



The Socio-Epistemic Dynamics Of Scientific Research

Jean-Philippe Cointet, Elisa Omodei, Thierry Poibeau

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ECCS'13

■ European Conference on Complex Systems

KEYNOTE SPEAKERS

Luís A. N. Amaral, Northwestern University

Jordi Bascompte, CSIC

Daniel G. Brown, University of Michigan

Morten H. Christiansen, Cornell University

Gustavo Deco, Pompeu Fabra University

J. Doyne Farmer, University of Oxford

Stefano Zapperi, CNR-IENI

INVITED SPEAKERS

Marián Boguñá, University of Barcelona

Ciro Cattuto, ISI Foundation

Cecilia Mascolo, University of Cambridge

Yamir Moreno, University of Zaragoza



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16 - 20 september 2013

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Using Friends As Sensors To Detect Global-Scale Contagious Outbreaks*Manuel Garcia-Herranz, Esteban Moro*, Manuel Cebrian, Nicholas A Christakis and James H. Fowler*

11:30 – 11:50

Room A1

Contributed talk

Recent research has focused on the monitoring of global-scale online data for improved detection of contagious outbreaks. However, privacy considerations and the sheer scale of data available online make global monitoring infeasible, and existing methods do not exploit the local network structure to identify key nodes for monitoring. Here, we develop a model of the contagious spread of information in a global-scale, publicly-articulated social network and show that a simple method can yield not just early detection, but advance warning of contagious outbreaks. We show that a random friend group of a small random fraction of Twitter nodes is more central in the network, allowing detection of viral outbreaks of the use of novel hashtags about 7 days earlier than we could with an equal-sized randomly chosen group. These results suggest that local monitoring is not just more efficient, it is more effective, and it may be applied to monitor similar contagious processes in global-scale networks.

The Socio-Epistemic Dynamics Of Scientific Research*Elisa Omodei*, Jean-Philippe Cointet and Thierry Poibeau*

11:50 – 12:10

Room A1

Contributed talk

How are social and epistemic structures driving future interactions in scientific research? We analyzed a very large data set of scientific publications (APS dataset) to investigate the social dynamics of collaboration network and the epistemic network of PACS codes co-occurrences network. In particular we show that the epistemic network built through concepts co-occurrences in articles has a non trivial structure characterized by a scale-free degree distribution and a high value of modularity, produced by linking probability mechanisms that depend on local similarity factors. We empirically show that those local epistemic dynamics are both linked to past social and epistemic structures. Moreover we show that the evolution of the social network depends also on epistemic factors and vice-versa, indicating that the two networks mutually influence their evolution and are thus co-evolving over time.