

ECCS'07 - Satellite Conferences – Summary

The Satellite Conferences on October 4 and 5, 2007:

- * Complex Networks: Dynamics and Topology Interplay (2 days)
- * Developmental Systems Biology:
 - From Molecular Feedback Loops to Spatio-Temporal Patterns (1day)
- * Heterogeneous Agent Systems and Complex Networks (1 day)
- * Dynamics on and of Complex Networks (1 day)
- * Engineering Environment-Mediated Multiagent Systems (1day)
- * Evolution and Game Theory (1/2 day)
- * Emergent Properties in Natural and Artificial Complex Systems (1 day)
- * Social Websites: Complex Dynamics and Structure (1 day)
- * Enhancing Social Interaction:
 - Recommendation Systems, Reputation, P2P, Trust and Social Networks (1 day)
- * Interacting Agents, Complexity and Inter-Disciplinary Applications (IACIA) (1/2 day)
- * Molecular Docking, Complexity, and Optimization (1 day)
- * Global versus Local Dynamics on Networks (2 days)
- * Multi-Agents for Modeling Complex Systems (MA4CS) (1 day)
- * Genetic and Biological Networks: Models, Dynamics, and Simulations (1 day)
- * Logistics Networks (1 day)
- * Critical Infrastructures as Complex Systems (1 day)
- * Synchronization and Emergent Coordination (1 day)

ECCS'07 offered Satellite Conferences in order to reach a "bottom up" involvement of the complexity science community and to provide space for self-organization and emergent fields. Our goal was a broad exchange of ideas across disciplines.

The idea and rules for organizing Satellite Conferences are as follows:

- 1) ECCS'07 provided lecture halls or seminar rooms, local organizational support, food and beverages. Moreover a certain sum of money was reserved for Satellite Conference Organizers in order to support invited speakers, waive conference fees, and/or support young scientists, with a focus on new EU member countries and female scientists. We provided about 1000 EUR for each half-day Satellite Conference with 15 participants (about 2000 EUR for a one-day conference with 30 participants and about 4000 EUR for a two-day conference with 60 participants).
- 2) In exchange we expected the Satellite Conference organizers to undertake efforts to attract additional, regularly paying participants to ECCS'07 (at least 15 participants per half-day Satellite Conference).
- 3) The obligations of Satellite Conference organizers were as follows:
 - * Contact their community to participate in the Satellite Conference.
 - * Ensure the selection of high-quality contributions in their own responsibility.
 - * Provide the ECCS'07 local organizers with the contact details of participants, particularly e-mail lists.
 - * Inform the participants that they must register for ECCS'07.
 - * Finish the Satellite Conference program and the corresponding internet page, containing the time schedule, speakers and titles of talks (preferably with links to corresponding abstracts) by August 3, 2007.
 - * Submit a short report by October 31, 2007, particularly containing the details how the money provided for the Satellite Conference was used, indicating the compliance with the guidelines listed.
- 4) The reimbursement of travel or accommodation costs within the limits of the financial support of Satellite Conferences Workshops required original receipts.

Complex Networks: Dynamics and Topology Interplay

Organizer: A. Barrat (Alain.Barrat@th.u-psud.fr)
R. Pastor Satorras
Webpage: <http://www.fen.upc.edu/~romu/ECCS07/index.htm>
Length: 2 Days (October 4+5, 2007)

Scope:

Complex network theory provides a theoretical framework that allows to describe and rationalize a large set of systems composed by many units that act upon one another through a heterogeneous pattern of contacts or interactions. Complex network theory has found applications in diverse fields, ranging from biology and social sciences to large information and transportation infrastructures, and noteworthy examples of networked systems can be found on the World-Wide Web, the Internet, social networks, protein or gene interaction networks. In early times, the largest effort in network science has been devoted to the analysis and description of the topology of interactions in networks. New statistical tools were thus developed and applied in this framework. The large scale analyses performed put in evidence the essential topological properties of real complex networks, and uncovered the ubiquity of features such as the small-world property or a widespread heterogeneity in the pattern of connections.

Networked systems, on the other hand, are in many cases the substrate of dynamical process that can be of critical importance. For example, biological networks in our cells carry out vital metabolic functions, the Internet is the support of many different information transfer networks, while social networks are the environment in which epidemics, rumors, fads or opinions propagate. The attention of the research community has thus been recently shifted to the understanding of such dynamical processes, and in particular to the question of the influence of the network's heterogeneity on these processes. Moreover, many networks are dynamical in nature and their topology cannot be considered as static, but is instead driven by a process of birth and death of nodes and connections. This is for instance the case of the Internet, in which new computer and physical connections are being added or removed on a daily basis. In some instances, dynamical processes on networks occur at a time scale which is much faster than any possible topological changes: it is then legitimate to neglect the network's dynamics and consider the dynamical processes on a static network topology. On the other hand, in other cases the dynamics itself may have an influence on the network, leading to its continuous topological reshaping. A most prominent example is the World-Wide Web, whose topological evolution is certainly strongly influenced by the performance and popularity of search engines. The workshop "Complex networks: Dynamics and Topology Interplay" is organized as a satellite conference of the European Conference on Complex Systems (ECCS'07), by A. Barrat (Paris, France) and R. Pastor-Satorras (Barcelona, Spain). It is devoted to the recent advancements in the understanding of dynamical processes of complex networks from a twofold perspective: the effects that a complex topology has on the behavior of dynamical systems with largely separated time scales, and the feedback mechanisms between evolving complex networks and dynamical systems occurring on top of them, with comparable time scales. These dynamical processes include (not exclusively) traffic, congestion and failure cascades, network resilience, ecosystem stability, navigation and random walks on networks, epidemics and rumor spreading, synchronization and other processes which show emergent cooperative behavior, and for which topology, network evolution, and dynamical behavior are intimately linked.

Speakers:

- M. Boguñá, Navigating scale-free networks
- S. Bornholdt, Toy models for evolving dynamical networks
- U. Brandes, Dynamic Visualization of Internet Topology Evolution
- G. Caldarelli, Self-organized network evolution coupled to extremal dynamics
- C. Castellano, Routes to thermodynamic limit in networks
- V. Colizza, Epidemic spreading in heterogeneous metapopulation networks: invasion threshold and effect of travel restrictions
- P. S. Dodds, Social and Biological Contagion: Models, Data, and Experiments
- S. Kirkpatrick, TBA
- F. Menczer, Web Traffic Network
- Z. Toroczkai, Topological bottlenecks in network communication
- L. Dall'Asta, New insights on the traceroute process of networks exploration

- T. Gross, State-Topology Interplay in Epidemic Dynamics on an adaptive Network
- L. Gulyás, Emergent Opinion Dynamics on Endogenous Networks
- D. Heide, Effects of load fluctuations on the robustness of networks
- S. Jalan, Synchronization and formation of synchronized clusters in coupled maps on networks with varying topology
- A.T. Lawniczak, Packet traffic dynamics in data communication network models
- N. Peyrard, A method to study the influence of the interaction network on infectious diseases propagation
- J. Scholz , Efficient routing weights in communication networks
- Vezzani, Aging dynamics and the topology of inhomogeneous networks

Developmental Systems Biology: From Molecular Feedback Loops to Spatio-Temporal Patterns

Organizer: L. Brusch (lutz.brusch@tu-dresden.de)
 A. Oates
 A. Deutsch

Webpage: <http://theobio.mtbio.de/DevoSysBio/index.php>

Length: 1 Days (October 5, 2007)

Scope:

This satellite workshop presents combined experimental/theoretical approaches to selected problems of biological morphogenesis. Starting from the interactions between the molecular and cellular components, the tools of complex systems science allow us to predict the emergent macroscopic patterns and tissue behaviour. The two morning sessions focus on the experimentally more tractable phenomena of lower organisms while the two afternoon sessions are devoted to higher organisms. We encourage lively discussion. By highlighting recurring structures in the corresponding mathematical models, the workshop will emphasise the common organizational principles underlying the considered examples.

Embedded within the European Conference on Complex Systems, the satellite workshop "Developmental Systems Biology: From Molecular Feedback Loops to Spatio-Temporal Patterns" will bring together mathematicians, physicists and biologists in Dresden on October 5, 2007. The workshop presents combined experimental/theoretical approaches to selected problems of biological morphogenesis. Starting from the interactions between molecular and cellular components, the tools of complex systems science allow us to predict the emergent macroscopic patterns and tissue behaviour. The two morning sessions focus on the experimentally more tractable phenomena of lower organisms while the two afternoon sessions are devoted to higher organisms. We encourage lively discussion. By highlighting recurring structures in the corresponding mathematical models, the workshop will emphasise the common organizational principles underlying the considered examples. The workshop is organised by Lutz Brusch and Andreas Deutsch of the Center for Information Services and High Performance Computing at TU Dresden and Andrew Oates of the Max Planck Institute of Molecular Cell Biology and Genetics.

Speakers:

- Markus Bär, Modelling pattern formation and orientational ordering in collective motion of myxobacteria
- Tobias Bollenbach, Morphogen gradient formation in epithelia
- Jos Käfer, The foam physics of biological morphogenesis
- Markus Kollmann, Strategies of noise suppression in information processing biological networks
- Michael Kücken, Volume oscillations in regenerating Hydra
- Roeland Merks, Modeling formation of auxin transport channels during leaf development: a traveling-wave hypothesis
- Andrew Oates, The rise and fall of synchrony in somitogenesis
- Isaac Salazar-Ciudad, Integrating pattern formation and morphogenesis in evolution and development: Examples from the simulation of tooth development

- Seiji Takagi, Various dynamic patterns and pattern transitions in the rhythmic contraction by true slime mould *Physarum polycephalum*

Engineering Environment-Mediated Multiagent Systems

Organizer: D. Weyns (Danny.Weyns@cs.kuleuven.be)

S. Brueckner

Y. Demazeau

Webpage: <http://www.cs.kuleuven.ac.be/~distrinet/events/eemmas/2007/>

Length: 1 Days (October 5, 2007)

Scope:

The advances in computing and communication technology have paved the way to large scale integration of distributed software systems. As a result, new generations of software applications are rapidly permeating our society. Yet, the development and management of these software applications introduce increasing levels of complexity. Addressing the challenges requires the development of new techniques, practices, and tools that build upon sound engineering principles. The fundamental results from complex system research provide a rich potential to software engineering of complex distributed systems.

The field of multi-agent systems (MAS) studies the foundations and engineering of software systems that consists of a network of autonomous entities (agents) that are situated in an environment and that interact with one another to achieve the system goals. Inspired by biological systems, MAS researchers have demonstrated how environment-mediated interaction among agents enables to build adaptive, robust, and scalable solutions. Computational fields and digital pheromones can guide agents in their local context and as such facilitate the coordination of a community of agents in a distributed manner, providing a promising approach to deal with the increasingly complexity of distributed applications. Key issues to develop environment-mediated multi-agent systems are (1) the need for proper infrastructure to support mediated interaction among agents, (2) understanding of self-organization and emergence, and (3) the need for disciplined engineering approaches. The goal of EEMMAS is to advance state of the art theory and practice in engineering environment-mediated multi-agent systems. In particular, EEMMAS aims to establish a forum for researchers and engineers interested in the foundations, the engineering, and applications of environment-mediated multi-agent systems. Invited speakers at EEMMAS are Marco Dorigo who will talk about Swarms of Self-Assembling Robots and Juan Pavon who will give a talk on Complex Systems and Agent-Oriented Software Engineering. Particular topics of work that will be presented at EEMMAS include Engineering Self-Organizing Applications, Stigmergic Interaction, Modeling and Structuring Mediating Environments, and Environment-Based Support for Context and Organizations.

Report:

The objective of EEMMAS is to establish a forum for researchers and engineers interested in environment-mediated multi-agent systems, and to advance state of the art theories and engineering in the field. In total, EEMMAS attracted around 50 attendees. 14 speakers presented research results and stimulated lively interactions among the attendees. During the closing discussion session, the attendees reflected on the presented research and discussions. The main observation was the increasing attention for supporting organizations in mediated coordination. Developing this next generation domain-specific middleware for multi-agent systems poses severe challenges, such as the definition of suitable sets of programming abstractions and development of supporting infrastructures. Another observation was the particular attention for the application domain of transportation (traffic, logistics, but also baggage handling). The papers presented at EEMMAS were distributed on a CD at the satellite conference and are available at the EEMMAS website. Post-activities include the preparation of post-proceedings that will be published by Springer as a volume in Lecture Notes in Computer Science series. The volume will contain thoroughly revised papers of the satellite conference completed with a number of invited contributions from renowned researchers in the field. In addition, a special issue in the ACM transaction on autonomous and adaptive systems will be devoted to the subject of engineering environment-mediated multi-agent systems. For this special issue, a selection of authors of conference papers will be invited to prepare a contribution. The EEMMAS attendees expressed

their interest to continue this effort. The plan for the next edition is to focus on the particular subject of supporting organizations in environment-mediated multi-agent systems. .

Speakers:

- Marco Dorigo, Swarms of Self-Assembling Robots
- Juan Pavon, Francisco Garijo, Jorge Gómez-Sanz, Complex Systems and Agent-Oriented Software Engineering
- Jan Sudeikat, Wolfgang Renz, Toward Systemic MAS Development: Enforcing Decentralized Self-Organization by Composition and Refinement of Archetype Dynamics
- Stefano Bromuri, Kostas Stathis, Situating Cognitive Agents in GOLEM
- H. Van Dyke Parunak, Theodore C. Belding, Sven A. Brueckner, Prediction Horizons in Agent Models
- Robrecht Haesevoets, Bart Van Eylen, Danny Weyns, Alexander Helleboogh, Tom Holvoet, Wouter Joosen, Context-Driven Dynamic Organizations applied in Coordinated Monitoring of Traffic Jams
- Michael Schumacher, Laurent Grangier and Radu Jurca, Modeling and Design of an Agent-based Micro-simulation of the Swiss Highway Network
- Marie-Pierre Gleizes, Valérie Camps, Jean-Pierre Georgé and Davy Capera, Engineering Systems which Generate Emergent Functionalities
- Gabriella Castelli, Marco Mamei, Franco Zambonelli, Engineering Contextual Information for Pervasive Multiagent Systems

Dynamics on and of Complex Networks

Organizer: N. Ganguly (ganguly.niloy@googlemail.com)
G. Canright
A. Deutsch

Webpage: <http://www.cel.iitkgp.ernet.in/~eccs07/>

Length: 1 Days (October 5, 2007)

Scope:

Dynamics On and Of Complex Networks, a satellite workshop of the European Conference on Complex Systems was held on 4th October, 2007 in Dresden, Germany. The overall aim of this workshop was to explore the statistical dynamics of various large-scale networks that are found in abundance in both nature and man-made systems (e.g., genetic pathways, ecological networks, social networks, networks of scientific collaboration, WWW, peer-to-peer networks, power grid etc.). The workshop received a large number of quality submissions from authors pursuing research in multiple disciplines thus making the forum truly inter-disciplinary. The total number of participants who attended the workshop was approximately 40. There were around 20 speakers who spoke about the dynamics on and of different systems exhibiting a complex network structure (e.g., biological systems, linguistic systems, social systems and various other man-made systems like the Internet, WWW, peer-to-peer systems etc.). As a sequel of the workshop, the organizing committee is going to publish some of the very high quality original submissions as an edited volume from BIRKHAUSER, SPRINGER describing contemporary research position in complex networks.

Report:

Dynamics On and Of Complex Networks, a satellite workshop of the European Conference on Complex Systems was held on 4th October, 2007 in Dresden, Germany. The overall aim of this workshop was to explore the statistical dynamics of various large-scale networks that are found in abundance in both nature and man-made systems (e.g., genetic pathways, ecological networks, social networks, networks of scientific collaboration, WWW, peer-to-peer networks, power grid etc.). The workshop received a large number of quality submissions from authors pursuing research in multiple disciplines thus making the forum truly inter-disciplinary. The total number of participants who attended the workshop was approximately 60. There were around 20 speakers who spoke about the dynamics on and of different systems exhibiting a complex network structure (e.g., biological systems, linguistic systems, social systems and various other man-made systems like the Internet, WWW, peer-to-peer systems etc.).

Evolution and Game Theory

Organizer: J.C. Claussen (claussen@theo-physik.uni-kiel.de)
C. Hauert
G. Szabó

Webpage: <http://www.theo-physik.uni-kiel.de/~claussen/eccs07eg/>

Length: 0,5 Days (October 5, 2007)

Scope:

Following John Maynard Smith, evolutionary game theory matured to a powerful metaphor of evolutionary and coevolutionary dynamics. In recent years, significant progress has been achieved in evolutionary dynamics in finite populations, which allows to systematically relate microscopic models and macroscopic descriptions. Another major topic that reaches across many disciplines is evolutionary dynamics on networks as well as the interplay between the evolution on networks and the evolution of network structures.

Complemented by new experimental data, it is expected that the methodical progress will inspire related disciplines dealing with agent-based models, chemical reaction kinetics, ecological and evolutionary models at large, and social, behavioural, and economic systems. The workshop invites contributions to all related emerging topics, with an emphasis on those being relevant to both, game theory and evolution.

Speakers:

- Daniel Lawson (London) Evolution as diffusion in type space
- Kunihiro Kaneko (Tokyo) Evolution of Robustness and Phenotypic Fluctuation
- Stefan Bornholdt (Bremen) Co-evolution and the Red Queen
- Peter Stadler (Vienna and Leipzig) Replicator Equations for Simple (Bio)chemical Replicons
- Kristian Lindgren (Gothenburg) Cooperation in repeated games with unlimited stochastic payoffs
- Konstantin Klemm (Leipzig) Altruism before the transition to extinction
- Jacek Miekisz (Warsaw) Equilibrium transitions in finite populations of players
- Tobias Reichenbach (Munich) Mobility promotes and jeopardizes biodiversity in rock-paper-scissors games
- Istvan Scheuring (Budapest) Evolution of cooperators on static and dynamic graphs
- Jorge Pacheco (Lisbon) Evolutionary dynamics on networks: from multiple networks to active linking dynamics
- Christoph Hauert (Harvard) Cooperation in Social Dilemmas: The Role of Punishment and Volunteering
- Gergely Szollosi (Budapest) Hierarchical meanfield theory of evolutionary games on structured populations
- Jeferson J. Arenzon (Porto Alegre) Cooperation in diffusive spatial games
- Matjaž Perc (Maribor) Cooperation out of noise

Emergent Properties in Natural and Artificial Complex Systems

Organizer: M.A. Aziz-Alaoui (aziz.alaoui@univ-lehavre.fr)

C. Bertelle

M. Cotsaftis

G.H.E Duchamp

Webpage: <http://www-lih.univ-lehavre.fr/~bertelle/epnacs2007.html>

Length: 1 Day (October 4, 2007)

Scope:

The 4th ECCS world's largest gathering of researchers in COMPLEX SYSTEMS will be held in Dresden, Germany, on 1-5 October, 2007. You are cordially invited to submit a paper to our Satellite Conference in this Conference, which is the second one following the one we organized in the 2nd European conference of ECCS in Paris, France in 2005, see EPNADS'05 and the edited book (by Springer) which is the outcome of this first EPNADS meeting.

The aim in this Satellite Conference is to study EMERGENT PROPERTIES arising through dynamical processes in various types of natural and artificial systems. The session is concerned with multidisciplinary approaches for getting representations of complex systems and using different methods to extract emergent structures. Equations formulation can lead to the study of emergent features such as self organization, opening on stability and robustness properties. Invariant techniques can express global emergent properties in complex and dynamical evolution systems. Artificial systems such as a distributed platform for simulation can be used to search emergent placement during simulation execution. Special attention is paid to bio-complexity (but not limited to this topic) where global emergent properties can be detected.

Speakers:

- Michel Cotsaftis: What makes a system complex? An approach to self organization and emergence
- Chih-Chun Chen, Sylvia B. Nagl and Christopher D. Clack: A calculus for multi-level emergent behaviors in component-based systems and simulations
- Andrzej Gecow: Emergence of growth, complexity threshold and structural tendencies during adaptive evolution of System
- Antoine Dutot, Frédéric Guinand, Yoann Pigné and Damien Olivier: GraphStream: A tool for bridging the gap between complex systems and dynamic graphs
- André Dauphiné: Theory of reaction-diffusion and emergence of the geographical forms
- Eric Daudé, Edwidge Dubos-Paillard, David Gaillard, Emmanuel Eliot, Patrice Langlois, Eliane Propeck-Zimmermann, Damienne Provitolo and Thierry Saint-Gerand: Industrial risks and complex systems
- Damienne Provitolo: A proposition for a classification of the catastrophes based on complexities criteria
- Rawan Ghnemmat, Cyrille Bertelle and Gérard H.E. Duchamp: Community swarm optimization
- Laurent Gaubert, Pascal Redou and Jacques Tisseau: Frequency locking in tissular coupling
- Bruno Rosseto and Jean-Marc Ginoux: Autonomous dynamical systems with periodic coefficients
- Nathalie Corson and M.A. Aziz-Alaoui: Dynamics of the Hindmarsk-Rose complex neuronal system
- Baba Issa Camara and M.A. Aziz-Alaoui: Complexity and self-organization in a Michaelis-Menton type predator-prey model
- Barna Laszlo Iantovics: Cooperative medical diagnoses elaboration by physicians and artificial agents
- Eduard Babkin, Habib Abdulrab and Tatiana Babkina: AgentTime: a distributed multi-agent software system for university's timetabling
- Cyrille Bertelle, Michel Nabaa, Damien Olivier and Pierrick Tranouez: A decentralised approach for the transportation on demand problem

Molecular Docking, Complexity, and Optimization

Organizer: C. Baldauf (carsten.baldauf@biotec.tu-dresden.de)
D. Merkle
Webpage: <http://pacosy.informatik.uni-leipzig.de/MDCO-2007/>
Length: 1 Day (October 4, 2007)

Scope:

The molecular docking problem is to find the best orientation of two molecules to each other. The interaction can be modeled by a scoring function that includes terms describing the inter- and intramolecular energies. The number of degrees of freedom strongly depends on the complexity of the docking approach. The resulting fitness landscape is highly irregular. Due to this complexity sophisticated optimization algorithms are needed. Bio-inspired methods are known to be valuable tools to successfully explore such search spaces.

In order to gain a deeper insight to biochemical processes and to support the finding of potent drugs, these methods are of great importance in academic and industrial research. Unfortunately, there is a lack of communication between the communities from computer and life sciences involved in these topics. This event is intended to overcome this and to serve as a platform for exchange of knowledge and for discussion. The focus is not limited to original work but also on introductory talks from the different fields of research.

Speakers:

- Vigneshwaran Namasivayam, Robert Günther, Institute of Biochemistry, University of Leipzig, Leipzig, Germany (Talk on Bio-Algorithms in Molecular Docking)
- Martin Middendorf, University of Leipzig, Leipzig, Germany (Talk on Swarm Intelligence)
- Michael Thormann, Origenis AG, Munich, Germany
- Peter Stadler, IZBI Leipzig, Leipzig, Germany (Talk on Fitness landscapes)
- Rebecca Wade, EML Heidelberg, Heidelberg, Germany (Protein-protein docking by simulating the process of association subject to biochemical constraints)
- Wolfgang Wenzel, FZ Karlsruhe, Karlsruhe, Germany
- Eckart Zitzler, ETH Zürich (link), Zürich, Switzerland (Talk on Multitobjective Optimization)
- Angel R. Ortiz, Universidad Autónoma de Madrid, Madrid, Spain (Talk on Solvent Models for Protein-Ligand Docking)
- Oliver Korb, University of Konstanz, Konstanz, Germany (Application of Ant Colony Optimization to Structure-Based Drug Design)
- El-Ghazali Talbi, University of Lille, Lille, France (Evolutionary Molecular Docking on Large Networks)

Multi-Agents for modelling Complex Systems (MA4CS)

Organizer: G. Rotundo (giulia.rotundo@gmail.com)
H.-P. Blossfeld
C. Deissenberg
J. Holyst
P. Richmond
D. Phan
Webpage: <http://www.glodyn.net/>
Length: 2 Days (October 4+5, 2007)

Scope:

The workshop aimed at gathering experts from different disciplines including physics, finance, mathematics and economy to share the latest knowledge surrounding the use of agent based and network models used to study social and economic issues. We seek to focus on the interplay between global and local aspects, to assess the state of the art and to consider future research directions.

Specific topics include:

- stochastic and percolation models, self-organized criticality, graph dynamics, control theory, design of agent-based models for computational economics;
- co-integration and stability of financial markets, minority games, models of economics and financial systems; risk;
- decision support systems, decision making under uncertainty and incomplete information;
- population dynamics and ecosystems;
- socio-physics including cultural dynamics, voting, immigration, integration, religion, terrorism and globalization.

Report:

The workshop “Global versus local dynamics on networks” was held at the University of Technology, Dresden, Germany, on Oct.4th-5th, 2007 as part of the WG2 activities. It was chaired and coorganized by Hans-Peter Blossfeld, Christophe Deissenberg, Janusz Holyst, Peter Richmond, and Giulia Rotundo. It was most supported by COST – P10 “Physics of Risk”, chair Peter Richmond.

The workshop was a satellite of the ECCS’07 conference, from which it received further support. Such support was used for waiving the registration fees of invited workshop participants. The session chairs were Marcel Ausloos, Christophe Deissenberg, Janusz Holyst, Giulia Rotundo, Dietrich Stauffer.

Some invited participants could not come (Joana Pais, Victor Eguiluz, Iina Hellsten, Peter Richmond). The workshop was intended to be opened to QMSS program act. In fact, Prof. Hans-Peter Blossfeld gave a very interesting talk on *Globalization, Rising Uncertainty and the transition from Youth to Adulthood in Modern Societies*. The workshop was opened to local scientists. Indeed, the workshop room was often crowded. Also speakers invited to other workshops satellite of the ECCS’07 attended many talks of our workshop.

Statistics

The number of registered participants by country (of institution):

Australia	2
Belgium	2
France	2
Germany	2
Greece	1
Italy	1
Israel	1
Japan	1
Poland	5
The Netherlands	2
UK	1

Many persons did not actually register, although attending talks.

Moneywise, the budget has been limited, but has been well used and expenses felt below expected/mandatory level. Scientific output will be realized within the next few years if some subjects or methods are cointegrated in different fields.

Speakers:

- Marcel Ausloos: Preferential Adherence as the Source of World Religion Adept Distribution Evolution
- Hans-Peter Blossfeld: Globalization, Rising Uncertainty and the Transition from Youth to Adulthood in Modern Societies
- Stanislaw Cebrat: Computer modeling of genome evolution during sympatric speciation
- Christophe Deissenberg: EURACE: One year after
- Tiziana Di Matteo: Global and local dynamics in correlated systems
- Janusz Holyst: Publish or perish: analysis of scientific productivity using maximum entropy principle and fluctuation-dissipation theorem
- Renaud Lambiotte: Majority Rule on heterogeneous networks

- Melinda Mills: Globalization: Convergence or Divergence of Societies?
- Andrew Roach: Social Networks and Ideological Networks in History: Burning and the Rise of English Protestantism
- Giulia Rotundo: Discrete models in decision support systems
- J. Sienkiewicz: Local and global discrete effects in complex networks
- Dietrich Stauffer: Do language change rates depend on population size?
- Joergen Vitting Andersen: Physics applied to social phenomena reported in behavioral
- Norikazu Suzuki: Dynamical evolution of clustering in complex network of earthquakes

Multi-Agents for modelling Complex Systems (MA4CS)

Organizer: S. Hassas (hassas@bat710.univ-lyon1.fr)

G. Di Marzo Serugendo

D. Phan

Webpage: <http://bat710.univ-lyon1.fr/%7Efarmetta/MA4CS07/index.html>

Length: 1 Days (October 4, 2007)

Scope:

The aim of this workshop is to provide a focal forum for active researchers, practitioners, developers involved in modeling complex systems using the multi-agents paradigm, from different disciplines (biology, economy, sociology, urbanism, cognitive science, computer science, etc) . The idea behind this meeting is to cross fertilize and foster research activities of these different domains. One first step to achieve with this workshop is to come up with hot issues raised in different disciplines for which multi-agents modelling seems to bring an interesting direction to face complexity. This first step is aimed to enhance multi-disciplinary cooperative research using multi-agents modelling. In particular, this workshop is aimed to address the following non exhaustive list of issues:

* answers that are provided so far by the multi-agents paradigm in terms of theories, models, programming or simulation tools, to the problems raised by complex systems in different disciplines;

* specific questions from the complex systems perspective, that a specific domain (biology, cognitive sciences, computer science, economy, etc.) would like to ask to the multi-agents community? and which answers, inspirations could these disciplines bring to the multi-agents modelling and multi-agents based engineering/modelling ?

* general questions raised by complex systems would one submit to the multi-agents research?

* multi-agents systems engineering from the perspective of complex systems addresses important issues like convergence, emergence, self-organization, autonomy versus control, scalability, etc? How could complex systems theories help to understand and implement these issues in an engineering context?

In the context of this workshop, four thematic areas are of particular interests: Biology, Cognition, Socio-Economy, Information Technology and Computing. A technical track is associated to each thematic area, where multi-agents systems are considered from the perspectives of their potential to model complex systems in each of the specified disciplines as well as from the perspective of the inspirations they could take from these different domains, as a modelling/computing paradigm for complex systems.

Summary of the MA4CS program:

The MA4CS was held on the 4th of October 2007 and attracted an average of 25 attendees all the day. The program was organized into 4 tracks:

- Track 1: Multi-Agents approaches for Biological Systems / Biological inspirations for Multi-Agents Systems

Chairs: Guillaume Beslon (LIRIS, INSA-Lyon, France),

Vincent Chevrier (LORIA, Univ. Nancy1, France)

- Track 2: Multi-Agents approaches for Cognition / Cognition in Multi-Agents Systems
Chairs: Catherine Garbay (LIG - Institut IMAG, France),
Luis Rocha (Complex Systems Group, Indiana University, USA)
- Track 3: Multi-Agents approaches for Socio-Economical Systems / Socio-Economical Systems inspirations for MAS
Chairs: Frédéric Amblard (SMAC, Université Toulouse III, France),
Denise Pumain (Laboratoire Géographie-cités, Univ.Paris 1, France)
- Track 4: Multi-Agents Systems from the perspective of Complex Systems for Computation
Chairs: Alessandro Ricci (DEIS, Università di Bologna, Italy),
Salima Hassas (LIESP, Université Claude Bernard, Lyon 1, France)

We have received 13 papers submission. The scientific PC members have accepted 6 papers for presentation at the conference. The conference program was enriched with 3 invited talks and an organized panel (Multi-Agent systems in the context of biological process simulations).

Speakers:

- Invited Talk: "Polyagents - Complex Reasoning with Heterogeneous Swarms Embedded in Dynamic Simulations", Sven Brueckner
- Invited Talk: "Situating Multi-Agent Models for Complex Systems: the Cases of Crowds, Web Sites and Context Aware Ubiquitous Systems", Giuseppe Vizzari
- "Self-adaptation in Autonomic Electronic Institutions through Case-Based Reasoning", Eva Bou, Maite López-Sánchez and Juan Antonio Rodríguez-Aguilar
- Invited talk : "Endogenous distributions and strong emergence in social simulations", David Chavalarias
- "MASVERP: A Multi-agents System for Safety Interventions on SEVESO Sites", Lydie Edward, Domitile Lourdeaux, Jean-Marie Burkhardt and Jean-Paul Barthe
- "Multiscale MAS modeling to simulate complex systems: A case study in soil science", Nicolas Marilleau, Christophe Cambier, Alexis Drogoul, Edith Perrier, Jean-Luc Chotte and Eric Blanchart
- "Ant Colony Systems and the Calibration of Multi-Agent Simulations: a New Approach", Benoît Calvez and Guillaume Hutzler
- Panel : "Multi-Agent systems in the context of biological process simulations", Marie Beurton-Aimar, Jérôme Glisse, G. Beslon, V. Chevrier
- "Coordination and self-organization in social systems: experiments and learning models", Viktoriya Semeshenko, Alexis Garapin, Bernard Ruffieux and Mirta Gordon.
- "Negotiation protocols and dynamic social networks", Philippe Caillou, Michèle Sebag and Frederic Dubut.
- "Multi-agent systems for modeling the dynamics of interacting cities: the case of Europe 1950-2050", Lena Sanders

Genetic and Biological Networks: Models, Dynamics, and Simulations

Organizer: F.M. Atay (fatay@aim.com)
 Webpage: <http://personal-homepages.mis.mpg.de/fatay/eccs07.html>
 Length: 1 Days (October 4, 2007)

Scope:

A network is intuitively understood as a collection of mutually interacting units. This simple definition already implies that networks are common in daily life, ranging from connected computer servers that form the backbone of the Internet, to entire human and animal societies where each individual interacts with a limited number of others. Although seemingly diverse, many networks have certain common properties that make them an interesting source of scientific enquiry. For instance, most networks lack a central governing unit or a director, but nevertheless manage to function coherently, as in ant colonies and the Internet. Furthermore, the collective behavior of the network often transcends the capabilities of the individuals by an order of magnitude, that is, "the whole is more than the sum of its parts". Perhaps the most striking

example is the human brain, formed by a huge number of nerve cells whose interaction underlies perception, learning, remembering, and reasoning.

Biological networks are formed by living entities. A unique challenge is the presence of "multiple scales" in biological networks, which describes the fact that a whole network at a certain scale is part of a larger network at a higher scale of hierarchy. One can start at the most basic level with the networks of biochemical reactions and move to protein-protein interactions and gene regulatory networks. At a higher level, a whole organism consists of networks of cells, and a whole community is formed by networks of organisms, where a yet higher scale of food webs describes the interaction of several species. A further challenge is the dynamic nature of the whole system, where both the individuals as well as the network structure itself may be changing in time, which this time may exhibit temporal multiple scales, ranging from very slowly to very fast changing processes and their interactions.

The satellite conference on Genetic and Biological Networks aims to contribute to our understanding of networks of biological systems. Similar to the networks formed by mutual interactions of individual units, the conference is a truly interdisciplinary endeavor, calling upon the interaction between the methods and expertise from the biological, physical, mathematical, and computational sciences. A fruitful discussion between the disciplines is hoped to increase our knowledge of biological networks, whose understanding is an important step in understanding life itself.

Speakers:

- Fatihcan M. Atay (Max Planck Institute, Leipzig)
- Canan Atilgan (Sabanci University, Istanbul)
- Ali Rana Atilgan (Sabanci University, Istanbul)
- Nihat Ay (Max Planck Institute, Leipzig)
- Duygu Balcan (Indiana University)
- Stanislaw Cebrat (Wroclaw University)
- Rui Manuel Dilão (IST Lisbon)
- Tobias Galla (University of Manchester)
- Florian Greil (TU Darmstadt)
- Marc-Thorsten Hütt (Jacobs University Bremen)
- Jürgen Jost (Max Planck Institute, Leipzig)
- Kunihiko Kaneko (University of Tokyo)
- Markus Kirkilionis (University of Warwick)

Logistics on Networks

Organizer: K. Peters (kpeters@mail.zih.tu-dresden.de)
D. Armbruster

Webpage: http://www.tu-dresden.de/vkitl/Satellite_ECCS07.htm

Length: 0.5 Days (October 5, 2007)

Scope:

Manufacturing and supply networks are complex networks of highly nonlinear and partially stochastic elements, designed to fulfill certain functional requirements, in particular consumers needs. The emerging theory of complex networks as well as agent based modelling techniques gave us new insights on the structure and functionality of these networks and made the dynamics tractable by analytical means and fast simulation techniques.

This Satellite Conference will present the new findings and discuss applications to real world problems of optimization and control of logistics networks. Furthermore, we will address the question how the practitioners view can be incorporated in the formulation of mathematical models and pinpoint the benefits and drawbacks of different modeling approaches.

Speakers:

- Optimal control policies for supply networks under uncertainty by Marco Laumanns

- Supply Networks under Different Production Strategies: Minimizing the Consequences of the Bullwhip Effect by Johannes Hoefener
- Strategic allocation of cyclically arriving container vessels to interrelated terminals by Maarten Hendriks
- Networks of companies and branches in Poland by Anna Chmiel
- Simple models of complex manufacturing systems by Oliver Rose
- Stability and Dynamics of Small-Scale Manufacturing Networks in an Event-Discrete Model by Reik Donner

Critical Infrastructure as Complex Systems

Organizer: G. Le Grand (gwendal.legrand@enst.fr)

V. Rosato

Webpage: http://www.ylichron.it/Satellite_ECCS07/

Length: 1 Days (October 5, 2007)

Scope:

Critical Infrastructures (CI) are central systems for ensuring life and services to citizens. They are thus the technological objects at the vertex of the nation's priority scale, as far as protection issues are concerned. CIs are excellent metaphors of Complex Systems (CS). Their structure is a composition of technological elements; their mutual interdependency and their dependence on human-controlled chains lead them to contain all the issues and properties which "define" a Complex System. Relationships between components are non-linear, contain feedback loops, are open systems and, as such, work far from equilibrium; they are also constituted by complex elements.

CS has allowed to tackle, in the last ten years, the analysis of a large variety of systems of different origins (technological, biological, social and others), as shown by the huge amount of scientific literature produced in these years. Also major critical infrastructures (such as electrical grids [2-4], communication networks such as routes and railways [5,6], information networks such as the Internet [7-8] etc.) have been analyzed, particularly under the standpoint of their network's topology. Most CIs can be ascribed to the class of systems growing with no external supervision and, as such, their behavior can be considered as indistinguishable from that pertaining to "natural" systems which evolve under the effect of some sort of selective pressure. Aside to basic questions aimed at understanding growth mechanisms, robustness, vulnerability, there is still a number of questions to be addressed by static and dynamic models of CIs

- * the relationship between topological structure and function
- * the assessment of effective "functional" vulnerability
- * the exploration of the functional phase space to detect phase transition and/or critical points
- * fast and reliable decision support
- * reliable reconfigurability

The technological scenario of CIs is further complicated by the presence of a peculiar feature which accomodate these objects: their mutual interdependency. This term indicates the fact that, more than ever, CIs cannot be thought as stand-alone entities but they are mutually interdependent in the sense that a perturbation occurring on one of them might have (small or large) repercussion on the others. These feedback effects lead the study of emergent properties of these systems even more intriguing. The emergence of new effects might be thus associated also to agencies which lie outside the realm of definition and functioning of a given CI and related to malfunctioning in other networks (like, e.g., the catastrophic effects induced by a prolonged electrical blackout on communication networks, whose resulting fault inhibits, in turn, the availability of a communication network allowing tele-controlling and thus needed to perform the necessary actions for restoring the electrical grid). These "perverse" feedbacks are at the origin of the so-called "cascade effects" recorded and analysed during recent large-scale blackouts, which affected several western countries in recent years (Italian and US blackouts in 2003, Germany-France-Italy blackouts in 2006 and other minor regional events). There are a

number of relevant technological questions which arise from stakeholders who operate major CIs such as electrical grids, communication networks but also transport networks. They are related both to the intrinsic mechanisms ruling the normal activity of these networks and to the exogenous agencies leading to (usually non-linear) perturbation effects. The main aim of the Satellite Workshop is to establish a link between the basic science community of CS with a management counterpart made of technological operators who must analyse and care for the efficiency of large national CIs.

The advent of new technological scenario (like that described caused by micro-generation for the power grid) opens the way to more deep reflection on the ideas and the methods to be used to develop new tools for the control and the management of CIs. Indeed, the EU FP6 programme hosted a number of projects aimed at definitely bridging the gap between basic science and technological operations, in this field. Among them, the IRRIS project, whose scientific goals totally complies with the intents of the proposed Workshop. In fact, IRRIS is an Integrated Project grouping the major institutions and some european CI stakeholders; it is aimed at increasing dependability, survivability and resilience of these information-based infrastructures through, among others, the development of a "Middleware Improved Technology", a collection of software components, which facilitates IT-based communication between different infrastructures and different infrastructure providers, by supporting recovery actions and increasing service stability in case of critical situations. In this contest, IRRIS is going to stimulate the interaction between the scientific and the technological communities around the problems opened by the complexity of CIs. Actions and programmes devoted to these problems are also forecast for FP7. The proposed Workshop would also provide a dissemination forum to let the scientific community aware of these problems and to stimulate the creation of scientific and technological groups ready to take the challenges. This one-day Workshop, structured around a few Invited Speakers, will present the major problems and the on-going challenges in this area. They will be part of EU and non-EU consortia which are involved in producing new instruments for the modern control of CIs, many of them based (or using) CS ideas and methods. We will also provide an opportunity to other scientists to present original works. A further purpose of the Workshop is also to establish a two-way connection between Science and Technology:

* on one side, technology and CI operations will present their problems to the CS scientific community

* on the other side, scientific community, which has been attracted by these problems, might have the opportunity to explain, to a wider audience, the results of their analysis which might open new frontiers in the field of analysis and control of CIs.

Speakers:

- R.K. Iyer, Urbana, USA, t.b.a.
- Walter Schmidt, IABG, D, Simulation and Test: Instruments for Critical Infrastructure Protection (CIP)
- Hermann Dwelling, IABG, D, Knowledge based Emergency Management Tool
- Massimo Salzano, Univesity of Salerno, I, The Effect of Globalization on Network's Nodes of Different Structural Characteristic: an Heterogeneous Agent Simulation
- W. Willinger, AT&T, USA, (White) Lies, Damned Lies, and Statistics: A Critical Assessment of Preferential Attachment-type Network Models of the Internet
- Yoshio Kajitani, Central Research Institute of Electric Power Industry, J, Modelling interdependencies of critical infrastructures under natural disaster- A case of supply-type and transportation-type infrastructures
- C. Balderer, ETHZ, CH, Repair strategies for minimizing the risk of cascading failures in electricity networks
- Lubos Buzna, Technische Universität Dresden, D, Evolution of high-voltage electricity networks topology
- J.C. Laprie, LAAS, F, Modelling Interdependencies between Electricity and Information Infrastructures
- Roberto Setola, Campus Biomedico, I, Model Critical Infrastructure via a Mixed Holistic-Reductionistic approach
- Claude Chaudet, ENST, F, High-level modelling of critical infrastructures interdependencies

Social Websites: Complex Dynamics and Structure

Organizer: B. Hoser (bettina.hoser@em.uni-karlsruhe.de)
C. Cattuto
Webpage: <http://www.tagora-project.eu/outreach/eccs07>
Length: 1 Day (October 5, 2007)

Scope:

Our aim is to leverage the large popularity and scale of the ECCS'07 conference to bring together researchers from Physics, the Semantic Web community, the Social Network Analysis community, the Web 2.0 community and other research areas. We plan to increase collaboration and exchange of experiences, with a concrete focus on mathematical tools and models, experimental data, and techniques for data analysis. Our goal is also to start creating a network of researchers with a common base of inter-disciplinary knowledge, as the basis of a new research community. Finally, this research field is very young and there are only a few European players. We would like them to become aware of each other, also in view of the call for new projects in FP7, for which the topics of this conference will be of high priority in the IST call.

A new kind of user-centered applications such as folksonomies, recommendation systems, wikis and so on, now commonly referred to as "Web 2.0" have gained considerable ground in the past 2 years. As examples we can point to Flickr, del.icio.us, YouTube, BibSonomy, Amazon.com and many more. In addition, the economic impact of these websites is surging, as can be readily seen from the fact that Yahoo acquired Flickr, News Corp bought MySpace and OpenBC went public in the last few months. The collaborative character underlying many Web 2.0 applications puts them in the spotlight of complex systems science. Modern web applications for organizing and sharing data are open-ended, dynamically evolving, collaborative and therefore intrinsically social. The huge popularity acquired by collaborative tagging systems, for example, shows that the computer-mediated interaction of web users can create valuable and complex information architectures. These structures are genuinely emergent and early research is reporting rich and often surprising features. The problem of linking the low-level scale of user behavior with the high-level scale of global applicative goals is a typical problem tackled by the science of complexity: understanding how an observed emergent structure arises from the activity and interaction of many globally uncoordinated agents. At the same time, from the viewpoint of Information Technology, this appears as an engineering problem, and its solution lies in understanding and eventually controlling the self-organized structures that arise in modern web-based systems. The large number of users involved, coupled with the fact that their activity is occurring on the web, provide for the first time a unique opportunity to monitor the "microscopic" behavior of users and link it to the high-level dynamics of applications, by using formal tools and concepts from the science of complexity.

Speakers:

- Gerd Stumme (University of Kassel): Information Retrieval and Knowledge Discovery in Folksonomies
- Riley Crane (ETH Zürich): A Shocking Look At YouTube
- Ciro Cattuto (Centro Studi e Ricerche "Enrico Fermi"): Memory and Growth in Collaborative Tagging Systems
- Ulrik Brandes (University of Konstanz): Visual Analysis of Controversy in User-generated Encyclopedias
- Vito D. P. Servedio (University of Roma "La Sapienza"): Network Structure of Folksonomies
- Filippo Menczer (Indiana University and ISI Foundation): Social Search
- Bettina Hoser (University of Karlsruhe): Linked? - Multiple link relationships in Social Sites

Enhancing Social Interaction: Recommendation Systems, Reputation, P2P and Trust

Organizer: S. Battiston (gwendal.legrand@enst.fr)
N. Gilbert
S. Leonardi
Webpage: http://www.sg.ethz.ch/events/ECCS_satellite
Length: 1 Day (October 4, 2007)

Scope:

The emerging technologies around the concepts of reputation, trust, collaborative filtering, peer-to-peer, social networks are changing not only the way people share information and interests, but also the way they trade and choose products and services. Popular social websites become increasingly influential, even in political elections. On the other hand, we witness the spontaneous formation of many large electronic communities and networks in various forms and domains. However, the potential implications are largely unknown, as for the first time these technologies make possible the large-scale and real-time self-organization of citizens. While most of the research in this field focuses on aspects such as protocols and security, the theoretical understanding of the emerging properties of these systems is still poor. What do Complex Systems offer to the design of social interactions in the so called Web 2.0? A number of topics and questions are of particular interest:

1. Whether the outcome of such collective dynamics is
 - (a) predictable
 - (b) easily influenced by individuals
 - (c) analysable in terms of the emergence and development of norms
 - (d) yields a desirable (e.g. efficient, consensual, democratic etc.) outcome.
2. To what extent can such systems be adapted to new domains (e.g. reviewing scientific papers or evaluating health care).
3. How can one manage the 'cold-start' problems (e.g. no incentive to be the first to contribute) and with free riding.

Today, reputation systems are used more and more in trading, even to the point that some people include their eBay reputation values on their Curriculum Vitae when looking for a job. However, there are several unsolved game theoretic drawback to such systems, for instance the incentive to give a good rating in order to avoid retaliation.

Recommendation systems based on collaborative filtering work quite well for low-involvement items such as movies, although the fact that information is processed in a centralized way raises scalability problems. However, if such rating systems were to be used for high-involvement services, such as for health care, the necessary centralization raises issues of confidentiality and privacy. The combination of collaborative filtering with trust and peer-to-peer architectures could be a promising way to overcome these limitations. Trust may also be useful in many electronic social interactions in which actors share opinions and information. Recently, collaborative environments and platforms (e.g. (Wikipedia, del.icio.us, Ohmynews.com, digg.com reddit.com, technocrati.com, flickr.com, blogdex.com), where people share knowledge, tastes, bookmarks, etc. are becoming increasingly popular and require trust to function effectively. Similarly, in peer-to-peer networks users share digital content in a distributed way and need to be assured of the probity of their peers. But how fragile are these platforms and how trustworthy is the information gathered? The Complex Systems approach could be appropriate to understanding these issues and more effort deserves to be spent in this direction. This satellite workshop of ECCS '07 welcomes contributions addressing the topics above and in particular, the design of mechanisms and incentives that preserve functionality of systems based on reputation and trust, or enhance their robustness against non-cooperative behaviour such as free riding and malicious acts. Topics related to this satellite workshop (4 October) will be covered also during the main conference (1-3 October) and in other satellite workshops (5 October). For more information, visit the web page listing all satellites.

Speakers:

- Bernardo Huberman (HP, Palo Alto), Beyond Web 2.0
- Filippo Menczer (School of Informatics, Indiana University), 6S: Collaborative Web search via an adaptive peer network
- Vinay Aggarwal (Institut für Informatik, TU München), Utilizing ISP-P2P collaboration to enhance trust in P2P systems
- Geoffrey Canright (Telenor Research and Development), Self-mapping Networks
- David Hales (Dept. Computer Science, Univ. of Bologna), Emergent Networks as Distributed Reputation System
- Debora Donato (Yahoo Research, Barcelona), Efficient and Decentralized PageRank Approximation in P2P Networks with Malicious Agents
- Stephan Schosser (Economics Dept., Magdeburg Univ.), How Competition Enforces Efficiency in Structured P2P Systems
- Stefano Leonardi, (Computer Science Dept., Univ. La Sapienza, Roma) , Metrics for Reputation Management in P2P networks
- Nigel Gilbert (Sociology Dept., Univ. of Surrey), Wikipedia as a site for the study of social norms
- Guido Caldarelli (Physics Dept., Univ. La Sapienza, Roma), Preferential attachment in the growth of social networks: the case of Wikipedia
- Ciro Cattuto (Physics Dept., Univ. La Sapienza, Roma), Stylized facts in collaborative tagging systems
- Stefano Battiston (ETH Zurich), Trust Based Networks and Recommender Systems
- Ben Markines (School of Informatics, Indiana Univ.), GiveALink: A socially constructed semantic network for Web search and recommendation
- Ben Jann (ETH Zurich), Evolution of Cooperation on Anonymous Markets. Empirical Findings From Internet Auctions
- Matus Medo (Physics Dept., Fribourg Univ.), Diffusion: a new approach to recommender systems

Interacting Agents, Complexity and Inter-Disciplinary Applications (IACIA)

Organizer: T. Galla (Tobias.Galla@manchester.ac.uk)
V. Alfi
M. Marsili
L. Pietronero

Webpage: <http://pil.phys.uniroma1.it/eccs07/>
Length: 1 Day (October 5, 2007)

Scope:

Let's face it: the world around us is a complex one, so that there is an urgent need for academia, industry, government and economic decision makers to understand how complex systems behave, how to design and to control them.

The fields of econophysics and socio-economically or biologically inspired physics have here seen a sharp increase of attention over the last decade, and have become an integral part of modern physics research in the area of complex systems. Physicists have successfully applied their methods to develop a better understanding of socio-economic phenomena and systems of interacting agents, and have contributed to a variety of fields, ranging from economic modelling, risk analysis and traffic flow over the dynamics of opinion formation and decision making to the analysis of eco-systems and metabolic networks. What these systems have in common, is that they are, much like models in traditional physics, comprised of a large number of interacting 'agents', where an agent can be an atom in physics, but also a trader in a financial market, a species in the context of an eco-system or a substance in a biochemical reaction. The satellite workshop 'Interacting agents, complexity and interdisciplinary applications' (IACIA) to the European Conference on Complex Systems focuses on the emergence of complex behaviour from basic rules of engagement between interacting entities and aims at presenting an interdisciplinary overview of our understanding of the link between the interactions at the level of individual agents and the resulting global behaviour, of the methods used to study it and of the

consequences in different fields, in particular from the viewpoint of statistical physics, biology, engineering sciences, social sciences and economics. The satellite has attracted a number of participants from various backgrounds including physicists, psychologists and biologists. Keynote talks will be concerned with 'Random stable matchings' (Dr Stephan Mertens, University of Magdeburg), 'Convention and opinion formation in negotiation dynamics' (Professor Vittorio Loreto, University of Rome) and 'A network analysis of the Italian Overnight Money Market' (Professor Guido Caldarelli, University of Rome).

Further contributed talks reflect the variety of fields in which methods from physics can be applied and include topics such as the collective behaviour of adhesive cells, psychological information processes or models of urban segregation. The workshop is organised jointly by Dr Valentina Alfi (Rome), Dr Matteo Marsili (Trieste), Dr Tobias Galla (Manchester) and Professor Luciano Pietronero (Rome), an international team of scientists in the area of complex systems.

Report:

The satellite workshop IACIA (Interacting Agents, Complexity and Interdisciplinary Applications) to ECCS'07 has attracted on the order of 15 participants (some of them delivering talks, others without presentation), in addition to the invited speakers. We were here very privileged to have Stephan Mertens (Magdeburg), Vittorio Loreto (Roma) and Guido Caldarelli (Roma) as keynote speakers, who in their presentations also reflected the breadth of the field of complexity and applications of interacting agent models. A full list of speakers can be found below. As seen from the titles of the presentations, topics discussed varied from models of segregation over, urban networks to applications in economics, ecology and in psychology.

Speakers:

- Stephan Mertens: Random Stable Matchings
- Elpida Tzafestas: Emergence of Social Networks in Systems with Attraction
- Dietrich Stauffer: Schelling-Ising Model of Urban Segregation
- Luca Dall'Asta: Statistical physics of the Schelling model of segregation
- Luigi Rarità: Study of congestion in urban networks
- Alberto Petri: From Granular Stress to Server Breakdown: a Yielding Model with Random Neighbours
- Vittorio Loreto: Conventions and opinions formation in negotiation dynamics
- Balazs Balint: He Drives Me Jam ? Studying the Effects of Individual Behavior in Traffic
- Kartik Anand: Small Analytical Model of the Financial System
- Alexei Khomenko: From phase transitions through self-organisation to self-organised criticality
- Martin Drechsler: Spatial Pattern Formation in Markets for Tradable Development Rights
- Guido Caldarelli: A network analysis of the Italian Overnight Money Market
- Gunter Neumann: Evolutionary dynamics of toxin mediated interactions
- Alexey Smirnov: Socio-economic Benefits from Global Earth Observations
- George Kampis: Niche Differentiation in Multi-Resource Ecosystems
- Anja Voss-Boehme: Interacting particle model and analysis of the collective behaviour of differentially adhesive cells
- Andrea Guazzini: Modelling psychological information processes
- Valentina Alfi: A model of agents in an active random walk
- Tobias Galla: Chaos and stability in learning random two-player games

Synchronization and Emergent Coordination

Organizer: U. Parlitz (gwendal.legrand@enst.fr)
M. Rosenblum

Webpage: http://www.agnld.uni-potsdam.de/~mros/ECCS07_SynchEmergCoord.html

Length: 1 Day (October 4, 2007)

Scope:

Synchronization is found in many natural and man-made systems, from microscale to macroscale and it is often crucial for proper functioning of a device or organism. Different kinds of synchronization phenomena have been observed and investigated in various fields of science, such as ecology, cardiovascular and brain dynamics, cell dynamics, laser physics, complex network dynamics and chaotic systems. This interdisciplinary research is connected by some underlying fundamental dynamical mechanism and features rendering synchronization a universal concept for understanding oscillating systems. The Satellite Conference provides a platform for exchanging and discussing new observations, mathematical models and ideas about synchronization between theoreticians and experimentalists working in this rapidly developing field. The talks that will be presented cover a broad range from simulation studies of different kinds of network dynamics to potential medical applications, from cell interactions to neuron dynamics and brain activity, from data analysis to ensembles of coupled oscillators and living systems. All this research is unified by abundant synchronization phenomena sharing the same dynamical principles providing new tools and insights for analyzing complex systems.

Speakers:

- Marc Timme, Network Dynamics Group, Max Planck Institute for Dynamics & Self-Organization, Göttingen, Germany "Which Network Connectivities Generate a Given Dynamics?"
- Bernd Blasius, University of Oldenburg, Germany "Synchronization of cell cycles in a phytoplankton chemostat"
- Laura Cimponeriu, Potsdam University, Germany "Phase models of coupled nonlinear oscillators from time series: methods and applications"
- Janusz Kozłowski, University of Szczecin, Poland "Farey tree as an organizing relation between the stimulation and response frequencies in EEG photic driving"
- Jürgen Kurths, Potsdam University, Germany "Structural and functional cluster of complex brain networks"
- Stefan Luther, Cornell/Max Planck Institute, Germany "Dynamics and Control of Phase Singularities in excitable media "
- Arkady Pikovsky, Potsdam University, Germany "Synchronization by common noise: application to neuron's reliability"
- Olga Sosnovtseva, Danish Technical University, Denmark "Dynamics of glia regulatory and potassium signaling mechanisms in neuron-neuron communication"
- Aneta Stefanovska, Lancaster University, UK "What is peculiar to synchronization in living systems? Why the exchange of energy and matter cannot be neglected"
- Serhiy Yanchuk, WIAS/Humboldt University, Berlin, Germany "How size of a large system affects its dynamics?"
- Ulrich Parlitz, University of Göttingen, Göttingen, Germany "Analyzing and forecasting synchronized dynamics"
- Michael Rosenblum, Potsdam University, Germany "Self-Organized Quasiperiodicity in Oscillator Ensembles with Global Nonlinear Coupling"

Heterogeneous Agent Systems and Complex Networks

Organizer: E. Scalas (enrico.scalas@gmail.com)
A. Namatame
Y. Hayashi
G. Germano
T. Kaizoji
Webpage: <http://www.mfn.unipmn.it/~scalas/dresden.html>
Length: 1 Day (October 4, 2007)

Scope:

The study of complex systems pervades all of science, from cell biology to ecology, from physics to computer science and traffic engineering to economics. A paradigm of a complex system is the network, where complexity may come from different sources: topological structure, network evolution, connection and node diversity, and dynamical flows of traffics. The macroscopic behavior of a network is determined by both the dynamical rules governing the nodes and the flow occurring along the links. Network structures are being found pervasively throughout natural and engineered systems, and the modern study of networks is requiring ideas from physics, statistics, biology, computer science, and social sciences. For instance, optimization leads to the concept of equilibrium. Equilibrium is reached for prices and quantities that optimize both the profit of producers and the utility of households. This equilibrium is strictly analogous to mechanical equilibrium. Indeed both in Economics and Mechanics, the mathematical tools used in order to find equilibrium coincide: optimization with constraints (via Lagrange multipliers). And the use of interacting heterogeneous multi-agent models can overcome most of the difficulties that mainstream Economics faces. It is at this level, the description of interactions, that networks enter agent based simulations.

Speakers:

- Masaru Aoyagi (Department of Computer Science, National Defence Academy, Yokosuka, Japan)
- Alessandro Cappellini (ISI and Turin University, Turin, Italy)
- Carmen Costea (Academy of Economic Studies, Faculty of Commerce, Bucharest, Romania)
- Giulia De Masi (Department of Economics, Polytechnic University of Marche, Ancona, Italy)
- Daniel Fulger (Fachbereich Chemie Philipps-Universitaet Marburg, Marburg, Germany)
- Yukio Hayashi (Japan Advanced Institute of Science and Technology, Asahidai Ishikawa, Japan)
- Kyungsik Kim (Department of Physics, Pukyong National University, Pusan, Korea)
- Yusuke Matsumura (Graduate School of Information Science and Technology, Hokkaido University and CREST, Japan Science and Technology Agency, Japan)
- Michael Schwind (Chair of Business Information Systems and Operations Research Tech. University Kaiserslautern, Germany)
- Hiroshi Tamaki (Department of Information and Physical Sciences, Graduate School of Information Science and Technology, Osaka University, Japan)
- Jie-Jun Tseng (AI-Econ Research Center and Department of Economics, National Chengchi University, and Institute of Physics, Academia Sinica, Taipei, Taiwan)