DEAR MEMBERS,

During its meeting of July 18, 2013 the ISSI board not only expressed its appreciation for the way in which our Austrian colleagues organized the 14th conference, but moreover took some important decisions about which I want to inform you.

First the board confirmed that the 15th conference (2015) will take place in Istanbul, Turkey and chose Wuhan (China) as the venue for the 16th conference (2017). As usual this decision must be confirmed during the board meeting which will take place in 2015.

From the previous section it is already clear that ISSI conferences will remain biennial organizations. Although a majority of the participants of the Vienna conference voted in favour of annual events the board stressed that this voting result had no binding force and by no means representative of the society since only a fraction of the attendees are members of the society and many members did not attend. During the discussion among the board two main arguments were brought forward. First, preparation time will be short for annual organization and, second, quality assurance will be a challenge. To these two points were added the fact that for many members it would be difficult – financially and...
otherwise - to attend the conference each year. Now that many groups organize yearly meetings (conferences, symposia, seminars) ISSI decided to keep its position as the main, intercontinental metrics conference. In the words of one attendee “Could one imagine yearly Olympic Games”?

As an alternative several board members suggested alternating the large, biennially organized conferences with more specialized, thematic conferences and trying to pull in different interest groups. Of course care must be taken that such conferences stay focussed on one topic.

The board hopes that such a “local” conference could already take place in 2014 or 2016, perhaps in the USA. Such a conference could be organized in combination with the Atlanta Conference on Science and Innovation Policy (but this is just a suggestion).

Finally another interesting development took place. Board member Jacqueline Leta from Brazil brought forward a motion concerning the establishment of a national Brazilian chapter of ISSI. The main argument in favour of this was the organization of national biennial meetings called ‘Brazilian Meeting on Bibliometrics and Scientometrics’ since 2008. Another argument referred to the linguistic aspect. Although there are a few practical problems related to possibly conflicts with the articles of the society, which are subject to Dutch law as the Society is registered in the Netherlands, the board is in favour of this development and has meanwhile found a possible solution. This opens the door for other regional or linguistic ISSI chapters if the need is felt for this.

Finally, members are suggested to make more use of the Newsletter for reports and the listserv for communication. These communication channels are open to everybody, but recall that the Newsletter is moderated and articles are reviewed.

*Ronald Rousseau*
President of the ISSI
The 14th International Society of Scientometrics and Informetrics Conference took place at the University of Vienna 15-19 July 2013 and was jointly organised by the University of Vienna and the Austrian Institute of Technology (AIT) under the auspices of ISSI – the International Society for Scientometrics and Informetrics.

This conference provided an international open forum for scientists, research managers, authorities and information professionals to debate the current status and advancements of informetric and scientometric theories, concepts and indicators. In addition to the traditional evaluative focus, participants discussed practical applications in related fields such as library and information science, history of science, philosophy of science, R&D-management, etc.

The ISSI conference is certainly one of the world’s largest international conferences devoted to this field, as is illustrated by the large
number of 338 submissions received this year. 912 authors are affiliated to organisations located in 42 countries from all over the world. The top three contributing countries were China (149), Spain (129) and the USA (101). Chile, Cuba, Malaysia, Sri Lanka and Ukraine were represented by at least one author, too.

All contributions were evaluated by at least three reviewers of the International and Local Committees. Thereof 145 (107 full papers and 38 research in progress papers) could be accepted for oral presentations.

Figure 1 depicts the reviewers’ self-assessed confidence of expertise, which confirms the successful choice of almost 200 international reviewers and the assumed high level of review quality.

Due to space constraints at the conference location online registration had to be closed a few days prior to the conference start. Nevertheless, the incredible number of 389 participants from all over the world exceeded all expectations from the organisers. It was therefore the biggest and most successful ISSI conference since its foundation. The countries with the highest number of participants were Austria, Germany, China, Spain and the United States (see Table 1).

The conference started on Monday – the pre-
conference day – with four tutorials, which dealt with several mapping tools (“Co-publication Visualisation” by Alexander Degelsegger, “Sciz” by Katy Börner and “Citespace” by Chaomei Chen) and also addressed the unification issue of organizations (by Raul Mendez-Vasquez), whereas four workshops focused on information retrieval (Philipp Mayr), topic extraction methods (Alan Porter), standards for classifications (Katy Börner et al.), and bibliometric analysis for funding agencies.

The last workshop was organized by the local committee, chaired by Dorothea Sturn, Managing Director of the Austrian Science Fund (FWF), with the contribution of international experts like Rodrigo Costas Comesana (CWTS), Éric Archambault (Science-Metrix), Klaus Schuch (ZSI) and Edgar Schiebel (AIT).

This day was complemented by a doctoral forum, organized by Christian Schlögl and Ivana Roche, and concluded with a festive get-together at a reception held in the university’s beautiful arcade court, which was also the location for all the conference lunch and coffee breaks as well as for the poster sessions (organized by Jacqueline Leta and Wolfgang Mayer) held on Tuesday and Wednesday.

The conference was officially inaugurated on Tuesday in the university’s Ceremonial Chamber, where this year’s De Solla Price Award ceremony, all three plenary sessions and the closing ceremony took place as well.

In the first plenary session, welcome address speeches were held by the confer-
ence chairs Juan Gorraiz (University of Vienna) and Edgar Schiebel (AIT), Ronald Rousseau (President of the ISSI), Susanne Weigelin-Schiewdrzik (Vice-rector of the University of Vienna) as well as Simone Mesner (representative of the Federal Ministry of Science and Research).

The importance of new metrics (usage metrics and altmetrics) as complement to the classical citation metrics was underpinned by two plenary sessions. In the first one, keynote speaker Johan Bollen provided an overview of social network services and analyses. The lecture was very well received by the audience and the interest also echoed in the Austrian media.

The first plenary session ended with a short overview of ORCID (Open Researcher and Contributor ID), presented by Martin Fenner.

The second plenary session on Wednesday started with the De Solla Price Award ceremony. This year the “Oscar of bibliometrics” (awarded by the journal “Scientometrics”) went to Blaise Cronin. The ceremony comprised of a laudation by Cassidy R. Sugimoto (Indiana University), a live performance of a classical music piece, the award handover by Wolfgang Glänzel and Juan Gorraiz
and finally a talk given by the awardee himself, titled “Whither is fled the visionary gleam? - Peerless Price and the Big Picture.”

Plenary 2 continued with “The wondrous world of bibliometric indicators”, where old metrics were contrasted with new ones in short introductions by experts (Henk Moed, Juan Gorraiz, Victor Henning) and followed by a panel discussion, moderated by Christian Gumpenberger, with representatives from research (Ulrike Felt), from research management (Susanne Weigelin-Schwiedrzik) and from information industry (Oliver Pesch, EBSCO Chief Strategist), who all shed light on the pros and cons of these indicators from their specific point of view.

The third plenary session on Thursday dealt with an evergreen as much as cumbersome topic, namely the methodological and ethical problems of individual-level evaluative bibliometrics. Wolfgang Glänzel and Paul Wouters presented “10 things one must not do with individual-level bibliometrics” followed by “10 things one can do with individual-level bibliometrics”, both commented by Henk Moed and Gunnar Sivertsen and a final panel discussion with all contributors moderated by the vice-rector of the University of Vienna, Susanne Weigelin-Schwiedrzik.
36 sessions run in parallel thrice a day in groups of four covering topics from “citation analysis” to “open access”. In spite of the hot mid-summer weather all sessions were always well-attended.

In addition, 107 posters were presented in the beforehand mentioned poster sessions.

All oral presentations and posters can be found in the conference proceedings, which are also available online. http://www.issi2013.org/proceedings.html

On the occasion of the closing ceremony on Thursday also the Garfield Price and the Best Poster Award were awarded. The Eugene Garfield Doctoral Dissertation Scholarship, donated by the Eugene Garfield Foundation, was presented to Ehsan Mohammadi by Ronald Rousseau (see Picture), and the Best Poster Award to Philippe Mongeon and Vincent Lariviere by Wolfgang Mayer and Jacqueline Leta for their contribution “The collective consequences of scientific fraud: an analysis of biomedical research”. The closing ceremony concluded by a spontaneous laudation of a conference delegate who praised this conference “as the best ISSI conference so far”.

The social highlight of ISSI 2013 was certainly the
themed conference dinner “Dancing with the stars in Vienna” held in the Festive Hall of the Vienna City Hall on Wednesday evening.

The whole event was leisurely concluded on Friday with a combined bus and boat trip to the Wachau, the romantic Danube valley.

By organising the 14th International Conference in Vienna the organisers did not only hope to extend the tradition of the ISSI conferences as one of the most important international meeting points for the scientometric and bibliometric community, but also to promote the respective on-going activities in Austria. Every endeavour was made to not only put together an outstanding scientific programme, but also to organize interesting and diverse social events, which allowed the participants to embrace the beauty and cultural richness of Vienna and its surroundings.

The organisers thank the ISSI board for their trust and their constant support, all the contributors for their submissions, the members of the Local and International Committee for their reviewing effort as well as the sponsors for their generous financial support.

Photos and video-streams from the conference will be made available at the conference website. Authors are furthermore invited to submit an extended version for the journal Scientometrics.
This year, the Doctoral Forum took place for the fifth time at an ISSI conference (http://www.issi2013.org FORUMS.html). The primary objective of the doctoral forum is to provide doctoral students with a forum for presenting and discussing their research projects with senior researchers and fellow students and to develop relationships with other scientists.

The Doctoral Forum was organized by Ivana Roche from INIST (Institut de l’Information Scientifique et Technique) and Christian Schlögl from the University of Graz. Due to the limited time available (the Doctoral Forum took place between 9 a.m. and 4 p.m. on July 15th) not all applications could be accepted. Finally, nine students from five different countries (Austria, Germany, Hungary, The Netherlands and the U.S.) were invited. Interestingly, a few students were from organizations without a direct link to scientometrics or information science but came from various other disciplines (computer science, economics, sociology). Also the presented topics were broad. They ranged from traditional themes like, for instance, determinants of the research activity and efficiency in Russia and the Ukraine over the period 1993 – 2013, research career systems or the use of co-author networks for the measurement of social capital on research performance to the use of altmetrics in research evaluation or...
the visualization of research fields based on scholarly communication on the web. Their quality is reflected in that a few of the doctoral students had also a presentation in the regular program of ISSI 2013.

Each presentation lasted 30 minutes. In the first part the students presented their dissertation projects. The second part served for discussion and input. In order to give feedback to the students, the organizers were assisted by highly-renowned scientometricians (Peter Ingwersen, Jonathan Levitt, Ronald Rousseau, and Cassidy Sugimoto).

One of the highlights of the Doctoral Forum was lunch in a traditional Viennese cafe (Café Landtmann) which was sponsored by ASIS&T. Here, students had the opportunity to socialize and to get to know each other in more detail. Of course, the stay in Café Landtmann could not have been completed without having had a cup of coffee selected from the wide range of coffee specialities offered (approximately 20).
THE DILEMMAS OF PERFORMANCE INDICATORS OF INDIVIDUAL RESEARCHERS

AN URGENT DEBATE IN BIBLIOMETRICS

INTRODUCTION

In the last quarter of the 20th century, bibliometrics evolved from a sub-discipline of library and information science to an instrument for evaluation and benchmarking (Glänzel, InScit, 2006; Wouters 2013). As a consequence of this shift in perspective, new fields of applications and challenges opened to bibliometrics, although many tools were still designed for use in the context of scientific information, information retrieval and libraries. In other words, these became used in a context for which they were not designed (e.g., the Journal Impact Factor (JIF)).

This development has been joined by an intensified interest in the evaluation of individual researchers. The publication of the Hirsch Index in 2005 (Hirsch, 2005) and its popularisation by the journal Nature (Ball, 2005) has given this a strong stimulus. According to Hirsch, his index seemed the perfect indicator to assess the scientific performance of an individual author because “it is transparent, unbiased and very hard to rig”. The h-index combines publication activity with citation impact. For example, an author with a h-index of 14 has created 14 publications that each have been cited at least 14 times each. So neither authors with a long list of mediocre publications, nor an author with a one won-
der hit are rewarded by this indicator. Nevertheless, the h-index turned out to have several severe disadvantages to be wearing the crown of “the perfect indicator” (cf. Glänzel, 2006). As Hirsch acknowledged himself, it cannot be used for cross-disciplinary comparison. A field in which many citations are exchanged among authors will produce a much higher average Hirsch index than a field with much less citations and references per publication. Moreover, the older one gets, the higher ones h-index will be. Furthermore, confidence intervals of empirical h-indexes are huge (Glänzel, 2010) such that this indicator is not suited for ranking individuals or research units and rankings based on the h-index may also be influenced in rather counter-intuitive ways (Waltman & Eck, 2012). Although many variants of the h-index have been published, none of them has turned out to be the perfect indicator. In fact, we cannot expect any indicator to be the perfect one. Nevertheless, there is ample evidence that the use of the h-index and other bibliometric indicators (such as the JIF) has become pervasive in the estimation of the scientific and even scholarly impact of a body of work by an individual scientific author. For example, many biomedical researchers mention the value of their h-index on their CV. In publications lists, one can regularly see the value of the JIF mentioned after the journal’s name. In some countries, for example Turkey and China, one’s salary can be determined by the value of either the h-index or the journal’s Impact Factor one has published in.

This situation is clearly not desirable. If researchers are being evaluated, they should be aware of the criteria used and these criteria should be justified for the purpose at hand. This requires that users of performance indicators should have clear guidelines. It seems rather obvious that the bibliometric community has an important responsibility to inform and provide such guidelines. However, at the moment, there is no consensus yet about such guidelines. Individual bibliometric centres do indeed inform their clients about the use and limitations of their indicators. Moreover, all bibliometric centres have the habit of publishing their work in the scientific literature, often including technical details of their indicators. However, this published work is not easily accessible to non-expert users such as deans of faculties and research directors. The literature is too technical and distributed over too many journals and books. It needs synthesizing and translation into plain language which is easily understandable.

So how should the community of scientometricians relate to this development? What should the responsibility be of scientometric and bibliometric experts in the process of research evaluation? Should science and technology indicators be used at this level? If so, how should their limitations be interpreted? In what sense are we in need of a heightened ethical awareness in the field of scientometrics, informetrics and bibliometrics? We are fully aware that these questions are not new. In fact, they have been raised several times at scientometric and bibliometric conferences, almost from the very start of the field. But social relationships are always dynamic and this certainly holds for the scientific and scholarly system. The increased role of indicators in general and of scientometric performance indicators in particular makes it necessary to address these questions again and in the context of the evolving practices of research evaluations and assessments. This was our motivation to propose two debates at the subsequent scientometric conferences this year. At the 14th ISSI Conference 15-19 July in Vienna, a special plenary session was organized with a joint presentation by Wolfgang Glänzel and Paul Wouters, followed by responses by Henk Moed and Gunnar Sivertsen. At the STI2013 conference, “Translational twists and turns: science as a socio-economic endeavour” 4-6 September in Berlin, a full plenary was devoted to bibliometrics of individual researchers, chaired by Ben Martin (SPRU), with presentations by Wolfgang Glänzel, Paul Wouters, Marc Luwel, and Jochen Gläser. In this short report, we wish to give an impression of this discussion with the aim to further stimulate this exchange of ideas, experiences and, of course, technical knowledge.
THE ISSI CONFERENCE IN VIENNA

To initiate a process of a more professional guidance for the application of bibliometric indicators in the evaluation of individual researchers, we asked the organizers of the ISSI conference to devote a plenary to this problem, which they kindly agreed to. At the plenary, Wolfgang Glänzel and Paul Wouters presented “The dos and don’ts in individual level bibliometrics”. We do not think this is a final list, more a good start with ten dos and don’ts. A start for reflection, experiments and the exchange of experiences. In the following, we sketch our proposals for applying bibliometrics on individual researchers as well as the ensuing debate at the conference.

TEN THINGS YOU MUST NOT DO:

1. Don’t reduce individual performance to a single number
2. Don’t use journal impact factors as measures of quality of individual researchers
3. Don’t apply hidden “bibliometric filters” for selection
4. Don’t apply arbitrary weights to co-authorships
5. Don’t rank scientists according to one indicator
6. Don’t merge incommensurable measures
7. Don’t use flawed statistics
8. Don’t blindly trust one-hit wonders
9. Don’t compare apples and oranges
10. Don’t allow deadlines and workload to compel you to drop good practices.

TEN THINGS YOU CAN DO:

1. Basic measures such as numbers of publications and citations are still relevant statistical measures
2. Analyze collaboration patterns of researchers
3. Always combine quantitative and qualitative methods
4. Use citation context analysis
5. Analyze subject profiles of individual researchers
6. Make an explicit choice between the analysis of the full oeuvre or comparative analysis using a citation window
7. Combine bibliometrics with career analysis
8. Clean bibliometric data carefully and use external sources
9. Don’t take this list of dos and don’ts too absolutely: even some don’ts can be used given the right context
10. Help users to interpret and use your results.

Of course, the complex business of research assessments cannot be reduced to a simple list of “commandments”. In other words, we do not want to initiate a bibliometric police with absolute rules. The context of the evaluation should always determine which indicators and methods to use. Therefore, some don’ts in our list may sometimes be perfectly useable, such as the application of bibliometric indicators to make a first selection among a large number of candidates. Also, in informed peer review of large institutions it may be inevitable to use bibliometric filters to zoom in on the most relevant work for closer inspection. In all those cases, these filters should however be made explicit. After all, the researchers who are subjected to assessment should be able to provide counter-arguments if they think the filters have been used inappropriately.

Our presentation was commented on by Henk Moed (Elsevier) with a presentation on “Author Level Bibliometrics” and by Gunnar Sivertsen (NIFU, Oslo University) with comments on the basis of his extensive experiences in research evaluation. Henk Moed built on the concept of the multi-dimensional research matrix which was published by the European Expert Group on the Assessment of University Based Research in 2010, of which he was a member (Assessing Europe’s University-Based Research - Expert Group on Assess-
ment of University-Based Research, 2010). This matrix aims to give global guidance to the use of indicators at various levels of the university organization. The first row of the matrix discusses goals, output dimensions and bibliometric and other indicators at the individual level. The matrix as a whole does not focus on the problem of how to evaluate individual researchers. Still, the matrix is surely a valuable contribution to the development of more professional standards in the application of performance indicators. In his presentation, Moed discussed a number of case studies which clearly showed that no absolute rules can be expected. It all depends on the goal of the assessment as well as on the state of affairs in the research area involved. Moed argued that the data should be verified by the researchers themselves (already a standing practice in most if not all of the main bibliometric centres). A key problem he identified is the attribution of scientific performance to an individual when in reality most research is based on collaborative work within and between teams. One of the three cases he presented involved a country in which science policy suspects that their researchers are not oriented enough toward international networks. In this case, a policy measure could be to stimulate and reward publication in top international journals. For this, the number of publications in those type of journals could be an appropriate bibliometric indicator.

Gunnar Sivertsen strongly agreed with the main thrust of the discussion. Moreover, he made clear that the discussion should not be restricted to the bibliometric community itself. On the contrary, the main audience of bibliometric guidelines and standards should be the researchers themselves and administrators in universities and funding agencies.

The ensuing debate led to a large number of suggestions. A few speakers emphasized that this debate is indeed not new and was already addressed at the ISSI conference in Chicago in 1995. A key point was the issue of responsibility: it is clear that researchers themselves and the evaluating bodies should carry the main responsibility for the use of performance indicators. However, they should be able to rely on clear guidance from the technical experts. How must this balance be struck? Should bibliometricians refuse to deliver indicators when they think their application would be unjustified? Should the association of scientometricians publicly comment on misapplications? Or should this be left to the judgment of the universities themselves? Several calls were made to publicly criticize applications of bibliometric measures that are deemed harmful. At the same time, it is not yet clear in whose name these statements should be made. The plenary did not solve these issues yet. However, a consensus seemed to be emerging that more explicit guidance by bibliometricians is required (building on the work from the past) and that researchers should have a clear address to which they can turn to with questions about the application of performance indicators either by themselves or by their evaluators.

THE STI2013 CONFERENCE

The plenary at the STI2013 conference started with an introduction by Ben Martin. He reported on a dramatic case of the rise and fall of a young professor in economics in Germany. This researcher had conducted one research project for his PhD and was able to generate a rather impressive number of publications on the basis of this dataset. Because he was so productive, he was able to attract more external research funding. Subsequently, he became an attractive target for headhunting by universities looking for high profile researchers who might help them increase their ranking position in various league tables and in getting grants for the Excellence Initiative program in Germany. And indeed, a university was quite eager to hire him for precisely this purpose. It was only then that a few members of the selection committee decided to actually read the publications by this young economics researcher. It struck them that these publications were quite like each other. Not very surprising given that
the research was all based on a single dataset from his PhD project. It turned out that he had published a large number of variations of the same article in different journals without anyone noticing these duplications. This discovery was the beginning of the end of the career of this formerly promising economist. A number of journals began retracting these publications, although not with the cooperation of the researcher. This process is still ongoing. A sobering tale, according to Martin, and one which shows that the abuse of bibliometrics is now a serious concern for all parties involved in the management and development of scientific research.

Wolfgang Glänzel then informed the audience about the discussion at the ISSI conference. He emphasized especially the need for more information and guidelines among researchers, managers and policy makers. The bibliometrics community should play a role in providing at least the core of these guidelines. He also emphasized that the ISSI conference had made clear that we need some organization to which questions about the proper use of bibliometric indicators can be addressed. ISSI as an organization may not be in the best position to play this role, given its scientific rather than professional role. This may therefore be a role that the main bibliometric centres should take up, in a somewhat coordinated way.

In his presentation, Paul Wouters argued in favour of a portfolio approach and showed how CWTS has been developing bibliometric profiles at the level of the individual researcher. He also presented the philosophy behind the 7th Framework project ACUMEN which aims to enable individual researchers to enrich their Curriculum Vitae with properly calculated and relevant bibliometric indicators as well as qualitative evidence. The portfolio approach has also been proposed by other researchers such as Bornmann (2013).

Marc Luwel focused on the tensions in the concrete practice of science policy making. There is an increasing need for justification of the budgets devoted to research. This needs to be based on verifiable empirical evidence, hence the need for performance indicators among which also bibliometric indicators. Nevertheless, Luwel stressed, quantitative indicators cannot be used as the sole basis. Luwel: “Beware of the lone librarian cooking a toxic cocktail of publication and citation data!”

The presentation by Jochen Gläser linked to Luwel’s talk by taking one more step in the area of applied ethics and the dilemmas in the application and use of bibliometric indicators. Gläser made clear that he does not see himself as a bibliometrician pur sang, but more as a sociologist who is interested in combining bibliometric methods with other social science methods, such as surveys and interviews. Moreover, he is not himself involved in applying bibliometrics for research assessments and can therefore take a step back and present reflections that may be useful to the community. He presented a couple of scenarios in which bibliometric reports are carefully crafted but basically ignored by the decision makers or only cherry-picked in order to justify decisions that were going to be taken anyway. And indeed, often it is not clear to what extent and how the bibliometric reports that we produce are actually useful for quality decision making. The reports may very well start to live a life of their own. Gläser discussed to what extent the current available literature on applied ethics is useful for the bibliometric community (not very much) and in what sense we can learn from the communities that have been producing guidelines and standards for their profession (more promising perhaps). His presentation made clear that ethics is indeed inevitable and highly relevant, albeit not in all respects completely new. Some of the bibliometric centres have been following implicit and explicit ethical rules without always formalizing them. Gläser also mentioned the proposal by Wouters in a parallel session at STI2013 on bibliometric standards to initiate a bibliometric “Ombudsman Office” to which researchers that have been evaluated can
turn in case they feel misjudged or harmed by the performance analysis and these conflicting interests cannot be solved with the bibliometric experts involved. He saw this proposal as a long-term goal. In the shorter term, he proposed that the next few STI conferences should all devote more attention to these ethical and political issues, for example by organizing special sessions devoted to them.

As authors of this short report, we think this last proposal is an excellent idea. It might for example be possible to not only discuss formal research papers in these sessions, but we might want to focus more on exchanging experiences. This could take the form of submitting problems or case studies rather than the normal papers. The discussion could also be organized in more engaging and discussion oriented way.

The ensuing discussion at the STI2013 conference again made clear that these issues have become quite urgent for many practitioners in the field of science & technology indicators. The issue of responsibility rose to the top again of most urgent issues, although it is also clear that it will also remain a rather complex web of problems. This complexity was illustrated by a number of participants who addressed the limitation of the present discussion to the European and Anglo-Saxon context. The role of indicators in China, Turkey, Iran, and South East Asia is clearly different and perhaps even more dominating. As a result, many researchers have had to set explicit indicator based targets in their career development. This means that the current debate should be linked to these practices.

In the discussion an additional fundamental problem was raised: to what extent is the ethical problem in reality caused by a fundamental problem in the state of our knowledge in bibliometrics? Often, we actually do not know what exactly is represented by the patterns we see by the indicators. Therefore, it was argued, we should first of all try to generate more robust knowledge, using also a much larger variety of databases in addition to the traditional citation indexes.

Perhaps this questions might be a good agenda for the next series of STI and ISSI conferences? In parallel, we will be organizing a workshop on these issues targeted at the users of bibliometric indicators, including the scientific communities in the first half of 2014. Stay tuned!

REFERENCES


In an earlier study [1], based on Koestler’s idea [2], Schubert & Schubert proposed ‘title term bisociation’ as a tool for detecting emergent areas in inorganic chemistry as reflected in the papers in Inorganica Chimica Acta. Bisociation occurs whenever two well known, but so far unconnected entities get connected, i.e., emergent areas are expected where two frequent but so far not co-occurring terms begin to co-occur regularly.

By analyzing the terms in the titles of the 1995–1996 period relative to the 1990–1994 period, 14 new connections appeared to emerge: Bipyrid(ine/yl) & Osmium; Bipyrid(ine/yl) & Polymer; Cluster & Ruthenium; Coordination Chemistry & Mechanism; Cyclopentadienyl & Mechanism; Dinuclear & Stereochemistry; Electrochemistry & Osmium; Kinetics & Macrocycle; Lanthanides & Macrocycle; Macrocycle & NMR; Macrocycle & Palladium; Macrocycle & Synthesis; Nitrosyl & X-ray; Polymer & Synthesis.

The study was concluded by stating: “which, if any, of these ‘bisociations’ represent real creative foci is a question far beyond the scope of such a bibliometric analysis, and requires the knowledgeable discernment of the experts of the field and, after all, the final judgment of time passed.”

After several years passed, curiosity lead us to make a follow-up study in order to test whether the research areas defined by the co-occurrence of the pairs of title terms have really “emerged” (i.e., develop permanently) or came to a standstill or, maybe, vanished as they came.
In the follow-up study, the scope of the analysis was extended, and not only a single journal but the whole coverage of the Web of Science has been considered. Moreover, the pairs of terms have been searched not only in the titles but in the ‘topics’ of the paper, i.e., in the keywords and the abstract, as well.

The number of papers with each pair of terms in their topic in the period 1995–2012 is given in the online Appendix. Table 1 shows the annual growth patterns in the same period. Upward arrows denote ‘years of growth’, i.e., years when the annual output was higher than that in the previous year. The rightmost column contains the number of years of growth in the total period of 18 years.

It was found that except for three topics (shaded in grey in the table), all others exhibited increasing tendency in at least the half of the period under study. In these cases the predicted ‘emergence’ seemed to be confirmed. Although a “knowledgeable discernment of the experts of the field” would still be required, the bisociation-based prediction method apparently passed the test of the judgment of time.

### REFERENCES


<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bipyrid(ine/yl) &amp; Osmium</td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Bipyrid(ine/yl) &amp; Polymer</td>
<td>↑</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td>↑</td>
<td>↓</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>15</td>
</tr>
<tr>
<td>Cluster &amp; Ruthenium</td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Coordination Chemistry &amp; Mechanism</td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>Cyclopentadienyl &amp; Mechanism</td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Dinuclear &amp; Stereochemistry</td>
<td>↑</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>9</td>
</tr>
<tr>
<td>Electrochemistry &amp; Osmium</td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Kinetics &amp; Macrocycle</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Lanthanides &amp; Macrocycle</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td></td>
<td>↑</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Macrocycle &amp; NMR</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>10</td>
</tr>
<tr>
<td>Macrocycle &amp; Palladium</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>11</td>
</tr>
<tr>
<td>Macrocycle &amp; Synthesis</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>11</td>
</tr>
<tr>
<td>Nitrosyl &amp; X-ray</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>11</td>
</tr>
<tr>
<td>Polymer &amp; Synthesis</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>↑</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 1 Growth patterns of emerging topics detected in 1997