



ASSYSTComplexity Newsletter

Number 2, September 15th 2009

Special ECCS'09 Edition

www.assystcomplexity.eu

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I. Editorial

Welcome to the 2nd ASSYSTComplexity Newsletter which is published to coincide with the European Conference on Complex Systems, ECCS'09 at Warwick University.

One of the main goals of the ASSYST Coordination Action is to promote Complex Systems for Socially Intelligent ICT (COSI-ICT) and, more generally, Complex Systems (CS) Science in Europe and Worldwide. We do this by communicating widely with scientists, policy makers, and business people, and by showcasing success stories of CS applications.

In this issue you will find a success story concerning applications of Complex Systems Science concepts and tools to a number of practical business and social problems by a team of scientists and software developers under the leadership of Professor George Rzevski. More details can be found at the ASSYST Portal.

The ASSYSTComplexity newsletter received a great deal of attention after its launch in July and we hope to reach even higher numbers in this edition. The number of subscribers has grown significantly and we are reaching even more practitioners and researchers in complex systems studies with this 2nd edition. We'd like to remind readers that the newsletter is open to all, and any reader can share his or her stories.

Please send your success stories using the email newsletter@assystcomplexity.eu (see more details at the end of this newsletter in **Contacts**). These stories should inform a general audience on successes applying the ideas and methods of complex systems science in any domain. We are interested in the successful application of CS research to real world problems. They will be published in the next Newsletter and in the ASSYST Portal. Also, these success stories will appear in the forthcoming brochure "Successes and Applications

The poster for ECCS'09 features a blue and white abstract background with a network-like structure. It includes the following text:

THE UNIVERSITY OF WARWICK | CSI

ECCS'09

European Conference on Complex Systems
21- 25 September 2009

Committees:
Marina Kirillova, Francois Kepes, Paul Bourgin, Jeff Johnson, Susan Mackay, Robin Ball, Amos Baron, Francis Galton, Edmund Charles Brown, Andrea Lenti, Paul Vercellis, Wolfgang Mauer, Helge Kantz, Fatihcan Ay, Matteo Marsili, Colin Connaughton, Stefan Grossmann, Itzhak Kozminski, Maria Neubauer, Yulia Tsvetkova, Yassou Merali, Jianlong Peng, Josephine Chan, Jan Gertel, David Will

Policy, Planning & Infrastructure
Policymaking; Urban Planning; Intelligent Transport & Power Networks; Medical & Health Systems.

Collective Human Behaviour and Society
Economics & Finance; Sociology; Psychology; Game Theory.

Interacting Populations and Environment
Climate Change; Pollution; Demography; Ecology; Epidemiology.

Complexity and Computer Science
Robotics; Grids, Clouds & Novel Computing; Ubiquitous Computing.

From Molecules to Living Systems
Self-assembly of Self-organisations; Neuroscience; Cell Developmental and Systems Biology; Genetics; Medicine & Physiology.

Mathematics and Simulation
Mathematics; Modelling; Simulation; Theoretical Physics.

Invited Speakers:
Edward Ayns, Peter Beutels, Nigel Gilbert, Dirk Helbing, Robert Mackay and many more.
Information is published regularly at [HTTP://ECCS09.INFO](http://ECCS09.INFO)

Deadlines:
Paper Submission: 31 March 2009 / 19 April 2009 / 3 May 2009
Registration open until 1 September 2009.

Logos for EPSRC (Engineering and Physical Sciences Research Council), BBSRC (Bioscience Research Council), and the London Mathematical Society are visible at the bottom.

of Complex Systems” as part of our efforts to publicise the new science and encourage more research funding.

Finally, and as usual, the Newsletter includes additional news and information about our community, including the most recent developments of the ASSYST Portal.

2. Success Stories: Practical Business Applications of Complexity Science from George

Implementation of Complexity Management Systems

In 1990, when George Rzevsky was a Professor in the Design and Innovation Department of The Open University, UK, and Director of the Centre for the Design of Intelligent Systems, he was invited to give a series of lectures on multi-agent technology in Samara, Russia by the Soviet Academy of Sciences. This visit marked the beginning of a long-term collaboration with Petr Skobelev, a talented young researcher. George and Petr jointly founded, and provided technological leadership for, Magenta Corporation Ltd and Knowledge Genesis Ltd. These commercial organizations, based both in London and Samara, developed the software for all the projects described in this article.

During the ten-year period, 1999 – 2009, Magenta Corporation and Knowledge Genesis have developed, based on principles and methods discovered and articulated by Professor Rzevski, a very large number of complexity management systems. These systems, which are all in commercial use, have one feature in common – *they have succeeded in solving problems, which were considered too complex for generally available conventional methods and tools.*

Examples of successfully developed and implemented complexity management systems, include:

- Managing in real time a fleet of 2,000 taxis, for a transportation company in London
- Managing in real time a large fleet of car rentals, for one of the largest car rental operators in Europe
- Managing in real time 10% of the world capacity of crude oil sea-going tankers, for a tanker management company in London
- Resolving clashes in aircraft wing design for the largest commercial airliner in Europe
- Real-time scheduling of a large fleet of trucks transporting parcels across the UK
- An agent-based simulator for modelling the airport and in-flight, RFID-based, catering supply chain, luggage handling processes, and passenger processing, for a research consortium in Germany

- Selecting relevant abstracts for a research team using agent-based semantic search, for a genome mapping laboratory in the USA
- Discovering rules and patterns in data using agent-based dynamic data mining technology, for a logistics company in the UK
- Managing social benefits for citizens supplied with electronic id cards, for a large region in Russia

Two of these systems, the “Real-Time Management of a Large Fleet of Taxis” in London, and “Managing a Large Fleet of Rental Cars” in the European territory, are described in more detail at the ASSYST Portal – please visit <http://www.assystcomplexity.eu>

Publications

Professor George Rzevsky has a long list of publications on the topic of complex systems that can be found in his website at <http://www.rzevski.net/>. The following is a selection of some of his work most relevant work.

EMERGENT INTELLIGENCE IN MULTI-AGENT SCHEDULERS

George Rzevski, Petr Skobelev

“The paper describes a multi-agent scheduler which exhibits emergent behaviour such as self-organization, learning, co-evolution with their environment and spontaneous autocatalytic acceleration of the agent interaction leading to a fast building of schedules. The intelligence of the scheduler emerges from the horizontal and vertical interaction of its constituent agents balancing their individual and group interests.”

Link: <http://assystcomplexity.eu/short/?id=25>

RESOLVING SCHEDULING ISSUES OF THE LONDON UNDERGROUND USING A MULTI-AGENT SYSTEM

Rajveer Basra, Kevin Lü, George Rzevski, Petr Skobelev

“We consider the logistic issues for The London Underground (LU), which spans the entire city, and is a vast network of inter-related railway lines. By its very nature, it is a dynamic, complex and unpredictable environment; operating or being maintained 24 hours-a-day. This paper reports on an investigation in to how a Multi-Agent System (MAS) may be used for resolving scheduling issues for LU. It is a previously unexplored domain. A prototype system MASLU is developed through the use of Multi-agent Systems (MAS) technology, in an innovative and unique manner, with a view to resolving the London Undergrounds scheduling/logistics issues in real time.”

Link: <http://assystcomplexity.eu/short/?id=26>

DESIGNING COMPLEX ENGINEERING SYSTEMS

George Rzevski

“Physical artefacts such as machines, vehicles, spacecraft and robots could be designed as intelligent networks rather than integrated units, giving them the feature of adaptability. Two examples of the new approach to the design of engineering artefacts are given: an intelligent variable geometry compressor and a family of space exploration robots.”

Link: <http://assystcomplexity.eu/short/?id=27>

ON CONCEPTUAL DESIGN OF INTELLIGENT MECHATRONIC SYSTEMS

George Rzevski

“We have technology now to design networks of small intelligent units capable of competing and/or co-operating with each other on specified tasks and making decisions under conditions of uncertainty through a process of negotiation. In highly dynamic environments, such distributed systems are capable of achieving considerably better results in terms of performance/cost ratio and reliability than conventional centralised large systems and structures. The major elements of these systems are intelligent agents, which are software objects capable of communicating with each other, as well as reasoning about received messages. The paper discusses conceptual design of mechatronic systems based on multi-agent technology.”

Link: <http://assystcomplexity.eu/short/?id=28>

3. Making the case for CS Science

One of the most important ways that ASSYST can serve the complex systems community is to coordinate good arguments for the science to be funded. While the world needs complex systems science more than ever, there are huge pressures on public funds. Different research communities compete more or less effectively for their share of the research cake, and those communities that are divided or cannot be bothered to promote their science can expect nothing but the crumbs. The Complex Systems research community has made an eloquent case for support that has resulted in national funding in a number of countries, and the current COSI-ICT research programme funded by the FET unit of the EC. Now we must look to the future. There is no call targeted at complex systems in the current FET programme, and ASSYST is actively trying to lobby the commission by bringing the CS community together to make the best possible case for funding our science.

ASSYST is currently soliciting answers for some questions that you can find at the end of this newsletter. They will be synthesised with the contributions of others into a document edited by Jeff Johnson, Paul Bourguine and David Hales to be published in October.

4. News from the Portal

COSI-ICT 09: First International Workshop on Complex Systems For Socially Intelligent ICT

Members of the COSI-ICT Research Programme (CYBEREMOTIONS, EPIWORKS, QLECTIVES, and SOCIONICAL) will present their projects at a Satellite Conference of ECCS'09 at Warwick University on Wednesday 23rd September 2009 (www.eccs09.info). This is organised by the COSI-ICT coordination action ASSYST. Members of the research community are also invited to present relevant work on social networking and socially intelligent ICT and the workshop is open to all.

Digital Library

<http://www.assystcomplexity.eu> recently launched the ASSYST Digital Library section. The Digital Library will be the central repository for all digital documents related to Complex Systems studies. Initially it has a video section, and in the future it will hold many different types of documents, audio files, presentations, and more.

The first videos in the library were from the *Aesthetics at the Heart of Science* workshop organised by ASSYST at the FET 2009 *Science Beyond Fiction* conference in Prague, the 21-23 April 2009. Following this we added videos from the Arrábida Meeting 2009. The next challenge will be to add videos from the ECCS'09 which will take place in Warwick, 21-25 September 2009.

Link: <http://www.assystcomplexity.eu/video.jsp>

Lyapunov Analysis, from Theory to Geophysical Applications

Lyapunov exponents and vectors provide a powerful theoretical and practical framework for the analysis of the instabilities that can develop in a dynamical system. This Thematic Institute, to take place at the Institute of Complex Systems, Paris on October 26th-30th aims at bringing together scientists active in applied mathematics and/or geophysics, finding the crossing point between state-of-the-art Lyapunov analysis theory and the current challenges faced by geophysics. Special emphasis will be put on recent theoretical results on Lyapunov vector analysis, turbulent transport, and data assimilation.

Link: <http://www.iscpif.fr/LTG09>

International Symposium on Complex Systems Science

ISC-PIF and IXXI, Paris, 17-18 September 2009

The Complex Systems Institutes of Paris Ile-de-France (ISC-PIF) and Lyon Rhône-Alpes (IXXI), and the French National Network for Complex Systems (RNSC) are organizing an "International Symposium on Complex Systems Science" in the honour and with the kind participation of their scientific boards' members.

Link: <http://iscpif.fr/symposium09>

5. Conferences and Workshops

<http://assystcomplexity.eu/conferences.jsp>

Conflict and Complexity II: Theory, Evidence and Practice
8 Sep 2009 to 9 Sep 2009
University of Kent, Canterbury, UK

Darwin Meets von Neumann: European Conference on Artificial Life 2009
13 Sep 2009 to 16 Sep 2009
Budapest, Hungary

ESSA 2009 - The Sixth Conference of the European Social Simulation Association
14 Sep 2009 to 18 Sep 2009
University of Surrey, Guilford, UK

SASO 2009 - Third IEEE International Conference on Self-Adaptive and Self-Organizing Systems
14 Sep 2009 to 18 Sep 2009
San Francisco, USA

Complex Systems and Changes: Darwin and Evolution - Nature-Culture Interfaces
15 Sep 2009 to 20 Sep 2009
Sant Feliu de Guixols, Spain

The Future of Complexity
15 Sep 2009 to 16 Sep 2009
BICS, University of Bath

ECCS 2009 - European Conference on Complex Systems
21 Sep 2009 to 25 Sep 2009
University of Warwick, UK

2009 International Conference on Adaptive and Intelligent Systems
24 Sep 2009 to 26 Sep 2009
Klagenfurt, Austria

Complexity Theories of Cities have come of Age
24 Sep 2009 to 27 Sep 2009
Berlageroom at BK City, the new faculty building of the TU Delft Faculty of Architecture.

Natural and Biomimetic Mechanosensing
26 Oct 2009 to 28 Oct 2009
Dresden, Germany

The 11th International Symposium on Stabilization, Safety, and Security of Distributed Systems
3 Nov 2009 to 6 Nov 2009
Lyon, France

SiCoSSys 2009 - International Workshop on "Simulation of Complex Social Systems"
9 Nov 2009 to 9 Nov 2009
Sevilla, Spain

AESCS 2009 - The Sixth International Workshop on Agent-Based Approaches in Economic and Social Complex Systems
13 Nov 2009 to 14 Nov 2009
National Chengchi University, Taipei, Taiwan

DARWIN 2009 - Trends in Complex Systems - International Workshop on 150 Years after Darwin: From Molecular Evolution to Language
23 Nov 2009 to 27 Nov 2009, Palma de Mallorca, Spain

ISDA 09 - The International Conference on Intelligent Systems Design and Applications
30 Nov 2009 to 2 Dec 2009, Pisa, Italy

NICSO 2010 - Workshop on Nature Inspired Cooperative Strategies for Optimization
12 May 2010 to 14 May 2010
Granada, Spain

Breaking News

ECCS'10 will be held in Lisbon!

ECCS 2010 - LISBON

www.eccs2010.com

6. Academic Programs and Summer Schools

PHD IN COMPLEX SYSTEMS AND COMPUTATIONAL SOCIAL SCIENCE,
Geary Institute, University College Dublin
<http://geary.ucd.ie/cscs>

The CSCS PhD programme is a four year thematic, structured programme commencing in the Academic Year 2009/2010.

The programme incorporates a range of taught modules (Stage I), followed by a program of original research leading to the award of Doctoral degree by research (Stage II). CSCS students may also participate in short, external internships during the four year programme.

INTERNATIONAL DOCTORAL PROGRAM IN COMPLEXITY SCIENCES, Lisbon

http://idpcc.dcti.iscte.pt/IDPCC_home.html

This new academic program is a joint action between ISCTE - IUL and FCUL (Lisbon). The IDPCC program is proposed and organised by the same team responsible for the Master Program in Complexity Sciences, already existing at ISCTE and FCUL.

7. Contacts

Website: <http://assystcomplexity.eu>
Email: newsletter@assystcomplexity.eu

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Contributors to this edition:

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Story Submission Guidelines: If you are a Complex System researcher/practitioner and want to share a success story about your work / research please submit it to newsletter@assystcomplexity.eu. The story should be no longer than 500 words (if you want to submit an extended story please contact us) and should be sent in ODT, RTF, DOC or TXT format.

If you want to subscribe to this newsletter please send a message to newsletter@assystcomplexity.eu with the subject "subscribe"

If you want to unsubscribe to this newsletter please send a message to newsletter@assystcomplexity.eu with the subject "unsubscribe"





SURVEY: FET Programmes for Funding Complex Systems Science

With the hope of persuading FET Proactive¹ to make a call involving complex systems science ASSYST is currently soliciting your answers to the following questions. They will be edited into a document by Jeff Johnson, Paul Bourguine and David Hales to be presented to FET in October 2009. We want the opinions of the whole CS community, and all contributors will be acknowledged.

- What is the relation and contribution of a potential future call of CS to ICT

- What makes CS research suitable for FET ICT?

- Can it be expected to achieve universal concepts in systems that can be applied to or influence future ICT?
 - Are there steps forward in this direction worth chasing?

 - What has been the progress over the last 10 years towards this unification?

 - Are there observables that may be general?

 - What (if any) are the reasons to study dynamics of CS?

 - Can there be "thermodynamics" of CS?

 - What are the arguments for studying "out of equilibrium" dynamics and what is its relevance for ICT?

¹ http://cordis.europa.eu/fp7/ict/fet-proactive/home_en.html

- What could be an appropriate balance between theory and application?
- How do we make sure if we have a mixed call that theory (or fundamentals) are worked on?
- What should be the priority application areas? On what basis are we selecting? ICT relevance?
- Is there a value in bringing together CS with other communities, i.e. PERADA?²
- Who are the users and how are they involved (for the research results)?
- What is going to be the tangible output/impact of a call in theory/fundamentals?
- What is going to be measure of success of the research in CS?

We urge you to send us your answers to these questions. Just a line or two on each can ensure that your interests will be represented when we lobby for a CS call in future FET Proactive calls. There will a box at the ECCS'09 conference registration desk where you can leave written answers on this questionnaire, or email then to:

csfunding@asssycomplexity.eu

With thanks – Jeff Johnson, Paul Bourguine and David Hales

Inquiries relating to this questionnaire can be sent to j.m.bromley@open.ac.uk

² Pervasive Adaptive Research, <http://www.perada.eu/>