

# ASSYST

## Complex Systems Society

Number 6, May 2010

[www.assystcomplexity.eu](http://www.assystcomplexity.eu)

[www.cssociety.org](http://www.cssociety.org)

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### A science of extreme events

The **Eyjafjallajökull** volcano that erupted in Iceland this April showed a major dependence of Europe on Air transportation. Suddenly it was like time went back 100 years. All travel had to be arranged by land or sea. Air companies stopped their planes on the safety concern that the ashes from the volcano could clog jet engines. How could our daily life be disrupted by something so far way?

Tanaka and Yamamoto[1] used numerical simulations to predict the dispersal of the volcanic plume of Usu volcano in Japan in 2000. In Denmark, a team of the National Environmental Research Institute modelled the dispersion of the volcanic plume of the Iceland volcano [2]. The results are shown in the New York Times infographics of the event [3]. In Europe, the NEST Pathfinder Project E2-C2 [4] went further in predicting extreme hazards, both natural and socio-economic, and examining their consequences under a framework of extreme events statistics.

Extreme events share a common characteristic: the bigger the event, the less likely it is to happen, but when it happens the social and economic costs are enormous. Future scientific research needs to include crisis observation, monitoring environmental change, financial crashes, shortages in supply, or epidemics. Analysis of massive data is key to the identification of interdependencies and causality chains that may lead to cascade spreading effects. This is undoubtedly one of the reasons why "**The FuturICT Knowledge Accelerator**" Flagship proposal, presented in this Newsletter, is essential for complex systems research.



photo – Lightning visible in the plume of the Eyjafjallajökull volcano in Iceland - April 17, 2010. Image of Astronomer Snaevarr Gudmundsson.

The Assyst Team

# About gender & age without borders inside CSS

by Prof. Dr. Carmen Costea

The Gender Committee is running since early days of CSS. Trying to diversify and consolidate image of Complex Systems around the world and among all sort of scientists, the people involved in this department belong to different countries, different field of research, and different political and economic field of activity, different cultures, and different ages. It was considered as a complex bridge between seniors and juniors, between experienced and highly motivated people to act against indifference, to bring together the most creative minds and thoughts to prove that Complex Science is Added Science. Beyond this, we all act united to give the same chance to all of us who have something to say, no matter the gender, the age, the culture, the nationality. Thus, we did the best in sponsorise most of people who applied for participated at the former ECCS conference and will go on to bring the best representatives in Lisbon for the 2010 ECSS Conference. Open to those people who face ethnic, professional or age difficulties, we pay a particular attention in identifying diamonds there where only coal is perceived by local approach.

To act differently, at Jeff Johnson's idea, we took a local pattern of alternative education and brought it into CSS to develop a new tool of apply in Complex Systems knowledge at both scientific and social level. Below it is a story written by students for young people opening large eyes to sciences, speaking their mind and dreams for a better world and better implication in complex education.



activity and promotion of youth and females as scientist. Since the very beginning, ASA, part of CSS, set itself up as a middle point between a social education and a non-formal profession for sustaining the minoritarian individual, for social and professional development. The passing of the years was relevant because the number of members increased, reaching in 2010, 470 active members.

Activity started with ASSYST and developed with time as an informal academic education becoming stronger and stronger every year. Thus, during this academic year, Mathematics applied to Complex Systems Course created by Jeff Johnson as an ASSYST tool is given online from Open University under a program developed with is given online by professor Johnson and sustained formally by Carmen from her desk in Bucharest reunited a



It is about the Business Club Future Managers, created by Alternative Sciences Association as an apart idea of education oriented more towards training by coaching than learning by teaching.

Created with the initiative of Carmen Costea, from the ASE Bucharest in the spring of 2005, The Club of The Future Managers represents the first scientific wave in the educational civic connotation, this being the point from where The Alternative Sciences Association was born. The main purposes are connected to gender affecting

number of 295 of students from the Bologna Cycle as below. For the first time, pregnant students, ethnic minoritarian declared students found their equal places among the enrolled attendants.

MALE	48	12	-	7	1
FEMALE	164	31	2	27	3
SUM	212	43	2	34	4

The overview that emerges from the first part of applied mathematics course in complexity is a good one.

Undergraduate students with those of masters and doctoral believe that through this course have found another unseen part of mathematics.

People involved in high school who studied mathematics-computer science think that may be a retrospective of the learned information viewed from another angle. For those who have studied in the human and technical profiles this is the way to learn many things from word figures, considering it interactive and useful. In fact it is an alternative tool that builds the new mind for an N dimensional understanding of the future society.



Most students agreed to participate in this math course because they have the advantage of working at home tasks required sites. Another advantage would be that there is no deadline for each weekly lesson; students will be allowed to send aggregated responses.

Among the participants of this course, there are students from the International Economic Relations Faculty, who helped the students from the Faculty of Commerce to understand better some notions, which resulted to be a good thing. This created a social connection between them.

From the very first lesson there where discussions cantered on fundamentals such as: sets, operations with sets, diagrams, students found their interest in the operations represented by sets going on to natural numbers, integer, rational, real, mappings and functions, order, equivalence relations and tolerance. The hardest part was the very first question: who invented and reinvented the number zero. The social connections developed with Math with lesson 3 where students found a deeper link between Mathematics and Nature. NO matter the difficulty they had with the graphic representation of the logarithm, Zipf's Law, they became more open to study, finding complex answers and develop more social connections between them. The result was that 60 of them participated in the April scientific session of studies, about fourteen got awarded by ASE Bucharest and different business owners as some of their papers relied on market applications or ideas linked to earthquakes, financial markets, flooding and Mathematics. The numbers of female students engaged into applied research increased three times compare to the previous years and this is due only to this course.

The mixture of students coming from different years of activity is the beginning of future research teams of which real science is so much in need. At least by now, the number of students considering this sort of lectures as an appropriate alternative to formal, rigid education should be useful for everyone who wants to work in the Complex System and understand that the robust future of Science is inside the Complex System shell. Hopefully different, we are unique in sustaining the real mean of Complex System and support the ASSYST as an appropriate tool of assembling differences in proving the excellence when sustaining robust development.

Prof. Dr. Carmen Costea ASSYST Gender Committee Chair, ASA founder (*Feedback completed by students: Tabirca Loredana Elena- 1st year, Cortez Sabina – 2nd year, Luca Sorin – 2nd year, Damian Anca – president of Busienss Club*).

## Latest news



### ***Dynamics of Multi-Level Complex Systems (DyM-CS)***

According to the orientation expressed by the communication from the European Commission to the European Parliament and Council, adopted on 20 April 2009, the FET initiatives for 2011-12 will include a call for projects concerning "Dynamics of Multi-Level Complex Systems (DyM-CS)". Our newsletter will stay attentive to this call.

### ***Epiwork participated in Science Beyond Fiction Exhibition.***

Epiwork project participated in the FET exhibition organized by the FET Units in the European Parliament in Strasbourg on 20-21st April 2010. The objective of the event was to illustrate to the Members of the European Parliament and in particular to the ITRE Committee members the kind of research funded under the FET program.

There were 6 thematic stands shared by two FET projects. The theme titles were: Understanding Global Systems, Better Living, Brain inspired Technologies, Data Deluge and Privacy, Observing and Learning from Nature and Human-Computer Confluence.

<http://assystcomplexity.eu/short/?id=55>

# The FuturICT knowledge accelerator

## Unleashing the power of information for a sustainable future

EU flagship proposal – <http://futurict.eu>

With our knowledge of the universe, we have sent men to the moon. We know microscopic details of objects around us and within us. And yet we know relatively little about how our society works and how it reacts to changes brought upon it. Humankind is now facing serious crises for which we must develop new ways to tackle the global challenges of humanity in the 21st century. With connectivity between people rapidly increasing, we are now able to exploit information and communication technologies to achieve major breakthroughs that go beyond the step wise improvements in other areas.

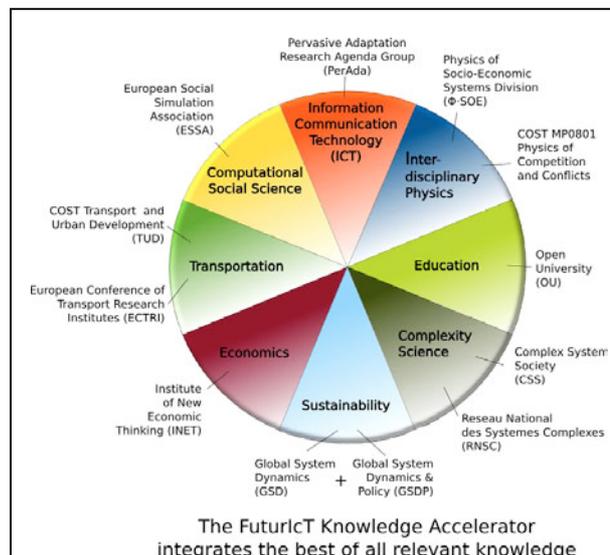
It is thus timely to create an ICT Flagship to explore social life on Earth, and everything it relates to, in the same way that we have spent the last century or more

understanding our physical world. This proposal sketches out visionary scientific endeavours, forming an ambitious concept that allows us to answer a whole range of challenging questions. Integrating the European engineering, natural, and social science communities, this proposal will release a huge potential.

The FuturICT Flagship will create interactive, multi-purpose modelling, exploration, and systems design tools that use the best combination of human and machine intelligence. Experts will be able to choose among the variables, parameters, model variants, simulation scenarios, hypotheses to be explored, and system designs proposed by this semi-automated tool (the “knowledge accelerator”). It will stimulate creativity and extend the limits of imagination. The knowledge accelerator will also provide a living, self-organizing data pool and a cyber-infrastructure for people with various backgrounds.

The integrated, large scale modelling of complex techno-social-economic-environmental systems will promote cross-pollination between different fields. Simplifying and standardizing data collection, modelling and simulation will stimulate interdisciplinary research questions, collaborations and discoveries. Best practices will emerge and shared standards of evidence will result in fundamental and substantial advances.

Using crowd-sourcing and reputation systems, an innovation accelerator will be built to support the collaboration of the best fitting partners. It will help to separate relevant from irrelevant information, thereby increasing the transparency, usefulness and control of the information everybody is exposed to, and it shall be able to deal with inconsistencies by considering multiple model variants and to determine their respective validity. The FuturICT Flagship will simplify scientific research and evaluation procedures, generating higher-quality outcomes. The application to social and economic systems will deliver a new economic theory that captures realistic human behaviour and system states far from equilibrium.



Schematic diagram of interacting research areas (illustration by Stefano Balietti)

The Flagship is expected to cross-fertilize developments in multiple areas and to improve the capacity to cooperate. Through a free sharing and better accessibility of massive data sets and multidisciplinary scientific knowledge, it will kick off a new age of systemic modelling and simulation, triggering radical innovation in all areas of society, technology and economics. It will provide the tools to make humanity fit to cope with the problems of environmental and demographic change, health, safety, security, and sustainable development. Furthermore, taking into account affective components of information transfer will improve the quality of

human interaction with engineered systems, including ICT systems.

The innovations of the FuturICT Flagship will be practically relevant for many sectors of society. In fact, information has become a critical resource in the economy. The FuturICT flagship will support the communication with customers and end users, and the development or even co-creation of highly customized products. This will allow a wider variety of interests and agents to be expressed and satisfied. In this way, the FuturICT Flagship will create new business opportunities, particularly for small and medium-sized enterprises. However, FuturICT will also help to reduce losses by financial and other crises, inefficiencies in transportation and production systems, and social problems, thereby saving large amounts of tax payers' money

## Reading snippets

### ***Songbird teaches us how our own brain is wired***

An international team of researchers has sequenced the genome of the zebra finch (*Taeniopygia guttata*). It is only the second time ever that scientists have been able to sequence a bird's genome (the first was that of the chicken) and the first time a songbird's genome has been sequenced. The zebra finch genome now provides us with a unique opportunity to understand our own genetics as well as the mechanics at work behind some special traits inherent in birds.

In Cordis - <http://assystcomplexity.eu/short/?id=51>

### ***Tools and techniques for network forensics***

Network forensics deals with the capture, recording and analysis of network events in order to discover evidential information about the source of security attacks in a court of law. This paper discusses the different tools and techniques available to conduct network forensics.

In Arxiv - <http://arxiv.org/abs/1004.0570>

### ***Older brain regions key to unconscious learning***

New research bolsters the idea that older brain regions are involved in our unconscious learning ability. The findings could potentially be used in the development of novel treatments for conditions such as Parkinson's and Huntington's disease, which involve these parts of the brain. The study, published online ahead of print in the Proceedings of the National Academy of Sciences (PNAS) journal, involved scientists from the Karolinska Institutet in Sweden and the National Institute of Neurological Disorders and Stroke, which is part of the National Institutes of Health (NIH) in the US.

In Cordis - <http://assystcomplexity.eu/short/?id=53>

### ***BOOK: Ant encounters: interaction networks and colony behavior***

By Deborah M. Gordon

How do ant colonies get anything done, when no one is in charge? An ant colony operates without a central control or hierarchy, and no ant directs another. Instead, ants decide what to do based on the rate, rhythm, and pattern of individual encounters and interactions--resulting in a dynamic network that coordinates the functions of the colony. Ant Encounters provides a revealing and accessible look into ant behaviour from this complex systems perspective.

In <http://press.princeton.edu/titles/9240.html>

### ***Enter the matrix: the deep law that shapes our reality***

By Mark Buchanan

SUPPOSE we had a theory that could explain everything. Not just atoms and quarks but aspects of our everyday lives too. Sound impossible? Perhaps not.

In NewScientist - <http://assystcomplexity.eu/short/?id=52>

### ***The internet of cars***



An internet of cars promises a road system designed around cooperative technology enabling each element of the traffic system – cars, drivers, traffic lights, signs – to cooperate proactively to create a safer, more efficient driving experience. No road rage required.

In Cordis - <http://assystcomplexity.eu/short/?id=54>

### ***Evolution of cooperation by natural selection***

By Dimitris Iliopoulos, Arend Hintze, Christoph Adami

The observed cooperation on the level of genes, cells, tissues, and individuals has been the object of intense study by evolutionary biologists, mainly because cooperation often flourishes in biological systems in apparent contradiction to the selfish goal of survival inherent in Darwinian evolution. In order to resolve this paradox, evolutionary game theory has focused on the Prisoner's Dilemma (PD), which incorporates the essence of this conflict. We find that if stochastic strategies for the iterated Prisoner's Dilemma (IPD) are encoded as genes, the environmental conditions that the strategies are adapting to determine the fixed point of the evolutionary trajectory. We find novel stochastic strategies that represent attractors of evolutionary trajectories, and that a transition between cooperative and defective attractors occurs as a function of different parameters that affect a player's ability to predict an opponent's behavior.

In Arxiv - <http://arxiv.org/abs/1004.2020>

# Conferences and workshops

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

- MS4**  
MODELS AND SIMULATIONS 4  
7 May 2010 to 9 May 2010  
Toronto, Canada
- AAMAS 2010**  
9th International Conference on Autonomous Agents and Multiagent Systems  
10 May 2010 to 14 May 2010  
Toronto, Canada
- ALA2010**  
ALA 2010: Adaptive and Learning Agents Workshop at AAMAS 2010  
10 May 2010 to 14 May 2010  
Toronto, Canada
- NICSO 2010**  
Workshop on Nature Inspired Cooperative Strategies for Optimization  
12 May 2010 to 14 May 2010  
Granada, Spain
- IMASC2010**  
International Workshop on Multi-Agent Systems and Collaborative Technologies (I-MASC 2010)  
14 May 2010 to 17 May 2010  
The Westin Lombard Yorktown Center, Chicago, Illinois, USA
- AICCSA 2010**  
2010 ACS/IEEE International Conference on Computer Systems and Applications  
16 May 2010 to 19 May 2010  
Hammamet, TUNISIA
- ICCS2010**  
International Conference on Computational Science  
31 May 2010 to 2 Jun 2010  
University of Amsterdam, The Netherlands
- WiOPT 2010**  
9th International Symposium on Modeling and Optimization in Mobile, Ad Hoc, and Wireless Networks  
31 May 2010 to 4 Jun 2010  
Avignon, France
- ECCC2010**  
The 11th Experimental Chaos and Complexity Conference  
1 Jun 2010 to 1 Jun 2010  
Lille, France
- ICAC2010**  
7th International Conference on Autonomic Computing and Communications  
7 Jun 2010 to 11 Jun 2010  
Washington, DC, USA
- Orflow10**  
Living organisms in flows: From small-scale turbulence to geophysical flows  
7 Jun 2010 to 11 Jun 2010  
Palma de Mallorca, Spain
- MSM10**  
International Workshop on Modeling Social Media 2010  
13 Jun 2010 to 13 Jun 2010  
Toronto, Canada
- Hypertext2010**  
21st ACM Conference on Hypertext and Hypermedia  
13 Jun 2010 to 16 Jun 2010  
Toronto, Canada
- HuCom10**  
Human Factors and Computational Models in Negotiation  
21 Jun 2010 to 24 Jun 2010  
Delft University of Technology, Delft, The Netherlands
- KES-AMSTA 2010**  
KES Symposium on Agents and Multi-agent Systems – Technologies and Applications  
23 Jun 2010 to 25 Jun 2010  
Gdynia, Poland
- i-Society2010**  
International Conference on Information Society  
28 Jun 2010 to 30 Jun 2010  
London, UK
- ECoMASS-2010**  
Workshop on Evolutionary Computation and Multi-Agent Systems and Simulation Workshop (ECoMASS-2010)  
7 Jul 2010 to 11 Jul 2010  
Portland, Oregon, USA
- SCSC10**  
2010 Summer Computer Simulation Conference  
11 Jul 2010 to 14 Jul 2010  
Ottawa, Canada
- MSULSS**  
Modeling and Simulation of Ultra-Large-Scale Systems  
11 Jul 2010 to 14 Jul 2010  
Ottawa, Canada
- IJCAR2010**  
5th International Joint Conference on Automated Reasoning  
16 Jul 2010 to 16 Jul 2010  
Edinburgh, UK
- IEEE WCCI 2010**  
The 2010 IEEE World Congress on Computational Intelligence  
18 Jul 2010 to 23 Jul 2010  
Barcelona, Spain
- ICICCA2010**  
The 2010 International Conference on Informatics, Cybernetics, and Computer Applications  
19 Jul 2010 to 21 Jul 2010  
Bangalore, India
- DDSA 2010**  
Dynamics Days South America 2010  
26 Jul 2010 to 30 Jul 2010  
São José dos Campos, SP - Brazil
- ESSLLI 2010**  
European Summer School in Logic, Language and Information 2010  
9 Aug 2010 to 20 Aug 2010  
The University of Copenhagen, Denmark
- OSINT-WM2010**  
International Symposium on Open Source Intelligence & Web Mining 2010  
9 Aug 2010 to 11 Aug 2010  
Odense, Denmark
- M-PREF10**  
5th Multidisciplinary Workshop on Advances in Preference Handling  
16 Aug 2010 to 17 Aug 2010  
Lisbon, Portugal
- ECAI 2010**  
19th European Conference on Artificial Intelligence  
16 Aug 2010 to 20 Aug 2010  
Lisbon, Portugal

A2HC  
VI Workshop on Agents Applied in Health Care  
16 Aug 2010 to 16 Aug 2010  
Lisbon, Portugal

CLIMA XI  
11th International Workshop on Computational Logic in Multi-Agent Systems  
16 Aug 2010 to 17 Aug 2010  
Lisbon, Portugal

AMORPH 2010  
Amorphous Computing & Complex Biological Networks  
17 Aug 2010 to 20 Aug 2010  
The Edge/Halifax Conference Centre, Sheffield, S10 3ED, United Kingdom

Alife XII  
Artificial Life XII (ALife XII) Odense  
19 Aug 2010 to 23 Aug 2010  
Odense, Denmark

CoSMoS 2010  
3rd Complex Systems Modelling and Simulation Workshop  
19 Aug 2010 to 19 Aug 2010  
Odense, Denmark

TSCS10  
Turunc Summer School on Complex Systems  
23 Aug 2010 to 27 Aug 2010  
Turunc, Marmaris, Turkey

SAB10  
FROM ANIMALS TO ANIMATS 11  
24 Aug 2010 to 28 Aug 2010  
Paris, France

TWCS10  
Turunc Workshop on Complex Systems 2010  
30 Aug 2010 to 1 Sep 2010  
Turunc, Marmaris, Turkey

WI-IAT2010  
Web Intelligence - Intelligent Agent Technology  
31 Aug 2010 to 3 Sep 2010  
York University, Toronto, Canada

IMPRESS 2010  
First International Workshop Interactive Multimodal Pattern Recognition in Embedded Systems  
1 Sep 2010 to 1 Sep 2010  
Bilbao, Spain

WCSS2010  
3rd World Conference on Social Simulation  
6 Sep 2010 to 9 Sep 2010  
UNIVERSITY OF KASSEL - CENTER FOR ENVIRONMENTAL SYSTEMS RESEARCH

COMMA 2010  
Conference on Computational Models of Argument  
8 Sep 2010 to 10 Sep 2010  
Desenzano del Garda, Italy

ANTS2010  
ANTS 2010 - Seventh International Conference on Swarm Intelligence  
8 Sep 2010 to 10 Sep 2010  
Brussels, Belgium

AE2010  
Artificial Economics 2010  
9 Sep 2010 to 10 Sep 2010  
Treviso, Italy

PPSN2010  
11th International Conference on Parallel Problem Solving From Nature  
11 Sep 2010 to 15 Sep 2010  
AGH University of Science and Technology, Krakow, Poland

ECCS2010  
ECCS 2010 - European Conference on Complex Systems  
13 Sep 2010 to 17 Sep 2010  
Lisbon, Portugal

ACRI2010  
The Ninth International Conference on Cellular Automata for Research and Industry  
21 Sep 2010 to 24 Sep 2010  
Ascoli Piceno, Italy

MATES2010  
Eight German Conference on Multi Agents System Technologies  
21 Sep 2010 to 23 Sep 2010  
Karlsruhe, Germany

SEISMYC-2010  
Workshop on Socio-Economics Inspiring Self-Managed Systems and Concepts  
27 Sep 2010 to 27 Sep 2010  
Budapest, Hungary

SASO-2010  
Fourth IEEE International Conference on Self-Adaptive and Self-Organizing Systems  
27 Sep 2010 to 1 Oct 2010  
Budapest, Hungary

Future Internet and Society 2010  
Future Internet and Society: A Complex Systems Perspective  
2 Oct 2010 to 7 Oct 2010  
Acquafredda di Maratea, Italy

New Frontiers in Complex Networks  
New Frontiers in Complex Networks : Statphys24 satellite meeting  
13 Oct 2010 to 15 Oct 2010  
Seoul National University, Seoul, Korea

CompleNET 2010  
2nd Workshop on Complex Networks  
13 Oct 2010 to 15 Oct 2010  
Rio de Janeiro, Brazil

BWSS2010  
Second Brazilian Workshop on Social Simulation  
23 Oct 2010 to 28 Oct 2010  
FEI University Campos, São Bernardo do Campo, Brazil

META10  
International Conference on Metaheuristics and Nature Inspired Computing  
28 Oct 2010 to 30 Oct 2010  
Djerba Island, Tunisia

ACIT2010  
International Arab Conference on Information Technology  
14 Dec 2010 to 16 Dec 2010  
University of Garyounis in Benghazi, Libya

ICAART2011  
3rd International Conference on Agents and Artificial Intelligence  
28 Jan 2011 to 30 Jan 2011  
Rome, Italy

## Jobs

<http://jobs.cssociety.org>

Position: Postdoc/Lecturer  
Analysis of Dynamical Networks  
Centre de Physique Theorique, Marseille  
France – 10/05/2010

Position: Research Fellow (2 positions, 4 yrs)  
EPSRC Care Life Cycle Research Program  
University of Southampton – School of Social Sciences  
UK – 19/05/2010

Position: Postdoc/Lecturer  
Spatial-Temporal Network Inference for the Regulation of  
Root Nitrogen Uptake in Arabidopsis thaliana  
INRA Biochimie et Physiologie Moléculaire des Plantes  
France – 30/06/2010

Position: Postdoc  
Computational and Systems Biology  
University Pierre et Marie Curie (UPMC), Paris CNRS  
UMR 7211  
France – 1/07/2010

Position: Engineer  
Programmer – 6 months starting anytime to work on a  
research project on networks.  
CNRS  
France – 31/08/2010

## Contacts

### **ASSYST - Action for the Science of complex SYstems and Socially intelligent icT**

Web: <http://assystcomplexity.eu>  
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### **CSS – Complex Systems Society**

Web: <http://cssociety.org>  
RSS: [http://cssociety.org/tiki-calendars\\_rss.php](http://cssociety.org/tiki-calendars_rss.php)  
Suggestions: <http://cssociety.org/suggestions>

## Contributors to this edition:

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<http://www.flickr.com/photos/freeparking/502609973/>

## Editorial references

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<http://www.dmu.dk/International/Air/Models/volcanicplume/>
- 3 - NYT - Tracking Airport Status -  
<http://www.nytimes.com/interactive/2010/04/15/world/europe/airport-closings-graphic.html>
- 4 - European Commission EUR 22423 - Tackling Complexity in Science – A Nest Pathfinder Initiative – 2007 -  
<ftp://ftp.cordis.europa.eu/pub/nest/docs/2-nest-tackling-290507.pdf>

## 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](mailto: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.

