



At the Second BIOMICS Summer Workshop

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Editorial

Through the sustained interdisciplinary synthetic work by our interdisciplinary team of computer scientists, mathematicians, system biologists, security experts, and chemists, BIOMICS in its second year learned much about the symmetry structure of discrete and continuous models of biological systems, delving deeper into the possible correspondences between internal and external types of symmetry, as well as gaining new insights into symmetry's possible roles in computation.

For example, functors map the symmetries of biochemical reactions to those of their discrete and continuous models;

and we now have deeper insights in the symmetries of differential equations and their discrete variants.

A mathematical framework appropriate for interaction computing came into place through the interdisciplinary discussion of biologists, computer science and mathematicians in the project, in which (recursive) interaction of computational units brings about their dynamic deployment, creation and destruction in interaction with each other and their environment.

Coalgebraic formulations of this interaction computing framework will lead to

specification of Interaction Computing systems, and is compatible, e.g., with the Abstract Machine Framework, successfully used in industry.

BIOMICS was represented at the Unconventional Computation/Natural Computation Conference (UCNC 2014) held in London, Ontario in July, where we presented the status of the project in the UCOMP Unconventional Computation in Europe Workshop. In September, two of our researchers attended the 2-week TRUCE Summer School in Unconventional Computation in Malaga, Spain.

Project Coordinator and Co-Cordinator
Paolo Dini and Chrystopher Nehaniv (UH)

Second BIOMICS Workshop at St Andrews



Prof Bruce Christianson, Prof Egon Börger, Prof Chrystopher Nehaniv, Dr Attila Egri-Nagy, Dr Fariba Karimi

Dr Eszter Gselmann and Prof Zoltán Muzsnay

Dr Paolo Dini, Eric Rothstein, Daniel Schreckling and Dr Zoltán Halasi

Prof Egon Börger

Communicating and collaborating across disciplinary boundaries is always a challenge. However, from a team-building point of view we have addressed this challenge with a great deal of positive energy. We held seven multi-lateral and two plenary meetings, one of which was our Second BIOMICS Summer Workshop. The workshop was a very fruitful exchange of ideas, disciplinary languages and perspectives and cultural interactions.

The Workshop was hosted by the University of Dundee and took place at the University of St Andrews in Scotland 18-20 June. The meetings led to one joint paper and several budding collaborations between all the partners.

Participants said it provided a solid platform for the BIOMICS researchers to come together, update one another on each of the research deliverables, and collaborate even more closely going into year three.

The partner institutions were represented by 15 BIOMICS researchers over the two days.

Prof Egon Börger of the University of Pisa (Dipartimento di Informatica) was a special guest. Prof Börger gave a 2-hour tutorial on Abstract State Machines and spoke about how they could be relevant to BIOMICS.

UCNC in London, Ontario, Canada

UCNC 2014 Conference

In July 2014, Paolo Dini, Fariba Karimi and Ágnes Bonivárt (all UH) attended the Unconventional Computation/Natural Computation (UCNC) 2014 Conference in London, Ontario.

(<http://conferences.csd.uwo.ca/ucnc2014/>).

This exciting conference has been held every 1- 2 years since 1999 in different countries all over the world and attracts a very wide range of interdisciplinary researchers from biology, chemistry, mathematics, physics, and computer science. Paolo Dini gave a well-received presentation on the status of the BIOMICS project in the UCOMP: Unconventional Computation in Europe Workshop, organized by the TRUCE Project, and presented our project poster.



Dr Fariba Karimi, Dr Paolo Dini, Ágnes Bonivárt



Dr Paolo Dini, Ágnes Bonivárt, Prof Chrystopher Nehaniv, Dr Fariba Karimi,

TRUCE Summer School in Malaga, Spain



Ágnes Bonivárt and Eric Rothstein

BIOMICS researchers: Eric Rothstein (UNI PASSAU) and Ágnes Bonivárt, (UH) participated in the TRUCE Summer School on Unconventional Computation, Malaga, Spain, September 2014. The TRUCE Summer School was a two-week programme, comprising lectures from leading researchers in unconventional computation, intensive workgroups, and leisure time, set in the beautiful surroundings of Andalusia, Spain. Topics included bio- and nature-inspired computing, synthetic biology, reaction-diffusion computing, quantum computing, physical computation, evolution, and computer creativity.

More details at:

<http://www.truce-project.eu/2014-summer-school.html>.

Latest BIOMICS Publications

The BIOMICS project team published 8 Journal articles, submitted 11 articles to journals, 3 Refereed Conference Proceedings, 22 Conferences and Workshops papers and presentations, and 13 BIOMICS Summer Workshop presentations. You can view them on the BIOMICS website at:

<http://www.biomicsproject.eu/public-publications>



Forthcoming

Seven BIOMICS researchers and two members of the Interaction Computing Research Network have been invited to contribute a paper to a Special Issue on Heterotic Computing of the Philosophical Transactions of the Royal Society A. This paper has just been submitted and, subject to review, will be published in 2015.