

Iss. 6 | April 2008

Open research – the ORS way

By **Miltiadis Lytras**, Assistant Professor in the Computer Engineering
and Informatics Department, CEID, University of Patras

and **Miguel-Ángel Sicilia**, Associate Professor in the Computer Science
Department, Technical School of Informatics, University of Alcalá

Presentation
Julià Minguillón
Assistant Director,
Internet Interdisciplinary Institute, UOC

Presentation

Julià Minguillón

The open movement has gained weight over recent years, in particular thanks to the educational sector and the concepts of open content and open educational resources as ways of aiding dissemination of knowledge and overcoming the barriers existing in terms of access to quality educational content. This movement stems from the open source software development movement, the main aim of which was to change the way software was seen as a commodity to be bought and sold, as a closed and opaque product that could not be manipulated by users. The open source movement, instead, promotes the sharing of the source code –the real knowledge that makes the software work– so that each user (in an ideal world) can see how it functions and adapt it to their needs, extending it, where necessary, and redistributing this new version among the community as part of a process of continuous collaborative improvement.

At heart, the open concept fights the barriers to the free spread of knowledge. It is referred to as "open" rather than "free" given the ambiguity of the latter, which can take on two different meanings: as in free beer and free speech; two similar ideas, but obviously not the same. Open now means guaranteed access, the ability to modify and redistribute –with the definitive aim of promoting reuse. Adopting policies that aid the use of open resources, in general, is not simply a question of anti-system fundamentalism, but backed up by clear examples of the benefits offered. Shared building of knowledge on a large scale ensures a better response to change and a level of quality on a par with other proprietary solutions. Wikipedia is an example of how a collaborative space incorporating thousands of users can achieve levels of quality that were unthinkable only a few years ago.

Thus, initiatives are starting up in different areas of the Information Society to promote the same spirit to create and share collectively. Virtual communities can now form around almost any point of interest thanks to the availability of a range of technological tools that allow for the shared creation of knowledge and the overcoming of the barriers of time and space. The same paradigmatic change seen, in its day, in the open source movement and, now, in the open content movement is being seen in other areas, such as the dissemination of the research

activities (which are often funded by public administrations) taking place around the world.

Nonetheless, research has not only to open up and feedback to society by improving access to the results obtained through a particular form of open content, but it also has to be reviewed throughout, promoting participation from the initial stages of all research projects. Initiatives such as open access scientific journals are necessary, but obviously insufficient. The goal here is to ensure the quality of the scientific method employed, aiding access to all the information required to reproduce experiments, with the twofold aim of assuring integrity, on the one hand, and allowing for new perspectives that lead to new derivative lines of research, on the other. The links between research, teaching, innovation and development and the Information Society are so evident that it is vital that formal guarantees be provided to ensure all the factors involved are accounted for and clearly defined.

In their article, Miltiadis Lytras and Miguel-Ángel Sicilia describe the key factors that need to be looked at to ensure an open critical scientific review process for all scientific work. Basic criteria are required to ensure this is the case in terms of creating collaboration areas for scientists, improving the feedback to society and industry or simplifying the processes for sharing and disseminating results. Thus, the Open Research Society presented in this article looks to act as a regulatory mechanism for the whole process. It promotes a series of best practices that should offer real alternatives to the current research scene, which is at a delicate time as it tries to balance the massive quantity of information available and the ability to manage it collaboratively with the secrecy of the almost individualistic scientific production and review processes. If other areas of knowledge (such as software or educational resources) have been able to adequately adopt the open concept, then why should research, the first step in any development and innovation process, not be able to?

Julià Minguillón
Assistant Director,
Internet Interdisciplinary Institute, UOC

article

Open research – the ORS way

Miltiadis Lytras
Miguel-Ángel Sicilia

Submission date: January 2008
Acceptance date: February 2008
Published in: April 2008

Abstract

Openness has become a key concept in many areas of human action in the last years. Open source software development and open access to scholarly publishing are two prominent examples of this. The application of the concept of openness to research poses significant challenges in the analysis of how research activities, institutions and methods can be made more open and transparent. The Open Research Society (ORS) is a non governmental organization pursuing the goals of experimenting open approaches to research, and analyzing in which ways research activities and outcomes can be considered "closed" today. Even though no single solution can make research –as a whole– more open, there is a need to reflect, test and promote concrete approaches that innovate in the field of openness, which would eventually lead to an evolution of shared practices, methods and institutions. The ORS provides an umbrella for such experimental and evolutionary approaches to inquiry in making research less closed than it is at present. This paper briefly discusses the main ideas behind the foundation of the ORS.

Keywords

Open Research Society, open source, open access

Resum

L'obertura s'ha convertit en un concepte clau en moltes àrees d'acció humana en els últims anys. El desenvolupament de programari de codi obert i l'accés obert a la publicació acadèmica en són dos exemples importants. L'aplicació del concepte d'obertura a la recerca planteja reptes importants en l'anàlisi de com es pot fer que les activitats, les institucions i els mètodes de recerca siguin més oberts i transparents. La Societat per a la Recerca Oberta (ORS, per Open Research Society) és una organització no governamental que té els objectius d'experimentar amb plantejaments oberts de recerca i d'analitzar en quin sentit les activitats i els resultats de recerca es poden considerar «tancats» avui dia. Tot i que no hi ha una única solució que pugui fer que la recerca sigui –en conjunt– més oberta, hi ha la necessitat de reflectir, provar i promoure plantejaments concrets que innovin en el camp de l'obertura, cosa que finalment ens portaria a una evolució de les pràctiques, mètodes i institucions compartits. L'ORS proporciona un paraigua per a aquest plantejament experimental i evolutiu de la investigació per a fer que la investigació sigui menys tancada que avui dia. Aquest article analitza breument les idees principals que hi ha darrere la fundació de l'ORS.

Paraules clau

Open Research Society, societat per a la recerca oberta, codi obert, accés obert

Background – open source, open access, free beer!

"Open" has become an important word in the world today. In common language, *open* is "which is not closed", or "which is accessible", such as for instance an open gate. However, in recent years the concept of openness has begun to be used as a qualifier for

several human intellectual artifacts and processes. "Open source" is arguably the first important application of openness to both a human artifact and a process. Concretely, the artifact is *software* (which means that the authors somehow provide access to the source code of computer programs) whereas the process is *software development*. However, at this point in time many others exist.

The open access movement, as defined by Peter Suber¹, is "the worldwide effort to provide free online access to scientific and

1. <http://www.earlham.edu/~peters/fos/timeline.htm> [viewed online January 8, 2008]

scholarly research literature, especially peer-reviewed journal articles and their preprints". This is indeed a highly relevant application of the concept of openness today. Particularly, open access mainly focuses on making accessible the outcomes of a particular kind of artifact –the academic paper. Notable initiatives in this area include the Budapest open access initiative (<http://www.soros.org/openaccess/>) and, on the technical side, the Open Archives Initiative (<http://www.openarchives.org/>).

If we examine the implications of the idea of openness as applied to different areas, there are many different aspects that appear as important consequences. However, let us go back to the open source example. Open source programs can be developed with standard, "non-open" techniques. A company might, for some reason, decide to provide one of its products as open source. At first glance, it might seem that openness here affects only the artifact, that is to say, the source code. But it is possible that the strategy of the company is also affected by the idea of openness (Behlendorf, 1999). Thus, openness can be considered a principle that potentially affects any area of human action. Another example is the existence of software development methods (and even cultural elements such as taboos and norms) specific to open source (Feller and Fitzgerald, 2002).

Today, the fever of openness has crossed over to many other domains, lately including beer! The Vores Øl beer was the first open beer design, and now it has evolved into the FREE BEER brand² which is published under a Creative Commons attribution – share alike license³. This means that anyone can use the recipe to brew the beer or to create a derivative of the recipe, even for commercial purposes. The general idea behind the "share alike" philosophy is that licensees may distribute derivative works only under a license identical to the one that governs the original work. Typically, authors of open resources retain only limited rights as attribution (so you must, for example, refer to the original author).

Openness is therefore a philosophy that is currently expanding to many areas of human action, and which is now a legitimate concept in many areas of human activity, such as in the examples provided or in opening access to education. Regarding the latter, an effort promoted by the Open Educational Resources movement, see for example the *OER Commons* (<http://www.oercommons.org/>) or *OLCOS* (<http://www.olcos.org/>).

Recently, openness has begun to be applied to the term "research" (not only to the papers, which are the "product" of research, but to the research activities that ultimately produce those papers). Applying the openness philosophy to research is a challenging task, since research is an area of human activity that has major implications on the wealth of nations and change

in our societies. Thinking in open research is thinking in opening human knowledge and opening the mechanisms that create such knowledge. This is what the Open Research Society is about.

Opening research

If we consider opening research, we first have to think about what research is and in which ways it is considered to be "closed" today.

Research is defined in the Wiktionary as "diligent inquiry or examination to seek or revise facts, principles, theories, applications, etcetera; laborious or continued search after truth." The beauty of this definition is that it is not tied to any particular scientific method or knowledge area, and it equally applies to social science, technical research, formal sciences and natural sciences. In any case, it is clear that research is a set of activities that follow certain guiding principles. Open access focuses on the end of the process –the production of the final report (the paper) with the results of research activities. However, there is much more to open in open research, and this is what the ORS aims to pursue. Even in the case of opening the results, the academic paper is only half of the story.

Research is obviously closed when there are restrictions to access it –e.g. fees or barriers to accessing research documents. But there are several other aspects in which research might be considered "closed", including the following:

- Research is closed when the intermediate products of research are closed, e.g. the data used, the details of the methodology and the techniques, the computer tools used (if any) or any other element essential to reproducing and fully understanding how the "diligent inquiry" was done. We only need to remember recent scientific frauds regarding cloning cells to stress the importance of the replication of experiments and the availability of intermediate products that can be used to audit scientific research.
- Research is closed when the social structure supporting scientific work (including decision making in funding programs, conferences, editorial boards of journals, etc.) has no transparent government rules, because this situation gives rise to non-fair "lobbies", "invisible colleges" and similar structures that put up access barriers not necessarily related to the standard quality criteria of research itself.
- Research is closed when the data used for measuring research outcomes is not available for scrutiny in a

2. <http://www.freebeer.org>

3. <http://creativecommons.org/>

transparent way (Rossner, Van Epps, and Hill, 2007). Consequently, bibliometrics, scientometrics and committees deciding on academic promotions, for instance, should themselves be subject to measures of transparency and fairness. A first step towards that is opening all the rules, procedures and data used in their evaluation processes.

The above list is by no means exhaustive, and of course it is impossible to find a single model that provides "perfect" openness. However, it is worth the effort of experimenting new methods, models, systems and structures for opening research. If we consider openness as a general concept or philosophy, it is possible to contrast, discuss and criticize approaches to openness on the basis of several guiding principles. An example of this is the fact that some "open access" publishers charge fees to authors as a model of sustainability. This guarantees that the papers published are freely available, but imposes a barrier to access to individual researchers or groups without funding for their research.

In addition, it is important to note that openness should never become a fundamentalist approach, but a model in which people and organizations engage because of its benefits. The freedom to maintain closed results or models need not be compromised by open models, but they may coexist or even complement each other (as currently occurs in the software industry). Of course this opens a debate on who is paying for doing research – in the case of public research institutes or universities it is reasonable that the taxpayers have access to the results of the research they are supporting, but privately funded research need not be obliged to anything similar. At any rate, open research need not be radically incompatible with existing ways of doing, but complement them and eventually replace them only if practice has objectively demonstrated that they are better for the purpose of research as a human endeavor.

Openness in the structure of the ORS

An organization making use of the term "open" in its name should consider openness in its own structure and functioning. This is a basic matter of credibility. However, the ORS operates in the world we have, and it consequently has materialized in a concrete real form, in a concrete country (Greece), and in concrete persons (the founders). The constitutional objectives of the ORS are shown in the box below; however, they might not look so innovative when compared to the aims of other organizations that promote openness.

The Open Research Society (ORS⁴) is a non governmental organization (NGO) and does not depend on any government, political party, political or religious organization or entities representing financial interests.

- Providing free access to knowledge and the results of scientific research to all people at national, European or international level.
- The promotion and spreading of the idea of volunteering and voluntary offer among the creators of knowledge and the deliverers of scientific research.
- The development of the citizens' society without dependence or influence from state bodies and/or the market, as well as fighting off social exclusion in the fields of knowledge and scientific research.
- The promotion of the lifelong learning idea and the distance learning method, especially by making use of computers and the internet.
- Providing dedicated training and knowledge validation or metrication to individuals, professionals, executives and officials.

Open Research Society constitution document (excerpt)

In spite of what we find in the concrete wording of the objectives, in the mind of the founders there was the intention of having openness as a "genetic" feature of the ORS. In other words, openness is a founding principle that must reign in the decisions of the ORS, and that spreads, evolves and perfects itself in the course of the activities of the society.

An important concept in the management and evolution of openness in the ORS is that of *open policies*. Open policies are documents that contain procedures or principles for the different areas of action of the ORS. Open policies are versioned (and of course made open), so that they can change and be traced – eventually allowing people to study how the policies had changed in the past. Open policies are discussed inside the ORS (of course considering any external opinion), and a deliberative approach is established for rational discussion on how the policies relate to an open philosophy.

Research outcomes – ORS journal policy

One of the areas in which the ORS seeks to make an impact is that of scientific journal publishing. Of course open access is a key characteristic for the ORS, but one of a specific kind. Enforcement of payment by authors excludes researchers that do not have funds for that particular use, so no publishing fees are allowed.

4. <http://www.open-research-society.net/>

Sustainability then should come from the resources owned by the ORS, or by any other sponsoring or voluntary subscription mechanism.

However, open access is not the final but an intermediate stage in experimenting new scholarly communication practice. The following box summarizes the current open policy for this, which represents only an initial attempt, and would likely be improved after the coming general assembly.

ORS open access policy

The following is the statement of the open access policy of all ORS journals. The current policy is version 1.0 and was stated on September 1, 2007. Future revisions of this open access policy would eventually replace this one if approved by the ORS, but open, free access will be retained in any case.

Policy on fees and subscriptions

All the papers published are and will continue to be open access. In addition, publishing will never require fees to the authors of the papers (or their institutions).

However, authors could be asked to follow some specific guidelines for the format and style of their papers, and they could be required to provide metadata and complementary digital files for their papers. These requirements will be oriented to increase the openness of research results.

Requirements for open source scientific resource publishing

Authors will be required to provide, in open source form, all the resources used or created in the course of the research reported in their papers. This typically includes data sets in the case of empirical studies, software, files or ontologies in the case of papers that report on technology, and educational resources in the case of papers reporting instructional practice. This does not conflict with preserving anonymity and privacy, but instead is oriented to make research contrastable and repeatable and to improve opportunities for meta-analysis.

Requirements for openness in the peer review process

All ORS journals follow a double-blind peer review process, similar to that of most standard scholarly journals. This process can not be made public as of today without losing the benefits of the tradition of scientific review. However, this process is enhanced by the option of preliminary screening.

Preliminary screening consists of a fast review phase that gives a provisional assessment on the appropriateness of the submission of a paper to a journal, in terms of scope, degree of innovation and a provisional look at the contents. This could avoid frustrating long delays in the review process that authors suffer in many cases, since one of the peer reviewers of the paper, if the authors request it, will be the person who issues the preliminary screening. In this

Some of the policies may look "traditional" to many people, or misleading to others, but the idea behind them is that of establishing a starting point. For example, innovations in the review process will be introduced by "controlled mutation", with controlled experiments that can be contrasted with "traditional" approaches. There are several proposals that aim at changing the current practice of peer review, but they must be tested in a controlled way to examine their strengths and weaknesses.

way, the author may decide early on not to submit to that journal or to improve the paper before submitting.

Experimental review processes (as collaborative or incremental reviews) will be provided as an option for authors that consider them more appropriate than the conventional review process. The ORS will report on which published papers were selected through these special processes to allow for objective comparison in terms of quality and impact.

Requirements for openness in Editorial Boards

The ORS renews Editorial Boards by a process of temporary appointment. Editorial Board members serve in periods of 3-4 years. Open editorial board positions are covered by one of the following processes:

- Invitation to prominent scholars or experts that are suggested by present Editorial Board members.
- Self nominations. In this case, the requestor must obtain the positive evaluation of at least two existing Editorial Board members.
- Invitation to authors of papers of special relevance in ORS journals. These invitations will be based on the bibliometric assessment of the impact of the papers published and on the evaluation of the author's research vitae.

The policy for Editorial Board membership allows for plurality, rotation and openness in the decision-making organization of ORS journals, in contrast with other existing practices that result in static boards that change at the discretion of publishers or editors in chief.

The editors-in-chief of ORS journals are ORS members who act as managing editors, but the decision to accept or reject papers is left up to the discretion of the editorial board member who accepts management of the review process of a paper.

Bibliometrics and ORS journals

All ORS journals require authors of accepted papers to provide the full list of references in some widely used format such as BibTex, thus easing the task of organizations that carry out bibliometric analysis.

In addition, the ORS will compute and make available its own bibliometric analysis on the impact of journals, authors and papers, serving as a tool for the assessment of research quality.

Some other ideas to opening research

There is much more in opening research than scholarly publishing and opening the access to documents in general. Unfortunately, in other areas the field is largely unexplored. Here we provide some thoughts, but the reader must be aware that these are suggestions for inquiry, since as of today; the ORS has still not established an open policy for them. An initial short list can be the following:

- Opening the education of researchers. The current model is institution centric, but models of open Consortiums can be explored. The key objective in this area is opening the possibility for candidates and senior researchers to meet, discuss and negotiate on collaboration. This entails breaking economic, geographical and cultural barriers, but also breaking the barriers of the concept of research group.
- Opening bibliometric (and scientometric) data. There are many initiatives in this area, and the ORS is to support and try to expand them. Open impact factor lists for journals is a key milestone in this direction, but not the final one.
- Opening data. Some disciplines, such as Biology, are very active in building databases of scientific information on the Web (e.g. the RCSB Protein Data Bank at <http://www.rcsb.org/pdb>, just to cite one of the many available), but many others are not, and this is a critical area for action in the ORS.
- Opening reflection and social ties. Conferences and other kinds of scientific meetings, along with stays and visits, are key elements in establishing the ties required in scientific activity. However, many of them are subject to economic constraints, and it is still important today to provide researchers, students and other interested parties with the environment to meet and discuss. The vision of a "village of science" as a physical and also virtual place open to every person doing research is one of the long-term aims of the society.
- Opening the relationships between industry and academia, and between research and the general public. There are many barriers to break down between these communities, including the different jargons used. Also, orientation to business is seen by many people in academia as incompatible to science, but it is not in most cases, since synergies and complementarities arise naturally.

All the above are to some extent dependant on the availability of (open) technology for supporting communication, search and management of data and documents. In this regard, the ORS will be active in fostering technological development for e-science. The society will use a prototyping approach for any initiative,

so that we can put our own activities into observation before they get bigger.

Opening data and resources is surely a key area of action for the society. However, simply publishing resources on the Web need not result in a global benefit. We must consider that the explosive growth of information on the Web also leads to information overload, and there are no standard ways to filter resources by quality. This, for us, is a matter of *information sustainability*, that is, of maintaining the Web as useful for its users as a place to find information over time. Metadata is critical for making search more precise, and there is also a need to employ quality filters or services able to filter by given criteria and for given needs. This need is clear in research –researchers need concrete kinds of information, ranging from grey literature to conventional papers or data, while some other kinds of data introduce noise in the process of contrasting existing evidence.

Outlook

The mission of the ORS is that of doing research on open research –that is, stimulating and testing new approaches for breaking down barriers to research, research outcomes and research communities. We have presented the initial ideas and guiding principles. However, openness also means change and evolution that may include the potential contribution of any individual. It is especially important that we, as current members, become involved and active in gaining the attention and collaboration of enthusiastic individuals who want to take the lead in some initiative, and also of relevant institutions at the national or international level. Synergies are critical in opening research, especially with the Higher Education system and the main actors in producing research outcomes, such as research institutes and R&D departments in industry.

Thus, it might be that the next article on the ORS discusses different directions, and it would definitely be desirable that it be written by different people. The ORS is open to anybody that wishes to take the lead in a particular area or in the coordination of the Society. So, expect that the ORS may be hardly recognizable in ten years, and it is desirable that this happens. The open research spirit should be safeguarded, but the rest is accident, and rational inquiry is the criteria for making the ORS evolve. The founders of the ORS warmly invite you to join and to drive the future of the organization!

Bibliografia

- BEHLENDORF, B. (1999). «Open source as a business strategy». In: Chris DiBONA; Sam OCKMAN; Mark STONE (eds.). *Open*

<http://uocpapers.uoc.edu>

Open research - the ORS way

Sources: *Voices from the Open Source Revolution*. Cambridge, Massachusetts: O'Reilly and Associates.
FELLER, J.; FITZGERALD, B. (2002). *Understanding Open Source Software Development*. London: Addison-Wesley.

ROSSNER, M.; Van EPPS, H.; HILL, E. (2007). «Show me the data». *J. Cell Biol.* Nr. 179, ps. 1091-1092.

Recommended citation

LYTRAS, Miltiadis; SICILIA, Miguel-Ángel (2008). «Open research – the ORS way». *UOC Papers* [online article]. Iss. 6. UOC. [Date of citation: dd/mm/yy].
<http://www.uoc.edu/uocpapers/6/dt/eng/lytras_sicilia.pdf>
ISSN 1885-1541



This work is subject to a Creative Commons Attribution-NonCommercial-NoDerivativeWorks 2.5 licence. It may be copied, distributed and broadcast provided that the author and the journal that publishes it (*UOC Papers*) is cited. Commercial use and derivative works are not permitted. The full licence can be consulted on <http://creativecommons.org/licenses/by-nc-nd/2.5/es/deed.en>

**Miltiadis Lytras**

Assistant Professor in the Computer Engineering and Informatics Department-CEID, University of Patras, and in the Department of Library Science and Information Systems, ATEI Athens
mdl@aueb.gr

PhD degree in Information Systems (Semantic Web for Knowledge Management and Technology Enhanced Learning) from the Department of Management Science and Technology, AUEB (2004), an MBA from the AUEB (1998) and a BSc degree in Informatics from AUEB (1995).

Editor in Chief of the *International Journal of Knowledge and Learning* (<http://www.inderscience.com/ijkl>) as well as the Editor in Chief of *International Journal of Teaching and Case Studies* (<http://www.inderscience.com/ijtc>). He serves also as the Co-Editor in Chief of the *International Journal on Semantic Web and Information Systems* (<http://www.idea-group.com/ijswis>). Recently he undertook the co-editing responsibility of the *International Journal of Social and Humanistic Computing* (<http://www.inderscience.com/ijshc>) as well as the *International Journal of Entertainment Technology and Management* (<http://www.inderscience.com/ijenttm>). Miltiadis serves as the Editor in Chief of "Knowledge and Learning Society Book Series" (<http://www.idea-group.com/requests/details.asp?ID=121>) as well as the Editor of the "Advances on Semantic Web and Information Systems Book Series", in IDEA Group Publishing.

Dr Miltiadis Lytras is currently an Assistant Professor (407-80) in the Computer Engineering and Informatics Department-CEID (University of Patras), and in the Department of Library Science and Information Systems (ATEI Athens). His research focuses on semantic web, knowledge management and e-learning, with more than 80 publications in these areas. He has co-edited and co-edits, 25 special issues in International Journals (like *IEEE Transactions on Knowledge and Data Engineering*, *IEEE Internet Computing*, *IEEE Transactions on Education*, *Journal of Knowledge Management*, *British Journal on Educational Technology*, *Computers in Human Behavior*, *Education Technology and Society*, etc) and has authored/edited 12 books.

Founder and officer of the Semantic Web and Information Systems Special Interest Group in the Association for Information Systems (<http://www.sigsemis.org>) as well as the co-founder of AIS SIG on Reusable Learning Objects and Learning Design (<http://www.sigrl.org>). He serves as the Editor in Chief of 9 international journals while he is associate editor or editorial board member in seven more. He has participated in 20 R&D projects and currently he serves as member of the Scientific Advisory Board of ELEGI Project (<http://www.elegi.org>). Finally Dr Miltiadis Lytras is the President of the Open Research Society, non-government organization aiming to promote the vision of the Knowledge Society worldwide.

More information about the author:

http://istlab.dmst.aueb.gr/content/members/m_md.html

**Miguel-Ángel Sicilia**

Associate Professor in the Computer Science Department, Technical School of Informatics, University of Alcalá, Spain
msicilia@uah.es

Degree in Computer Science from the Pontifical University of Salamanca, and a PhD from Carlos III University. His current research interests include ontologies and the Semantic Web, learning technology and Knowledge Management, Software Engineering and applications of fuzzy set theory. He is editor-in-chief of *IJMSO* (<http://www.cc.uah.es/msicilia/ijms0>) and leads AIS SIG-RLO (<http://www.sigrlo.org/>).

More information about the author:

<http://www.cc.uah.es/msicilia/index.html>