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ORCID

Author Identifiers for Librarians

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Generating accurate publication lists by researchers can be challenging when faced with scholars who have common names or who have published under name variations. This article describes ORCID and the goal of generating author identifiers for scholars to connect their research outputs. Included are the reasons for having author identifiers as well as the types of information within individual profiles. This article includes information on how academic libraries are playing a role with ORCID initiatives as well as describing how publishers, institutions, and funders are employing ORCID in their workflows. Highlighted is material on academic institutions in Pennsylvania using ORCID. The purpose of the article is to provide an overview of ORCID and its uses to inform librarians about this important initiative.

Background

Open Researcher and Contributor ID (ORCID) is a nonprofit organization developed to address the common problem with name ambiguity among researchers across various fields. ORCID began distributing unique, persistent 16-digit alphanumeric identifiers to individuals in 2012 to allow scholars to link a number to their work in order to accurately capture their wide array of productivity (ORCID, 2012).

ORCID is international and interdisciplinary in scope, accounting for scholarly output throughout the world and across most subject areas. As of June 2017, 3.5 million ORCID IDs have been created, and this number continues to grow (ORCID, n.d.a.).

The main benefit to author identifiers, such as ORCID, is to link a unique identifier to individuals rather than relying on their given name. Searching for publication information by name comes with challenges. Uncommon names make for easy discovery, yet most searches are not this straightforward. Name variations, such as changes to last name as well as either including or omitting a middle initial, add to confusion when finding publications. One of the more difficult situations is disambiguating among very common surnames, such as Smith, Kim, or Wang. In 2008, Qiu noted that Chinese authors find receiving credit for their work challenging, as over a billion people have only 129 common

surnames. She argues that author identifiers would assist in decreasing the confusion among these authors. A report in 2016 shows that the top 10 names in the ORCID repository were Asian, with Wei Wang topping the list with 185 people by that name in the system (Bohannon, 2016). Arunachalam and Madhan (2016) note similar challenges among Indian researchers and funders and encourage them to adopt ORCID.

While having an author identifier may simplify searching for a particular author's publications, funders and researchers of scholarly communications and bibliometrics will also benefit. In 2014, Liu et al. noted that users of the PubMed database frequently search for author names. To combat the potential problem of retrieving poor results in this popular biomedical literature database, the authors developed a machine-learning disambiguation system that was applied to the PubMed search engine. A small increase in accurate results was observed (Liu et al., 2014). Also addressing author ambiguity challenges in PubMed, Lerchenmueller and Sorenson (2016) sought to associate publications with National Institutes of Health (NIH)-funded researchers. Accurate links between researchers and their publications could lead to analyses of biomedical researchers' activities, such as determining the impact of collaborations and understanding career progression. Using the Author-ity author database and Principal Investigator IDs assigned to funded researchers by NIH, the authors were able to determine NIH-funded researchers and their publications with a high degree of accuracy regardless of name commonality or research productivity (Lerchenmueller & Sorenson, 2016).

The issue of author ambiguity has been a challenge for a long time (Bourne & Fink, 2008; Rotenberg & Kushmerick, 2011), and as ORCID started delivering its services, discussions about the importance of ORCID began (Butler, 2012). ORCID is not solely used for researchers to receive credit for their work but also by publishers and research funders to identify scholarly output at the individual level. The rapid adoption of ORCID by these groups discussed in this paper is a driving force behind the increase in ORCID iDs. As ORCID increases in popularity, it is important for librarians to understand ORCID and its effects on the scholarly communication landscape.

ORCID Profiles

ORCID's home page (orcid.org) allows users to establish a profile and learn more about the system. In building an ORCID record, users can opt to make their information private, available to trusted third parties, or publicly available. Users choose which information to include, so each profile will look different. Linked is an example of the author's profile (orcid.org/0000-0003-2141-0490).

Due to the flexibility of the ORCID system, authors and researchers have the opportunity to capture all of their productivity in a single profile, making it part of their professional identity. ORCID categories include education, employment, funding, and works. Labeling output as "works" allows users to include more than authored journal articles, books, or book chapters but also dissertations, poetry, conference presentations, musical scores, intellectual property, and datasets. ORCID records can include other unique identifiers, such as digital object identifiers (DOIs), patent numbers, grant numbers, and a wide variety of other external identifiers. Additionally, if a scholar has works indexed in popular sources like CrossRef, DataCite, or Scopus, that information can be exported and deposited into ORCID records. CrossRef and DataCite are nonprofit organizations that provide DOIs to publications or research data, respectively, to make research products more discoverable and identifiable. Users can connect other author identifiers, including ScopusIDs (Elsevier) and ResearcherIDs (Clarivate Analytics), to ORCID accounts. If a researcher has secured grant funding, those funding sources and details can be included in their ORCID record. If a scholar has published under a different name or names, all combinations are included in their profile. Because ORCID is not a repository, publications, datasets, and other scholarly materials cannot be attached to profiles (ORCID, n.d.b.). However, the uniform resource locator (URL) field in the item entry can link to materials stored elsewhere, such as institutional repositories.

Maintaining up-to-date profiles is difficult, because capturing dynamic research output is challenging. In 2015, ORCID announced a partnership with CrossRef and DataCite to assist with this problem. Both organizations agreed to post records to individual ORCID profiles when iDs are provided from the publisher. Additionally, individuals must grant permission to both CrossRef and DataCite to upload information to their records (Haak, 2015). Any work that is not indexed in CrossRef or DataCite can be added manually to the individual's profile.

ORCID Compared to Other Academic Profiles

A common question regarding ORCID is how it differs from similar-looking products, such as Google Scholar profiles and ResearchGate. All digital profile options, including ORCID, have unique features. ORCID was designed to be an identifier system with the capability of integrating into existing manuscript, grant, and research systems, and its purpose is to help researchers get credit for all of their professional work.

Some similar products to ORCID (ex. ResearchGate or the National Institutes of Health's SciENcv) can generate a curriculum vitae. Research metrics, such as article citation counts, are included in Clarivate Analytics' ResearcherID as well as Google Scholar profiles. ResearchGate and Elsevier's Mendeley have social network capabilities on their platforms. Currently, ORCID does not have these features. Each of these resources is dynamic, and current information on their functionality can be found on their platforms. Academic libraries receive questions from patrons about these resources, and some maintain a comparison of these profile platforms on their website. The Harrell Health Sciences Library website (harrell.library.psu.edu/bibliography) has a good example on their tracking publications guide.

ORCID Member Benefits

Some features of ORCID are free to individuals regardless of institutional membership. Researchers are allowed to create and maintain profiles as well as share their iD numbers and associated data. ORCID provides non-member institutions with a public application programming interface (API) they can use with their research systems.

As a non-profit organization, ORCID is dependent on funding from member institutions. The main benefit to membership includes access to the ORCID Member API, which assists with user registration, data editing, and updating information. Additionally, members receive tailored technical support (ORCID, n.d.c.).

Boston University (BU) is one of the earliest adopters of ORCID. Beginning in 2013, BU used the ORCID API to create ORCID iDs for faculty, postdoctoral scholars, graduate students, and undergraduates who had a research focus. Once members accepted the invitation to join ORCID, BU populated the records with information from BU Profiles, their research networking system ("Universities Now Creating ORCID iDs for their Researchers and Scholars," 2013).

Publishers, Funders, and Professional Society Uses of ORCID

While ORCID iDs can serve as a valuable tool to capture scholarly output, publishers, funders, and professional societies also find ORCID worthwhile, and its use is on the rise among these organizations. These groups also have the challenge of author ambiguity discussed earlier and would like to gain a better understanding of individual researcher activity. ORCID provides integration and technical information to these member groups on their website to assist with the implementation process (ORCID, n.d.d.).

Many publishers who use ORCID in their workflows are scientific in scope. Some publishers and journals joined ORCID shortly after it began, and in 2015, more publishers committed to requiring ORCID iDs, including the

Public Library of Science (PLOS), IEEE, Wiley, Springer Nature, and the American Geophysical Union ("Requiring ORCID in Publication Workflows: Open Letter," 2015). Leading chemistry publishers, Royal Society of Chemistry and the American Chemical Society, have also joined ORCID (American Chemical Society, 2016).

As more publishers join ORCID, the affected journals typically include editorials notifying authors and readers about the changes and describing ORCID. See examples in the *Journal of the American Association of Nurse Practitioners*, *British Journal of Dermatology*, and *Journal of Materials Science* (Anstey, 2014; Carter & Blanford, 2017; Pierson, 2016).

Major publishers like Elsevier, Springer, and Nature Publishing Groups capture author ORCID iDs upon manuscript submission to their journals. Elsevier is among the publishers that transfer iD information in their metadata to Crossref, allowing ORCID records to update automatically (Elsevier, 2017; ORCID, n.d.e.; Springer, 2017).

Social sciences and humanities groups also use ORCID to capture the scholarly output in these disciplines. The high profile Social Science Research Network (SSRN) (2017) open access repository features hundreds of thousands of research papers from social sciences and humanities disciplines. Researcher profiles on SSRN include ORCID iDs (Elsevier, 2017). Earlier this year, the Netherlands-based academic publisher Brill announced its membership in ORCID, adding to the social sciences and humanities use of ORCID (Brill, 2017).

In addition to connecting ORCID to publications, publishers have started linking iDs to peer reviewers. The American Geophysical Union and F1000 were early adopters of this feature and are hopeful that other organizations will follow suit to capture these contributions to scholarship (Hanson, Lawrence, Meadows, & Paglione, 2016). ORCID provides technical details for organizations to connect ORCID to their peer-review platforms (ORCID, n.d.f.).

Some funding agencies have started using ORCID in their systems. Autism Speaks requires principal investigators and co-investigators to register with ORCID and permit the funder limited access to their profiles. Autism Speaks uses ORCID to create "an improved grants administration and reporting process as well as improved tracking of return on research investment" (Autism Speaks, 2017).

U.S. federal funding agencies are gradually adding ORCID to their workflows. The National Institutes of Health completed its ORCID integration and currently enables researchers to link to their ORCID records to build biosketches for grant applications (ORCID, n.d.g.).

Professional organizations use ORCID for member disambiguation and capturing research productivity. The American Psychological Association integrated with ORCID and now allows members to log into the society's website with their ORCID iD (ORCID, n.d.h.). The Society for Neuroscience is among the organizations requesting an ORCID iD with membership registration or renewal (Society for Neuroscience, 2017).

Academic librarians should understand the ORCID requirements made by publishers and funders as described above or as they evolve. Researchers within their institution will likely have questions about the system, and the library and research offices are places to seek answers on this topic. These requirements are also important for librarians to understand, because they could affect librarian workflow. PubMed and Web of Science are examples of two bibliographic databases that allow searching by author identifiers. As more publishers require ORCID iDs upon manuscript submission, the more efficient author identifier searches will be.

Academic Libraries and ORCID

Academic libraries have been involved with ORCID in different ways since its inception. In 2015, librarians at East Carolina University (ECU) reported engagement with ORCID outreach efforts across their campus. While much of the outreach was to faculty at departmental meetings, some was through a partnership with their Office of Faculty Excellence. Together, they helped faculty generate and optimize profiles to showcase research output in the Research,

Engagement, and Capabilities Hub of North Carolina (REACH NC), a Web-based tool to connect people with different research expertise across North Carolina. The collaboration with REACH NC created a natural way to couple ORCID outreach with ongoing REACH NC initiatives. Positive results of improved researcher connections and populated ORCID profiles at ECU were reported (Thomas, Chen, & Clement, 2015).

In 2014, the libraries at Texas A&M University (TAMU) began their ORCID initiative. To assist TAMU in tracking research output over time, the libraries developed a model in which they integrated ORCID iDs into electronic thesis and dissertation publishing. As part of this initiative, the libraries marketed ORCID on their website, created online guides, and held in-person sessions to assist with questions involving ORCID. Using the ORCID API, the libraries created more than 10,000 iDs for enrolled graduate students and invited them to accept the invitations to activate their iDs. At the end of the enrollment period, around 20% of the students claimed their iDs. The libraries found that email notifications were problematic in alerting students of their ORCID iDs. As of 2015, the libraries planned to build a database of ORCID iDs for all faculty, graduate students, postdoctoral scholars and research staff at TAMU (Thomas et al., 2015).

The libraries at Carnegie Mellon University (CMU) coordinated an ORCID campaign starting in 2014. An interdepartmental committee with representation from the libraries, information technology, and research administration recommended using ORCID to assist in handling researcher compliance as well as other workflows. The library coordinated the ORCID @ CMU project, a two-phase project over two years. The first phase included development of an ORCID @ CMU web app, and the second phase marketed ORCID across the university by college. The purpose of the app was to generate new iDs for people wishing to create them and to capture established iDs of current CMU members and associate them with the university. Using targeted emails, articles in local publications, flyers sent to faculty and graduate students, and other marketing techniques, the rollout encouraged people to register for an ORCID iD using the app or on the ORCID @ CMU website. The percentage of people claiming and populating ORCID records varied by college but was lower than the desired project goal of 40%. The libraries state their best success was the development of the ORCID @ CMU app, available as open source software (Troll Covey, 2016).

Use of ORCID in Higher Education in Pennsylvania

ORCID's website includes an up-to-date list of over 600 funders, professional organizations, research and educational institutions, government, and repository members of ORCID from across the world. The site allows sorting by country and type of member (e.g. professional organization) (ORCID, n.d.i.). The number of ORCID members both nationally and internationally continues to rise. At the time of manuscript submission, the following educational institutions in Pennsylvania were listed as members according to the ORCID website: Carnegie Mellon University, Pennsylvania State University (Penn State), Temple University, University of Pennsylvania, and University of Pittsburgh. Some organizations join as independent members while others, such as Penn State, join as part of a consortium, in this case, the Big Ten Academic Alliance.

ORCID at Penn State University

The Harrell Health Sciences Library: Research and Learning Commons in the College of Medicine at Penn State began its ORCID campaign in 2014. The goal of this program is to explain what the ORCID initiative is while encouraging researchers to register for an ORCID iD, as they are likely to be required to do so when publishing in the future. A strong liaison program among the librarians within the College of Medicine provides the structure for a marketing campaign of ORCID. Information on ORCID was disseminated at departmental faculty meetings, postdoctoral events, graduate student programs, and research coordinator groups. Included in marketing materials

was a postcard designed by a library staff member containing basic information on ORCID to share at various events (Harrell Health Sciences Library, n.d.).

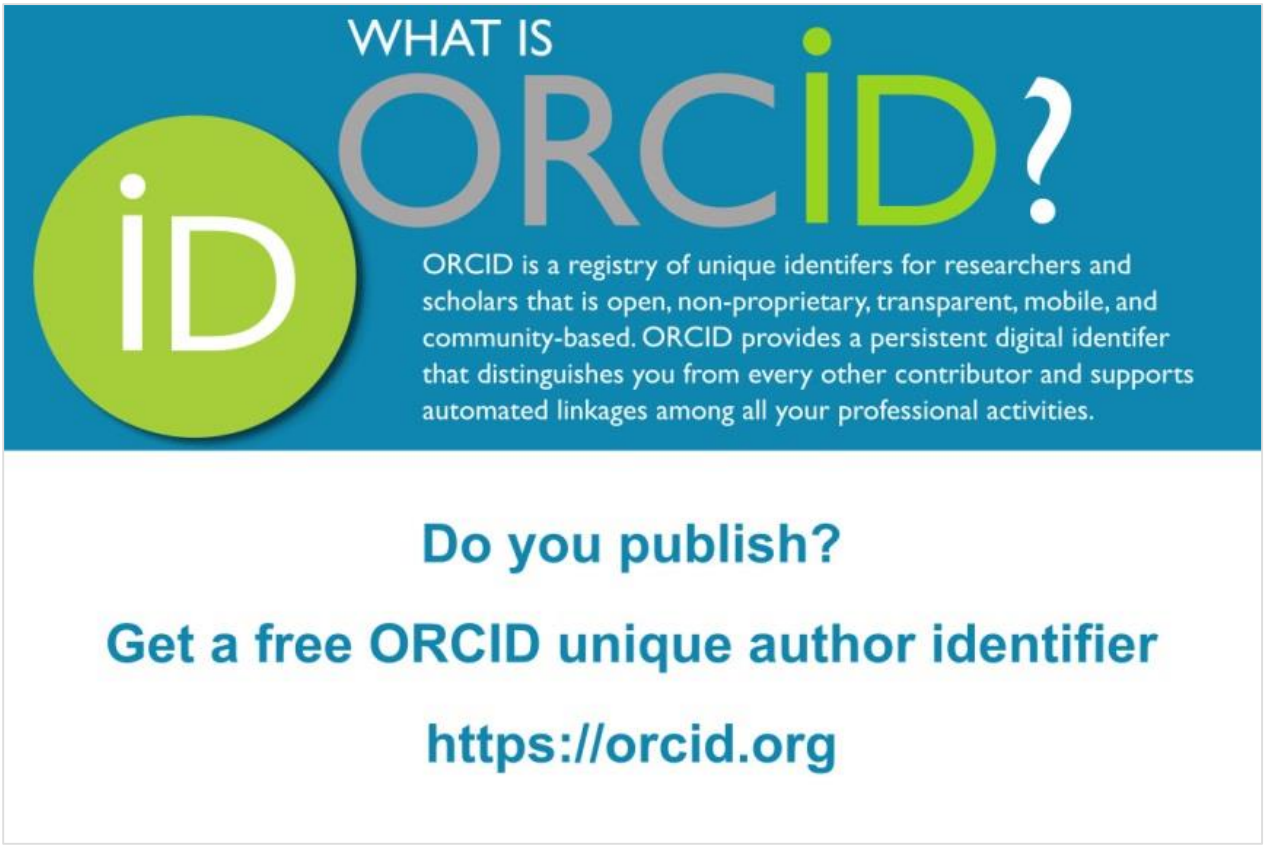

Figure 1
Front of ORCID marketing postcard

Figure 2
Back of ORCID marketing postcard

Additionally, promotional information was circulated using digital signage as well as on the library website. The Harrell Health Sciences Library continues to encourage new researchers to register for an ORCID iD and promotes the system as needed.

ORCID initiatives at Penn State outside of the College of Medicine are underway. With the university's membership subscription, institutional credentials are linked with individual ORCID records. Institutional subscription allows Penn State affiliates to connect their ORCID profile with existing systems across the university. These integrations are in various planning or implementation stages. Current or future associations may include adding the ORCID iD to directory records or integrating into the faculty activity management and reporting system. Connecting to research output in Penn State's institutional repository, ScholarSphere, is also in the planning stages (D.M. Coughlin, personal communication, March 30, 2017).

Some academic institutions have elected to issue ORCID iDs to their various research communities and invite them to accept their iDs rather than having individuals register themselves ("Universities Now Creating ORCID iDs for their Researchers and Scholars," 2013; Thomas et al., 2015). Penn State's current approach is voluntary registration. Due to the increase in publisher and funder mandates for obtaining an ORCID iD as noted earlier, many researchers likely have an existing profile.

Penn State University Libraries is collaborating with the Office of the Vice President for Research (OVPR) and Penn State Information Technology (IT) in a few initiatives. Penn State IT has assisted in linking Penn State access accounts to ORCID.

University Libraries is taking the lead in a marketing campaign encouraging researchers to register for ORCID iDs and associate them with Penn State. The first step in this process was the creation of an ORCID LibGuide (guides.libraries.psu/orcid) that explains the ORCID platform, how to register for a profile, and how to link that profile to Penn State (Olendorf, 2017). If researchers have an ORCID iD, they can associate it with Penn State through this website. Another beneficial collaboration between University Libraries and OVPR is with Penn State's research networking system. OVPR purchased a subscription to Pure (Elsevier) and cross-campus collaborations aid in integrating data in ORCID and Pure (D.M. Coughlin, personal communication, March 30, 2017).

Conclusion

The rapid growth in popularity in ORCID among individuals, publishers, and funders suggests ORCID is meeting a need as an author identifying system. With ongoing increases in participation from worldwide groups, the available data will continue to grow and become more accurate. Librarians can participate in the use of ORCID by establishing an iD for their own scholarly output and making it part of their professional profiles. Additionally, understanding what ORCID is and what can be done with it will be helpful when discussing scholarly communications with their research community. As ORCID continues to grow, librarians need to be aware of ORCID and institutional uses of ORCID to assist in connecting researchers to their scholarly output.

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