

Overview editorial

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The recent trend towards increased scientific collaboration, although accelerated by the popularity of social media and further exacerbated by the exoflood of big data, is not a unique phenomenon. The need to collaborate has its roots in the very development of human knowledge, in the human urge, and perhaps social necessity, to characterize and share information. Although collaboration has been a factor in research for centuries, we have seen an explosion of the study and characterization of the role of collaboration in science in the last few decades. In his tribute to Belver C. Griffith at Drexel University [1], Gene Garfield cites Henry Small's canonical paper on co-citation in *JASIS* in 1973 [2]. He says "Closely related to the subject of co-citation is that of bibliographic coupling. . . . As will be shown, in later years, bibliographic coupling was essentially displaced by co-citation clustering as a tool for mapping science". "Co-citation analysis has had an enormous and measurable impact on the field of information science itself as well as outside the field by scholars who have used it as a tool for mapping their disciplines or specialties".

As Garfield parlayed his work into the creation of Institute for Scientific Information (ISI) and later into the ISI Web of Science, we see the impact of this work on the entire gamut of science.

We have also seen a plethora of articles on science mapping in scientific and medical journals as well as journals dedicated to scientometrics such as *Scientometrics* (<http://www.springer.com/computer/database+management+%26+information+retrieval/journal/11192>), *Journal of Scientometric Research* (<http://www.jscores.org/>), *Cybermetrics* (<http://cybermetrics.cindoc.csic.es/>) and several others.

Scientific collaboration at an organizational level is also present in the virtual environment in organizations such as CENDI (<http://www.cendi.gov/>) which is an interagency working group of senior scientific and technical information (STI) managers from the 15 US federal agencies that are responsible for more than 97% of the US federal research and development budget.

And finally we see how the rapid advances in information technology, which have enabled the new mode of data driven science, have created more opportunities and, indeed, more imperatives for collaboration.

This issue of Information Services and Use features articles, drivers and projects that support scientific collaboration across a variety of research organizations with special emphasis on the role of social media and big data in scientific collaboration. While the domain of most of these papers is largely centered on scientific research that is sponsored by US federal government agencies in the fields of energy and defense, we believe that the trends and observations discussed are extensible to most other areas of scientific research.

The first article, "Status of the adoption of social media in the scientific research community" (Coppock and Davis), takes a broad view of the current status of the use and role of Social Networking by

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scientists and researchers. It also takes a detailed look at the barriers for entry into social media by researchers as well as a description of the model user profile for social media tools for scientists.

The next article, “Social network analysis of scientific collaborations across different subject fields” (Bozdogan and Akbilgic), following in the tradition of bibliometrics, examines the collaboration among researchers that is evidenced in a large US Department of Energy research database. This paper examines both how collaboration has changed over time as well as how collaboration differs across different research subject areas.

“Toward a ubiquitous virtual collaboration environment: A fusion of traditional and leading-edge virtualization tools that empower distributed participants to explore, discover and exchange information without traditional boundaries or constraints” (Vanchieri, Seby and Dooley), describes a brick and mortar center for virtual scientific collaboration that is being developed by the Virginia Tech Applied Research Corporation for the US Air Force Office of Scientific Research (AFOSR). AFOSR’s goal is to leverage the capabilities of the BRICC to evolve from “doing things better” to “doing things differently” with respect to Basic Research Initiatives; Multidisciplinary University Research Initiatives; Small Business Technology Transition; Science, Technology, Engineering and Math (STEM) programs; and international collaboration. In doing things differently, AFOSR wanted to establish a new, innovative partnership with an unbiased, neutral facilitator, who could act as the Partnership Intermediary on behalf of basic research, innovation, outreach and collaboration goals.

“Research collaboration tools for the U.S. Department of Defense” (Schwalb), examines the approach taken by the US Department of Defense to develop the collaborative tools, intended goals, challenges to adoption of the sites, and some lessons learned in their effort to provide the DoD research community collaboration tools. It also reviews how the Defense Technical Information Center (DTIC) has provided its registered customers with robust social media tools, albeit limited to the defense community.

“PeerJ – A case study in improving research collaboration at the journal level” (Binfield), describes their model for Open Access and peer review and how the Journal facilitates scientific collaboration. It addresses what happens when we open peer review to a more collaborative model.

The final paper, “‘Big Data’ collaboration: Exploring, recording and sharing enterprise knowledge” (Sukumar and Ferrell), steps us into the world of big data and scientific collaboration. It addresses the specific, emerging challenge in the market practice of big data analytics: the inability of data scientists/knowledge engineers, and analysts to quickly digest diverse sources of seemingly related information across multiple data assets within and across enterprises. It addresses how we make the collaborative process of knowledge discovery from multi-enterprise data more productive.

We are addressing a complex and rapidly advancing concept of collaboration in this special issue. We hope that the diversity of these contributions provide the reader with some stepping off points to further pursue the use of social media and other emerging technologies in scientific research collaboration.

References

- [1] E. Garfield, From bibliographic coupling to co-citation analysis via algorithmic historio-bibliography – A citationist’s tribute to Belver C. Griffith presented at Drexel University, Philadelphia, PA, Chairman Emeritus, ISI[®] President and Editor-in-Chief, *The Scientist*[®] November 27, 2001.
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