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# ORCID growth and field-wise dynamics of adoption: A case study of the Toulouse scientific area

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## Summary

Research-focused information systems harvest and promote the scientific output of researchers. Disambiguating author identities is key when disentangling homonyms to avoid merging several persons' records. ORCID offers an identifier to link one's identity, affiliations, and bibliography. While funding agencies and scholarly publishers promote ORCID, little is known about its adoption rate. We introduce a method to quantify ORCID adoption according to researchers' discipline and occupation in a higher-education organisation. We semi-automatically matched the 6,607 staff members affiliated to the 145 labs of the Toulouse scientific area with the 7.3 million profiles at orcid.org. The observed ORCID adoption of 41.8% comes with discipline-wise disparities. Unexpectedly, only 48.3% of all profiles listed at least one work and profiles with no works might just have been created to get an identifier. Those 'empty' profiles are of little interest for the entity disambiguation task. To our knowledge, this is the first study of ORCID adoption at the scale of a multidisciplinary scientific metropole. This method is replicable and future studies can target other cases to contrast the dynamics of ORCID adoption worldwide.

## KEYWORDS:

bibliography, disambiguation, ORCID, researcher identifier, multidisciplinary

## 1 | INTRODUCTION

Scholarly publications feature the names of the contributing authors in the byline of the articles. With an increasing number of scholarly works published each year, the number of homonyms is growing too:

“Of the more than 6 million authors in a major journal citations and abstracts database, more than two-thirds of them share a last name and single initial with another author, and an ambiguous name in the same database refers on average to eight people.” (Sabine 2014)

Such ambiguity has several implications, a critical one being identity theft. The recent Surgisphere scandal a.k.a. LancetGate stressed this issue of homonymy detection (Piller 2020). A US-based tenured faculty padded his CV with two-thirds of publications not written by him but by homonyms.

<sup>0</sup>This article is an extended version of a conference paper given in French (Heusse & Cabanac 2020). It covers a longer time period, includes the data for one overlooked lab, includes an analysis of adoption by sex, and features a revised discussion.

Bibliometric studies also suffer from the ‘namesake’ problem and Harzing (2015) stressed the case of author Y. Wang publishing 9 papers a day as per Web of Science data. In reality, this identity amalgamates thousands of academics whose production is considered as one.

Research organisations worldwide use Current Research Information Systems (CRIS) to collect, analyse, and share their research output (Fabre, Egret, Schöpfel, & Azeroual 2021; Sivertsen 2019). They rely on document identifiers (e.g., DOI) and author identifiers, such as VIAF, ISNI, and later ORCID in October 2012.<sup>1</sup> ORCID stands for ‘Open Researcher and Contributor ID’ and is operated by a non-profit organisation that mints identifiers for authors of scholarly works (Haak, Fenner, Paglione, Pentz, & Ratner 2012). As of May 2021,<sup>2</sup> there were 11 million ORCIDs created, a number greater than 7.8 million researchers, a UNESCO estimate of the worldwide population of researchers (Soete, Schneegans, Eröcal, Angathevar, & Rasiah 2015, p. 33). This discrepancy may partly come from non-researchers creating ORCID profiles, such as support staff and librarians. Organisations and publishers also adopted and promoted ORCID: funding agencies and editorial managers request an ORCID to submit a proposal, a manuscript or a report during peer-review (Haak, Meadows, & Brown 2018; Hanson, Lawrence, Meadows, & Paglione 2016). ORCID has also become a key component for open archives (Brown, Demeranville, & Meadows 2016).

## 2 | ORCID PROFILE: CREATION, UPDATE, AND VISIBILITY SETTINGS


There were two ways to create an ORCID profile. On the one hand, up until 2016 an institution could create an ID for its employees, such as the University of Colorado<sup>3</sup>. As of March 2021, ORCID listed 11 million profiles and 1,230 member organisations, 80% of which were of type ‘research institute.’<sup>4</sup> There were 6 French institutional members (4 research institutes and 2 publishers) at the end of 2019. Meanwhile many French institutions joined a consortium agreement with ORCID in December 2019.<sup>5</sup> As of March 2021, ORCID listed 44 French members (40 research institutes, 2 repository/profile organisations, 1 funder, 1 inter-governmental economic organisation), 91% of which being research institutes. To the best of our knowledge, none of the French members created ORCIDs on behalf of their staff, though.


On the other hand, authors are free to sign up with their email and obtain an ID. They are asked to pick a visibility setting for their profile: public, restricted to trusted parties only, or private (Fig. 1). Several sections make an ORCID profile, as shown in Fig. 2: *Person identifiers*, *Employment*, *Education and qualifications*, *Invited positions and distinctions*, *Membership and service*, *Funding*, and *Works*. These are completed by the profile owner and trusted parties upon permission. Other sections are updated by trusted parties only with the owner’s explicit permission: *Peer review* and *Research resources*.<sup>6</sup> Profile owners can set the visibility of each item in all sections of their profiles. For instance, a publicly available profile may contain items that are available to trusted parties only, or even visible to the owner only (e.g., some confidential works).

**Visibility settings**

Your ORCID iD connects with your ORCID record that can contain links to your research activities, affiliations, awards, other versions of your name, and more. You control this content and who can see it. [More information on visibility settings.](#)

**By default, who should be able to see information added to your ORCID Record?**

 **Everyone** (87% of users choose this)

 **Trusted parties** (5% of users choose this)


 **Only me** (8% of users choose this)

FIGURE 1 Visibility settings proposed while creating a new ORCID profile at orcid.org.

<sup>1</sup>See <http://viaf.org>, <http://www.isni.org>, and <https://orcid.org>

<sup>2</sup>See the live statistics <https://orcid.org/statistics>. The latest annual dump was released in October 2020 <https://doi.org/10.23640/07243.13066970.v1>.

<sup>3</sup><https://www.colorado.edu/fis> and <https://info.orcid.org/universities-now-creating-orcid-ids-for-their-researchers-and-scholars/>

<sup>4</sup><https://orcid.org/members> and <https://orcid.org/statistics>.

<sup>5</sup><https://www.couperin.org/services-et-prospective/orcid-doa-j-sparc-europe-scoss/orcid>

<sup>6</sup>See <https://support.orcid.org/hc/articles/360006971333> and <https://support.orcid.org/hc/articles/360011433613>.

The screenshot shows the ORCID profile for Josiah Carberry. The header includes the ORCID logo and navigation links for researchers, organizations, about, and help. A search bar and a 'SIGN IN/REGISTER' button are also visible. The profile itself is divided into several sections:

- Biography:** A notice stating that the account is a demonstration account used to show the interaction of ORCID with other systems. It also mentions a fictional professor, Josiah Stinkney Carberry, created as a joke in 1929.
- Employment (2):** Lists two positions:
  - Wesleyan University: Middletown, CT, US (1930-02-29 to present) as Professor (Psychoceramics).
  - Brown University: Providence, RI, US (1929-02-29 to present) as Professor (Psychoceramics).
- Works (6 of 6):** Lists two journal articles:
  - 'A Methodology for the Emulation of Architecture' (2012), part of ISSN 0264-3561, DOI: 10.5555/12345680.
  - 'The Memory Bus Considered Harmful' (2012), part of ISSN 0264-3561, DOI: 10.5555/66665554444.

FIGURE 2 ORCID demo profile for the fake author Josiah Carberry.

ORCID operates no control over the contents of the profiles. As a result, many profiles are void of information: all sections appear to be empty, and even the owner's identity is undisclosed (we elaborate on this in Sect. 5). There is no way for readers to know if owners entered no data at all or if owners chose to mask some entries (picking a visibility different from 'Everyone'). While some authors prefer not to disclose information legitimately, Teixeira da Silva (2021) reported some abusive profile creations by papers mills to fool publishers at paper submission time.

ORCID owners can contribute data themselves or use built-in import features. For some sections, such as *Funding* and *Works*, owners provide an identifier (e.g., DOI, PubMed ID, ArXiv ID) or a search query and the system fetches all relevant metadata. Haak et al. (2019, p. 15) reported that 67% of the 49 million works in ORCID profiles were added through an API provided by Scopus, ResearcherId, PubMed Central, and CrossRef mostly. According to an OECD survey of corresponding authors of Scopus-indexed peer-reviewed journals, 68% of the 6,476 corresponding authors from a representative sample of territories and fields of science had an ORCID (Bello & Galindo-Rueda 2020, p. 74). This figure might overestimate the adoption of ORCID, as it concerns selective venues and selected scientists (corresponding authors) who are likely to have created an ORCID during the submission process.

To overcome these biases, we designed a study focusing on a large scientific area in France (Heusse & Cabanac 2020) gathering 6,471 research staff (a sample of equivalent size compared to the OECD study). We found an adoption rate of about 40% in the Toulouse area, to be compared with the 17% in Caen University, a smaller site accounting for 1,047 research staff members (Boudry & Durand-Barthez 2020). To the best of our knowledge, there is no other estimate of ORCID adoption in the general research population of a scientific metropole. The present paper extends our previous study published in French (Heusse & Cabanac 2020) to report the ORCID adoption in the Toulouse scientific area for the period 2012–2020.

### 3 | CASE STUDY: THE TOULOUSE SCIENTIFIC AREA

This article aims to assess the dynamics of ORCID adoption in one of the leading academic site in France.

About twenty years ago, European countries have harmonised the structure of training at university. The organisation of research, however, is not uniform across Europe. This article focusing on a scientific area in France, let us briefly summarise the higher-education landscape in France (Angermuller 2017; Chevaillier 2001; Grossetti, Maisonobe, Jégou, Milard, & Cabanac 2020). This context is important to bear in mind when interpreting the results presented in this paper.

France had 115,308 teaching and research staff (Meuric 2020, p. 91) in 2017 working as tenured civil servants or contract workers:

- Academics employed by universities and higher schools (*grandes écoles*) share their agenda between research and teaching (192 hours a year of face-to-face teaching). Nine-tenth are tenured staff (Meuric 2020, p. 100).
- Full-time research staff employed by national institutes (by decreasing number of researchers: CNRS, INRAE, INSERM, IRD, INRIA and a few smaller institutes with less than 200 researchers) and to a lesser extent by universities and higher schools, dedicate most of their time to research. They are not expected to teach yet some do teach a few hours a year.

Whatever their employer, all staff are affiliated to a public research laboratory (*laboratoire de recherche*) which provides office space and research facilities (Chevaillier 2001, p. 57). A laboratory is not usually run by a single PI (as in some countries like in the US) but gather many teams (*équipes*) and host from 30 to 500+ members.

The Toulouse scientific area is third after Paris and Lyon in terms of scientific output (Grossetti et al. 2020). More than 100,000 students a year are trained in all disciplines, 45% of which are taught in a masters or doctoral programme. More than 9,000 researchers whose disciplinary breakdown is detailed in Sect. 4.1 work in 145 public research laboratories. The Toulouse scientific area is known best for its contributions in health, astronomy, universe science, and economics.

### 4 | METHOD AND DATA

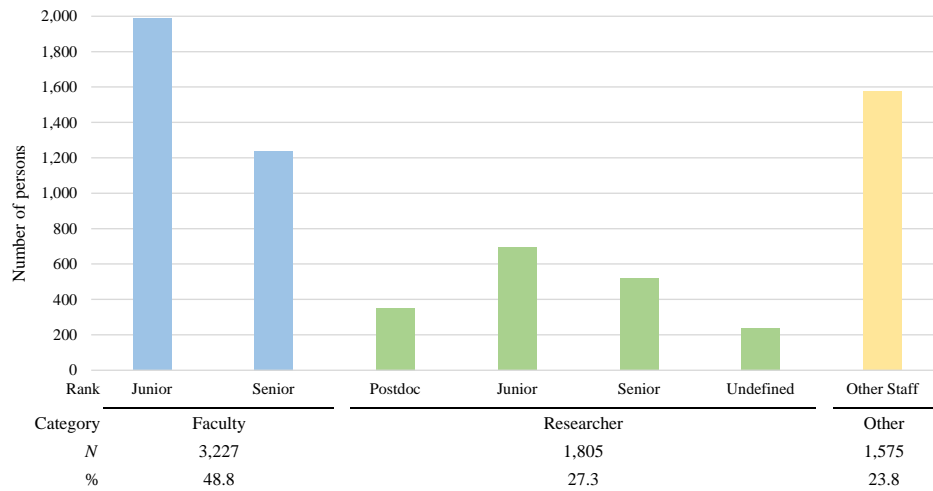
This section introduces the data collection protocol we used. We detail how the demographic data retrieved from the institutions were matched to ORCID profiles and manually validated. The resulting dataset supports the longitudinal analysis of ORCID adoption at the scale of a French scientific conurbation. To the best of our knowledge, this is the first study of ORCID adoption at this geographic scale.

#### 4.1 | Demographics and bibliographic data collection

Demographic data of the 6,607 persons affiliated to the research centres in the Toulouse scientific area were collected in a previous study (Heusse 2016). This staff registry tabulates 5,029 faculty and researchers as well as 1,578 support staff involved in research activities: engineers, technicians, clinical research fellows. The 4,284 PhD students enrolled in universities and schools (*écoles*) were not included. Each individual included in the registry is characterised by his/her identify (first name, last name), year of birth, sex, institution, job category, rank, laboratory, and scientific domain. The staff registry lists individuals (Fig. 3) with the following job categories:

- Faculty (*enseignants-chercheurs*) teach and conduct research activities as junior faculty (*maître de conférences*) or senior faculty (*professeur des universités*).
- Researchers are involved in research and can teach without it being mandatory. Four ranks were considered: postdocs (*post-doctorant*), junior (*chargé de recherche*), senior (*directeur de recherche*), and undefined (e.g., visitors).
- Other Staff refers to support personnel, such as engineers (*ingénieur d'étude* and *ingénieur de recherche*), high-school teachers affiliated to university (*enseignant du second degré*), hospital practitioners (*praticien hospitalier*).

Demographic data were collated by each research structure (145 laboratories). We merged these data into the staff registry of the Toulouse scientific area and tagged each person with the discipline of the lab he/she belongs to. Each lab is associated to one of the six following discipline groups delineated by the research council of the Toulouse scientific area to reflect its major scientific highlights:



**FIGURE 3** Share of the 6,607 persons by job category and rank.

- AAE: Astronomy, Astrophysics, Environment
- AHS: Arts, Humanities, Social Sciences
- CP: Chemistry, Physics
- EMC: Engineering, Mathematics, Computing
- HBA: Health, Biology, Agronomy
- LEM: Law, Economics, Management

Figure 4 shows how the 6,607 distribute among job categories and ranks. The AHS and LEM disciplines have a larger number of faculty compared to researchers and other staff. The situation is reversed in AAE and HBA where most of the personnel is no faculty but researchers and other staff. The large number of other staff in HBA corresponds to clinical research personnel who are active in teaching hospitals (*centre hospitalier universitaire*). The sex ratio is imbalanced across disciplines (Fig. 5), with more males in all disciplines but *Art, Humanities, Social Sciences* and *Health, Biology, Agronomy*.

We aimed to retrieve the ORCID profile of the 6,607 individuals by querying the ORCID public API<sup>7</sup> with their firstname and lastname. Results were overabundant for some identities such as “Philippe Durand” that yielded 4,534 profiles. The top-ranked profiles were perfect homonyms and the remaining were partial matches such as “Philippe S. Durand” and “Romain Durand.”<sup>8</sup> We considered the top 20 results per query only. Each retrieved profile was downloaded as an XML file<sup>9</sup> recording the profile creation date, the date of last update, and the person’s identity, biography, affiliations, and works. Part of these data appear on the online version of ORCID profiles (Fig. 2).

We tagged the profiles mentioning the named entities relevant to the Toulouse scientific area: 12 cities (the largest ones being Auch, Castres, Foix, Rodez, Tarbes, and Toulouse), university names (*Champollion, Capitole, Mirail* and its new name *Jean Jaurès*, and *Paul Sabatier*) and 13 school acronyms (e.g., ENSEEIHT, SUPAERO, TBS). This tag with the count of matching entities proved helpful to the visual inspection performed, that we detail in the next section.

## 4.2 | Matching the staff registry to ORCID profiles: semi-automated approach

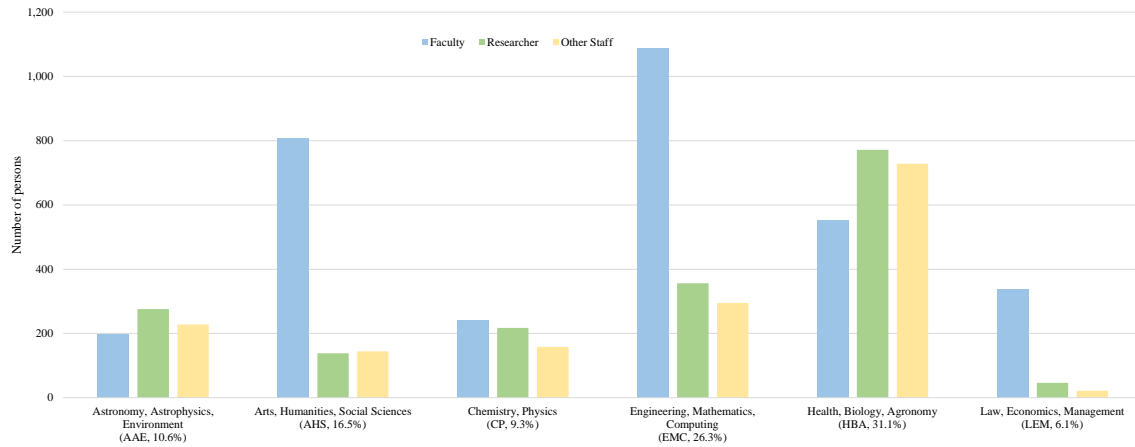
With the ORCID data collected, we faced three cases for a given person’s identity used as query:

1. No matching ORCID profile.

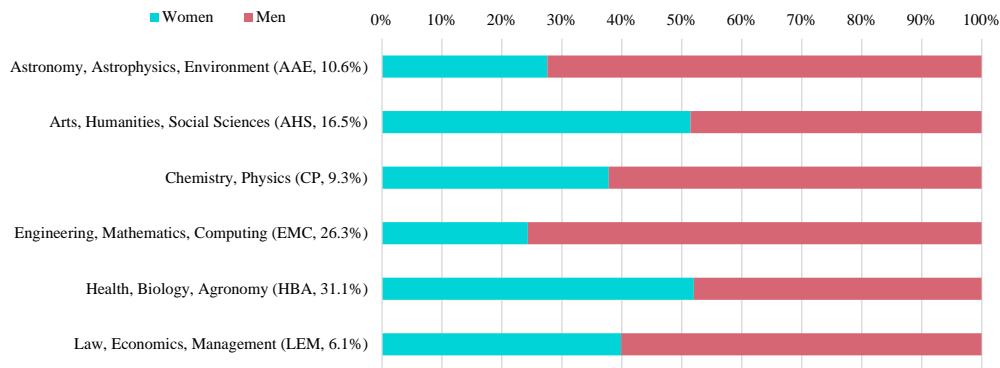
<sup>7</sup><https://orcid.org/organizations/integrators/API>

<sup>8</sup>We noticed that some identities (as listed by the laboratories) differed from the identities authors use in their publications. Consider the case birth name vs. maiden name, for instance. As a result, we did not use phrasal search (e.g., “Philippe Durand” with quotes) to query ORCID profiles.

<sup>9</sup><https://members.orcid.org/api/tutorial/reading-xml>



**FIGURE 4** Share of the 6,607 persons by discipline and position.



**FIGURE 5** Share of the 6,607 persons by discipline and sex.

2. One matching ORCID profile.
3. Between two and 20 matching ORCID profiles.

The first author (MDH) performed a visual inspection of all matches. Candidate profiles were validated based on the biography and affiliations (listed in the profiles and on the publications appearing as works). The major pitfall concerned ‘empty’ profiles registered for a given identity but showing no works. Such profiles were validated with a quasi certainty for discriminant identities (rare associations of first and last names), using Google Scholar to check the absence of homonyms.

Each pair of matching identity–profile pair was annotated with one of these codes:

- code ‘0’ when the looked-up identity and the ORCID profile did not match (e.g., different first names).
- code ‘1’ when the looked-up identity and the ORCID profile matched and the profile contents featured evidence of the Toulouse scientific area.
- For empty ORCID profiles:
  - code ‘?’ when no homonyms were detected via Google Scholar searches for the looked-up identity, suggesting that there is only one known author with this identity.
  - code ‘??’ when homonyms were detected via Google Scholar searches.

We considered as ORCID adopters the 2,789 identities with code ‘1’ or ‘?’ This is a conservative estimate of the number of ORCID adopters in the Toulouse scientific area since some identities coded ‘??’ were discarded because of lacking evidence.

## 5 | QUANTITATIVE RESULTS

As of September 2020, 41.8% of the considered population had an ORCID profile. Setting aside the ‘Other staff’ job category, the ORCID adoption amounts to 46.9%. These two figures reflect some disparities when broken down by job category or discipline, as discussed in this section.

### 5.1 | ORCID adoption by job category

Researchers were the most likely (54.7%) to register an ORCID profile, with a varying adoption per rank (Fig. 6). Junior and senior tenured researchers registered more ORCID profiles (64.0% on average) than postdocs (36.4%). This imbalance is all the more surprising as postdocs usually have an intense research activity and they are expected to care for the visibility of their research (Nicholas et al. 2019).

Faculty members were less likely to register an ORCID (42.5%) and there is little difference with respect to seniority. This lesser adoption can result from two factors. On the one hand, faculty members are overrepresented in disciplines with a lesser use of ORCIDs: *Art, Humanities, Social Sciences* and *Law, Economics, Management*. On the second hand, part of the faculty members are more active in teaching and management roles than in research *per se*.

The Other Staff category has the lowest ORCID adoption rate (25.5%). They are engineers, technicians, and assistants part of a research lab. Their work is acknowledged in the papers and they are sometimes co-authors of their lab’s publications.

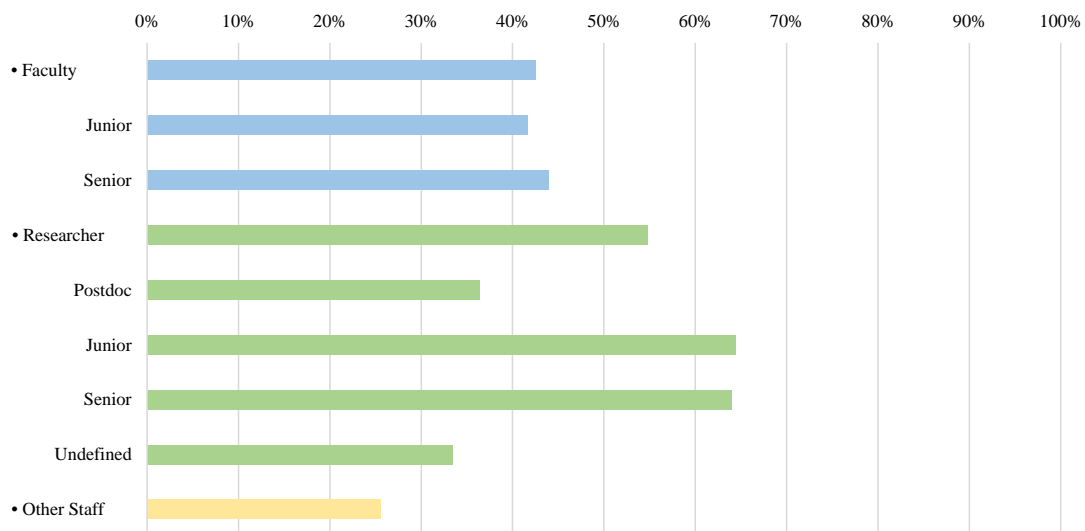


FIGURE 6 ORCID adoption by job category and rank.

### 5.2 | ORCID adoption by discipline and sex

The average ORCID adoption per discipline is 39.2%, ranging from 21.7% for *Law, Economics, Management* to 49.8% for *Physics, Chemistry* (Fig. 7). This result is in line with the publication habits of these disciplines and the use of identifiers that is well established in the hard sciences. The sex imbalance of adopters reflects the one we observed in the population (Fig. 5) except for *Health, Biology, Agronomy* where women adopters are 5% less than men in this discipline.

Figure 8 shows the adoption of each discipline per job category. Researchers are top adopters for all disciplines but *Health, Biology, Agronomy*. The promotion of ORCID by research institutes<sup>10</sup> might be a favouring factor here. In *Law, Economics, Management* researchers and faculty members adopted ORCID at a lower rate than average. Other Staff have a high adoption rate in AAE, HBA, and PC; these are disciplines whose labs were more likely to list support personnel as co-authors (see Sect. 6.2).

<sup>10</sup>See for instance <https://doranum.fr/wp-content/uploads/DoRANum-fiche-ORCID-maj-2020-10-08.pdf>.



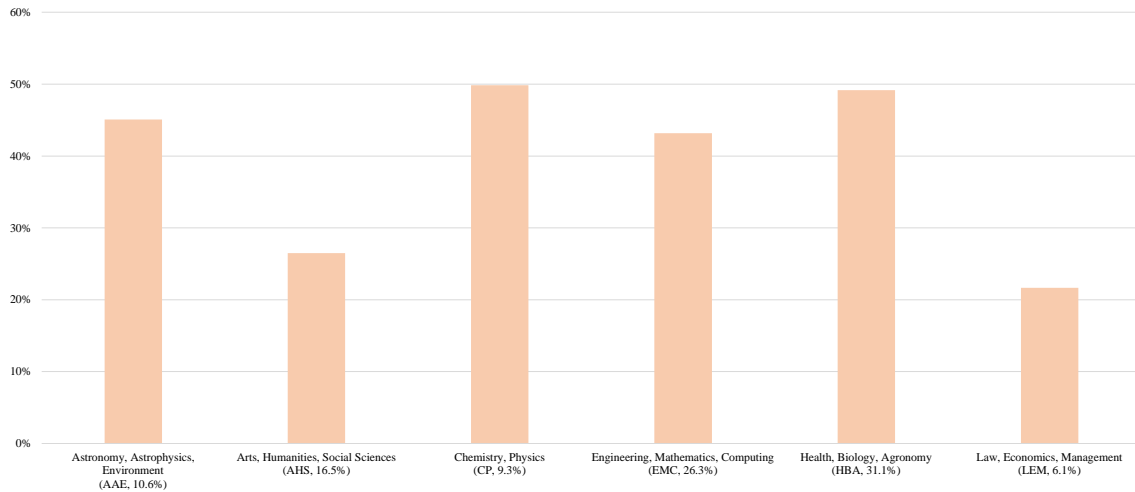


FIGURE 7 ORCID adoption by discipline.

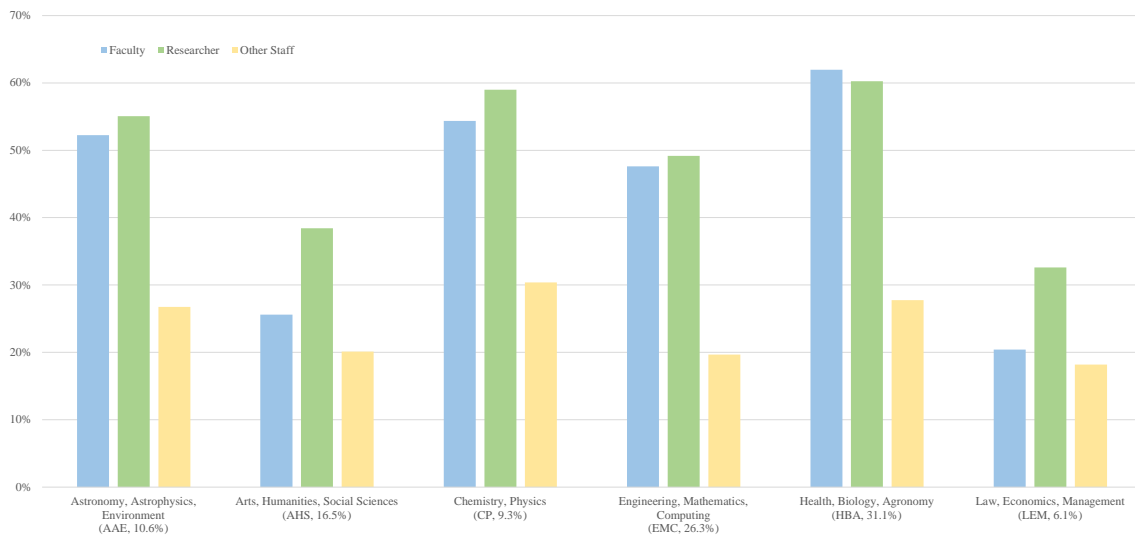


FIGURE 8 ORCID adoption by job category and discipline.

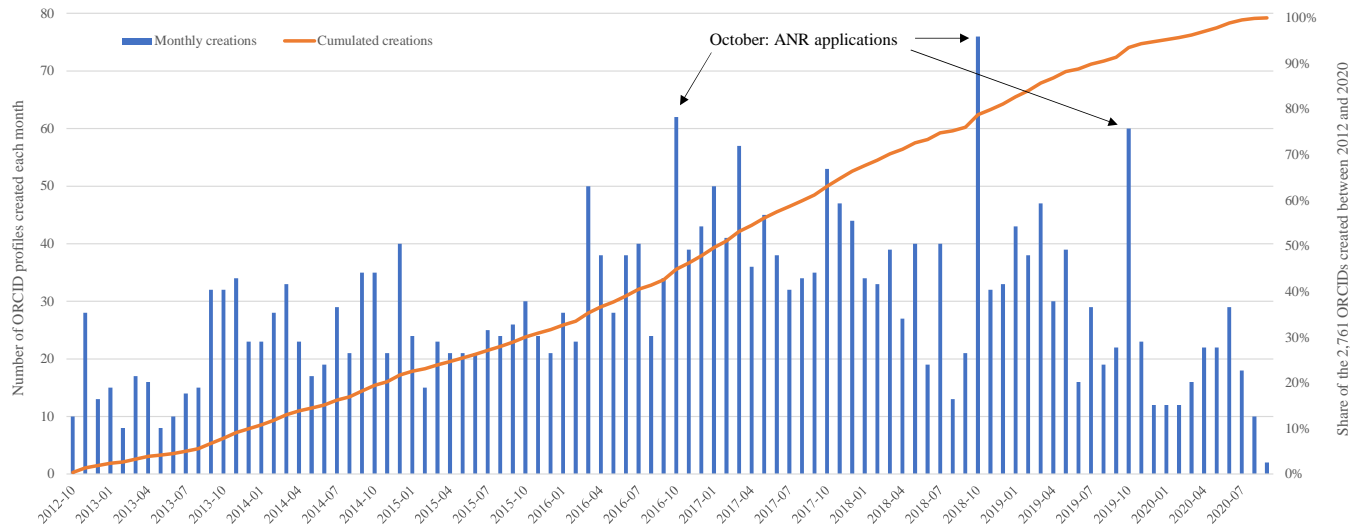
### 5.3 | ORCID adoption through time

ORCID was launched on October 16, 2012. Each profile retrieved via the ORCID API includes its creation date. We used this information to plot the dynamics of ORCID adoption. The first ORCID profile created by a researcher in the Toulouse area dates back from October 20, 2012. They were 51 early adopters in 2012 from the Toulouse area: 10 in October, 28 in November and 13 in December.

The number of newly created ORCID profiles between October 2012 and September 2020 is shown in Fig. 9. Creations follow a steady rate with peaks in October, which coincides with grant applications to the French National Research Agency (*Agence Nationale de la Recherche*). This agency requires consortium members to be identified with an ORCID: usually the PI and at least one partner per institution involved.<sup>11</sup>

We split the cumulated red line of Fig. 9 to plot the cumulated number of profile creation for each discipline (Fig. 10). Disciplines gather into two groups characterised by different growth types. Throughout the 2012–2020 period, AAE–EMC–HBA–PC showed a greater adoption rate compared to AHS–LEM. For the first group, HBA adopted ORCID early, then AAE

<sup>11</sup>See page 20 in <https://anr.fr/fileadmin/aap/2019/aapg-anr-2019-Guide.pdf>



**FIGURE 9** ORCID profile creation through time.

became a forefront adopter. Despite a slow start, PC is nowadays the leading adopting discipline. For the second group with lower adoption, LEM was quicker to create ORCID profiles compared to AHS until 2018 when AHS showed the largest adoption rate among all six disciplines. The rationale behind the changing adoption speed is unknown. We can only speculate on the different publishing houses active in EMC–AAE–HBA–PC (i.e., STEM – Science, Technology, Engineering, and Mathematics) versus AHS–LEM (i.e., SSH – Social Sciences and Humanities) and their use of ORCID :

- STEM publishers are generally large-sized firms (e.g., Elsevier, Springer, Wiley). Most of them are members of the ORCID consortium and they integrated ORCID into their peer-review and production system. Authors and reviewers are encouraged to create and link their ORCID to their profile on the submission/review platform (Johnson, Watkinson, & Mabe 2018, p. 162).
- SSH publishers are more diverse and smaller publishing houses (e.g., local University Presses). Many are small-sized companies publishing works on a specific topic, such as Dalloz in Law, Vrain in Philosophy, Presses Universitaires de Rennes in the social sciences and humanities. Most of these publishers are not members of the ORCID consortium and their authors are not asked to provide an ORCID at submission stage.

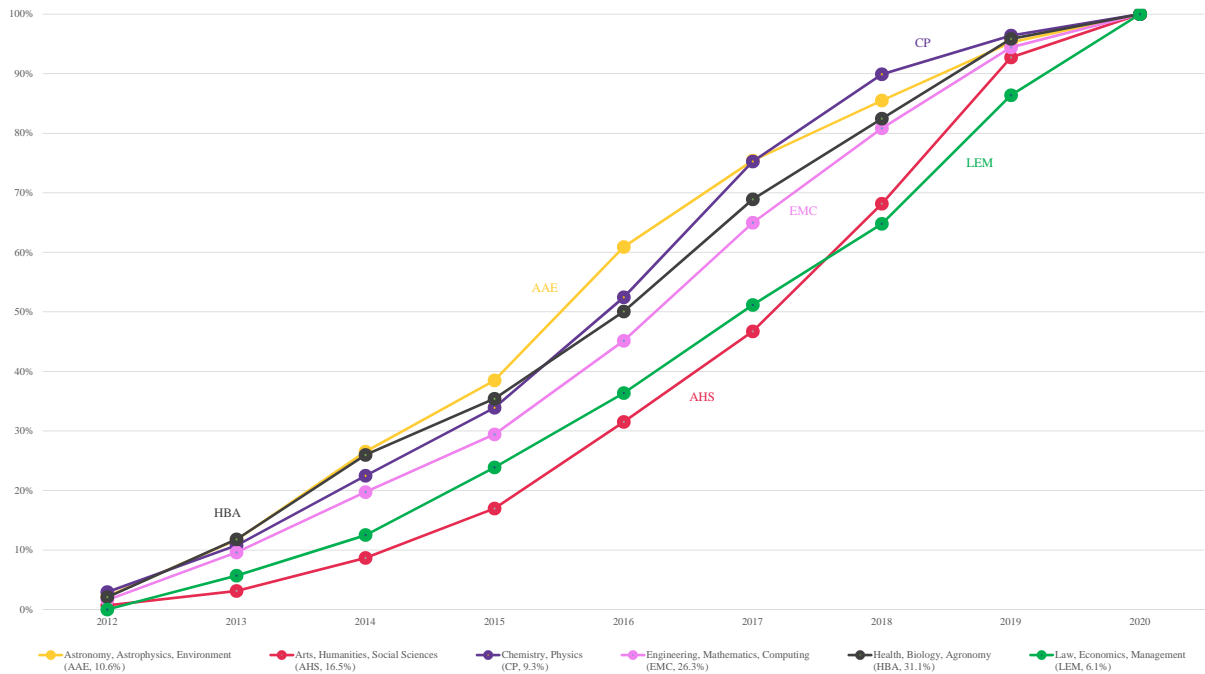
## 6 | QUALITATIVE RESULTS

### 6.1 | Diversity of ORCID profile (mis)uses

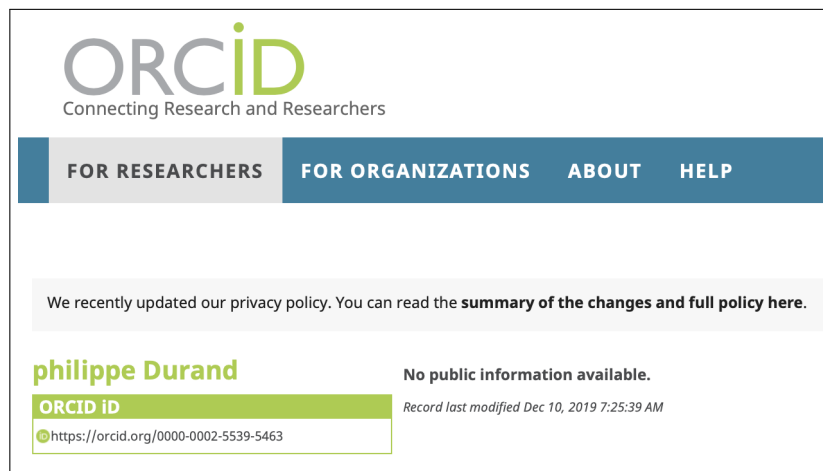
Let us recall that researchers from the Toulouse area register an ORCID themselves (no institutional automated registration is performed) and fill the associated sections, such as identity, employment biography, and works (Sect. 2). The ideal ORCID profile as illustrated in Fig. 2 lists comprehensive data about the author and his/her publications. Looking at the ORCID profile in our corpus, we found that many are far from such thoroughly completed profile with up-to-date data. Most profiles appear to be incomplete and even empty: Fig. 11 only shows ‘philippe Durand’ as the author’s identity (there were 5 such empty profiles for this name at the time of data extraction). This homonym issue is even worse with surnames such as Wang (Youtie, Carley, Porter, & Shapira 2017).

For our corpus, Fig. 12 shows the percentage of ORCID profiles with at least one publication listed. All disciplines considered, only 48.3% of the profiles feature one or more works. This is larger than the 26.8% expected from the ORCID statistics page.<sup>12</sup> Using a per discipline breakdown, *Health, Biology, Agronomy* has the largest rate of completed profiles (57.5%). *Arts, Humanities, Social Sciences* is the least adopting discipline with only 26.2% of completed profiles (but certainly not completed

<sup>12</sup><https://orcid.org/statistics>



**FIGURE 10** Cumulated share of ORCID profiles by discipline.

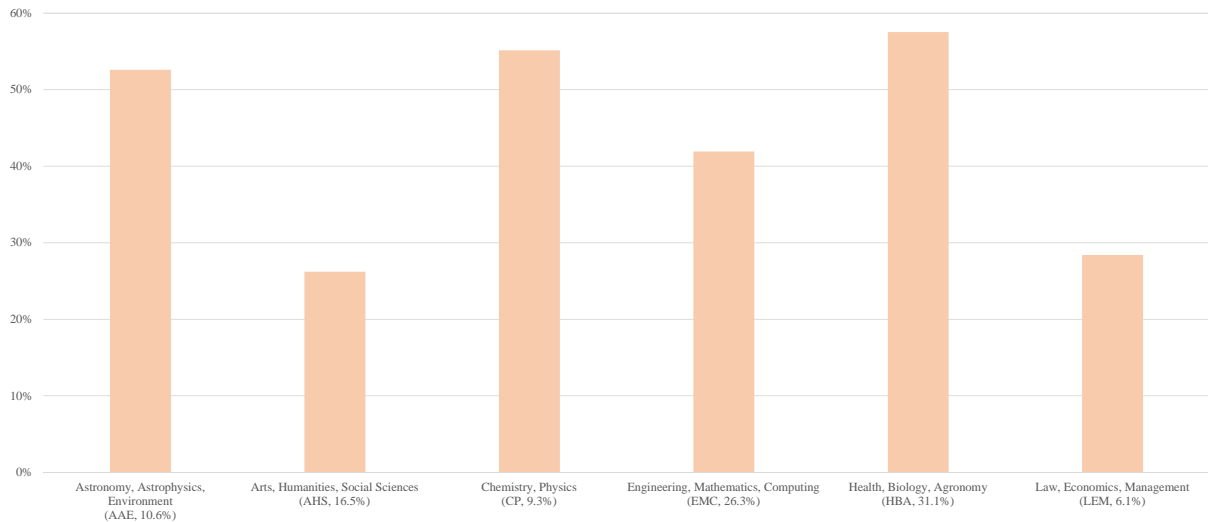


**FIGURE 11** Example of an 'empty' ORCID profile.

comprehensively). There is no direct way to check how comprehensive an ORCID profile is. One should consider the works listed with care and do not infer any selection process from the owner of the profile: the listed works might just have been pushed by a few publishers. Another point relates to the default visibility setting for new data added. When profile owners decide 'private by default' (Fig. 1) and never connect to ORCID and change the visibility to public, the works are attached to the profiles but invisible to the public.

Based on the visual inspection of 100+ profiles, we noted the following intriguing characteristics regarding two aspects:

- The Biography and Employment sections are supposed to list the successive affiliations of the profile owner. Yet, some users list foreign universities that never employed them. It appeared that these universities are affiliations of colleagues with whom the profile owner collaborated. There is also a propensity to list prestigious institutions. For researchers employed in French national research organisms (e.g., CNRS and INSERM) and affiliated to a lab in the Toulouse area,



**FIGURE 12** Share of ORCID profiles with at least one publication.

we noted that some of them mention the Paris headquarters (e.g., CNRS Paris) instead of the regional lab (e.g., CNRS IRIT Toulouse). And yet, they use their ‘local’ affiliation in the published papers.

- The Works section do not seem comprehensive for most ORCID profiles that contain only a fraction of the publications of the profile owner. We noticed several profiles of highly productive researchers missing hundreds of bibliographic records when compared to the Web of Science. We also raised quality concerns: some bibliographic records did not show any publication date, some titles and authors were misspelled. These errors suggest that profile owners entered the bibliographic data manually themselves. They might have ignored that they could have automatically retrieved metadata by providing the DOIs or other identifiers they wanted to add to their profiles.

A researcher can create multiple ORCID profiles linked to a several of his/her email addresses. One can only speculate that it was easier and faster to create a new ORCID instead of searching in one’s archives for the ID and associated password created a long time ago. We found 18 individuals from our corpus who created multiple ORCID profiles: 8 cases of a completed vs empty profile, 7 cases of two empty profiles, and 3 cases of completed vs completed profile (with a varying degree of completion). The profile created last was not always the one completed by the researchers. We do not suspect any fraud related to fake profile creation as reported in (Teixeira da Silva 2021).

One may wonder: why don’t people create ORCID profiles and, when they own one, why don’t they fill it properly? ORCID is not the only platform allowing the creation of a profile for an author to list his/her publications (Boudry & Durand-Barthez 2020; French & Fagan 2019; Tran & Lyon 2017). Some authors might own such a profile and view ORCID as a platform providing identifiers only, disregarding its bibliography curation capability. These authors might invest more efforts into Google Scholar and the likes at the expense of their ORCID profiles. We tested this hypothesis by tabulating (Tab. 1) the use of ORCID and Google Scholar for 15 individuals from the staff registry who were listed as ‘Highly Cited Researchers’ by Clarivate Analytics.<sup>13</sup> No clear conclusions emerge: a majority of the most productive researchers in the Toulouse area failed to complete their ORCID profiles although 80% of them created an ORCID. Surprisingly, one of these Highly Cited Researchers in health sciences has no online presence at all, neither on ORCID nor on Google Scholar.

## 6.2 | Focus on the ORCID profiles by ‘other staff’

Slightly more than 25% of the ‘other staff’ have created an ORCID profile (Sect. 5.1). Including these staff as co-authors or not varies according to the disciplines. Other staff were included as co-authors in 7 out of the 30 labs in *Health, Biology, Agronomy*.

<sup>13</sup><https://recognition.webofsciencegroup.com/awards/highly-cited/2019/>

**TABLE 1** Online presence of 15 *Highly Cited Researchers* (HCR) as per Clarivate Analytics with their ORCID and Google Scholar profiles, if any. ORCID owners (with a Profile) might have a Biography, an Affiliation, and Publications listed or not.

ID	Discipline	ORCID			Google Scholar
		Profile	Biography	Affiliation	
1	Agronomy	×		×	×
2	Biology	×		×	
3	Ecology				×
4	Ecology	×		×	×
5	Economics				×
6	Engineering	×		×	×
7	Health	×			×
8	Health	×			×
9	Health	×	×		×
10	Health				
11	Health	×			
12	Health	×			
13	Health	×		×	×
14	Health	×			×
15	Astronomy	×			×

It also happened in *Astronomy, Astrophysics, Environment* and *Physics, Chemistry*. Some extra cases occurred in *Engineering, Mathematics, Computing*. This virtually did not happen in *Law, Economics, Management* and *Art, Humanities, Social Sciences*. Being listed as co-authors is an incentive for the creation of ORCID profiles among the ‘other staff’ job category.

## 7 | CONCLUSION

Introduced in 2012, ORCID has become a key global infrastructure to disambiguate scholarly authors’ identities. This study reported on the adoption of ORCID in one of the largest scientific areas in France. Contrary to Youtie et al. (2017) who focused on Wang as a single surname of interest, we considered the entire multidisciplinary research workforce of a French scientific metropole. Matching the 6,607 staff members affiliated to the 145 labs based in the Toulouse area in 2016 with the ORCID registry, we showed a steadily increase for all research disciplines. The overall adoption is 41.8% with varying percentages among job ranks and disciplines. Faculty members in *Health, Biology, Agronomy* are leading adopters (62.0%) as opposed to those in *Law, Economics, Management* with 20.4% ORCID profiles. Such differences might result from various contexts: discipline-related incentives enacted by research institutions, funding agencies, and the publishing industry. For the 60% ORCID profiles with contents provided, a qualitative analysis reveals they were not comprehensively filled. Profile sections documenting the biography, employment history, other identifiers, awards and grants received are frequently lacking. The same goes for publications with incomplete lists of works. We acknowledge that the people hired between 2017 and 2021 are not considered in this study. Likewise the people who left Toulouse since 2016 are included in this study performed in 2020. All in all, our results suggest that a majority of researchers in the Toulouse area have little use of ORCIDs or understanding (or interest?) for identifiers.

There are only a few comparable studies of ORCID adoption worldwide. Dasler, Deane-Pratt, Lavasa, Rueda, and Dallmeier-Tiessen (2017) analysed the ORCID profiles created over 2012–2016, stressing breakdowns by discipline and location. This

study at the global scale lacks a reference population, contrary to two studies on French scientific areas published later. The adoption in Toulouse of 41.8% (the present study) is higher than the 17.1% reported by Boudry and Durand-Barthez (2020) for the Caen University which is smaller in research workforce. We have no clue about this threefold observed difference and more research is needed to decipher this imbalance. The limited adoption of ORCID—and related misuses—calls for a better education to the issue of identity management for academics and the use of ORCID to tackle the issue of homonyms among authors worldwide, as stressed by the Surgisphere affair (Piller 2020).

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