

## Application for participation at the Doctoral Forum

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### Description of doctoral research project

#### Introduction and background

Acknowledgments are one of many conventions by which researchers bestow their gratitude upon the individuals, organizations, or funding agencies which played a role in the work that led to publication. Acknowledgments are found in more than half of published scientific articles (Cronin, McKenzie, & Stiffler, 1992) and are today established as a “constitutive element of academic writing” (Cronin, Shaw, & La Barre, 2004, p. 160) revealing significant contributions to the scientific production. Although they could be considered a simple “scholar’s courtesy” (Cronin, 1995), acknowledgments have also been perceived as markers of symbolic capital (Bourdieu, 1975) and an intrinsic part of the “reward triangle” alongside authorship and citations (Cronin & Weaver-Wozniak, 1993, p. 94) in the sociology of science.

Acknowledgments in scholarly communication have been the subject of more than 75 scientific articles, editorial notes, book chapters and theses since the 1970s<sup>1</sup>; yet no clear consensus can be drawn from this literature as to their value and functions in the reward system of science (Merton, 1973). However, since 2008, we witness a resurgence of interest for the study of acknowledgments in

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<sup>1</sup> Databases searched to retrieve items pertaining to acknowledgments in scholarly communication: Web of Science Citation Indexes; Library and Information Sciences Abstracts; Library, Information Science & Technology Abstracts; Library Literature & Information Science Index; Dissertation & Theses (ProQuest); FRANCIS; and Sociological Abstracts. Keywords and controlled-vocabulary searches were used, as well as pearl-growing techniques.

scholarly communication, namely because of the massive indexation of acknowledgements in the Web of Science (WoS) databases, which now enables larger-scale acknowledgments analyses.

The symbolic capital (Bourdieu, 1975) associated to scientific work is typically provided through the formal signature of a publication. However, since the 1960s, it is common practice in scholarly publication to acknowledge diverse entities (individuals, institutions, organizations or funding agencies) which contributed in various ways to the research (Cronin, 1991, 1995, 2005).

Criteria for determining contributor' status in a research project—author or acknowledged—vary greatly depending on the academic status of individuals and disciplines studied (Birnholtz, 2006). Acknowledgments provide information that can help to better understand the role of individuals and organisations who contributed to a publication, namely contributions that did not warrant authorship status (Cronin, Shaw, & La Barre, 2003). Acknowledgments also provide information about collaboration networks, both at the technical and intellectual contributions standpoints, thus exposing part of the “invisible college” (Crane, 1972) and allowing bibliometrics analyses that go beyond traditional citations and authorship studies (e.g. Costas & van Leeuwen, 2012; Díaz-Faes & Bordons, 2014).

### **Research aims**

This doctoral research project aims at understanding the value and functions of acknowledgments in the scholarly communication process. Analysing quantitative and qualitative data, the doctoral work proposes to empirically explore the relationship between authorship and acknowledgments in order to better understand the symbolic capital associated to signaling gratitude in scholarly publications. More specifically, this project seeks to answer the following research questions:

1. Which units (individuals, institutions and funding agencies) are acknowledged in scholarly publications and how do they vary by discipline?
2. Which types of contributions are acknowledged?
3. Is there a relationship between the presence of acknowledgments, certain characteristics of a scientific publication (e.g. number of authors, interdisciplinary collaboration, international collaboration, language of publication) and scientific impact as reflected by citations?
4. Are socio-demographic variables such as age and gender of authors or persons acknowledged influencing the characteristics of acknowledgments?
5. Which typology of acknowledgments emerges from patterns observed in scholarly communication?

### **Methods**

Since August 2008, WoS databases include a “Funding Acknowledgments” field which indexes the whole of the acknowledgments text. The principal corpus for this project will thus total more than 3.5 million acknowledgments identified in WoS for the 2008-2012 period. The data will be transformed into a relational database optimized for bibliometrics queries and hosted by the *Observatoire des sciences et technologies* (OST) in order to perform the various analyses.

The first phase of the project will consist of a quantitative content analysis of acknowledgments, which can range from a few words to a few paragraphs. Since the joint presence of terms in the same sentence indicate a stronger relationship, acknowledgments will first be segmented into sentences (Bertin, Atanassova, Larivière, & Gingras, 2013). Significant terms will then be identified and isolated from strings of characters automatically with *part-of-speech algorithm* (Kageura & Umino, 1996; van Eck, Waltman, Noyons, & Buter, 2010). *Topic modeling* (Blei, Ng, & Jordan, 2003) will be used to identify terms which have the strongest relationships in order to isolate acknowledged units (individuals, institutions and funding agencies) and reasons for acknowledging them. Social network analysis methods and tools (such as UCINET, Gephi and VOSviewer) will be used to analyze and visualize the relationship and structure of units and reasons of acknowledgments.

In a second phase, a qualitative content analysis of a subset of acknowledgments will be made, directed by the quantitative findings previously established. The qualitative content analysis, by its flexible nature, will allow for a contextualization of the first phase results (Hsieh & Shannon, 2005).

Building on the findings of previous phases' findings, the final phase will consist of bibliometrics analyses examining the relationship between the characteristics of acknowledgments (e.g. types of units acknowledged, academic age and gender of individuals acknowledged), the characteristics of scientific publications (e.g. number of authors, interdisciplinary collaboration, international collaboration, language of publication) and their scientific impact as measured by citations, using the average of relative citations (ARC). The ARC provides a field-normalization allowing for comparison between the different disciplines that have otherwise different citation practices, as well as papers published in various years.

### **Conclusion**

Acknowledgments in scholarly publications reveal collaboration practices and contributions to research that did not lead to authorship, thus helping us to better grasp relationships between researchers, institutions and funding agencies that collaborate in a research project. Information conveyed through acknowledgments provides a unique window on the internal dynamics of scientific collaboration that could in turn contribute to a better understanding of the scholarly communication process as a whole.

Overall, results of this research project will provide insight into the practices of acknowledgments and their functions in the reward system of science. The objectives of this doctoral research project are of great significance for the bibliometrics field, the sociology of science and for the entire scientific community, for which the author concept has a central value as the main mean to indicate peer recognition. Moreover, as emphasis is increasingly placed on metrics and the quantification of scholarly production, acknowledgments might become relevant evaluative indicators. However, before any proposition for standardization of acknowledgments can be envisioned, their value and functions have to be better understood. The results of this project could thus provide insight for the development of public scientific policies and have concrete implications for the evaluation of research by suggesting contextualized approaches to the measurement of impact and influence through acknowledgments as part of the reward system of science.

### **Current Status**

Currently enrolled in my first year of the doctoral program, the research project described above is still in its planning phase. However, a comprehensive literature review of research on acknowledgments in scholarly communication is presently carried out. The content analysis of this literature will convey how observed trends and emerging issues can guide us in understanding how acknowledgments might further develop into an evaluative indicator. At this point of the analysis, the literature appears to be consistent on what aspects of acknowledgments need to be analyzed (who, why, where to acknowledge) and how (content and form). The next phases to come will consist data cleaning (acknowledgments retrieved from Web of Science "Funding Acknowledgements field") followed by the quantitative content analysis of acknowledgments (part-of-speech algorithm and topic modeling).

### **Motivation for student participation**

ISSI2015 will be my first participation to an ISSI Conference. As a fairly new member of the scientometrics field, the ISSI Doctoral Forum constitute for me the ideal opportunity to better know the community, develop relationships with its members and my fellow doctoral students. Moreover, as I am still in the elaboration and planning phases of my doctoral project, input and feedback from senior researchers and students would be of considerable value for the following phases of my doctoral studies.

The main issue I would like to discuss with senior researchers is related to the limitations associated to my data source, Thomson Reuters Web of Science “Funding Acknowledgments Field”. As highlighted by Costas and van Leeuwen (2012, p.1649), it is not clear how and from where Thomson Reuters retrieve the “Funding Acknowledgments” information and if it is done systematically. After a manual analysis of small sample of publications which contained acknowledgments but no funding information, Costas and van Leeuwen (2012) found that Thomson Reuters did not collect the acknowledgment texts of these papers, thus suggesting that acknowledgments are collected only when they include funding information. As a result, before conclusions can be drawn from acknowledgments analysis, we need to better understand how the data is collected. Any insight from experimented researchers as to how to tackle those limitations would thus be appreciated.

## References

- Bertin, M., Atanassova, I., Larivière, V., & Gingras, Y. (2013). The distribution of references in scientific papers: An analysis of the IMRaD structure. In Proceedings of the 14th International Conference of the International Society for Scientometrics and Informetrics.
- Birnholtz, J. P. (2006). What does it mean to be an author? The intersection of credit, contribution, and collaboration in science. *Journal of the American Society for Information Science and Technology*, 57(13), 1758–1770. doi:10.1002/asi.20380
- Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent Dirichlet Allocation. *J. Mach. Learn. Res.*, 3, 993–1022.
- Bourdieu, P. (1975). The specificity of the scientific field and the social conditions of the progress of reason. *Social Science Information*, 14(6), 19–47.
- Bourdieu, P. (2001). *Science de la science et réflexivité*. Éditions raisons d’agir.
- Costas, R., & van Leeuwen, T. (2012). Approaching the “reward triangle”: General analysis of the presence of funding acknowledgments and “peer interactive communication” in scientific publications. *Journal of the American Society for Information Science and Technology*, 63(8), 1647–1661.
- Crane, D. (1972). *Invisible colleges; : diffusion of knowledge in scientific communities*. Chicago, IL: University of Chicago Press.
- Cronin, B. (1991). Let the credits roll: A preliminary examination of the role played by mentors and trusted assessors in disciplinary formation. *Journal of Documentation*, 47(3), 227–239. doi:10.1108/eb026878
- Cronin, B. (1995). *The scholar’s courtesy : the role of acknowledgement in the primary communication process*. London: Taylor Graham.
- Cronin, B. (2005). *The hand of science: Academic writing and its rewards*. Lanham, Maryland: Scarecrow Press.
- Cronin, B., McKenzie, G., & Stiffler, M. (1992). Patterns of acknowledgement. *Journal of Documentation*, 48(2), 107–122.
- Cronin, B., Shaw, D., & La Barre, K. (2003). A cast of thousands: Coauthorship and subauthorship collaboration in the 20th century as manifested in the scholarly journal literature of psychology and philosophy. *Journal of the American Society for Information Science and Technology*, 54(9), 855–871.
- Cronin, B., Shaw, D., & La Barre, K. (2004). Visible, less visible, and invisible work: Patterns of collaboration in 20th century chemistry. *Journal of the American Society for Information Science and Technology*, 55(2), 160–168. doi:10.1002/asi.10353
- Cronin, B., & Weaver-Wozniak, S. (1993). Online access to acknowledgements. In Proceedings of the 14th National Online Meeting 1993 (pp. 93–98). New York: M.E. Williams.
- Díaz-Faes, A. A., & Bordons, M. (2014). Acknowledgments in scientific publications: Presence in spanish science and text patterns across disciplines. *Journal of the Association for Information Science and Technology*. doi:10.1002/asi.23081
- Hsieh, H. F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277–1288. doi:10.1177/1049732305276687
- Kageura, K., & Umino, B. (1996). Methods of automatic term recognition: A review. *Terminology*, 3(2), 259–289. doi:10.1075/term.3.2.03kag
- Merton, R. K. (1973). *The sociology of science : theoretical and empirical investigations*. Chicago: University of Chicago Press.
- Van Eck, N. J., Waltman, L., Noyons, E. C. M., & Buter, R. K. (2010). Automatic term identification for bibliometric mapping. *Scientometrics*, 82(3), 581–596. doi:10.1007/s11192-010-0173-0