



Elżbieta Bieńkowska:
The Industry Commissioner on the EU strategic priorities ensuring the European space sector remains competitive



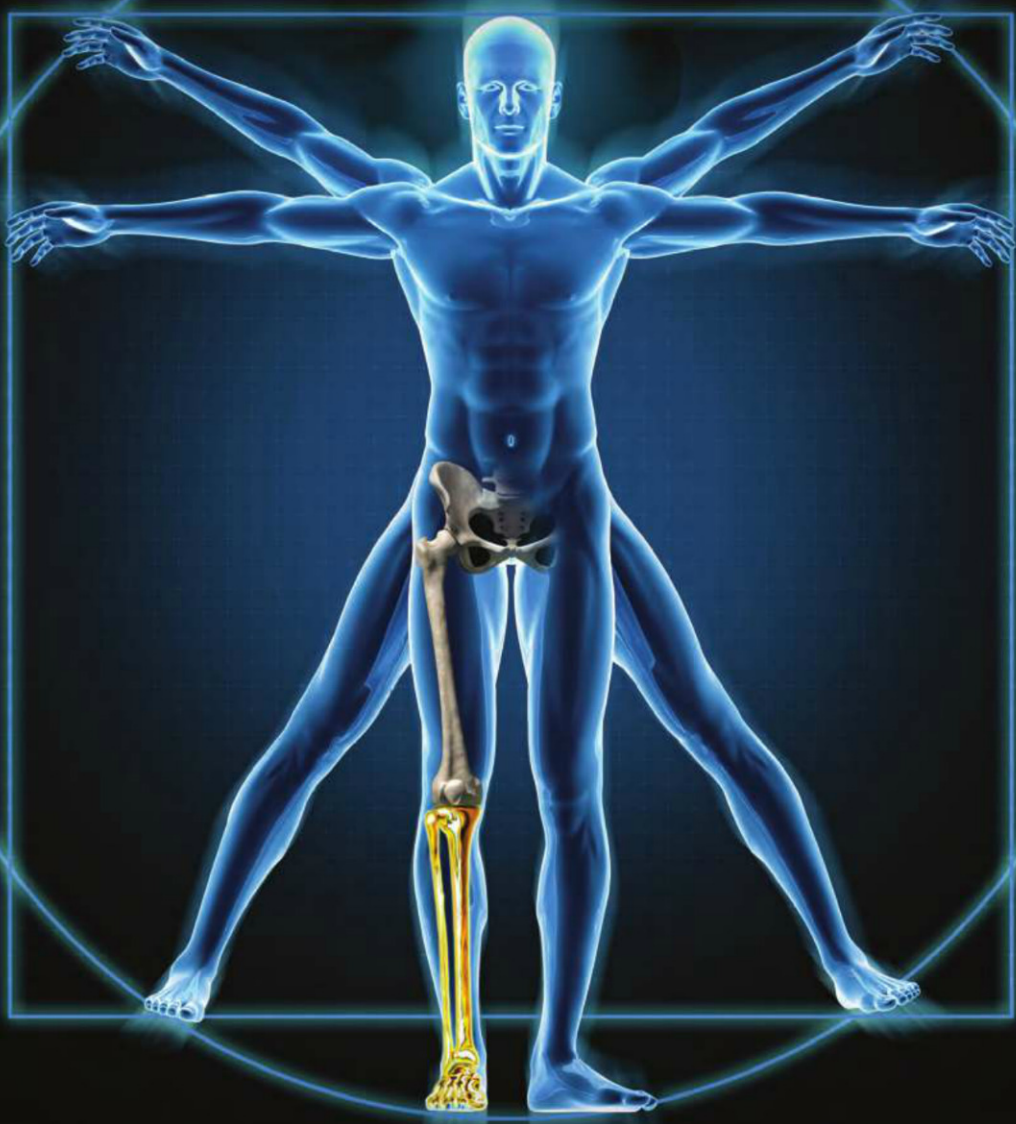
Fred Jansen:
The Rosetta mission manager discusses some of the lessons learnt from this comet-chasing enterprise



Vytenis Andriukaitis:
The Health Commissioner outlines how he will continue to work towards a healthier Europe

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A STRATEGY FOR SPACE

The space sector, including the many and diverse related activities, is inextricably tied to Europe's future growth and success. Here, the European Commissioner for Internal Market, Industry, Entrepreneurship and SMEs, Elżbieta Bieńkowska, outlines some of the EU's strategic priorities to ensure the European space sector remains competitive 52



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ESSA PRESIDENT **PROFESSOR FLAMINIO SQUAZZONI** DISCUSSES THE ROLE OF ESSA AND THE UNIQUENESS OF SOCIAL SIMULATION RESEARCH IN EUROPE

Stimulating simulations

The European Social Simulation Association (ESSA) promotes the development of social simulation research, education and application in Europe and has become the most important hub of social simulation worldwide, promoting international initiatives to build a bridge between regional groups and associations.

ESSA's objectives include encouraging the development of social simulation in Europe and more widely, promoting international co-operation, developing the distinctiveness of European social simulation research, and favouring applied social simulation research that responds to important stakeholders' needs.

In an interview with Pan European Networks the president of ESSA, Professor Flaminio Squazzoni, discussed the role of ESSA, the uniqueness of social simulation research in Europe, and the need for the ICT aspect to be integrated into the education of the next generation of social scientists.

How would you define social simulation?

Social simulation is the application of computer simulation techniques to study complex social phenomena, such as ethnic segregation in urban areas, traffic jams or discriminative norms in social groups or organisations. It combines social science theories and advanced computing methods to understand how the relatively simple behaviour of individuals can generate unpredictable collective patterns, especially when network externalities are present.

If people's behaviour also depends on what others do, and if certain contexts influence the way individuals perceive a given situation, then it



Professor Flaminio Squazzoni

If people's behaviour also depends on what others do, and if certain contexts influence the way individuals perceive a given situation, then it can be very difficult to predict what can happen at the collective level

can be very difficult to predict what can happen at the collective level. By building computer simulations whereby individual behaviour and social interaction are realistically modelled, social simulation attempts to provide insights on collective patterns that can spontaneously emerge from social interactions. In doing so, this research synthesises findings from the behavioural sciences, psychology, economics and the social sciences, and so helps to fill the gap between qualitative and quantitative knowledge, which are typically fragmented in different disciplines or areas.

Building on the pioneering contributions of the 1990s, social simulation is now recognised worldwide as an innovative method to examine social phenomena which also has important implications for policy and examples of applications in businesses and the public sector.

The field also has highly recognised international journals – the *Journal of Artificial Societies and Social Simulation (JASSS)*, for example – and three regional associations – ESSA, the Pacific-Asian Association for Agent-based Approach in Social Systems Sciences (PAAA) in Asia, and the Computational Social Science Society of the Americas (CSSSA) – which gather together hundreds of researchers from different disciplines who aim to understand the mechanisms that preside over a social system's behaviour.

What makes European social simulation research distinct?

The origins of social simulation are European, and Europe has the largest community of people doing this type of research.

The initial meetings on social simulation were organised in Europe in the 1990s; the first was hosted by Nigel Gilbert at the University of Surrey in the UK. These meetings were pivotal in initiating a community that eventually





developed worldwide, especially around the online SimSoC network.

In 1998, SimSoC promoted the establishment of *JASSS*, an Open Access, online journal which had a lot of Europeans among its promoters and which is now the main forum in this field worldwide.

Following that, the initial community expanded with the establishment of ESSA, the first association of social simulation scholars, which was founded in 2003. ESSA had an active role in promoting a European community and also induced other communities to establish regional associations (PAAA and CSSSA), with which ESSA collaborates in biannual joint meetings.

This created positive conditions for developing a large scale, cross-national EU community, with important implications for collaborative research projects and joint educational and scientific initiatives – which were highly recognised in the last EU framework programmes in terms of funds and support.

However, what makes social simulation distinct in Europe is the fact that, from the very beginning, it has been dominated by social scientists, i.e. by people interested in combining social science with advanced computational research. By way of comparison, social simulation in Asia is dominated by computer scientists, while the US community mostly traces back to the Santa Fe Institute's complex

While prediction is what some people may expect from science, I believe that the understanding and management of complex social systems is more important

adaptive systems research programme. This implied that social simulation was less recognised among social scientists, and its fortune was dependent upon the ups and downs of this institution.

Generally, the widespread impression is that social simulation is more vital in Europe, and there are more funding opportunities for this type of research here than anywhere else.

How would you like to see social simulation promoted at the international level?

Social simulation already has something of an international dimension, in part thanks to the collaboration between ESSA, CSSSA and PAAA, and social simulation events (conferences and summer schools, for instance) typically attract scholars and students worldwide. However, a critical mass has not yet been reached in order to stimulate the establishment of social simulation communities in places like South America, China, or India.

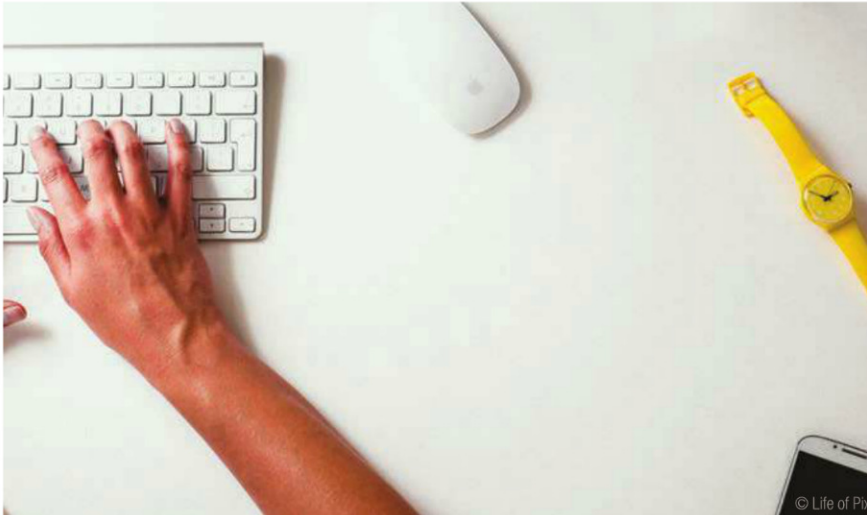
On the other hand, dramatic barriers exist with regard to the establishment of international collaboration in research activities, with the exception of personal contacts, student exchanges, or small scale projects.

Exploring funding schemes that could promote international research would also be helpful for social simulation.

What are your thoughts on the argument that using fairly simple models to simulate real life with computers is not always the best way to predict behaviour?

This is a serious point. However, I don't believe that predictability depends on the degree of simplicity or complexity of scientific models. And, moreover, we are able to develop rich computer models with simulations that include hundreds of parameters and real-time data.

While prediction is what some people may expect from science, I believe that the understanding and management of complex social systems is more important. If we consider that markets or societies are complex systems in constant change, as people's behaviour is different depending



on the context, simulation models that look at people's behaviour and what happens when large groups of individuals interact in non-trivial ways can be helpful to understand what to do.

Social simulation indicates that the complexity of social systems cannot be suppressed or reduced; rather it must be harnessed for the common good. To do so, understanding is fundamental, independent from the fact that our simulations cannot produce exact predictions.

With the increasing prevalence of social media, as well as issues such as terrorism and extremism, how are the challenges of social simulation evolving?

First, incorporating large scale data in our simulations is now possible with the advent of new social media, and so social media should be seen as a great opportunity. However, Big Data without theories on human behaviour can at best generate puzzles to be solved and new questions to be answered; science-based intellectual exercises will always be needed. On the other hand, abstract models or pure theories without data will soon be viewed as a poor, old school exercise, also within the social sciences. A new alliance between the Big Data approach and social simulation is thus required.

The real problem is, given that social simulation is a more complicated endeavour than running econometric regressions or executing a data mining algorithm on an empirical dataset, for instance, its capacity to provide real-time responses to important social issues such as terrorism is still limited. Important advances have been made towards standardising social simulation model building so that now everyone can work on pre-existing or computational modules and build them faster and more efficiently.

However, the possibility of responding to urgent social issues also depends on the ability to convince policy makers about the advantages of this research to solve such problems. I nevertheless remain optimistic and believe that it is just a matter of time due to the fact that the limitations of the current repertoire of policy instruments (such as econometric estimations, geo-visualisation and economic models) have now been recognised.

Promoting reform of social science curricula, as well as injecting social science into other curricula (e.g. artificial intelligence or data mining), is something that ESSA will support more actively

Yet this process will not be a spontaneous convergence; social simulation scholars must be able to produce a new policy narrative which is to be coherent with the principle of social complexity and, moreover, be able to take this research to the next level so as to demonstrate its policy-informing potential.

The importance of this effort is widely recognised in our community, and I am confident that we are getting close to a tipping point where this research will be considered a serious tool by policy makers.

Where does ESSA fit into this?

ESSA has the potential to build on its past and current successes (conferences, schools, student awards etc.) and to do much more moving forwards. In the first instance, we could promote educational reform of the traditional social science training, which is crucial for the future.

Many social scientists are not trained in computing, and this holds for all training levels and universities. This computing gap penalises social scientists. Promoting reform of social science curricula, as well as injecting social science into other curricula (e.g. artificial intelligence or data mining), is something that ESSA will support more actively.

We also need to involve public and private stakeholders to a greater degree and to improve the impact of this research and ensure jobs for young scholars outside of academia. We aim to be a platform to encourage institutional experiments towards transdisciplinary, issue-oriented research and education institutions that embody social simulation research.

Indeed, the mantra of discipline and ultra-specialisation is detrimental to a complexity-friendly view of societies, economies and technologies.

Professor Flaminio Squazzoni
President
European Social Simulation Association
(ESSA)

browse www.essa.eu.org
