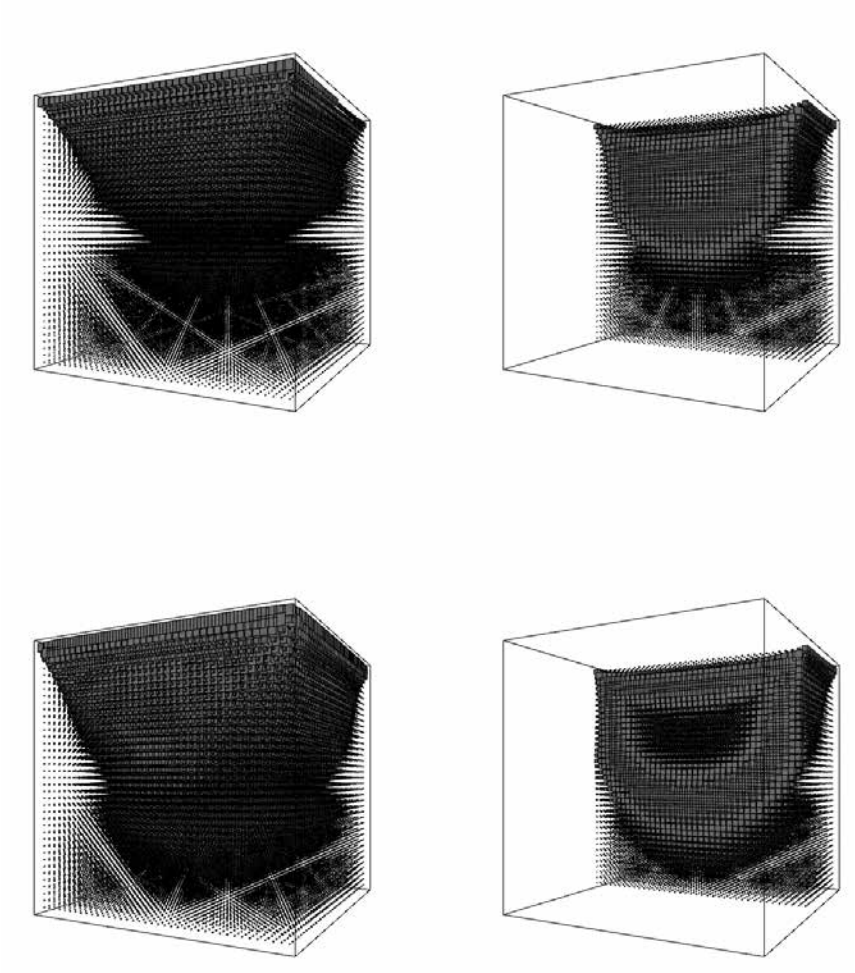

2 Diagrams to show the patterns of consolidation in a soil volume of 10m x 10m. The diagram shows the results of different expression profiles for bacteria with two different pressure sensitivities in the soil. The soil volume is shown both whole and in section.

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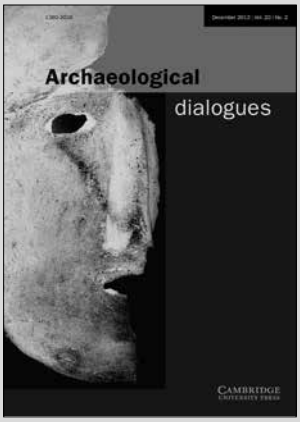

Archaeology is undergoing rapid changes in terms of its conceptual framework and its place in contemporary society. In this challenging intellectual climate, *Archaeological Dialogues* has become one of the leading journals for debating innovative issues in archaeology. Firmly rooted in European archaeology, it now serves the international academic community for discussing the theories and practices of archaeology today. True to its name, debate takes a central place in *Archaeological Dialogues.*

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