

A Call for Papers for a special issue of *Scientometrics* on:

“Simulating the Social Processes of Science”

Deadline: 30th April 2015

Motivation

Science is the result of complex interactions between institutions and individuals self-organizing their research. There has been a tendency to depict/sketch science as an individual, cognitive endeavour marked by new ideas, breakthroughs and problem solving activities. However, there is no doubt that science is also substantially a social process. That is, science relies on many inter-personal processes, including: selection and communication of research findings, discussion of method, checking and judgement of others' research, development of norms of scientific behaviour, organisation of the application of specialist skills/tools, and the organisation of each field (e.g. allocation of funding). Furthermore, science is full of the social phenomena that are observed elsewhere: fashions, concern with status and reputation, group-identification, collective judgements, social norms, competitive and defensive actions, to name a few.

Although we sometimes can directly observe scientists interacting, usually our theorising about this is indirect, via the traces of their behaviour (individual and social) in terms of the documents they produce, such as journal articles, patents or grant applications. Empirical observations of science – in the form of quantitative studies – for a long time remained focuses primarily on traces of formal communication. The simple reason is, those are captured in a structured way in bibliographic databases, and available for analysis. However there are other sources of data about the behaviour of researchers. These include, for example altmetrics, but also the more qualitative evidence that can be harvested from narratives, interviews, and questionnaires or science history accounts. Agent-based models are particularly suitable for building upon hypotheses derived from such micro-level data as they encapsulate hypotheses about behaviour and produce outputs that can be validated against macro-level observable traces and data (Moss and Edmonds 2005).

This special issue calls for models that explicitly represent the interactions between individual researchers, capturing aspects of the social processes of science. They may build upon hypotheses about individual behaviour from a variety of sources, including: the sociology of science, cognitive science, or qualitative observations as long as they also are comparable with some kind of validation data. Their heuristic power unfolds when the system under study involves substantial interaction between heterogeneous actors or over within complex networks. Such models hold out the potential as a complementary tool to the existing range of quantitative and metric approaches. New insights about science can be gained by comparing and relating different kinds of model, including data, statistical, observational, psychological and computational. This special issue aims to present a state of the art in terms such computational models.

The Topic

We are looking for original articles that use simulation methods to understand and explore the social (i.e. inter-researcher) processes that contribute to the phenomena we call science. These could be simple or complex, agent-based or otherwise, but need to go beyond data analyses and data description approaches that only deal with the relation of macro-level variables. All models should link individual interactions between researchers to outcomes that are possible to measure (at least in principle). All models should list their conceptual, epistemic or empirical points of departure – being as clear as possible as to the assumptions on which they are built. Given the focus of the journal, the models should be presented and assessed in formal or numerical ways. They should be validated with empirical data where possible. We are also open to the submission of models that lead to new ideas about measuring and observations and might accept one survey paper covering the field up to the present. However, overall we will favour submissions that take some effort in aligning assumptions and theories with observations and data.

Specific topics could include, but are not limited to, the following:

- How individual and social behaviour of researchers result in citation networks, such as those we observe?
- When and how researchers choose to co-author papers or write grant applications together?
- How is current production of scientific knowledge by individuals and groups influenced by project-funded science and evaluation schemes?
- How does the individual career path unfolds under the condition of globalization and team science? How the structure and social practices of science impact upon the career of early stage researchers?
- What are the properties of peer review, including the effectiveness and robustness of alternative systems and what are their influences on scholarship?
- How academic topics emerge, are maintained and finally fall out of fashion?
- What are the social and reputational factors behind the success or frustration of interdisciplinary research?
- How can we describe, analyse and model the impact of different social aspects upon the development of scientific knowledge: trust, reference group identification, honesty, methods of measuring reputation, team working, etc.?

History

Broadly this approach goes back to (Gilbert 1997), but interest in this has recently intensified. There was a workshop, then book on “Models of Science Dynamics” (Scharnhorst et al. 2012), which did not focus on models of the social processes of science, but included a review of agent-based models up to that point (Payette, 2012). Then there followed special issue of *position* papers on this topic in the Journal of Artificial Societies and Social Simulation, in 2011 (Edmonds et al. 2011), followed by some papers appearing at simulation conferences (ESSA, ECMS, MABS), leading up to the week-long Lorentz Workshop on this topic in April 2014. <http://knowscape.org/simulating-the-social-processes-of-science-a-summary>. Contributors to this special issue are by no means limited to those involved in the above.

Submission

Although participants of these previous events are encouraged to submit revised and mature versions of their papers, this is an open call that will be freshly peer-reviewed according to the normal standards of *Scientometrics*, without any prior preference. However, the editors reserve the right to reject papers that clearly fall out of the scope of this special issue, without review. Therefore, potential contributors are asked to submit their papers prior to the regular reviewing process by email to Bruce Edmonds (bruce@edmonds.name) for possible selection by the 30th April 2015. Authors will then receive instructions for submission along with some technical notes.

Special Issue Editors

- Bruce Edmonds, Professor of Social Simulation, Centre for Policy Modelling, Manchester Metropolitan University, UK.
- Andrea Scharnhorst, Royal Netherlands Academy of Arts and Sciences, Data Archiving and Networked Services, Amsterdam, Netherlands

References

- Edmonds, B., Gilbert, N., Ahrweiler, P. & Scharnhorst, A. (2011) Special Issue of the *Journal of Artificial Societies and Social Simulation* on 'Simulating the Social Processes of Science' 14,(4) (Introduction to special issue is at: <http://jasss.soc.surrey.ac.uk/14/4/14.html>).
- Gilbert, N. (1997). A simulation of the structure of academic science. *Sociological Research Online*, 2(2), <http://www.socresonline.org.uk/2/2/3.html>.
- Moss, S. and Edmonds, B. (2005) *Sociology and Simulation: - Statistical and Qualitative Cross-Validation*, *American Journal of Sociology*, 110(4) 1095-1131.
- Payette N. (2012) Agent-based models of science. In Scharnhorst, Börner, and Scharnhorst A., Börner K. & Van den Besselaar, P. (eds.) (2012). *Models of Science Dynamics*. Springer. Ch 4, pp. 127-157