

Challenges in Top-Down, Bottom-Up and Computational Approaches in Synthetic Biology

A Symposium Sponsored by SynBioNT

18 – 22 March 2010

One of the biggest unanswered scientific questions is how what we term as 'life' actually emerged from the 'primordial soup' several billion years ago. As a proxy for understanding the question of the origins of life, synthetic biologists are attempting to develop "artificial life", and are doing so by following two separate and competing routes: the 'top-down' and 'bottom-up' approaches to *minimal cells* (also called "protocells" or "chells" for chemical cells). In the former, a primordial or minimal cell is generated by systematically reducing a biological cell's genome until only essential genes remain. The bottom-up methodology, on the other hand, seeks to assemble from scratch components or information units until an aspect of 'life' emerges. On the other hand, computational modelling for the top-down reduced biological cells and the bottom-up complexified protocells, aims at formalizing and operationalising life's processes. Along the way, by tackling modeling issues from both directions, computational endeavours might shed light on the limits of modelling and perhaps produce deeper insights not only for synthetic biology but also for systems biology. The *Synthetic Biology Network for Modelling and Programming Cell-Chell Interactions*¹ (SynBioNT), funded in March 2008 by a grant from the BBSRC (with participation from EPSRC & ESRC), UK, invites participation in its sponsored symposium "*Challenges in Top-Down, Bottom-Up and Computational Approaches in Synthetic Biology*".

This symposium invites speakers and participants working in the following themes: **(1)** syntheticbiology (top-down); **(2)** artificial chemical cells (chells, protocells, minimal cells) (bottom-up); **(3)** artificial computational cells and systems biology modelling; and **(4)** Ethical, Legal and Social issues in synthetic biology. The three technical routes are necessary to systematically chart the possible paths to a successful and complete understanding of life, and its potential instrumentalisation towards fulfilling and securing societal needs.

If you would like to give an oral presentation (30' + 10' Q/A) please send a title, extended abstract and **firm** commitment to participate to Nicholas Poxon (nzp@cs.nott.ac.uk) not later than the **8th February 2010**. Titles and abstracts will be evaluated for fit with the symposium and the first author of accepted papers will have all of her/his expenses covered by the network. We expect to accept up to 40 fully funded talks (~10 per theme) and up to 20 partially funded (i.e. not presenting) participants.

Dr. N. Krasnogor (co-chair)
Dr. P. Martin (co-chair)
A. Balmer (co-chair)

¹ <http://www.synbiont.org>