

# Special Session on Artificial Biochemical Networks

IEEE Congress on Evolutionary Computation 2009

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Biological organisms appear to be orders of magnitude more complex than present-day computational systems, yet current understanding of their genomes suggests they consist of only a relatively small number of functional components. This highlights that the source of biological complexity lies not within the individual gene products but rather within their interactions and consequent organisation into biochemical networks.

Biochemical networks are able to carry out very complex behaviours using relatively few functional components, and they do this using a genetic representation that is inately evolvable. In essence, this is exactly what is desired when evolving computation within an evolutionary algorithm: complex behaviours, a small search space, and an evolvable representation. This has led to a growing interest in computational models based upon the structure and behaviour of biochemical networks, such as computational models of genetic regulatory networks (GRNs), artificial chemistries, and cell signalling models.

These artificial biochemical network models feature a number of related behaviours, such as self-organisation, feedback, and complex dynamics, and consequently they face a number of common issues: such as methods of programming and input-output coupling, the use of appropriate levels of abstraction, and techniques for analysing, understanding and visualising their behaviour.

This session aims to bring together researchers interested in artificial biochemical networks and other computational models motivated by the behaviours of biological cells. We welcome submissions reporting theoretical or empirical results for both standalone models and those used within the context of evolutionary algorithms. Topics of interest include, but are not limited to:

- Computational models of Genetic Regulatory Networks
- Algorithmic/Computational chemistries
- Computational models of cell signalling
- Programmability, scalability, evolvability and fault tolerance
- Dynamical systems analysis and mathematical modelling
- Implementations and applications, in both hardware and software
- Uses within computational development

## Organiser

Michael Lones  
University of York, UK  
mal503@ohm.york.ac.uk

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To submit your paper, please use the standard submission page on the CEC website, indicating that you wish to submit to this special session.

