Speaking for Ourselves

Adopting ORCID as a unique identifier will benefit all involved in scholarly communication

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ABSTRACT

ORCID, the Open Researcher and Contributor ID, is a non-profit, community-driven effort to create and maintain a registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers. Together with other persistent identifiers for scholarly works such as digital object identifiers (DOIs) and identifiers for organizations, ORCID makes research more discoverable. It helps ensure that one's grants, publications and outputs are correctly attributed. It helps the research community not just in aggregating publications, but in every stage of research, viz. publishing, reviewing, profiling, metrics, accessing and archiving. Funding agencies in Austria, Australia, Denmark, Portugal, Sweden and the UK, and the world's leading scholarly publishers and associations have integrated their systems with ORCID registry. Among the BRICS countries, China and South Africa are adopting ORCID avidly. India is yet to make a beginning. If research councils and funding agencies in India require researchers to adopt ORCID and link ORCID iDs to funding as well as tracking performance, it will help them keep track of the workflow. Journal editors can also keep track of contributions made by different authors and work assigned to different reviewers through their ORCID iDs.

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INTRODUCTION

Names in scholarly publishing are not all that simple. Names here mean both names of authors of papers and names of researchers referred to in those papers. They can cause much confusion to researchers, editors of journals, database producers, librarians and bibliometricists, but if we handle them correctly we can overcome most of the problems.

SCHOLARLY LITERATURE: DISAMBIGUATION OF NAMES AND AGGREGATING ONE'S WORKS

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As early as 1969, Eugene Garfield had expressed his dismay at the 'needless ambiguity and confusion' caused by authors who omit parts of their names and initials in their published works, and recommended that 'scientists who are just now embarking on their careers would be well advised to measure the information content on their names as they appear in indexes such as *Index Medicus*, *Physics Abstracts*, *Biological Abstracts* and *Science Citation Index*.'[1] Some 12 years later, he wrote a detailed paper on the problems the scholarly world faces on account of mere names of people.[2] He had reasons to worry more than anyone else; as the publisher of *Science Citation Index*, *Current Contents* and several other search and indexing tools for the world's scientists and scholars, he had the unenviable task of processing millions of papers and author names not only in the byline of these papers but also in the references cited in them and rendering these author names accurately and attributing research papers to the right authors and institutions within a few weeks of publication.

People hail from all parts of the world and from different cultures, each having its own peculiarities in naming their people so much so people from one culture may find names of another strange. Added to that are the ways names from different cultures and languages are transliterated into the Roman script. The names in most parts of the western world have three parts, viz. the first name (or given name), middle name and last name (also called the family name or surname). Often the last name may have more than one word, e.g. Duncan Smith, von Braun, van der Waals, de Solla Price. The prefix 'van' in some names may be spelt with a capital V, albeit rarely, e.g. Van de Graaff (of generator fame). In some cultures there are a very large number of people having the same surname. For example, close to 85% of China's population have one of only 129 surnames, and three names in particular, viz. Wang, Li and Chen, are predominant among authors publishing currently. Also there are two Chinese surnames that can be spelt as Wang when publishing in English language, says Jane Qiu.[3] Eight Chinese names transliterate in Roman script into Wei Wang and to avoid ambiguity in such cases journals may allow authors the option to include their names in their own language in parentheses after the transliterated name.[4] Among Korean authors, Kim and Park account for a large percentage. In India there are many Agarwals, Guptas, Mukherjees, Raos, Sharmas and Singhs among publishing authors. While some Indians have two-part surnames, e.g. Ghosh Dastidar, Guha Thakurta and Sen Sharma, a few drop their initials altogether, e.g. Karmeshu.

Some have hyphenated names, e.g. Noel-Baker, Szent-Györgyi, Julius Wagner-Jauregg, all three Nobel laureates. Curiously, Noel-Baker was born Philip Baker, but took Noel as his second surname on marriage to Irene Noel and subsequently started hyphenating his surname. But in the majority of cases hyphenated

names are those of women who add their husband's family name to their own, e.g. Françoise Barré-Sinoussi, Rita Levi-Montalcini, both of whom won Nobel Prizes for medicine, and Irene Joliot-Curie, who won a Nobel Prize for chemistry. In a variation, Marie Curie, née Sklodowska, who won Nobel Prizes in both physics and chemistry, used her husband's name ahead of her maiden name: Marie Curie, née Sklodowska. Some examples from among Fellows of the Indian Academy of Sciences and the Indian National Science Academy: mathematician Rajinder Jeet Hans-Gill, photochemist Krishna Kamini Rohatgi-Mukherjee, plant physiologist Renu Khanna-Chopra, condensed matter physicist Tanusri Saha-Dasgupta, development biologist Professor Priyambada Mohanty-Hejmadi, conservation biologist Professor Asha Chandola-Saklani, and neurophysiologist Professor Sushil Dua-Sharma. Many of these women scientists have published papers both under their maiden names and under their hyphenated family names.

In Japan, married couples are required by a 1898 law, which is valid till date, to have the same surname, even though giving up one's maiden name does disadvantage women in certain ways, including professionally.[5]

Both retaining one's maiden name and adopting the husband's surname have their advantages. If one achieves a lot as a young person, one would be better off retaining the name that brought her the reputation in the first place. If one achieves much after taking her husband's name, she will have much to lose if she ever gets a divorce. Better to hold on to one's maiden name, says Kalpana Sharma.[6] Some professionals, e.g. Bhatnagar award winner and fluid flows expert Professor Rama Govindarajan, has chosen this option. The situation is changing in India albeit slowly. A woman in Maharashtra can now use either her father's or husband's names in all official documents.

There are also rare instances of people changing their names midway in their career, e.g. a woman electrical engineer of Indian origin working in the University of Waterloo has over the years published under three different names, viz. K.H. Sheshakamal, Shesha Jayaram, Shesha H. Jayaram (personal communication, Muthanna J, 23 Dec 2015).

Missing middle name in the byline, spelling mistakes and problems faced in printing (or processing by computers) texts with diacritical marks can all lead to ambiguity. But with all these vagaries, it is important that contributions such as papers, patents, datasets and software are attributed to the right contributors.

Many researchers have recognized the problem of author name disambiguation. A *Scopus* search (on 28 June 2015) using the key words 'author name' and 'disambiguation' led to 86 papers in the 13-year period 2003–2015. Of these, 46 had the keywords in the title. Some of these papers were related to the problems faced by biomedical databases, e.g.

1. Author Name Disambiguation for *PubMed*, *http://onlinelibrary.wiley.com/doi/10.1002/asi.23063/pdf*
2. Author Name Disambiguation in *MEDLINE*, *http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2805000*

From 2012 onwards *PubMed* uses a ranking algorithm for author searches to show more relevant results by disambiguating common author names.[7] This helps pooling papers by the real A.K. Sen when there are papers by others with the same name and initials.

The name ambiguity problem can only be solved collaboratively, when all stakeholders agree on a standard identification scheme.

Rachel Bruce, deputy chief innovation officer, Joint Information Systems Committee (Jisc), UK, says that our inability to associate valuable research outputs with their right authors 'has led to extremely inefficient research management and difficulty in identifying what has been produced. Ineffective reporting and sharing of research impact on both individual researcher's and universities' profiles.' According to her, 'wider adoption and use of Open Researcher and Contributor ID (ORCID)' is the solution to this problem.[8]

WHAT IS ORCID?

A person's ORCID iD takes the form of a unique 16-digit number, e.g. 0000-0000-0000-0000. ORCID also gives each person a web page profile based on the iD, e.g. *http://orcid.org/0000-0002-4398-4658*, listing their iD number, name(s), institution(s) and publications. (Generally ORCID is used for the organization and the registry, and ORCID iD to denote the identifier itself.) Publications here go beyond research publications such as journal articles, conference papers, dissertations, reports, research techniques, software and inventions to include books, lectures/speeches, websites, etc.

These profiles or records together comprise the ORCID registry. This registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers (*http://orcid.org/node/47*) is created and maintained by an open, non-profit, community-driven effort. ORCID iDs help distinguish individuals with common names, and they are not affected by changes in name or name order or alphabet in which the name is rendered. ORCID is researcher-controlled; the researcher decides what information is included in her ORCID record.

ORCID iDs can be embedded in research workflows. If included by the publisher or funding agency, they are part of the metadata associated with scholarly works and grants. Together with other persistent identifiers for scholarly works such as DOIs and identifiers for organizations, ORCID makes research more discoverable.

But ORCID is not the first such attempt to associate unambiguously research papers (and other output such as datasets and software) with the right authors. Fenner has listed a number of them.[9] Some of these cover only specific fields. Some are country specific. Some are proprietary. Some are linked to specific databases while others want to cover a wide area of science and scholarship. Fenner's list includes RePEc Author (set up by Thomas Krichel in 1999), LATTES (an information platform mandatory for researchers in Brazil, set up by the National Council of Scientific and Technological Development or CNPq, in 1999), VIAF (set up by OCLC in 2003), NARCIS (set up in 2004 by the Royal Academy of Sciences of the Netherlands and mandatory for all researchers in the Netherlands), arXiv Author ID (set up in 2005 by Cornell University for researchers in physics and related disciplines), Scopus Author ID (set up in 2006 by Elsevier), Names Project Mimas (set up in 2007 by the British Library for authors and institutions in all academic disciplines), Researcher ID (set up in 2008 by Thomson Reuters) and Author Claim (set up by Thomas Krichel in 2008).

If there are many author identity services already available, why add ORCID, one may ask. The other services are not truly interoperable, whereas ORCID allows linkage to other identifiers such as Scopus ID and Researcher ID. ORCID is the only service trying to associate its identifier with other existing author identifiers, with more than publications, and to collaborate across the community to embed it at the time that a work is 'released' by a researcher. Also, most other services are linked to a single bibliographic database

(e.g. Researcher ID is linked to *Web of Science*).

'Thus, since none of the available author identifier services looked like the solution to the name ambiguity problem, the ORCID initiative was started in late 2009 and formed as a non-profit organization in August 2010.'[10]

Why should a researcher have an ORCID iD?

This section draws on information mainly from private communication with the Executive Director and other staff of ORCID and the Library Guide of the University of Southampton.[11]

ORCID helps ensure that one's grants, publications and outputs are correctly attributed. It is for life, irrespective of where one chooses to live and work. Connections between the ORCID registry and other databases help one to keep one's research profile updated and to make it visible worldwide. Authors with an ORCID iD can have Crossref automatically push information about their published work to their ORCID record.[12]

Often researchers waste much time in filling forms that require address, employment history, collaborator names, affiliation, etc. when applying for jobs, awards, academy fellowships or grants or submitting manuscripts to journals. One can have all such information in one's ORCID profile and draw upon it at short notice. Researchers can save much of their productive time by linking their ORCID iDs to the grants or manuscript processing systems.

As the Caltech Library Guide points out, as one collaborates across disciplines, institutions and borders, one 'must interact with an increasing number and diversity of research information systems. Entering data over and over again can be time-consuming, and often frustrating' (*http://libguides.caltech.edu/orcid*).

To obtain the list of publications of a researcher from a database such as *Web of Science*, one would need to give the name (with all variants), research domains and names of organizations (with all their variants) associated with the author. With all that, one may not get the full list. But if one uses the researcher's ORCID iD in the identifier field, the search will give the correct list instantaneously.

Anstey, editor of the 125-year-old *British Journal of Dermatology*, has explained lucidly why researchers, editors and funders should embrace ORCID and how through ORCID iDs one could connect to websites such as *Web of Science*, figshare, Impactstory and others.[13]

How do researchers get an ORCID iD?

Scientists, researchers, teachers, students, clinicians, scholars, authors and anyone at all, contributing to scholarly outputs from anywhere in the world can sign up for a free ORCID iD through the ORCID website (*https://orcid.org/register*). It is also possible to create an ID at other websites that are integrated with ORCID, for example manuscript submission websites of journals. About 5000 journals, including those published by the Institute of Electrical and Electronic Engineers (IEEE), Taylor & Francis, and Cambridge University Press, use ScholarOne developed by Thomson Reuters and whenever one submits a paper to these journals one is asked to provide an ORCID iD. And if you do not have one you can create it through the publisher's Application Program Interface (API). Claiming an ORCID iD is not at all difficult. After claiming, researchers can associate the ORCID iDs with their education and employment details and details related to collaborators, publications and outputs.

Including one's publications is simple. One can import bibliographic details of one's publications having unique identifiers (e.g. DOI, ISBN) from the list of databases integrated with ORCID registry. The list includes *Scopus*, *Web of Science*, *Europe PubMed Central*, *Crossref Metadata Search*, *Redalyc, etc.*[14] One can just log in to ORCID and choose the database from which one wants to import bibliographic data. For publications that are not indexed by the databases integrated with ORCID, one can use the template provided by ORCID to manually add details. Also ORCID has created a tool by which one can import bibliographic data from BibTeX (.bib) files into one's ORCID record, including files exported from Google Scholar and other popular reference management tools.[15]

Is one's ORCID private information?

Of course, one can choose which information to be assigned as public or private in one's record except the actual iDs assigned by ORCID that are designed to be publicly available. Once researchers have claimed their ORCID iD, the settings are in their sole control. ORCID has a privacy selector option that lets one set the privacy level of all new works, education, employment and funding items. Usually, everyone makes the list of publications public.

ORCID features

ORCID offers its essential features for free to individual researchers and organizations across the world. Researchers would be able to automatically update their ORCID record with links to published manuscripts in which they have included their ORCID iD. However, ORCID charges membership fees from organizations such as publishers, funders, and academic and research institutions, in order to sustain the registry and the mission to achieve name disambiguation, and in return offers them premium API services and personalized technical support. Also, when many organizations join as a consortium, they benefit from reduced ORCID membership costs and enhanced technical support.

ORCID conforms to the values of an open scholarly infrastructure organization.[16] Indeed, Public Knowledge Project (PKP) Director John Willinsky considers ORCID 'an important emerging technology with opportunities to help shape and improve the open access publishing landscape worldwide'.[17] Organizations can integrate ORCID iDs into research management systems and workflows using the free public API. ORCID releases a public data file annually under Creative Commons License (CC0 1.0 Public Domain Dedication) to support broad access to data that are made public by individual researchers through their ORCID records. The file contains the public information associated with each user's ORCID record. Each record is included as a separate file in both JSON and XML formats (*http://orcid.org/content/orcid-public-data-file-2014*).

ORCID helps institutions track one's work, compile information for university-level reporting (including total funding received by its scholars), and more efficiently manage information on faculty profiles. By eliminating redundancies and automating some reporting functions, ORCID will be especially helpful in reducing time and monies spent on other assessment activities such as the *Research Excellence Framework* (REF) in the UK.[18]

Feedback from a pilot study with eight UK universities showed that organizations that have adopted ORCID were likely to see 'measurable efficiency improvements within two years of implementation—especially in internal data quality, streamlining of publications management, and enhanced reporting to funders—with accrued benefits increasing steadily over the following three to four years.'[19]

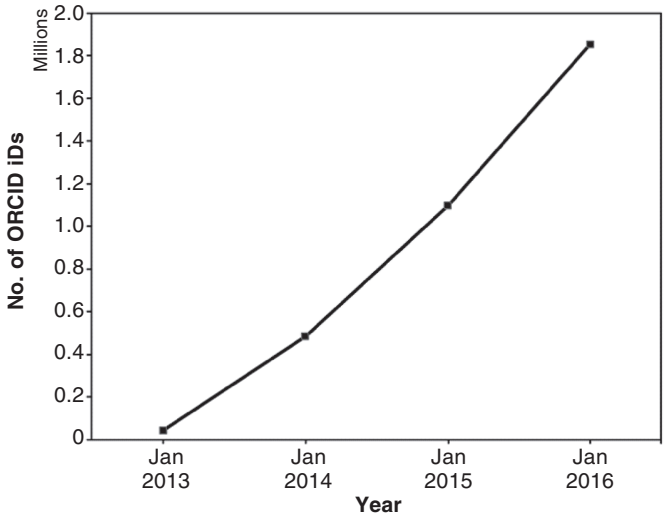

FIG 1. Growth of ORCID iDs (*http://support.orcid.org/knowledgebase/articles/150557-number-of-orcid-ids*)

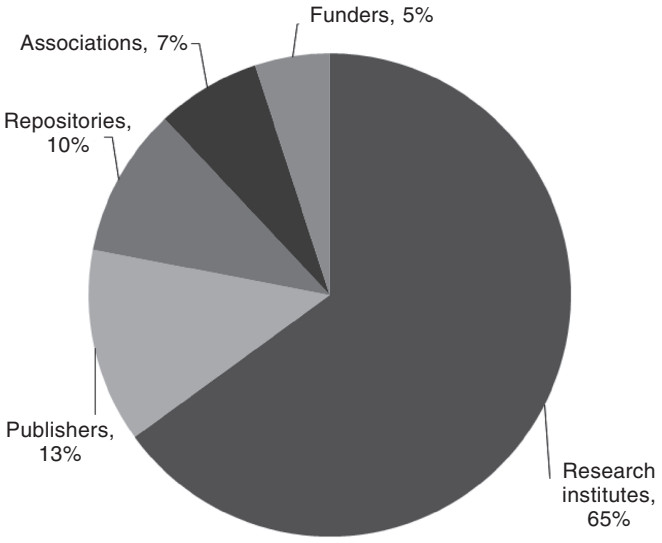

FIG 2. Sectoral distribution of ORCID members (Haak LL, personal communication, 30 Sep 2015)

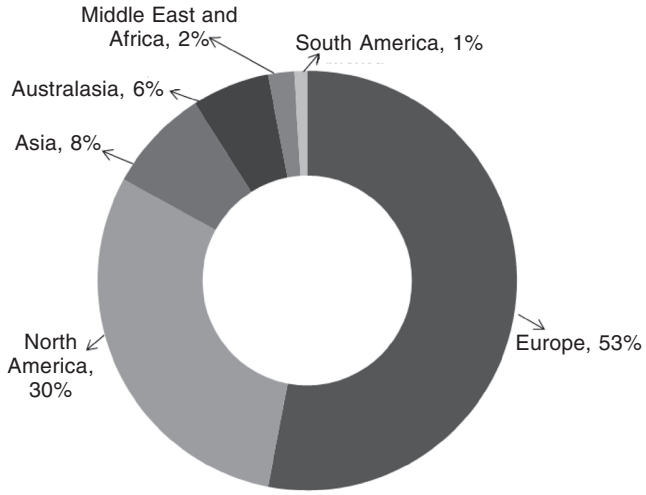

FIG 3. Geographical distribution of ORCID members (Haak LL, personal communication, 30 Sep 2015)

Uptake of ORCID

The number of live ORCID iDs grew rapidly from late 2012 (Fig. 1) and as of 29 July 2016, it exceeded 2.43 million. These are currently used by more than 200 research and workflow platforms at academic and other research institutions, at funding agencies and at publishers.

As of mid-December 2015, more than 350 organizations have opted for ORCID's member services and are at different stages of integrating ORCID iDs into their systems and workflows (Miyairi N, personal communication, 18 Dec 2015). As of 30 September 2015, 65% of ORCID members were universities (Fig. 2) spread all over the globe (Fig. 3). A representative list of different categories of members is provided in Box 1. The large European contingent is a result of three national consortia. These proportions are expected to be fluid over the next couple of years as more consortia are formed and join ORCID (Haak LL, personal communication, 30 Sep 2015).

Recognizing that publishers can promote systems that would provide support to researchers and to science, commencing January 2016, eight publishers will be requiring the use of ORCID iDs by corresponding authors during the publication process. These include the American Association for Advancement of Science (AAAS; publishers of *Science*), American Geophysical Union (AGU), eLife, EMBO, Hindawi, IEEE, the Public Library of

Box 1. Uptake of ORCID

Among the long list of members of ORCID are:

Publishers: AIP Publishing, Elsevier, National Academy of Sciences (USA), Oxford University Press, Public Library of Science (PLoS), Science Open, Springer, Taylor & Francis, Wiley, Wolters Kluwer

Associations: American Association for Advancement of Science (AAAS), American Astronomical Society, American Chemical Society, American Psychological Association, American Physical Society, American Society of Microbiology, American Society of Civil Engineers, Association of Computing Machinery, Electrochemical Society, Institute of Electrical and Electronic Engineers (IEEE), IOP, Modern Language Association, Royal Society of Chemistry

Universities: Harvard University, Massachusetts Institute of Technology, Caltech, Cornell University, Lund University, Stockholm University, City University of Hong Kong, National Taiwan University, CINECA, Italy's consortium of 70 universities and four research institutes

Academies: African Academy of Science, Chinese Academy of Science, Royal Society

Funding agencies: National Institutes of Health (USA), Department of Energy (USA), Wellcome Trust (UK), National Institute for Health Research (UK), Fundação para a Ciência e a Tecnologia (Portugal)

Intergovernmental bodies: CABI, CERN, International Food Policy Research Institute, International Water Management Institute

Libraries: British Library, Royal Library – Denmark

Repositories: Social Science Research Network (SSRN)

For the full list of members, see *http://orcid.org/about/community/members*

Science (PLoS), and the Royal Society. More than 3000 journals are already collecting ORCID iDs from corresponding authors. Currently about 75% of all registrations are through journal accounts.

Similarly, six consortia too will require the use of ORCID iDs. These are: Jisc (50 universities and research councils, UK), Italy/ANVUR (70+ universities and research institutes), Australia, via the Australian Access Federation (40 universities, research institutes, and Australian Research Council and National Health and Medical Research Council funders), and three library consortia in the US: Committee on Institutional Cooperation (CIC) consisting of 15 universities in the US midwest, the Greater Western Library Alliance (GWLA), a consortium of 35 research libraries located in the central and western US, and the North East Research Libraries Consortium (NERL) comprising 29 core member academic research libraries and approximately 90 affiliate member academic and/or research libraries.

Jisc negotiated an ORCID consortium through which universities would benefit from premium ORCID membership at significantly reduced costs. The official launch event for the consortium took place at Imperial College in late September 2015 with the participation of more than 50 UK universities, ORCID, Jisc, GuildHE, RCUK and Current Research Information System (CRIS) vendors.[20] Since August 2015, the Wellcome Trust has required all lead applicants for grants to provide an ORCID iD.[21] From 23 September 2015, an ORCID iD has become mandatory for all new National Institute of Health Research (NIHR, UK) personal award applications.[22]

Italy has implemented ORCID on a national scale, and has signed a three-year consortium membership agreement with ORCID. Under the auspices of ANVUR (National Agency for the Evaluation of the University and Research Systems) and CRUI (the Conference of Italian University Rectors), 70 universities and four research centres initially participate in the consortium (Cineca). ANVUR made ORCID mandatory in order to participate in the National Assessment from November 2015.[23] The Italians expect that at least 80% of Italian researchers will have an ORCID iD, with links to their research output by the end of 2016.[23]

ORCID is now included in the Danish National Open Access Strategy and the National Research Data Strategy. The Danish Council for Independent Research recommends, and the Novo Nordisk foundation requires an ORCID iD in funding applications. Currently DEFF, a library collaboration funded by several ministries, is sponsoring a national ORCID implementation project with project partners including seven of the eight Danish universities, a consortium of all Danish university colleges and a consortium of research institutions under the Ministry of Culture.[24]

In Australia, according to Arthur Sale of the University of Tasmania, 'there is an active ORCID activity, and it has been adopted (or recommended) for universal application, but this has not yet reached the status of a mandate by government' (personal communication, 2 Jan 2016). The Australian ORCID Consortium was launched on 1 January 2016 with 38 organizations (*http://aaf.edu.au/orcid/*). The Universities of Sydney, Melbourne, New South Wales, and Queensland, Macquarie University, Griffith University, Queensland University of Technology, La Trobe University and Charles Darwin University and the Australian National Data Service (ANDS) are all members of ORCID. ORCID Working Group of Australia comprising research councils and associations has developed a consortium model for implementing ORCID iDs across the Australian research sector.[25]

Funding agencies are also keen to partner with ORCID. Portugal's Foundation for Science and Technology (FCT) mandated the use of ORCID in 2013. The National Institutes of Health (NIH) asks that grantees use ORCID iDs to manage information in their ScienCV system.

Many other funding agencies across the world have also adopted ORCID:[26]

- The Swedish Research Council (SRC) mandated the use of ORCID in Spring 2015.
- Austrian Science Fund (FWF) has mandated the use of ORCID starting in 2016.
- European Commission H2020 Grantee Guidelines recommend that contributors be uniquely identifiable through identifiers which are persistent, non-proprietary, open and interoperable (e.g. through leveraging existing sustainable initiatives such as ORCID).[27]
- Science Foundation Ireland (SFI) will mandate the use of ORCID in the next funding cycle.
- Autism Speaks, a US-based awareness, advocacy and funding body, requires all investigators and mentors to register with ORCID to obtain a unique iD. This enables Autism Speaks to update one's funding record and to monitor one's research progress. Autism Speaks will not consider applications without ORCID accounts for the key personnel.[28]

Publishing platforms such as Aries Editorial Manager, eJournal Press, and ScholarOne have already built-in ORCID support so authors publishing in those journals can create their ORCID iDs through them. PKP is working on developing modules for the Open Journal Systems used by more than 8600 journals.

Research information systems such as Elements, Plum Analytics, PURE, SmartSimple, InfoEd, University Office and Research Master, and the open access repository platforms DSpace, Dryad, EPrints, and VIVO have also built-in ORCID support.

Towards the end of 2015, Altmetrics integrated ORCID with its Explorer apps, and now one can search for Altmetric attention data for all the research outputs associated with one's ORCID profile and thus scholars can get credit for all their research contributions, including journal articles and participation in social media.

SUPPORT TO ORCID

Right from the beginning, ORCID's aim was to become completely self-sustaining based on member fees. However, they did have some sponsors and they did take some loans from their own members/stakeholders (*http://orcid.org/about/community/sponsors*).

In September 2011, ORCID received an NSF Eager grant of US$ 200 000 via the University of Chicago.[29] The APIs developed with this funding and released in November 2011 could be used by third parties to integrate grant, manuscript or personnel tracking systems with ORCID. This project led to the formal launch of ORCID and its website (*http://orcid.org*). The philosophy and evolution of ORCID were disseminated through journals such as *Nature* and *EduCAUSE*, outreach meetings and social media channels such as twitter.

Seeing its value, a few philanthropic foundations came forward to support ORCID. An award by Alfred P. Sloan Foundation to ORCID funded the pilot integration of ORCID identifiers by a group of universities and science and social science professional associations, such as Purdue University and the Society of Neurosciences. This programme supported the collaborative elicitation and documentation of 'use cases' and open source code, and established a collaborative venue for disseminating best

practices. All projects were completed in December 2014. Partnering institutions have shared integration source code and lessons learnt with the ORCID community through ORCID's GitHub open source repository and online 'use cases', and now serve as reference sites for organizations planning similar integrations.[30]

In April 2015, the Leona M. and Harry B. Helmsley Charitable Trust awarded US$ 3 million to ORCID to develop the infrastructure and capacity to support international adoption and technical integration.[31]

ORCID IN EMERGING AND DEVELOPING COUNTRIES

The National Science Library (NSL) of the Chinese Academy of Sciences (CAS) has taken the lead in China and is taking steps to adopt ORCID nationwide.[32] China fully recognizes the importance of the unique author identifiers, especially so for Chinese authors and the NSL sees the value in an international, open, and researcher-driven person identifier. Scientists in China are willing to work with ORCID to promote it in CAS and in the country. To this purpose, the NSL is enlisting cooperation from *Web of Science*, the *Chinese Science Citation Database* (CSCD), *Chinese Social Science Citation Index* (CSSCI), CAS Science, Technology and Medicine (STM) Journal Association, University STM Journal Association, and a number of major research and academic libraries. NSL has developed the *iAuthor* platform, as an easy Chinese front gate to register for an ORCID identifier and to interoperate with Chinese journals, CSCD and others. The NSL *iAuthor* service was launched in October 2014.[32]

ORCID is yet to pick up in India. As of 15 September 2015, more than 1.5 million ORCID iDs have been assigned. Of these, 14 439 have been registered with an email address that ends in '.in' and 17 048 records where the country is set to India (email communication from ORCID, 29 Jun 2015). That comes to <1.14%. Many authors may be using web mail addresses and we will not be able to identify them as Indian researchers.

ORCID is just starting in Latin America, according to Dominique Babini, Open Access Program Coordinator at the Latin American Council of Social Sciences (CLACSO) (personal communication, 1 Jan 2016). According to Abel Packer, Director of SciELO, 'ORCID is not yet widely adopted in LA. There is an increasing awareness of it and its role and importance. But, only a few institutions adopted it as an obligatory policy to their affiliates' (personal communication, 2 Jan 2016). Less than 10% of the authors fill the ORCID field in the submission form in the online manuscript submission/processing services used by SciELO Brazil. But, it will be adopted if funding agencies and journals make it mandatory on their submission systems. A barrier to its wide adoption is that researchers have many options to manage their profiles (personal communication, 2 Jan 2016). The first to join ORCID were:[33] Redalyc, the University of the State of Mexico's open access platform; CONCYTEC – National Council of Science and Technology in Peru; and UNESP (Sao Paulo State University) in Brazil.

Interest in ORCID has been growing in Africa for some time. In South Africa alone over 3500 researchers have registered and three universities, viz. University of Cape Town, Stellenbosch University, and the Gordon Institute of Business Science are ORCID members, as is the National Research Foundation. In all of Africa, there are >7000 registered researchers mostly from South Africa, Egypt, Nigeria, Tunis, Ghana, Kenya and Botswana. The cities in Africa that lead in ORCID use are Cairo, Tunis, Lagos, Algiers, Giza, Cape Town, Pretoria and Alexandria.[34]

In the Asia–Pacific region there were 37 members of ORCID[35] as of August 2015, including 13 in Australia, 3 in New Zealand, 6 in Hong Kong, 5 in Taiwan and 4 in Japan. There is one in India—a multinational company providing editing and publishing services—with offices in many countries and does not really qualify to be known exclusively as an Indian entity.

SOME CONCERNS

Some are critical of ORCID. One criticism is that ORCID is not open access and it appears to be a complicated, expensive, proprietary and monopolistic system, and the participation of several commercial publishers makes it a Trojan horse which could eventually lead to strengthening the stranglehold of the publishing industry over scholarly communication. We were alerted to this concern by Thomas Krichel (personal communication, 6 Jul 2015). Krichel ignores the fact that without the participation of large bibliographic databases, ORCID cannot provide the service effectively. Bringing on board *Scopus* (Elsevier), *Web of Science* (Thomson Reuters), etc. is not only a clever move but is an absolute necessity.

Many others do not agree with this view. Bilder *et al*.[16] believe that ORCID conforms to the values of an open scholarly infrastructure organization. Also, as Paglione[36] has put it: 'One of the core principles of ORCID is that all software we develop will be publicly released under an open source software license approved by the Open Source Initiative. In addition to transparency, releasing our code will improve interoperability and integration with external services, lead to more robust code because more individuals are auditing and testing it, and, with an extended developer community, enable faster code iteration and evolution.' Haak has also listed the open features of ORCID, viz. it provides free, barrier-free access, it is democratic and transparent, and it is open access.[37]

Another concern is: what if unscrupulous individuals claim authorship on papers that are not theirs, if the ORCID authorship has not been previously claimed by the true author? Is there any safeguard to prevent such a possibility? Can ORCID help prevent fraudulent reviewing?

In the early days, it is possible for someone to claim authorship of papers written by others. But, according to Laure Haak (personal communication, 10 Dec 2015), 'ORCID is a public resource, and if someone claims erroneously this can be monitored by the community and reported and addressed using ORCID's dispute procedures (see *http://orcid.org/orcid-dispute-procedures*). As universities and other employers of researchers are using ORCID to assert affiliation (and funders are asserting awardees also using ORCID), there becomes built a web of trusted data about an individual's research activities, all with researcher consent.' Also, as more and more publishers receive ORCID iDs of authors as part of the metadata when authors submit papers, and as Crossref updates the ORCID records, it will reduce unethical claims.

As far as peer-review fraud is concerned, there are attempts to counter it using ORCID.[38] But, these are social problems and technical solutions are not the answer. The fight between good and evil is often a see-saw. However, as the uptake of ORCID gains momentum it will become difficult for such fraudsters to lay claim on others' works.

There are some reservations though about the costs involved in becoming a member of ORCID. Here is what J.K. Vijayakumar of King Abdullah University, Saudi Arabia, told us: 'if an institution wants to use ORCID to integrate with their repository, research

management systems, etc., the institution needs to become a member (the fees are high and one has to pay even more if ORCID integration is required for more than one system). This needs to be debated and ORCID should bring down the membership fee according to income of the country, so that developing nations can also take part' (personal communication, 11 Jul 2015). This seems to be a good suggestion. In fact, a member can use one member API credential in many systems. ORCID also provides a substantial discount for small organizations (<US$ 200 000). In addition, affordability is partly why the consortium member model was launched. Haak says: 'We continue to evaluate membership fees and are starting an initiative for adoption in developing countries in 2016' (personal communication, 2015).

What we are concerned more is the fact that although the number of live ORCID iDs exceed 2.43 million (as of 29 July 2016), only about 337 000 of them have at least one work (*https://orcid.org/statistics*). Only about one in five iDs is actually being used.

DISCUSSION

The value of ORCID is evident even in its first 5 years. As Jonathon Kram of the Strategic Planning and Policy Unit at Wellcome Trust says, 'the ability to uniquely identify contributors is a deceptively simple concept which, if realized, could enable forms of real-time understanding of scientific research that up to now have been extremely costly (if not impossible).'[39]

When the Modern Language Association (MLA) enabled in June 2015 retroactive assigning of ORCID iDs to the nearly two million records in its International Bibliography, which holds the key to language and literary scholarship for more than 90 years, it met an especially critical need in the humanities and arts, where publication types and venues are so diverse, needing more work to be done to create clarity and connect the parts than in the sciences. It would also bring increased recognition and validation of humanities scholarship.[40]

As early as 2012, concerned by the lack of quality, comprehensive data about biomedical researchers, the US NIH recommended the development of a simple, comprehensive tracking system for trainees, and implemented a researcher profile system called the Science Experts Network Curriculum Vitae (SciENcv), and encouraged the adoption of unique, persistent ORCID identifiers for researchers.[41]

ORCID, along with open access and open educational resources, is integral to the open knowledge movement. It supports 'the transition from science to e-Science, wherein scholarly publications can be mined to spot links and ideas hidden in the ever-growing volume of scholarly literature'.[42]

Such benefits of ORCID adoption will be fully realized only if ORCID iDs are adopted widely across the research community, and if ORCID iDs are integrated within systems of higher educational institutions, funders and publishers.[43]

If research councils such as the Council of Scientific and Industrial Research (CSIR), Indian Council of Agricultural Research (ICAR), and Indian Council of Medical Research (ICMR) and funding agencies such as the Department of Science and Technology (DST), Department of Biotechnology (DBT) and the University Grants Commission (UGC) mandate ORCID iDs for all researchers in all their laboratories and for all applicants for grants, India can make quick progress. Vice chancellors of universities, directors of research institutions, and the governing boards of academies and professional associations and societies could insist on all researchers in their respective institutions registering for an ORCID iD. Scholarly journals published by the science academies, CSIR-NISCAIR, ICAR, ICMR, professional associations, etc. could mandate inclusion of ORCID iDs by all authors at the time of submitting manuscripts. It would help immensely if India were to adopt a manpower tracking system based on ORCID in all areas of science, technology and innovation, similar to that used by NIH.

India has done reasonably well in the area of open educational resources (OER). In particular, the National Programme of Technology Enabled Learning (NPTEL) executed by a consortium of IITs and Indian Institute of Science is highly regarded and is used well. But it took several years of voluntary effort before green open access became acceptable to a small percent of Indian researchers and research institutions, long after it became standard practice in many countries. We hope this time around things will move quickly and many researchers and institutions will adopt ORCID soon.

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