The Second Open Global Systems Science Conference

Program Details of Plenary and Break-Out Group Sessions

Day One:  Monday, June 10

10.00 – 10.30  Registration and Coffee

10.30 – 12.30  Plenary:  A Research Program for Global Systems Science  
(Room: Balmoral I-II)

Introduction: Jose Cotta, DG CONNECT, European Commission
Keynote: Alan AtKisson, Member of the EU Science and Technology Advisory Council/AtKisson Group

Panelists:
Prof. Patrik Jansson, Chalmers University of Technology
Dr. J. David Tabara, Global Climate Forum, ICTA/Autonomous University of Barcelona
Prof. Sander van der Leeuw, Arizona State University

Short Description: After a brief introduction by Jose Cotta, Alan AtKisson will give a keynote speech drawing on his extensive experience advising governments and corporations on sustainability issues and he will do so from a global perspective. Next, J. David Tabara will introduce the GSS Orientation Paper, and this will be followed by additional contributions by Patrik Jansson and Sander van der Leeuw.

12.30 – 14.00  Lunch

14.00 – 16.00  Plenary:  EU-China and Global Climate Policy  
(Room: Balmoral I-II)

Chair: Prof. Carlo Jaeger, Beijing Normal University and Global Climate Forum

Panelists:
John Ashton, E3G London
Prof. Qian Ye, Beijing Normal University, P.R. China
Prof. Yongsheng Zhang, Development Research Council, P.R. China

Short Description: The panel will outline and discuss the current level of EU-China cooperation with special respect to cooperation options in climate policy, and more specific: green growth. The moderated discussion will touch upon topics such as ‘inclusive green growth’ and to what extent this could help to solve both the climate

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16.00 – 16.30 Coffee Break

16.30 – 18.30 Plenary: Global Systems Science and EU Policy (Room: Balmoral I-II)

Chair: Robert Madelin, DG Connect European Commission

Panelists:
Nick Banfield, DG ENV, European Commission
Prof. Anne Glover, Chief Scientific Adviser to the President of the European Commission
Prof. Julian Hunt, University College London
Prof. Carlo Jaeger, Beijing Normal University and Global Climate Forum
Andrea Tilche, DG RTD European Commission
Prof. Klaus Töpfer, Institute for Advanced Sustainability Studies Potsdam

Short Description: The panel will be introduced and chaired by Robert Madelin. Each panelist will give a 10 minutes input followed by discussion. The panel will discuss how in particular EC policy challenges can drive an innovative GSS research agenda and in turn, how GSS could be taken up by EC Directorates to support their policy actions.

19.00 – 21.30 Networking Dinner (Room: Balmoral III)

Day Two: Tuesday, June 11

08.30 – 10.30 Plenary: Sustainable Financial Markets (Room: Balmoral I-II)

Chair: Prof. Guido Caldarelli, IMT Lucca / Dr. Stefano Battiston, ETH Zurich

Panelists:
Ivan Alves, European Central Bank
Denada Prifti, DG-MARKT, European Commission
Co-Pierre Georg, Deutsche Bundesbank
Prof. Klaus Töpfer, Institute for Advanced Sustainability Studies Potsdam
Peter Zimmerman, Bank of England

Short Description: The panel will bring together policy-makers and researchers who will discuss research challenges posed by international monetary stability, shadow banking, and related issues. The topic of this panel will continue in break-out group sessions on Wednesday.

10.30 – 11.00 Coffee Break
11.00 – 13.00 Parallel Workshops: Knowledge Technologies for GSS

11.00 – 13.00 Parallel Workshop: Narratives and Public Stakeholder Engagement, Chair: Filippo Addari, EUCLID Network [Room: Wellington]

Short Description: Globalization has changed course becoming the main threat to Western society in the eyes of the man in the street. Fear, rage and despair are mounting amongst people as mirrored in the rise of populist parties, the crisis in every media and violence in the streets. Even if there is lack of statistical evidence it’s the general sentiment and this is very dangerous. Europe has already fallen in this trap a century ago. The public mood has to be seriously addressed and put back on track towards positive ends. Helping people understanding the 21st century in all its complexity - challenges and opportunities - is the first step. Then everybody has to be equipped with suitable strategies for adaptation and tools to act upon the new world. Therefore a project as GSS is not just good science but a necessary contribution to a new vision and strategy for political stability and economic prosperity in Europe and worldwide. Narratives are part of the plan but not the top-down ones. The network culture expects everybody to take part in building new narratives capable to explain and manage the 21st century. Such a process is the basis to build resilient communities and ICT is part of it.

A panel of speakers has been selected to explore different ways to design narratives and engage different types of stakeholders.

Contributions
Robert Bjarnason, Citizens Foundation (Iceland) will present cases of open source electronic democracy especially through games.
Paolo Gurisatti, European Center for Living Technologies, Università Ca’ Foscarí (IT) will present the first results of Emergence by Design, a EU funded research project, that is developing an new toll to measure impact through the narratives produced by all the stakeholders.
Stefano Mirti, Whoami.it (IT) will reflect on the relationship between design, narration and social media.
Darren Sharpe, Childhood and Youth Research Institute, Anglia Ruskin University (UK) will present cases focused on engaging young people in research and participation in public life and labour market through narratives.

Robert Bjarnason, Citizens Foundation (Iceland): Citizens Foundation is a non-profit foundation whose main mission is to promote open source electronic democracy with a focus on the young people that are both disillusioned with democracy and are natives of the Internet way of doing things quickly and with minimum friction. We want to facilitate citizens’ participation with their political representatives and give citizens a persistent voice in the political process while increasing quality debate about citizens priorities. http://citizens.is/Your

Priorities Platform
Our open source social innovation platform - has been used by over 500,000 people

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so far with great success in terms of participation, both in Iceland and Estonia. All our projects are based on this software platform. The platform has basic gamification elements including Social Points which people earn by providing useful content (based on other peoples feedback). People can then use those social points to buy promotions on the websites for the ideas they care most about. We are planning to significantly extend the gamification elements in the coming versions of the software as our experience and research shows that this is a vital element in participation.
https://www.yrpri.org/

Better Reykjavik
Better Reykjavik is our first successful example of a Your Priorities website, in terms of participation. The website is actively used by residents of Reykjavik, Iceland, creating open discourse between community members and city council. Better Reykjavik launched in 2010, and played a vital role in the year’s municipal elections. During these elections, 10% of Reykjavik voters voiced ideas on the site, 43% of voters viewed the site, and over 1000 priorities were created. There is now an open collaboration between the City Council and the Better Reykjavik. Ten to fifteen top priorities from Better Reykjavik are being processed by Reykjavik’s City Council and specialty councils every month. http://betrireykjavik.is

Estonia Peoples Assembly
Grassroots organizations with official ties are leading a law and constitutional reform project born out of political scandals in Estonia in 2012. Tens of thousands used the Your Priorities platform to crowd-source the best ideas for reform and the ideas were then developed further, both crowdsourced and by experts. The president of Estonia delivered the results to the Estonian Parliament in April 2013 which will process them as law amendments. http://www.rahvakogu.ee/

The Balkan eDemocracy Bootstrap project
We’re now working on and looking for funding for a democracy project in the Balkans. Currently there are 11 projects from 7 countries with different focus on how to use e-democracy to improve their communities. Recently we held workshops in Sarajevo and Belgrade in how to use our tool as well as meetings about the project. These are different projects with different challenges and lessons to be learned. One of the key things is the transfer of e-democracy knowledge from Iceland and Estonia to and from the Balkans as well as knowledge transfer between the Balkan countries. There are 3 project from Serbia, 3 from Kosovo and one each from Albania, Bosnia, Croatia, Montenegro and R. Macedonia.

- True Stories EVE Online
This project has a different perspective than most of our work. It’s purpose is to crowd-source the best stories from players from 10 years of the EvE Online multi-player game which 500.000 subscribers play monthly. The game is totally user driven so there is no storyline or plot from the makers of the game, CCP Games. During the process of adjusting our software to their requirements many code and UI improvements were made which are now used on the Your Priorities websites. As seen by this example, our software can be used for a myriad of applications, to crowdsource ideas and
arguments for and against most things that can be debated.
https://truestories.eveonline.com/

Stefano Mirti: Design, narratives and public stakeholder engagement

As a contribution for the on-going conversation on the relationship between design, narration and social media, I would like to start from a series of general observations. An introduction to the theme. A series of empirical thoughts developed in years of working at the cross-over between design, new media and narratives.

We all agree that design is mostly a narrative exercise (or if you prefer, story-telling). The writer tells his stories with a novel, the musician tells his stories composing music, the designer tells his stories making objects, spaces, buildings. But then, if we start to use new and social media, are there changes and transformations? Here below, 12 points to start a conversation. The community is the message (originally published on Abitare 532, May 2013).

A few days ago a friend asked me: “But why should I learn to use social media?” This is a question that doesn’t have an answer. It’s as if someone were to ask me: “Why should I learn to play the saxophone?” The question is put in a peculiar way, but it is possible to come up with a series of sensitivities and insights that we can gain and understand thanks to intense involvement with new social media.

Here are 12 points with which to start a conversation.

1. New media?
New media don’t exist (and conversely neither do old media). To put it another way: all old media were once new, and all new media will become old. The Bic pen is an extraordinary medium. It was incredible and perfect in 1950, and it still is today. VHS and cable radio have led different lives. In short, whether the medium is new or old is not the heart of the matter. It all depends on how you use it (and what are the goals you want to achieve).

2. Generosity
This is the first and most indispensable ingredient. If you’re not generous, nothing (significant) will ever come of using social media. There is the importance of doing things for the pleasure of doing them, without a fixed purpose: the more you give, the more you take away. There is (really and truly) no possibility of taking without giving. And then if all this takes on the form of a community, a vast array of possibilities opens up before us.
3. Digital flâneurs
Walter Benjamin had his own universe of reference. It was made up of details, things on the margins, aimless strolls, Parisian shopping arcades and a thousand other more or less invisible ingredients of daily life. Here it’s the same. God is not just in the detail, but this detail is in general – and apparently – insignificant. Here too, though, if you find that detail is able to fascinate other people, at that point, a breath-taking film begins.

4. Where does the money come from?
It doesn’t. Or if it does, it comes through absolutely unpredictable mechanisms. It should never be forgotten that becoming famous on Facebook is like becoming rich in Monopoly. Try and invent a project to develop with a digital community: if you manage to reach this level you’re already doing pretty well. Hardly anybody, in truth, succeeds in making much money. For convenience’s sake, let’s forget about money.

5. Deductive?
No. Inductive. The Web (and with it the digital media) is made up of millions of extraordinary unsystematised (and unsystematisable) fragments. You start out from one of these fragments and climb back up to empirical systematisations. Again, when you learn to carry out this process of “climbing” with other people, you gain a strength that would have been unthinkable in previous environments.

6. Humour
Humour is a fundamental ingredient. This was already true for an exclusively analogue world, but it has become indispensable in a digital planet (especially in the social version). If a sense of humour is not present in large doses, it’s all a waste of time.

7. Visual imagination
The landscape does not exist. What does exist are spectacles of interpretation that we put on when we look around us. In our heads the oil refineries of the Po Valley start to take shape after we have seen Red Desert. The cinema, photography and television have changed our visual imagination. The same thing is happening with new and social media. The revolution is first and foremost one of imagery. It is a subtle change, and one that proceeds and advances in an invisible manner. But it is already here.

8. The 1% Rule
In the worlds of the Web there is this very simple formula: 90-9-1. In a given digital community (be it Wikipedia or a Facebook group), out of 100 participants there will be 90 who use the medium in a passive way, nine who are sporadically active and one who generates almost all the content. Being in that 1% allows you to invent new heavenly bodies to which the remaining 99% want access. This is an element that should not be underestimated.

9. Experts They don’t exist.
At best, there are people who try and try again, making mistakes over and over again: in this long and tedious process they acquire a quantity of information that is

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useful to others too. The on-line community is the antithesis of technocracies dominated by elites of experts. Ennio Flaiano said some 30 years ago “today even the fool is a specialist”. Well, the digital community does not allow for specialists.

10. Hierarchies
It is often said that digital communities are horizontal, and that there are no hierarchies. This is not true. The hierarchies and dynamics of power exist, and are perhaps even stronger than the usual ones, but they are simply implicit, unspoken. Understanding the invisible mechanisms that regulate the life of one of these communities is an exercise that offers us an insight into many facets of the here and now. The fact that the majority of these goings-on are negative does nothing but add value to the exercise.

11. Watch out!
A digital layer has appeared in our lives. But this does not mean that the early analogue layers have disappeared. On the contrary; they may be even more important than before. It’s just that they now have to reckon with a new presence. In general, those who are able to make the most appropriate short-circuits between the analogue planet and its digital satellite are the ones who can get the best out of both.

12. The community is the message
McLuhan taught us that “the medium is the message”. Perhaps what we are seeing here is another step in a different direction: the community is the message. From this point on we should be aware that we are in those territories marked hic sunt leones et dracones. This creates a curious sensation… Obviously not all these ideas are of my own. They are the fruit of experiments and activities carried out with different communities. For a series of reasons, they have asked me to summarise them. But having got this far I cannot fail to mention the community of Gran Touristas and that of Whoami. Without the unbounded energy and enthusiasm of these people, I would not have been able to report anything at all. Then I should cite all the people with whom I exchange tweets and Facebook posts (not to speak of photos on Instagram). The list would be too long, but you’ve got the idea.

Confucius taught us a very simple truth: “If I hear, I forget. If I see, I remember. If I make, I understand”. This was true 2500 years ago as well as today. But today we have new and social media. Today we have a new generation of people who are born in a social media world (with various cognitive consequences). Does this imply...
some changes in the above mentioned truth? What kind of changes? Positive, negative, both? Think to Marshall McLuhan. ‘The medium is the message’ he said. But, what happens when the community becomes the message?

Darren Sharpe: This brief presentation redefines the agenda in global system science work by making a fascinating case for the inclusion and analysis of narratives made by marginalised and disadvantaged young people and adults who are heavily invested in narrating their own life circumstances within a framework that encompass global system science. The talk demonstrates how high quality grassroots user involvement contributes to wider conceptual debate in how global systems science can be further democratised and extended to positively re-engage the general public in shaping and influencing public policy.

Example one: E-Inclusion: Mobilising Marginalised Youth
This innovative project will create a sustainable e-platform for marginalised youth in UK, to share stories of transitions into work, training and employment. This e-inclusion project links young people Not in Education, Employment or Training to peers, employers and educators and policy officers and will increase digital literacy and self-resilience as they co-create and use the free e-platform.

Example two: Ethics Quest
The objective of this project is for young people to scrutinise childhood and youth research ethics applications before they reach research ethic committees. The site provides training in assessing research ethics through an evolving Sherlock Holmes type narrative. The e-platform will be game infused and includes a secure site for vignettes and protocols to be uploaded by researchers. The target audience is young people and adults aged 14-21 years of mixed academic ability, who are confident and motivated to go online, and recruited via schools (e.g. PHSE, ECM, or Citizenship groups) and youth participation groups.

Example three: Young Researcher Network
The YRN was launched by The NYA in summer 2007. Its mission is to encourage and support young people’s active participation in quality research that facilitates their voice and influence on policy and practice and contributes to their empowerment. Since launching it has trained and supported a wide range of national, regional and community based groups of young people (aged 11-25) to undertake research and evaluations. We work with organisations in local and central government, health and social care, education, the media, the voluntary and private sectors.

11.00 – 13.00 Parallel Workshop: Big Data Challenges and Models
Chair: Dr. Ciro Cattuto, ISI Turin (Room: Tearoom)

Short Description: The approach to monitoring, measuring, and dealing with collective phenomena in global systems has been rapidly evolving under the pressure of three main drivers: 1) the end of linear thinking brought forth by the maturity of complex system science applied to socio-technical systems; 2) the ability to monitor, quantify and model human behaviors at unprecedented levels of resolution and scale.
unleashed by the planetary-scale adoption of the World Wide Web, mobile communication technologies, e-commerce systems, and on-line social networks; 3) the emergence of new forms of human-machine compositionality arising from the designed or emergent interplay of ICT services and communities of citizens. These innovations are just starting to display their full transformative power. Historically speaking, the current level of interconnectedness and digital visibility is a sudden event with no precedents, and its inception is forcing change in the way organizations think about global systems and deal with global phenomena, both in the public and in the private sectors.

This session will discuss major fundamental challenges in realizing the vision of learning actionable models of social processes from big data sources on socio-technical systems, covering measurement, modeling and learning from data, and future human-machine compositional patterns.

Contributions

Ciro Cattuto, ISI Foundation
Introduction and framing: “Data to Models to Decisions”

Renaud Lambiotte, University of Namur
New data for old questions
The last few years have witnessed a change of paradigm in the social sciences driven by the emergence of pervasive technologies that fill electronic databases with information about our everyday lives. This may be our personal relations, our whereabouts, or even our taste in music or literature. Through this window of data, researchers observe the collective behaviour of millions of individuals and search for common trends and underlying patterns. In parallel, the advent of Internet gaming provides a huge pool of potential participants in online studies, making it possible to conduct laboratory-style experiments involving thousands of people. These studies offer exciting research perspectives by providing the first empirical observations of the dynamics and organization of social systems at a large scale, with the potential to radically improve our understanding of human societies. At the same time, the sheer size and sensitive nature of the data raises a series of theoretical, algorithmic and ethical issues. In this talk, I will focus on recent works bringing new insight on old problems concerning psychology, human mobility and conflict dynamics.

Devdatt Dubhashi, Chalmers University
Algorithmic and Statistical Challenges for Big Data
We will attempt to delineate some of the features of “Big Data” and the algorithmic and statistical challenges they present, especially with a view towards applications in GSS.

Vittorio Loreto, Sapienza University of Roma and ISI Foundation
Cultural dynamics in the era of big data

Guido Caldarelli, IMT Lucca
Financial Networks and policy modeling

Financial regulation is a challenging case of data-driven and policy-oriented applications. Indeed, data are large in size but dispersed in terms of gathering and access privileges. Moreover, policies are not easy to evaluate in terms of consequences, due to the complexity of financial instruments and the complexity of financial networks. The challenges are twofold. On the one hand, there are technical issues: how to make the financial system more resilient to shocks in an interconnected world. On the other hand, there are governance issues: how to mitigate moral hazard and regulatory capture arising from concentration of power in the financial sector at the international level. Both the technical and the governance issues benefit from a representation in terms of complex networks. Interestingly, many of the global issues that GSS intends to tackle share this similar structure where a technical issues and governance issues feed back to each other. In concrete terms, our strategy has been to collaborate closely with policy makers in order to start from the problems they face and deliver concrete contributions.

David De Roure, University of Oxford and Oxford e-Research Centre

Social Machines

12.30pm – 1.00pm

PANEL DISCUSSION

11.00 – 13.00 Parallel Workshop: Formal Languages and Integrated Problem Solving procedures in GSS, Chair: Prof. Patrik Jansson, Chalmers University of Technology (Room: Boardroom)

Short Description: This panel starts from the understanding of GSS goals as developing systems, theories, languages and tools for computer-aided policy making with potentially global implications. The focus of this workshop is the interaction between core computer science, software engineering and GSS. Topics covered include languages for policy formulation and enforcement, software as a key to productivity and innovation in IT industry and academia, domain specific languages for financial services. We will also touch upon dependable modeling, verification and validation of simulation models.

Contributions

Piero Bonatti, (Dipartimento di Scienze Fisiche - Sezione di Informatica, Universita' di Napoli Federico II): Languages for policy formulation and enforcement

Short Description: Policies govern and constrain a system's behaviour, and as such specify mappings from complex situation descriptions to decisions (or at least sets of options to support human decision making). The perfect languages for expressing such mappings should enjoy a number of features, including: clarity and conciseness, explainability, formal verifiability, and the ability of adapting to an enormous number of possible event combinations. The same requirements arise in the restricted domain of security policies. In this talk, the experience gathered in this field will be reported.
with the purpose of identifying the most effective languages for policy formulation.

**Martin Elsman** (HIPERFIT, DIKU, Denmark): *Global Systems Science meets Programming Languages and Systems*

**Short Description:** In this talk, we demonstrate how functional programming and domain specific languages, in particular, can be useful for effectively deriving performance efficient programs and systems. As an example, we outline a system for specifying financial contracts (used in practice by the financial industry) and demonstrate the effect of applying programming language technology to derive tools for pricing contracts efficiently on modern parallel hardware. We argue that research in managing and querying big data and efficiently performing big computations (simulations), as for instance carried out by the HIPERFIT research center, is a central ingredient of the development of a Global Systems Science.

**Jaana Nyfjord,** Director, Swedsoft, Sweden: Software as a key to cross-border innovation

**Short Description:** Software development is becoming an increasingly important part in innovation, production and services for both private and public organizations. Efficient software development with high quality, productivity and commercial impact is decisive for the competitiveness of our industry. Software development crosses industry and societal borders in a unique way. It is driving the renewal of many value chains through the increased use of IT in services and business processes. This gives opportunities for companies and society in large. Swedsoft in cooperation with representatives from industry, research institutes, academia, and the public sector has developed a strategic research and innovation agenda for software development. It will form the basis for a strategic initiative to ensure that Sweden keeps and further strengthens its leading position in the field.

**11.00 – 13.00 Parallel Workshop: Global Health and ICT**

**Chair:** Prof. Manfred Laubichler, Max Planck Institute for the History of Science

**Short Description:** All health challenges lie at the intersection of several global systems. These include various biological, ecological, social, technological, and economical systems. As part of a tightly interconnected world processes at all levels intersect—although exactly how is in many cases not fully understood. But what we do know is that there are multiple complex interactions that play out at different spatial and temporal scales and involve various feed-back and feed-forward loops. Most research has been focused on small or local intersections and has missed important dimensions that are only visible at a global scale. We are currently collecting data that will allow us to understand some of these connections and causal links (the big data challenge). But these data will only be meaningful, if we have a corresponding
A global systems perspective applies to all dimensions of health

- **Individual health:** While traditional biomedicine is exploring genomic, physiological and behavioral components of health as complex adaptive systems, it is becoming increasingly clear that global systems dynamics play a major role in determining individual health outcomes. Examples include shifts in the distribution of infectious disease agents due to global climate change, exposure to new diseases and environmental pollutants due to climate change and global economic activities, increased risks to the food supply, etc.

- **Population Health:** Many health issues also affect populations. In today’s world the population structure has reached a global scale. The ongoing danger of pandemics, the effects of demographic changes and the patterns of global migrations all affect health at the population level.

- **Ecosystem Health:** Another important aspect of global health is the state of the supporting ecosystems. These provide a variety of ecosystem services that are increasingly threatened by various aspects of globalization. Ongoing changes to ecosystems will, through various links and connections of integrated complex systems, affect all other dimensions of health. A global systems science perspective is essential to study, understand, and manage health at all levels.

**11.00 – 13.00 Parallel Workshop: High Performance Computing and Models, Chair: Prof. Michael Resch, HLRS, University of Stuttgart**

*(Room: 150 non liée opera)*

**Short Description:** The topic of the workshop is both on the relevant aspects of models for adequate simulation of GSS and on the relevant aspect of high performance computing with respect to GSS. We will entirely focus on models for simulation and on HPC for GSS, as other aspects are covered by other workshops. After a very short introduction by the chairman we will focus on the following questions:

1. **Models (1 hr)**
   - a. In which fields do we see models for GSS simulation?
   - b. Which general and basic limitations of models for GSS do we see?
   - c. Which steps will be necessary to get to the right models?

2. **HPC (1 hr)**
   - a. In which fields can HPC contribute to the simulation for GSS as worked out before?
   - b. Which general and basic limitations of HPC for GSS do we see?
c. Which steps will be necessary to get to the right HPC approach for GSS?
The result of the short workshop will be summarized in a few-slides-PPT file and will be made available to the workshop electronically.
Participants are expected to come to the workshop with an open mind as well as first ideas, prepared to participate in a discussion that considers the time limitations and stay focused.

13.00 – 14.00 Networking Lunch

14.00 – 16.00 Parallel Workshops: Global Policy Challenges

14.00 – 16.00 Parallel Workshop: Sustainable Financial Markets
Chair: Dr. Stefano Battiston, ETH Zurich / Dr. Antoine Mandel, University Paris 1
(Room: Wellington)

Short Description: Current societal challenges of climate change, food security, financial stability or energy provision are all highly interconnected, and at a global scale. Evidence in this complex interconnected context is hard to obtain and hard to analyze. In the meantime, policy-makers and society increasingly call for evidence-based policies. How shall we understand and address this requirement in global contexts? What type of evidence are we looking for and how can we gather it? The urgency of the problem has been highlighted by the financial crisis; interdependencies involving financial markets have led to contagious chain reactions to all sectors of the economy and from there to society at large, and these processes were not anticipated by policy-makers or by the simulation models their staff works with; so the question arises: can we do better, and if so, how?

The workshop on Sustainable Financial System will present recent contributions from EU funded projects to the investigation of systemic risk and financial networks and will bring together policy-makers and researchers who will exchange on research challenges posed by shadow banking, international monetary stability or climate finance.

Informal presentations on state of the art on financial networks: policy questions and applications

Contributions
Stefano Battiston, ETH Zurich
Guido Caldarelli, IMT Lucca
Antoine Mandel, University Paris 1

14.00 – 16.00 Parallel Workshop: Energy Systems, Chair: Prof. Julian Hunt, University College London (Room: 150 non liée opera)

Short Description: In this session, we consider the contributions Global Systems Science can make to energy systems that are global, multi-faceted and act across different
scales. Energy systems are critically interdependent with human systems, and many issues—such as energy security, climate change, and nuclear waste—require simultaneous consideration of environmental, social, and technological impacts. Transitions towards smarter, more resilient, and decentralized systems are currently underway, and require appropriate legislative mechanisms at different levels of governance. Talks and discussion will cover the multi-scale nature of energy issues, the design of energy infrastructure, and the challenges of policy support for multi-objective energy systems.

Contributions:
14:00 - 14:10: Introduction
Julian Hunt, UCL and UK House of Lords

14:10 - 14:40: Human and Energy Systems in Time and Space at Different Scales
Mark Barrett, UCL Energy Institute

Short Description: The talk will give an overview of complex energy systems and their performance in time—from minutes to years—and space—from buildings to international systems. The foundation for demand, services for people, will be discussed and then the end use and public energy systems required to provide these services in order to meet social, energy and environmental objectives at least cost.

Jobst Heitzig and Jürgen Kurths, Potsdam Institute for Climate Impact Research

Short Description: Power blackouts can impose huge costs on societies. In retrospect, the total costs of a blackout have often exceeded the price tag of additional transmission lines that would likely have prevented this particular blackout in the first place. Still, it is hard to judge in advance which new transmission lines should be built to most effectively improve a power grid’s stability against blackouts in general. This is what we attempt here. Specifically, we employ a novel component-wise version of basin stability, a recent nonlinear stability concept, to investigate how a grid’s degree of stability is influenced by patterns in the wiring topology. Various statistics from our ensemble simulations all support one main finding: the widespread and cheapest of all connection schemes, namely dead ends and more generally ‘dead trees’, strongly diminish stability. For the Northern European power grid we demonstrate that the inverse is also true: ‘healing’ dead ends by addition of transmission lines substantially enhances stability. This suggests a design principle by which smart wiring could help meet the mounting stability demands of tomorrow’s sustainable power grids: build just a few more lines to avoid dead ends.

15:10 - 15:40: Christian Bos, TNO

Short Description: His talk will focus on the policy-making regarding the targeted energy-transition and illustrate the need of better understanding the inter-relationships between the various applicable sub-systems. He will contend that current policies are unnecessarily ineffective and inefficient, and have been taken hostage by political scheming. For a more robust policy-support, models that explicitly study these sub-

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system inter-relationships could uncover these inefficiencies and suggest better alternatives. Examples to be discussed are:

1. Agent-Based Model of regional integrated energy-gas-heat socio-economic-technical systems. Hypothesis: policy-makers insufficiently understand the implications of network balancing on end-user cost and security of supply, and stimulate general behaviours which are likely to be ineffective/inefficient.

2. Model of Emission Trading Scheme (ETS). Hypothesis: policy-makers insufficiently understand the implications of having a market-based ETS and, at the same time, non-ETS parallel incentives (such as priority for wind, mandated Emission Performance Standards, energy-tax, etc.). The latter undermine the effectiveness of the former. One should not introduce a market system (i.e. the market selects the winners), and undermine it at the same time by interfering with the market (i.e. the government selects the winners). Similarly, one should not have different/incompatible objectives at the various organizational levels (EU, national, regional, local). That only results in unnecessary societal transaction costs, and in delays. The ETS model predicts the extent to which inconsistent policies undermine the realization of the stated ambitions.

3. In general, the need to develop a new science, which may be labeled “hierarchical optimization”, i.e. how to set targets and constraints at the various decision levels of an organizational system, consisting of (many) inter-related sub-systems, and subject to distributed decision-making?

15:40 - 16:00 Discussion

14.00 – 16.00 Parallel Workshop: Digital Anticipation and Global Understanding: Big Data, but what a future? Chairs: Prof. Diana Mangalagiu, Sciences Po/University of Oxford / Prof. David Tuckett, UCL (Room: Boardroom)

Short Description: A quick search on Google about what “made the world faster” returns as first results: the cloud, internet, globalization, technology, wireless communication, the end of the Cold War, machines, information technologies. We have begun to design technologies that can take advantage of this increase in the speed of information transmission to develop better short-term insights. Some claim we can now forecast the spreading of flu pandemics or the volatility of stocks using search query data, the results of elections using prediction markets, the demand of new products by tracking their adoption by influential characters in social networks, and better manage prevention of and recovery from extreme events.

One question to ask is whether we can really do all of that and what might be its limitations. Is the availability and rapid analysis of large quantities of big data making societies better or what might be the problems? Another question is whether the developments that have increased the speed and reach of communication mean that our societies feel better empowered and more confident when facing the future? In fact it can seem rather the contrary. A sense of powerlessness is spreading from the unemployed, underemployed or less and less relatively well paid workers in
Western Europe to the nation based policy-makers who have to confront global challenges such as financial and economic crises, climate change, or the rebalancing of power and influence at the global scale. In part, the picture is reminiscent of “the end of the economic man” in the 1930s.

The sense of empowerment or powerlessness may have to do with how we create narratives and visions of the future at an individual or collective level. Recent studies such as Tuckett et al (2013) showed that “aggregate behavior is subject to the convergence and sudden co-ordination of shared narratives about the future and inherently fragile and unstable. Whereas the state of the world changes rather slowly the state of narratives about what is happening in it can alter very sharply and is strongly subject to social interaction and influence.” Such studies suggest that big data analysis can help to capture historical shifts in narrative sentiment and possibly warn about future patterns.

Most decisions at all levels are made in conditions of ontological uncertainty, which is in situations where the future development of entities and their future relations are profoundly unknowable ahead of time. While scientific and technical developments seemed to develop better tools for prediction and control, if we look longer-term it now seems that could be an illusion. The crises of all kinds can be viewed as wake-up calls to remind us of the limits to our anticipatory capabilities and the need to consider and improve our capacity to question models and to expect unintended long-term consequences. There is a need to reflect on and experiment with how knowledge and foresight are developed and to understand how confidence and empowerment appear in multi-level, multi-stakeholder decision and policy-making processes. How emerging narratives and visions connect and co-evolve with existing ones and what is the role of human emotion and subjective narrative capacity in creating economic and social reality?

In this workshop, we would like to shape and address a few preliminary questions and start to identify avenues for research projects and collaborations. A follow-up workshop will be organized in the fall 2013 convening both scholars and reflexive practitioners. Conclusions and next steps for the workshop in Florence

- Preliminary questions to be addressed:
- In what ways is faster also better and in which ways perhaps not?
- What happens to digital communications and what do we know about their effects?
- Is there a sense of powerless among national decision-makers and, if so, what is the connection between that and the new communications systems?
- How can we make sure the short-term and specific issues on which scientists and experts are able to say something (e.g. insights on financial markets which suggest new regulations) also address longer-term consequences?
- In what ways, if any, can ICT help us to know where we want to go as societies and the obstacles facing us? What role for the emerging digital society(ies)?

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• What is “big data”, what do we know about how it is being used, what seem to be the potential advantages and drawbacks and how can we try to make sure we have more of the former than the latter?
• How can large quantities of big data and new digital structures such as social networks and source of information help individuals, organizations, communities shape their vision of the long-term?
• How do we understand the impact of real uncertainty on us and in which ways do we manage it?
• What is a narrative?
• How do narratives of the future get constructed, spread, modify or dissipate and with what consequences?
• Can ICT help us to make use of human feelings (such as to be anxious or optimistic and excited) and to understand and analyze the effect on us of narratives and visions when we are placed in situations of uncertainty?
• How to use multi-tool and multi-method approaches? E.g. combine insights provided by traditional social science methods and tools with big data analysis, modeling, simulations, foresight methods and tools.
• Where and how to search for futures in the digital spheres (crowd-sourcing, data-mining, trend-hunting, weak signals…)?
• Given that human decisions are interactively reflexive, what are the implications for drawing conclusions from digital communication or creating policies on shifting data?

Contributions
Diana Mangalagiu, Oxford University & Sciences Po, Paris: Introduction and rationale of the workshop
Franco Accordino, Digital Futures, DG CONNECT, European Commission: Evidence-based policy making as seen from a public administration perspective: the Futurium initiative experience
David Tuckett, Research Department of Clinical, Educational and Health Psychology, UCL, London: Computer Science, Complexity and Narrative

14.00 – 16.00 Parallel Workshop: Urban Systems and ICT
Chair: Prof. Sander van der Leeuw, Arizona State University (Room: Lancaster)

Short Description: It is a central belief of western civilization that we are capable ultimately of understanding the world. Our understanding is not, at any given moment complete, but exists to a certain degree. Moreover we believe that this degree will improve over time, as will our capacity to use this knowledge to improve management of the phenomena concerned.

Our existing ideas, developed from Jane Jacobs on down, are now being complemented by floods of information from a vast array of sensors in the natural and built environment, by government and industrial statistics, and by the chatter of the social networks. Moreover we can now draw on some fifty years of increasingly realistic and accurate methods of representing, visualizing, analyzing, and simulating...
complex natural and human phenomena. This body of expertise is being gathered under the heading of Global System Science. Finally, the power of scientific computing grows dramatically, enabling us to deal with ever-greater amounts of data. We may expect that more data and more computing power will beget even better models, better urban science and far better and higher resolution forecasts. We therefore feel emboldened to hypothesize that it may be possible to develop a Science of Cities by harnessing Global Systems Science to help us to gain insights from the floods of urban information.

Why should we want a GSS Science of Cities? Because by the end of the 21st century the vast majority of human beings will live in urban rather than rural areas. In this century we will construct as much urban capacity as has ever previously existed on the planet. The interactions between these cities are what drive the dynamics of our world. Finally the cities that we build in this century together with those already existing will probably serve global society for many centuries. It is time that we had a Science of cities to enable us to get the design, construction, operation, and management of our Cities right so that all citizens, wherever they may live, may have the best opportunity for a safe, healthy, prosperous, and sustainable life.

Contributions

Alan AtKisson, Member of the EU Science and Technology Advisory Council/AtKisson Group  
Sarah Cornell, Stockholm Resilience Center  
Maxi San Miguel, IFISC, UIB  
Denise Pumain, University Paris I

16.00 – 16.30 Coffee Break  
16.30 – 18.30 Plenary: Global Systems Science – A Preliminary Synthesis [Room: Balmoral I-II]

Chair: Dr. Ralph Dum, DG Connect, European Commission

Panelists:  
Prof. Guido Caldarelli, IMT Lucca  
Dr. Sarah Cornell, Stockholm Resilience Center  
Prof. Carlo Jaeger, Beijing Normal University and Global Climate Forum  
Prof. Vittorio Loretto, Sapienza University of Rome  
Prof. Michael Resch, HLRS, University of Stuttgart

Short Description: The panel will be summarize the critical points discussed so far in particular regarding a GSS research program and its implications for research and policy.

18.30 – 19.30 Networking drinks

Day Three: Wednesday, June 12

Information on the venue:
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8.30 – 10.30 Parallel Workshops:

8.30 – 10.30 Parallel Workshop: ICT and Global Systems (e)Governance
Chair: Prof. Chris Barrett, Virginia Tech (Room: Lancaster)

8.30 – 10.30 Parallel Workshop: Sustainable Financial Markets
Chair: Dr. Stefano Battiston, ETH Zurich / Dr. Antoine Mandel, University Paris 1
Continued, for ‘short description’ see Tuesday afternoon session (Room: Balmoral II)

Informal presentations on state of the art on financial networks: policy questions and applications

Contributions
Co-Pierre Georg, Deutsche Bundesbank
Tarik Roukny, Deutsche Bundesbank
Peter Zimmerman, Bank of England

8.30 – 10.30 Parallel Workshop: Digital Anticipation and Global Understanding: Big Data, but what a future?
Chairs: Prof. Diana Mangalagiu, Sciences Po and University of Oxford / Prof. David Tuckett, UCL (Room: Wellington)
Continued, for ‘short description’ see Tuesday afternoon session

Contributions
Ulf Dahlsten, London School of Economics, What it takes to organize data for scientific use and how you can use them
Nicole Dewandre, Advisor to the Director-General on Societal Issues of the DAE, DG CONNECT, European Commission
Rethinking the Human Condition in a Hyperconnected Era: Why Freedom is not about Sovereignty but about Beginnings

10.30 – 11.00 Coffee Break

11.00 – 13.00 Parallel Workshops:

11.00 – 13.00 Parallel Workshop: Sustainable Financial Markets
Continued, for short description ’see Tuesday afternoon session (Room: Balmoral II)

Informal presentations on Shadow Banking

Contributions
Mauro Galegatti, Università Politecnica Delle Marche
Giovanni Di Iasio, Bank of Italy
Daniel Neilson, Institute for New Economic Thinking

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11.00 – 13.00 Parallel Workshop: Digital Anticipation and Global Understanding: Big Data, but what a future? Continued, for short description ‘see Tuesday afternoon session (Room: Wellington)

Contributions
Trista Patterson, University of Oxford Smith School of Enterprise and the Environment
The Digital Citizen: Leapfrogging, Environment & Development on a Petabyte Planet
J. David Tabara, Institute of Environmental Science and Technology, Autonomous University of Barcelona, Narratives of Hope and Global Systems Governance

13.00 – 14.00 Lunch

14.00 – 16.00 Parallel Workshops:

14.00 – 16.00 Parallel Workshop: Climate Policy
Chair: Prof. Carlo Jaeger, Beijing Normal University and Global Climate Forum (Room: Balmoral II)

Short Description: The workshop will focus on climate policy challenges, with special attention to differences at national level and international level, and at the same time keeping tensions between climate and economic policies in mind.

Concerning national/EU level policies the discussion will focus on specific climate relevant sector, energy efficiency in the buildings sector. Important aspects are investment requirements and related macroeconomic and cross-sectoral effects of policies in this area. The second part of the discussion will be concerned with international climate negotiations and insights from game theoretical approaches.

We will discuss how policies at both levels can contribute to a transformation to a low-carbon economy and identify possible synergies.

Contributions
Jobst Heitzig, Potsdam Institute for Climate Change Research, Dynamic models of rational or boundedly rational climate coalition formation on networks
Oliver Rapf, Buildings Performance Institute Europe, Policy challenges in the building sector
Franziska Schütze, Global Climate Forum, German Green Growth Model - macroeconomic implications of sector specific climate policies

14.00 – 16.00 Parallel Workshop: Digital Anticipation and Global Understanding: Big Data, but what a future? Continued, for ‘short description’ see Tuesday afternoon session (Room: Wellington)

Contributions

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Gertjan Storm, Advisor science, policy and sustainability, International Centre for Integrated assessment and Sustainable development, University of Maastricht
Big data, “environmental democracy”, a test case
Gerard Weisbuch, Ecole Normale Supérieure, Paris, Opinion dynamics

16.00 – 16.30 Farewell Coffee

Practical Information:

Size of break-out group rooms:

- 150 non liée: 25
- Balmoral II: 35
- Boardroom: 12+3
- Lancaster: 30
- Tearoom: 13
- Wellington: 30