Coverage of Author Identifiers in Web of Science and Scopus

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Abstract

As digital collections of scientific literature are widespread and used frequently in knowledge-intense working environments, it has become a challenge to identify author names correctly. The treatment of homonyms is crucial for the reliable resolution of author names. Apart from varying handling of first, middle and last names, vendors as well as the digital library community created tools to address the problem of author name disambiguation. This technical report focuses on two widespread collections of scientific literature, Web of Science (WoS) and Scopus, and the coverage with author identification information such as Researcher ID, ORCID and Scopus Author Identifier in the period 1996 - 2014. The goal of this study is to describe the significant differences of the two collections with respect to overall distribution of author identifiers and its use across different subject domains. We found that the STM disciplines show the best coverage of author identifiers in our dataset of 6,032,000 publications which are both covered by WoS and Scopus. In our dataset we found 184,823 distinct ResearcherIDs and 70,043 distinct ORCIDs. In the appendix of this report we list a complete overview of all WoS subject areas and the amount of author identifiers in these subject areas.

Keywords: Disambiguation; author name homonyms; author identification; citation databases; WoS subject areas; Researcher ID; ORCID; Scopus Author Identifier

1. Introduction

The role of unique identifiers in the scientific publishing infrastructure is becoming more and more important [11]. Especially author identifiers [21] play a crucial role in bibliometric research and other searching and harvesting activities.

Author name disambiguation has an important effect on bibliometric analysis [14] [8], scholarly networks [10] and all other scientometric approaches using large-scale bibliographic data [13]. Therefore an author identification system with a
high accuracy is vital for the further processing on bibliometric data. Harzing [7] explains how frequency of homonym names in Thomson Reuter’s Essential Science Indicators can be problematic. Also, Torvik and Smallheiser [18] mentioned that accuracy of author disambiguation depends on name frequency and common names tend to be harder to disambiguate. Kawashima and Tomizawa [9] evaluated the accuracy of Scopus author identifier based on the largest funding database in Japan. They got a high precision and recall, but they noted the dependency of author ID accuracy on country or language.

Several approaches exist to address the systemic name ambiguity problems in research publications: automated or analytical procedures that apply algorithms to publication metadata to identify and group publications of the same author as well as manual approaches that require author interaction to claim or verify authorship [1]. Three recent surveys about author name disambiguation have been presented in the literature [5, 2, 15]. In these surveys the basic problems of author name disambiguation are outlined and the most popular methods are overviewed.

Researchers can register their ResearcherID by self-registration either as subscribers of Web of Science or at the ResearcherID website 2. The link between documents in Web of Science and ResearcherIDs is established by means of a publication list: Authors themselves add publications to their profile and thus connect their ResearcherID with the publication metadata in Web of Science.

In Scopus, Scopus Author Identifiers are assigned automatically. The algorithm groups author names under a common Scopus Author Identifier based on an algorithm that matches affiliation, address, subject area, source title, dates of publication citations, and co-authors information [3]. However, the exact matching procedure of Scopus is not known. ResearcherID and Scopus Author Identifier are integrated into their respective digital libraries, Web of Science resp. Scopus.

Independent from these two systems, ORCID 3 is an open system designed for author identification [6]. The system started in 2012 and is operated by a non-for-profit organization whose members are commercial as well as educational institutions. Similar to ResearcherID, authors register themselves and receive an identifier which then should be used whenever work is submitted for publication. A couple of journals (e.g. published with Springer or PLOS) use the ORCID identifier already in the submission process of a manuscript and publish the ORCID
In this technical report we describe the existence of three prominent author identifiers (ResearcherID, ORCID and Scopus Author Identifier) [4] in a joint subset of the Web of Science and Scopus. We will report about the gaps in coverage in different WoS subject areas. Finally we will try to show the effect of author name homonyms on the distribution of ORCIDs (orcid), ResearcherIDs (rid) and Scopus Author identifiers (Scopus).

2. Dataset

The Competence Centre for Bibliometrics in Germany has access to the raw data exports of Scopus and Web of Science from January 1996 to April 2014. Based on the raw exports, Leibniz Institute for Information Infrastructure (FIZ Karlsruhe) has created an infrastructure for bibliometric analyses that contains standardized representations of both collections. This infrastructure provides a duplicate database that maps pairs of identical publications. FIZ Karlsruhe automatically identified duplicates by pairwise comparisons of WoS and Scopus metadata. Each pair was checked multiple times, applying different properties to be compared (see Table 1). We decided to use a rather strict criterion to define the common subset for our analysis in order to achieve two standardized, nearly identical samples of publications in both collections. We set a minimum threshold of 317 (compare Table 1) to fetch documents from both collections. We consider pairs of metadata from WoS and Scopus describing an identical publication only if the DOI and two or more other metadata fields match in both records. Other fields are publisher item identifier, issue, publication year, volume, ISSN, first page, first author or title. Applying these criteria we got a dataset that consists of pairs of metadata describing approximately 6,032,000 publications which are both covered by WoS and Scopus.

A small difference (below 0.02%) in the number of publications indicates that the chosen criteria are appropriate to identify identical publications in the two collections.

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4http://www.bibliometrie.info/
5https://www.fiz-karlsruhe.de/en.html
6Here, duplicate denotes publications that are present in both WoS and Scopus database while [19] conducted duplicate record detection within Scopus metadata.
Table 1: Weights assigned to pairs of metadata according to matching properties

| weight | criteria                                      |
|--------|-----------------------------------------------|
| ...    | ...                                           |
| 93     | Title, 1.Page, ISSN, Volume, Issue            |
| ...    | ...                                           |
| 317    | DOI, 1.Author, 1.Page, ISSN, Volume, Issue   |
| ...    | ...                                           |
| 509    | DOI, PII, Title, 1.Author, 1.Page, ISSN, Volume, Issue |

3. Method

3.1. Comparing subject areas

We chose the WoS subject area⁷ as reference for the following comparison. As the duplicate database provides a reliable means to identify one specific document in both corpora, it is feasible to apply the subject areas of WoS to the same document in the Scopus database. We grouped all documents in our subset according to the publication year and the WoS subject areas that have been assigned to the same document.

3.2. Checking author homonyms

As another selection criteria we chose those first and last name pairs that have either an author id, an orcid or a researcher id assigned. We assumed that a large number of institutions and a very wide range of journals per identifiable author could be the result of incorrect author id assignment. For each first and last name pair with a single identifier of one of the three author id systems and a minimum number of 100 publications, we checked the distributions of institutions they have been affiliated to and the number of journals in which the related publication appeared.

⁷http://incites.isiknowledge.com/common/help/h_field_category_wos.html
4. Results

4.1. General coverage of author identifiers

Our analysis leads to 184,823 distinct ResearcherIDs (rid) and 70,043 distinct ORCIDs. In the Scopus data, we found 9,839,749 authors, out of which 9,839,711 (100 %) have a Scopus Author ID (authorid) assigned. The automatic assignment of Scopus Author Identifiers succeeded in nearly every document (see Table 3) in the subset, whereas the relative number of ResearcherIDs related to publications in recent years decreased steadily (see Table 2).

| year | authors in documents | rid | % rid | orcid | % orcid |
|------|----------------------|-----|-------|-------|---------|
| 2014 | 1,267,886            | 30,706 | 2.42 | 17,681 | 1.39    |
| 2013 | 6,207,543            | 213,368 | 3.44 | 111,535 | 1.80    |
| 2012 | 5,706,042            | 274,630 | 4.81 | 123,964 | 2.17    |
| 2011 | 5,083,237            | 294,630 | 5.79 | 119,752 | 2.36    |
| 2010 | 4,508,560            | 281,554 | 6.24 | 108,953 | 2.42    |
| 2009 | 4,052,351            | 278,685 | 6.88 | 105,504 | 2.60    |
| 2008 | 2,970,989            | 218,877 | 7.37 | 81,940  | 2.76    |
| 2007 | 250,397              | 18,946  | 7.57 | 7,305   | 2.92    |
| 2006 | 13,791               | 773     | 5.61 | 309     | 2.24    |
| 2005 | 6,640                | 393     | 5.92 | 157     | 2.36    |
| 2004 | 4,728                | 332     | 7.02 | 162     | 3.43    |
| 2003 | 2,198                | 120     | 5.46 | 57      | 2.59    |
| 2002 | 1,429                | 90      | 6.30 | 45      | 3.15    |
| 2001 | 1,162                | 99      | 8.52 | 42      | 3.61    |
| 2000 | 451                  | 19      | 4.21 | 11      | 2.44    |
| 1999 | 102                  | 4       | 3.92 | 2       | 1.96    |
| 1998 | 58                   | 2       | 3.45 | 1       | 1.72    |
| 1997 | 90                   | 10      | 11.11| 4       | 4.44    |
| 1996 | 165                  | 8       | 4.85 | 3       | 1.82    |

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8The publication year 2014 includes data from January to April.
Table 3: Scopus author ids - yearly percentage

| year | authorid | total   | %   | missing values |
|------|----------|---------|-----|----------------|
| 2014 | 1,262,894| 1,262,894| 100 | 0              |
| 2013 | 6,312,343| 6,312,343| 100 | 0              |
| 2012 | 5,929,758| 5,929,758| 100 | 0              |
| 2011 | 5,275,211| 5,275,214| 100 | 3              |
| 2010 | 4,704,713| 4,704,715| 100 | 2              |
| 2009 | 4,258,223| 4,258,250| 100 | 27             |
| 2008 | 3,093,222| 3,093,228| 100 | 6              |
| 2007 | 258,001  | 258,001  | 100 | 0              |
| 2006 | 14,673   | 14,673   | 100 | 0              |
| 2005 | 6,933    | 6,933    | 100 | 0              |
| 2004 | 4,865    | 4,865    | 100 | 0              |
| 2003 | 2,943    | 2,943    | 100 | 0              |
| 2002 | 1,494    | 1,494    | 100 | 0              |
| 2001 | 1,262    | 1,262    | 100 | 0              |
| 2000 | 466      | 466      | 100 | 0              |
| 1999 | 109      | 109      | 100 | 0              |
| 1998 | 108      | 108      | 100 | 0              |
| 1997 | 91       | 91       | 100 | 0              |
| 1996 | 169      | 169      | 100 | 0              |
4.2. **Coverage in subject areas**

We summed the absolute numbers of author ids (any system) present in the subset. Within the twenty most frequent subject areas, Scopus author identifiers are particularly dominant in medical domains such as 'oncology', 'surgery' or 'immunology' (see Figure 1).

![Figure 1: Top 20 subject areas log scaled](image)
Table 4: Top 10 subject areas covered with researcher ids

| classification                        | researcher id |
|---------------------------------------|---------------|
| Materials Science, Multidisciplinary  | 65,837        |
| Chemistry, Physical                   | 64,639        |
| Physics, Applied                      | 61,655        |
| Chemistry, Multidisciplinary          | 52,875        |
| Biochemistry & Molecular Biology      | 46,393        |
| Physics, Condensed Matter             | 42,387        |
| Nanoscience & Nanotechnology          | 39,123        |
| Multidisciplinary Sciences            | 30,250        |
| Environmental Sciences                | 29,394        |
| Physics, Multidisciplinary            | 29,141        |

Table 5: Top 10 subject areas covered with orcid

| classification                        | orcid |
|---------------------------------------|-------|
| Materials Science, Multidisciplinary  | 32,940|
| Chemistry, Physical                   | 30,708|
| Physics, Applied                      | 25,854|
| Chemistry, Multidisciplinary          | 25,382|
| Biochemistry & Molecular Biology      | 24,721|
| Physics, Condensed Matter             | 21,306|
| Multidisciplinary Sciences            | 19,002|
| Nanoscience & Nanotechnology          | 18,271|
| Environmental Sciences                | 17,694|
| Physics, Multidisciplinary            | 13,166|
Table 6: Top 10 subject areas covered with Scopus author ids

| classification                  | Scopus author id |
|---------------------------------|------------------|
| Biochemistry & Molecular Biology| 1,256,720        |
| Materials Science, Multidisciplinary | 983,555        |
| Physics, Applied                | 822,106          |
| Multidisciplinary Sciences       | 820,757          |
| Chemistry, Physical             | 798,542          |
| Oncology                        | 792,495          |
| Chemistry, Multidisciplinary     | 747,621          |
| Neurosciences                    | 699,094          |
| Pharmacology & Pharmacy         | 685,833          |
| Cell Biology                     | 664,492          |

4.3. Identification of homonyms

The following tables show the total, average and maximum number for each system with author ids related to at least 100 publications in the subset.

Table 7: Publications of supposed frequent authors

|                        | orcid | rid | Scopus |
|------------------------|-------|-----|--------|
| total author ids       | 91    | 86  | 8,338  |
| average publications per author | 132.7 | 133.6 | 142.2 |
| publications maximum   | 355   | 355 | 2,338  |

We found 91 authors with an ORCID, that have 100 or more publications, with 132.7 as average and 355 as the maximum. The Scopus data contains 8,338 authors that are each related to 100 or more publications, and one Scopus Author Identifier appearing in 2,338 publications (see Table 7).

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Please note that the descriptive statistics for publication (see Table 7), for institution (Table 9) and issue distribution (see Table 8) rely on the primary keys assigned to an institution resp. issue in the FIZ Karlsruhe bibliographic database.
The number of publications and journals of these supposed frequent writers are similar for related ResearcherIDs and ORCIDs.

Table 8: Journals in which supposed frequent writers appear

| orcid | rid | Scopus |
|-------|-----|--------|
| author ids | 90 | 81 | 8,219 |
| appeared in journals average | 115.1 | 115.5 | 118.4 |
| appeared in journals maximum | 329 | 329 | 2,322 |

This does not apply to the number of institutions associated with these publications, which is less for ResearcherID.

For Scopus, all distributions have much higher maximum values, while the averages differ significantly for the institutions related to the supposed frequent writers: 8,219 Scopus Identifiers have 100 or more publications, that are related to 151.4 institutions on average (see Table 9).

Table 9: Institutions supposed frequent writers are associated with

| orcid | rid | Scopus |
|-------|-----|--------|
| author ids | 90 | 81 | 8,219 |
| affiliated with institutions average | 98.6 | 87.0 | 151.4 |
| affiliated with institutions maximum | 1,417 | 344 | 5,364 |
For each of the three author identification systems, we chose ten authors that were related to the maximum number of publications. Tables 10 and 11 show a limitation of the automated procedure applied in Scopus: While the supposed top ten list of author names for ResearcherID and ORCID do contain Western as well as Asian names, the top ten Scopus Author Identifiers contain exclusively Asian names, which have a common Western transliteration.

Table 10: Names of 10 authors with highest publication count - orcid

| first     | last               | orcid                           | publications |
|-----------|--------------------|---------------------------------|--------------|
| PAUL K.   | CHU                | 0000-0002-5581-4883             | 355          |
| ULRICH S. | SCHUBERT           | 0000-0003-4978-4670             | 270          |
| ABDULLAH M. | ASIRI              | 0000-0001-7905-3209             | 210          |
| KRZYSZTOF | MATYJASZEWSKI      | 0000-0003-1960-3402             | 193          |
| RICHARD D. | SMITH              | 0000-0002-2381-2349             | 183          |
| HIDEO     | HOSONO             | 0000-0001-9260-6728             | 179          |
| AKIHISA   | INOUE              | 0000-0002-7546-5334             | 167          |
| JINDE     | CAO                | 0000-0003-3133-7119             | 163          |
| L.        | SCODELLARO         | 0000-0002-4974-8330             | 163          |
| ANNE B.   | NEWMAN             | 0000-0002-0106-1150             | 160          |

Table 11: Names of 10 authors with highest publication count - Scopus author identifier

| first | last | author id           | publications |
|-------|------|---------------------|--------------|
| WEI   | WANG | 7501761836          | 2,338        |
| WEI   | LIU  | 36077269600         | 1,773        |
| YAN   | WANG | 8640586600          | 1,735        |
| YING  | WANG | 55757783062         | 1,448        |
| WEI   | CHEN | 9639099600          | 1,375        |
| LI    | LI   | 55218828300         | 1,285        |
| WEI   | WANG | 36072896000         | 1,218        |
| HUI   | LI   | 56002811300         | 1,198        |
| QIANG | WANG | 35178491000         | 1,146        |
| XI    | CHEN | 8043429800          | 1,105        |
5. Discussion and conclusions

In this report we compared Web of Science and Scopus with regard to different author identifier systems. Documents in WoS and Scopus were considered identical if DOI and at least two more criteria matched. This might introduce artifacts, as some disciplines might have adopted DOI assignment earlier than others and are therefore overrepresented.

ORCID and ResearcherID require human intervention while Scopus Author Identifier is assigned automatically. Comparing documents with a manually assigned identifier system, ResearcherID is assigned more often (70.5%) than ORCID (29.5%).

Asian name transliteration leads to common representations of originally distinct author names [20]. This, in turn, results in a remarkable loss of precision of many automated author matching procedures [16]. Therefore, Scopus Author Identifier is not a reliable source for author assignments. Elsevier itself promotes the use of ORCID instead and offers the possibility to import publication metadata from Scopus to ORCID[10]. Authors might sort out false positives during this step and help to improve the Scopus Author Identifier assignment.

The review of author identifiers and the assignment of classification terms points into the same direction. The manual approach ThomsonReuters chose with ResearcherID leads to less ambiguous and more reliable author information, but it requires engagement of the authors. In order to minimize the effort needed to integrate with ORCID, users can link the ResearcherID platform with their ORCID account[11] to send their publication list from ResearcherID to ORCID and vice versa. ORCID is focussed solely on providing persistent identifiers for researchers. The ORCID technology is open source and the web platform can be integrated into other services using various APIs[12]. This openness might be crucial to encourage researchers and service providers to adopt ORCID.

We showed, that at the time of writing, the majority of researchers do not use ORCID or ResearcherID. The steadily growing number of ORCID users indicates that this might change in the future, but as long as this is the case it is necessary to elaborate automated author disambiguation technologies for resilient bibliometrics and increase their accuracy [12] [17].

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[10] https://orcid.scopusfeedback.com/
[11] http://wokinfo.com/researcherid/integration
[12] https://orcid.org/organizations/integrators/API
6. Acknowledgement

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7. Appendix

7.1. Author identifiers in WoS subject areas

| Subject area                                | Scopus    | rid    | orcid  |
|---------------------------------------------|-----------|--------|--------|
| Biochemistry & Molecular Biology            | 1,256,720 | 61,655 | 24,721 |
| Materials Science, Multidisciplinary        | 983,555   | 82,838 | 32,940 |
| Physics, Applied                            | 822,106   | 65,837 | 25,854 |
| Chemistry, Physical                         | 798,542   | 76,455 | 30,708 |
| Multidisciplinary Sciences                  | 820,757   | 42,387 | 19,002 |
| Chemistry, Multidisciplinary                | 747,621   | 64,639 | 25,382 |
| Oncology                                    | 792,495   | 17,247 | 6,174  |
| Neurosciences                               | 699,094   | 29,141 | 12,007 |
| Pharmacology & Pharmacy                     | 685,833   | 22,422 | 8,983  |
| Cell Biology                                | 664,492   | 27,041 | 10,428 |
| Surgery                                     | 652,405   | 9,574  | 3,340  |
| Engineering, Electrical & Electronic        | 586,457   | 29,394 | 12,475 |
| Environmental Sciences                      | 548,327   | 39,123 | 17,694 |
| Biotechnology & Applied Microbiology        | 555,379   | 27,943 | 11,852 |
| Immunology                                  | 569,124   | 10,026 | 5,939  |
| Genetics & Heredity                         | 541,310   | 25,625 | 10,575 |
| Physics, Condensed Matter                   | 498,070   | 52,875 | 21,306 |
| Nanoscience & Nanotechnology                | 467,866   | 46,393 | 18,271 |
| Clinical Neurology                          | 499,098   | 13,918 | 5,481  |
| Microbiology                                | 444,834   | 18,981 | 7,808  |
| Physics, Multidisciplinary                  | 378,029   | 30,250 | 13,166 |
| Medicine, Research & Experimental           | 403,176   | 11,204 | 4,405  |
| Public, Environmental & Occupational Health | 401,694   | 11,766 | 5,040  |
| Endocrinology & Metabolism                  | 400,239   | 12,950 | 5,134  |
| Chemistry, Organic                          | 381,821   | 20,184 | 7,981  |
| Radiology, Nuclear Medicine & Medical Imaging | 391,466  | 11,826 | 4,814  |
| Chemistry, Analytical                       | 366,278   | 22,824 | 9,627  |
| Cardiac & Cardiovascular System             | 388,487   | 7,291  | 2,753  |
| Biochemical Research Methods                | 358,469   | 21,718 | 9,318  |
| Engineering, Chemical                       | 356,641   | 21,956 | 9,406  |
| Plant Sciences                              | 336,511   | 20,052 | 8,535  |
| Hematology                                  | 339,350   | 8,611  | 3,164  |
| Subject area                                      | Scopus | rid  | orcid  |
|--------------------------------------------------|--------|------|--------|
| Medicine, General & Internal                     | 339,698| 6,950| 2,721  |
| Biophysics                                       | 307,776| 18,170| 7,460  |
| Infectious Diseases                              | 312,904| 7,732| 3,002  |
| Food Science & Technology                        | 302,714| 13,962| 6,477  |
| Pediatrics                                       | 313,091| 5,361| 1,931  |
| Energy & Fuels                                   | 290,779| 17,550| 7,686  |
| Chemistry, Medicinal                             | 298,768| 10,729| 4,246  |
| Biology                                          | 288,089| 17,706| 7,538  |
| Instruments & Instrumentation                    | 288,854| 16,401| 6,966  |
| Geosciences, Multidisciplinary                   | 277,734| 23,088| 10,176 |
| Optics                                           | 277,831| 19,587| 8,219  |
| Psychiatry                                       | 287,043| 10,828| 4,674  |
| Polymer Science                                  | 273,400| 20,009| 7,798  |
| Physics, Atomic, Molecular & Chemical            | 251,968| 29,009| 12,346 |
| Gastroenterology & Hepatology                   | 284,031| 5,214 | 1,863  |
| Astronomy & Astrophysics                         | 263,826| 12,110| 5,284  |
| Ecology                                          | 244,281| 25,280| 11,310 |
| Peripheral Vascular Diseases                    | 270,018| 6,621 | 2,456  |
| Chemistry, Applied                              | 257,403| 13,591| 5,969  |
| Physiology                                       | 234,179| 9,889 | 3,849  |
| Toxicology                                       | 233,588| 9,398 | 3,873  |
| Chemistry, Inorganic & Nuclear                   | 216,507| 16,162| 6,648  |
| Obstetrics & Gynecology                          | 224,383| 4,221 | 1,634  |
| Electrochemistry                                 | 202,755| 15,001| 6,253  |
| Urology & Nephrology                             | 217,652| 3,986 | 1,470  |
| Nutrition & Dietetics                            | 210,908| 8,264 | 3,596  |
| Physics, Particles & Fields                      | 209,743| 8,488 | 3,525  |
| Engineering, Biomedical                          | 205,175| 11,495| 4,725  |
| Mechanics                                        | 190,388| 14,404| 6,351  |
| Engineering, Environmental                      | 190,089| 13,884| 6,356  |
| Metallurgy & Metallurgical Engineering           | 192,307| 12,245| 5,296  |
| Spectroscopy                                     | 192,772| 11,384| 4,676  |
| Respiratory System                               | 201,044| 4,160 | 1,484  |
| Virology                                         | 196,141| 6,103 | 2,410  |
| Pathology                                        | 194,008| 4,604 | 1,689  |
| Subject area                                        | Scopus | rid  | orcid  |
|----------------------------------------------------|--------|------|--------|
| Engineering, Mechanical                           | 184,360| 10,114| 4,295  |
| Veterinary Sciences                                | 188,316| 6,598 | 2,710  |
| Meteorology & Atmospheric Sciences                 | 170,201| 16,887| 7,570  |
| Nuclear Science & Technology                       | 183,571| 7,730 | 3,157  |
| Mathematics, Applied                               | 174,821| 10,513| 4,790  |
| Computer Science, Interdisciplinary Applications   | 171,857| 11,701| 5,684  |
| Marine & Freshwater Biology                        | 162,891| 13,465| 5,954  |
| Water Resources                                    | 164,469| 11,581| 5,253  |
| Orthopedics                                        | 163,871| 2,982 | 1,191  |
| Engineering, Civil                                | 154,356| 9,313 | 4,348  |
| Crystallography                                    | 148,793| 10,613| 4,363  |
| Geochemistry & Geophysics                          | 141,171| 12,737| 5,482  |
| Transplantation                                    | 149,401| 3,088 | 1,062  |
| Health Care Sciences & Services                    | 143,766| 3,714 | 1,616  |
| Materials Science, Coatings & Films                | 134,968| 9,339 | 3,845  |
| Physics, Fluids & Plasmas                          | 126,520| 10,891| 4,735  |
| Computer Science, Information Systems              | 133,149| 5,639 | 2,669  |
| Dentistry, Oral Surgery & Medicine                 | 131,624| 4,108 | 1,345  |
| Ophthalmology                                      | 132,767| 2,987 | 1,135  |
| Telecommunications                                 | 127,165| 5,334 | 2,274  |
| Dermatology                                        | 130,731| 2,317 | 897    |
| Zoology                                            | 122,289| 8,191 | 3,349  |
| Agronomy                                           | 123,303| 6,429 | 2,904  |
| Materials Science, Biomaterials                    | 120,169| 7,821 | 3,099  |
| Computer Science, Artificial Intelligence          | 118,095| 6,937 | 3,454  |
| Sport Sciences                                     | 119,920| 4,270 | 1,791  |
| Behavioral Sciences                                | 115,975| 6,884 | 2,975  |
| Parasitology                                       | 117,331| 5,289 | 2,111  |
| Physics, Mathematical                              | 109,077| 10,658| 4,918  |
| Critical Care Medicine                             | 120,190| 2,440 | 928    |
| Economics                                          | 115,749| 4,467 | 2,140  |
| Mathematics                                        | 113,815| 4,982 | 2,231  |
| Physics, Nuclear                                   | 107,096| 5,943 | 2,564  |
| Rheumatology                                       | 111,076| 2,555 | 1,018  |
| Engineering, Multidisciplinary                     | 104,843| 5,960 | 2,741  |
| Subject area                                      | Scopus  | rid  | orcid  |
|-------------------------------------------------|---------|------|--------|
| Psychology                                      | 105,450 | 5,376| 2,348  |
| Evolutionary Biology                            | 98,061  | 10,339| 4,580  |
| Psychology, Clinical                            | 105,390 | 3,641| 1,528  |
| Rehabilitation                                  | 105,498 | 3,078| 1,269  |
| Developmental Biology                           | 103,322 | 4,509| 1,719  |
| Geriatrics & Gerontology                        | 103,823 | 3,751| 1,520  |
| Reproductive Biology                            | 103,928 | 3,514| 1,403  |
| Thermodynamics                                  | 98,378  | 5,671| 2,557  |
| Mathematical & Computational Biology            | 96,268  | 6,745| 3,242  |
| Oceanography                                     | 91,393  | 8,484| 3,976  |
| Mathematics, Interdisciplinary Applications     | 93,318  | 6,649| 3,083  |
| Agriculture, Multidisciplinary                   | 90,952  | 5,362| 2,534  |
| Computer Science, Software Engineering          | 91,754  | 4,207| 1,985  |
| Agriculture, Dairy & Animal Science             | 91,979  | 3,448| 1,565  |
| Operations Research & Management Science        | 87,893  | 5,125| 2,440  |
| Otorhinolaryngology                             | 90,801  | 1,428| 457    |
| Psychology, Multidisciplinary                   | 86,782  | 3,081| 1,433  |
| Psychology, Experimental                        | 80,966  | 4,868| 2,179  |
| Computer Science, Theory & Methods              | 81,640  | 3,980| 1,928  |
| Anesthesiology                                  | 83,430  | 1,482| 561    |
| Automation & Control Systems                    | 77,679  | 4,673| 2,197  |
| Geography, Physical                             | 73,991  | 6,662| 3,069  |
| Fisheries                                       | 75,959  | 4,590| 2,014  |
| Materials Science, Ceramics                     | 73,053  | 4,825| 2,083  |
| Nursing                                         | 77,911  | 1,378| 666    |
| Engineering, Manufacturing                      | 72,987  | 3,530| 1,588  |
| Medical Laboratory Technology                   | 74,890  | 1,628| 604    |
| Health Policy & Services                        | 74,082  | 1,821| 828    |
| Statistics & Probability                       | 70,142  | 3,527| 1,598  |
| Management                                      | 70,097  | 3,070| 1,461  |
| Soil Science                                    | 66,746  | 5,322| 2,320  |
| Entomology                                      | 65,502  | 3,811| 1,537  |
| Psychology, Developmental                       | 66,871  | 2,163| 857    |
| Tropical Medicine                               | 66,407  | 1,977| 800    |
| Acoustics                                       | 64,185  | 3,204| 1,403  |
| Subject area                                           | Scopus  | rid  | orcid  |
|--------------------------------------------------------|---------|------|--------|
| Neuroimaging                                           | 61,651  | 3,452| 1,533  |
| Education & Educational Research                      | 63,173  | 1,557| 711    |
| Emergency Medicine                                     | 64,179  | 823  | 349    |
| Biodiversity Conservation                              | 56,081  | 5,941| 2,614  |
| Forestry                                               | 56,561  | 4,666| 2,081  |
| Integrative & Complementary Medicine                  | 61,011  | 1,402| 614    |
| Computer Science, Hardware & Architecture             | 59,114  | 2,255| 980    |
| Environmental Studies                                  | 57,358  | 3,282| 1,683  |
| CELL & TISSUE ENGINEERING                             | 58,880  | 2,407| 906    |
| Construction & Building Technology                    | 56,236  | 2,872| 1,377  |
| Agricultural Engineering                              | 54,673  | 3,241| 1,472  |
| Engineering, Industrial                               | 54,623  | 2,822| 1,319  |
| Substance Abuse                                        | 53,831  | 1,544| 709    |
| Allergy                                                | 53,964  | 1,331| 486    |
| Gerontology                                            | 49,343  | 1,612| 653    |
| Remote Sensing                                         | 45,947  | 3,537| 1,744  |
| Medical Informatics                                    | 48,041  | 1,797| 783    |
| Business                                               | 45,039  | 1,731| 766    |
| Materials Science, Composites                         | 42,725  | 2,807| 1,233  |
| Horticulture                                           | 43,288  | 2,049| 927    |
| Imaging Science & Photographic Technology             | 40,866  | 3,022| 1,429  |
| Psychology, Social                                    | 42,662  | 1,673| 691    |
| Mineralogy                                             | 39,911  | 3,224| 1,327  |
| Education, Scientific Disciplines                     | 41,820  | 1,181| 594    |
| Anatomy & Morphology                                   | 39,503  | 1,748| 648    |
| Social Sciences, Interdisciplinary                     | 39,062  | 1,293| 625    |
| Social Sciences, Biomedical                            | 39,252  | 1,078| 465    |
| Psychology, Applied                                    | 37,772  | 1,381| 551    |
| Limnology                                              | 33,200  | 3,217| 1,399  |
| Mining & Mineral Processing                            | 34,398  | 1,824| 787    |
| Mycology                                               | 33,552  | 1,825| 764    |
| Geology                                                | 31,450  | 2,500| 1,004  |
| Medicine, Legal                                        | 32,472  | 869  | 400    |
| Information Science & Library Science                  | 31,160  | 1,663| 894    |
| Materials Science, Characterization, Testing           | 30,062  | 1,767| 808    |
| Subject area                                      | Scopus | rid  | orcid |
|--------------------------------------------------|--------|------|-------|
| Paleontology                                     | 28,681 | 2,205| 934   |
| Engineering, Aerospace                           | 30,096 | 1,189| 483   |
| Transportation Science & Technology              | 29,061 | 1,476| 645   |
| Engineering, Geological                          | 28,542 | 1,693| 772   |
| Business, Finance                                | 29,634 | 883  | 333   |
| Geography                                        | 26,731 | 1,597| 763   |
| Linguistics                                      | 26,786 | 853  | 370   |
| Microscopy                                       | 24,798 | 1,979| 838   |
| Sociology                                        | 25,846 | 913  | 397   |
| Anthropology                                     | 24,749 | 1,263| 626   |
| Family Studies                                   | 25,566 | 519  | 218   |
| Psychology, Biological                           | 23,561 | 1,399| 660   |
| **AUDIOLOGY & SPEECH-LANGUAGE PATHOLOGY**        | 23,155 | 1,025| 418   |
| Psychology, Educational                          | 23,105 | 639  | 277   |
| Materials Science, Textiles                      | 21,540 | 1,017| 470   |
| Robotics                                         | 21,017 | 1,111| 509   |
| Political Science                                | 20,684 | 650  | 273   |
| Planning & Development                           | 20,237 | 819  | 407   |
| Social Work                                      | 20,765 | 403  | 180   |
| Transportation                                   | 19,266 | 1,032| 497   |
| Social Sciences, Mathematical Methods            | 18,818 | 858  | 391   |
| Ergonomics                                       | 18,782 | 837  | 401   |
| Communication                                    | 18,702 | 543  | 234   |
| Education, Special                               | 18,090 | 459  | 221   |
| Archaeology                                      | 17,347 | 849  | 417   |
| PRIMARY HEALTH CARE                              | 17,766 | 502  | 251   |
| Criminology & Penology                           | 16,556 | 319  | 136   |
| Urban Studies                                    | 15,062 | 710  | 332   |
| Computer Science, Cybernetics                    | 14,705 | 768  | 382   |
| Engineering, Petroleum                           | 14,808 | 395  | 177   |
| Women’s Studies                                  | 14,437 | 253  | 102   |
| Engineering, Ocean                               | 13,058 | 871  | 393   |
| Hospitality, Leisure, Sport & Tourism            | 13,143 | 494  | 256   |
| International Relations                          | 12,663 | 385  | 171   |
| Ornithology                                      | 11,503 | 1,011| 427   |
| Subject area                                      | Scopus | rid | orcid |
|--------------------------------------------------|--------|-----|-------|
| Ethics                                           | 12,496 | 309 | 127   |
| Andrology                                        | 11,678 | 289 | 113   |
| Social Issues                                    | 11,581 | 310 | 126   |
| Language & Linguistics Theory                    | 11,469 | 252 | 116   |
| Materials Science, Paper & Wood                  | 10,562 | 627 | 279   |
| Public Administration                            | 10,454 | 355 | 168   |
| Law                                              | 10,358 | 176 | 73    |
| Psychology, Mathematical                         | 7,344  | 401 | 182   |
| History & Philosophy of Science                  | 6,958  | 206 | 98    |
| Medical Ethics                                   | 7,016  | 174 | 71    |
| Demography                                       | 6,361  | 167 | 77    |
| Engineering, Marine                              | 6,202  | 259 | 127   |
| Agricultural Economics & Policy                  | 5,954  | 267 | 143   |
| Industrial Relations & Labor                     | 5,739  | 152 | 72    |
| History                                          | 4,887  | 69  | 41    |
| Area Studies                                     | 4,222  | 84  | 40    |
| Religion                                         | 4,239  | 58  | 25    |
| LOGIC                                            | 3,715  | 209 | 117   |
| Ethnic Studies                                   | 3,918  | 80  | 29    |
| Philosophy                                       | 3,715  | 64  | 39    |
| Art                                              | 3,190  | 162 | 84    |
| History of Social Sciences                       | 3,086  | 92  | 52    |
| Humanities, Multidisciplinary                     | 3,043  | 52  | 31    |
| Psychology, Psychoanalysis                       | 2,501  | 52  | 21    |
| CULTURAL STUDIES                                 | 2,361  | 34  | 16    |
| Music                                            | 1,998  | 47  | 20    |
| Architecture                                     | 1,843  | 77  | 48    |
| Literature                                       | 1,567  | 22  | 11    |
| Film, Radio, Television                          | 795    | 20  | 8     |
| Asian Studies                                    | 704    | 5   | 1     |
| Theater                                          | 506    | 2   | 0     |
| Medieval & Renaissance Studies                   | 253    | 3   | 1     |
| Literary Reviews                                 | 160    | 0   | 0     |
| Dance                                            | 128    | 0   | 0     |
| Literature, Romance                              | 122    | 1   | 1     |
| Subject area                                                      | Scopus | rid | orcid |
|-----------------------------------------------------------------|--------|-----|-------|
| Literary Theory & Criticism                                    | 91     | 0   | 0     |
| Folklore                                                        | 87     | 2   | 1     |
| Classics                                                        | 85     | 0   | 0     |
| Literature, German, Dutch, Scandinavian                        | 67     | 0   | 0     |
| Literature, British Isles                                      | 62     | 0   | 0     |
| Literature, American                                            | 53     | 0   | 0     |
| Literature, African, Australian, Canadian                       | 27     | 0   | 0     |
| Poetry                                                          | 5      | 0   | 0     |