Slime Mould in Arts and Architecture

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Slime Mould in Arts and Architecture

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The cover design uses a photograph of slime mould *Pysarum Polycephalum* growing in template imitating Bristol city centre made by Elliott Ballam.

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Preface

Acellular slime mould *Physarum polycephalum* has a rich life cycle that includes fruit bodies, spores, single-cell amoebas, and syncytium. At one phase of its cycle, the slime mould becomes a plasmodium. The plasmodium is a coenocyte: nuclear divisions occur without cytokinesis. The plasmodium is a single cell with thousands of nuclei. The plasmodium is a large cell. It can expand up to several meters when conditions are good. The plasmodium consumes microscopic particles and bacteria. During its foraging behaviour, the plasmodium spans scattered sources of nutrients with a network of protoplasmic tubes. The plasmodium optimises its protoplasmic network to span all sources of nutrients, stay away from repellents and minimise transportation of metabolites inside its body. The plasmodium's ability to optimise its shape attracted the attention of biologists, then computer scientists and engineers. Thus, the field of slime mould computing was born.

In the last 15 years, over 50 sensing and computing devices have been invented with the slime mould. The field of *Physarum* computing flourished and got widely publicised in papers and monographs. While getting fame in science and engineering, *P. polycephalum* lived a second life. The slime mould's adaptability, polymorphism and aestheticism inspired artists and architects. The slime mould has been seen as a self-conscious fluid form continuously changing its shape in response to external stimulation and due to interactions of thousands of micro-oscillators in its body. Elusiveness is a magic feature of the slime mould. One moment the slime mould gives you a solution to a mathematical problem by a shape of its body, next moment it changes its shape and the solution disappears. The authors of this book employ this momentariness of structure of an "unstructured" creature.

The book presents a set of unique chapters by leading artists, architects and scientists resulted from creative translations of the slime mould behaviour into forms and sounds, unconventional investigations and sensorial experiences and the slime mould ability to remove boundaries between living and artificial, solid and fluid, science and arts. The book gives readers unique tools for designing architectural forms and creative works using the slime

mould, understanding how proto-cognitive living substrates can be used in every day life, it sparks new ideas and initiates further progress in many fields or arts, architecture, science and engineering.

Vibrant concepts of biology, arts, non-linear sciences and architecture interact in the book towards the formation of an unorthodox vision of the future and emergent concepts of a socium, where science and art are becoming a single unity. The striking polymorphism of contributions reflects the vibrant development of the field of bio-inspired and bio-integrated arts and architecture. This makes the book stand out from the standard art, science and architectural book. The book provides in-depth insight and first-hand working experiences into current production of art works at the edge of art, science and technology. The book is a unique compendium of works made by a new type of artists and architects who are not only concerned with the visual level of their work but also with scientific conceptualization and theoretical reflection on contextualization of their studies and work in the interdisciplinary field of art and science. All contributors of the book are world-leading artists, architects or scientists, with an impressive track record of exhibitions, installations and scientific and engineering discoveries. They provide in-depth insights and first-hand working experiences into current developments of artistic and architectural works at the edge of art, science and technology.

Andrew Adamatzky,
Bristol, UK
February 2019

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