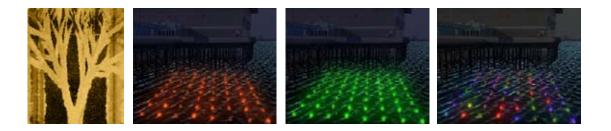Designing Physical Artefacts from Computational Simulations and Building Computational Simulations of Physical Systems

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OVERVIEW

DESIGNING FOR THE 21ST CENTURY OFTEN NECESSITATES HIGH-LEVEL KNOWLEDGE OR USE OF COMPUTATIONAL SYSTEMS. IN CONTEMPORARY ART AND DESIGN PRACTICE THESE COMPUTATIONAL SYSTEMS ARE FREQUENTLY EMBEDDED IN PRODUCTS THAT HAVE A PHYSICAL PRESENCE IN THE REAL WORLD.

HOWEVER, EVEN THOUGH DESIGN IS INCREASINGLY DOMINATED BY COMPUTATION, IT IS NOT CLEAR THAT THE RELATIONSHIP BETWEEN THESE PREVIOUSLY DISPARATE DISCIPLINES IS FULLY UNDERSTOOD OR EXPLOITED. IN THIS CLUSTER WE ARE SPECIFICALLY INTERESTED IN HOW TECHNIQUES USED TO SIMULATE THE NATURAL WORLD (SUCH AS CELLULAR AUTOMATA, MULTI-AGENT SYSTEMS, ALIFE TECHNIQUES) CAN BE HARNESSED INTO THE DESIGN OF PHYSICAL ARTEFACTS.

- HOW DO WE PERCEIVE AND RELATE TO THE COMPUTATIONAL IN THE PHYSICAL WORLD?
- WHAT DOES IT MEAN TO SIMULATE THE REAL WORLD IN A COMPUTATIONAL ENVIRONMENT?
- HOW CAN WE EXPLOIT COMPUTATIONAL SIMULATION IN PHYSICAL DESIGN?
- HOW CAN WE HARNESS EMERGENT PROPERTIES OF DISTRIBUTED SYSTEMS IN DESIGN?
- HOW CAN WE BEST EXPLORE AND SUBSEQUENTLY EVALUATE NEW MODES OF DESIGN THINKING ARISING FROM THE WORK OF INTER-DISCIPLINARY TEAMS FROM ART, DESIGN AND SCIENCE?
- WHAT MODELS CAN WE USE TO ENABLE INTERDISCIPLINARY TEAMS TO WORK TOGETHER MORE PRODUCTIVELY?

Activities

Our activities have included a website, newslist, the forming of a new community, an introductory symposium, a series of ten design challenges proposed by members, a two day workshop, a series of design meetings with members and a professional design house, the design and engineering of a prototype for an art work which exploits multi-agent simulation, a glossary to help artists and scientists work together, and finally the launch of the prototype and a review meeting to determine what we do next.

Insights

Setting up the website was time consuming, but a necessary signpost and a useful focus for both national and international researchers, especially given the visual nature of many of the themes. More recently it became key in presenting material relevant to the design challenges posted by the individual members. The newslist was useful to communicate details of events and challenges though our expectation of a high level of use was not met initially. It was only once members felt a stronger sense of ownership and community that volume was significant. The co-investigators spent a lot of time 'priming' the list and the website, especially for our events which all proved very successful. Transcription necessitated good quality recording of the day requiring additional organisation but this was worthwhile. For the chosen design challenge, a prototype has been designed and is now being produced. Working with a design company to design and engineer the chosen design has proved difficult and time consuming at first. However, this has now become more efficient and effective through learning each others working practices.