SCHOLARLY COMMUNICATION IN WEB AGE

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Lesson 2

- Bibliometric indicators
- Interinstitutional Style Guide
- Research evaluation identifiers
- Journal & Country Rank
- Italian Research Quality Assessment
- Scholars evaluation

Bibliometric indicators

Bibliometric Indicators: Quality Measurements of Scientific Publication

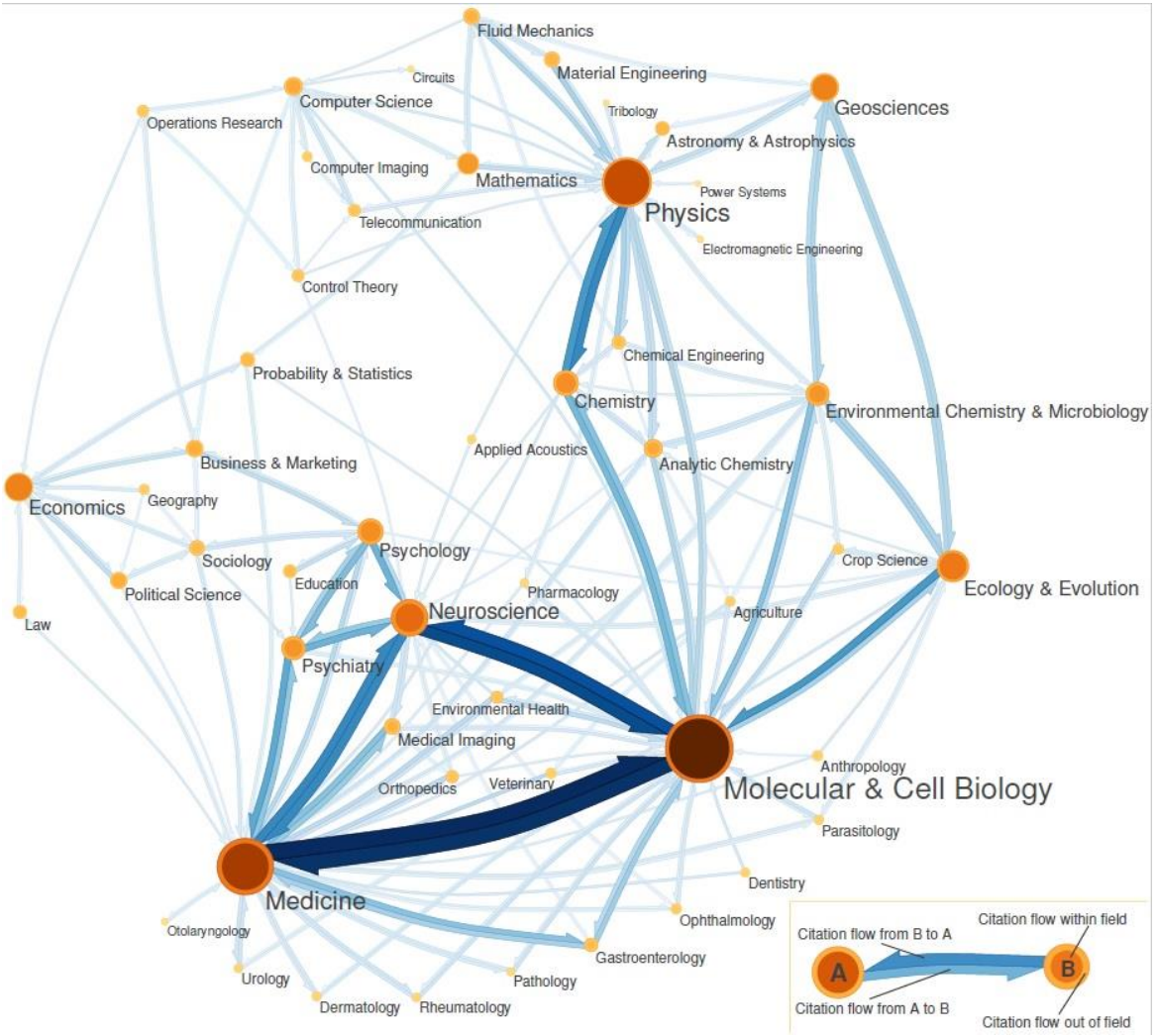
Bibliometrics is a set of mathematical and statistical methods used to analyze and measure the quantity and quality of books, articles, and other forms of publications. There are three types of bibliometric indicators: quantity indicators, which measure the productivity of a particular researcher; quality indicators, which measure the quality (or "performance") of a researcher's output; and structural indicators, which measure connections between publications, authors, and areas of research. Bibliometric indicators are especially important for researchers and organizations, as these measurements are often used in funding decisions, appointments, and promotions of researchers. As more and more scientific discoveries occur and published research results are read and then quoted by other researchers, bibliometric indicators are becoming increasingly important. This lesson provides an overview of the currently used bibliometric indicators and summarizes the critical elements and characteristics one should be aware of when evaluating the quantity and quality of scientific output.

Bibliometrics can be used e.g. for:

- Evaluating performance of individual researchers
- Positioning and benchmarking of countries, cities, research groups
- Citation analysis, scientific impact and excellence assessment
- Network and collaboration mapping

Bibliometrics: indicators and networks

- **Bibliometrics** is a field of **information and library science** devoted to the quantitative study of the process of scholarly publication of research achievements.
- The complex system of scholarly publication reveals different types of networks, mainly **citation networks** (where links represent bibliographic references) and **collaboration networks** (in which links correspond to co-authorships in publications).
- These networks are analysed in order to capture meaningful properties of the underlying research system, and in particular to determine the influence of bibliometric units like **scholars** and **journals**.



Science and social science citation map (generated with Mapequation.org)

Bibliometric indicators for journals

The traditional bibliometric indicator for journals is the **Impact Factor**:

The Impact Factor of a journal for a specific year is the mean number of citations that occurred in that year to the articles published in the journal during the two previous years.

The Impact Factor has its own merits:

- comprehensibility;
- robustness;
- wide and fast availability.

Frequently mentioned flaws of the Impact Factor are:

- that the target window of two years is too short;
- it does not represent a typical value since it is a mean of the citation distribution which is highly skewed; it does not consider the status of the citing journals;
- it widely differs from one discipline to another.

Citation distributions are severely right skewed, meaning that most papers are poorly cited and a few hubs collect the majority of citations. It is hence misleading to predict the importance of an individual publication, or of an individual researcher, based on the Impact Factor of the publication's journal. Indeed, most papers published in a journal will ultimately be cited much less than the journal Impact Factor.

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The Impact Factor equally weights all citations: citations from highly reputed journals are treated as citations from obscure publication sources. The Eigenfactor is a PageRank-inspired metric that weights journal citations by the influence of the citing journals. The Eigenfactor thesis reads:

«A journal is influent if it is cited by other influent journals».

Birth and development of bibliometry

- Late 1800s: "statistical bibliography" (statistics and probability theory were used to guide library purchases and measure the progress of scientific disciplines)
- **1st Bibliometry law** - Lotka's law, 1926: in a scientific community a very small number of scientists are responsible for most of the work produced
- 1927: two American chemists (the Gross spouses), trying to identify the most important journals to be owned by a prestigious university library, were the first to connect the quality of scientific journals with the number of citations they received
- 1934: the term bibliometry appears for the first time in the work of the well-known Belgian bibliographer Paul Otlet
- **2nd Bibliometry Law** - Bradford Law, 1934: in a specific disciplinary sector a limited number of magazines contain 90% of the fundamental literature
- **3rd law of bibliometry** - Zipf's law, 1936: in every
- written text there are few very frequent words and many infrequent words (parallelism with the other two laws)

The three laws, formulated by scholars from different fields, indicate the need to measure the progress of knowledge

- Eugene Garfield and the Science Citation Index, 1961: creation of a citation index thanks to the indexing of the most relevant scientific journals (no more than 1,000, based on Bradford's law), of all the articles contained in them and of all the citations featured in the articles. Garfield wrote: “Citations are the formal, explicit linkages between papers that have particular points in common. A citation index is built around these linkages. It lists publications that have been cited and identifies the sources of the citations. Anyone conducting a literature search can find from one to dozens of additional papers on a subject just by knowing one that has been cited. And every paper that is found provides a list of new citations with which to continue the search. The simplicity of citation indexing is one of its main strengths”.

- Start of the publication of the SCI, 1964, by the Institute for Scientific Information (ISI), today Clarivate Analytics (in 1973 the Social Sciences Citation Index, in 1978 the Arts & Humanities Citation Index, in 1990 the Conference Proceedings Citation Index and the Book Citation Index)

- Definition of bibliometry as a discipline in an article by Alan Pritchard published in 1969 in the Journal of Documentation ("the application of mathematics and statistical methods to books and other media")

- Establishment of bibliometric indicators since the late 1960s, first in the United States and then in Europe

Birth of scientometry

- The birth of scientometry, thanks to De Solla Price, 1963: the subject of the discipline is the analysis of scientific and technological progress through the measurement of the contribution of scientists and institutions to the advancement of science.

- Exponential growth of science; general probabilistic theory of cumulative advantages (a document cited several times is more likely to be cited again than a poorly cited document would have, a magazine often consulted is more likely to be consulted again than one that has been little used)

The establishment of bibliometrics

- Disciplinary autonomy of bibliometrics, from the 1990s: birth of the first university courses in the USA, publication of reference manuals, organization of conferences, birth of various journals and specialized research centers.
- Birth of the two large citation databases: Thomson Reuters' Web of Science (WoS) in 1997 and Elsevier's Scopus in 2004
- Google Scholar is born, 2004

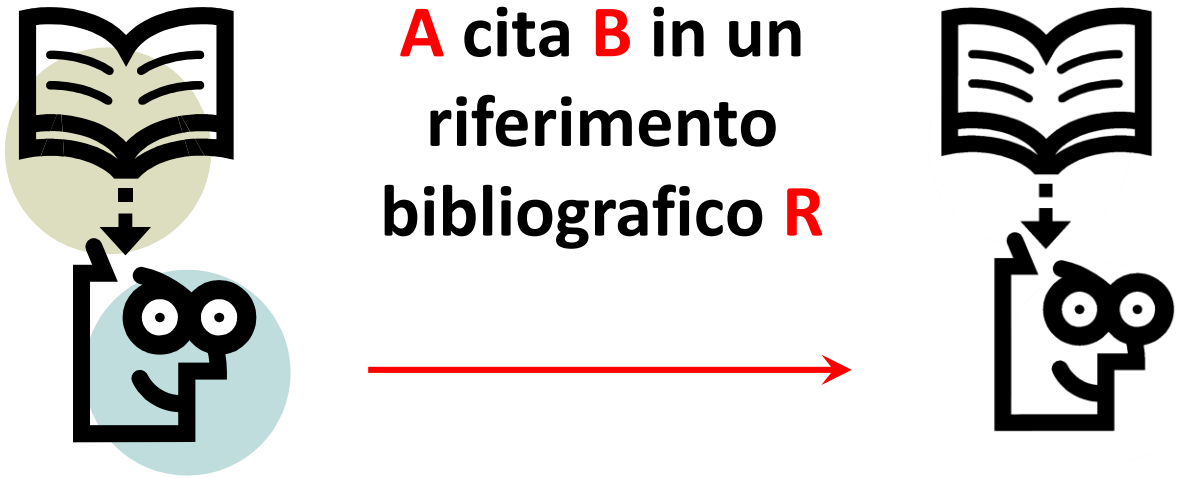
BIBLIOMETRY, SCIENTOMETRY & …

- BIBLIOMETRY: application of mathematics and statistical methods to communication products (texts, books, articles, bibliographies).
- SCIENTOMETRY: application of mathematics and statistical methods to the products of scientific and technological communication aimed at ascertaining the relative contribution of scientists, institutions, nations to the advancement of knowledge.
- INFORMATION TECHNOLOGY: study of the quantitative aspects of information in any form (not only information recorded in books, articles, etc.) and with any social group (not only scientists).
- WEBMETRICA (CYBERMETRICA, NETMETRICA): extension of biblio-scienti-informetric methods to information flows that materialize on the Internet (not only the Web, but also e-mail, ftp, p2p networks).

REFERENCE & CITATION

- The attention given to bibliographic citations at the expense of other quantifiable aspects presupposes that the difference between bibliographic reference (reference) and bibliographic citation (citation) is clearly understood.

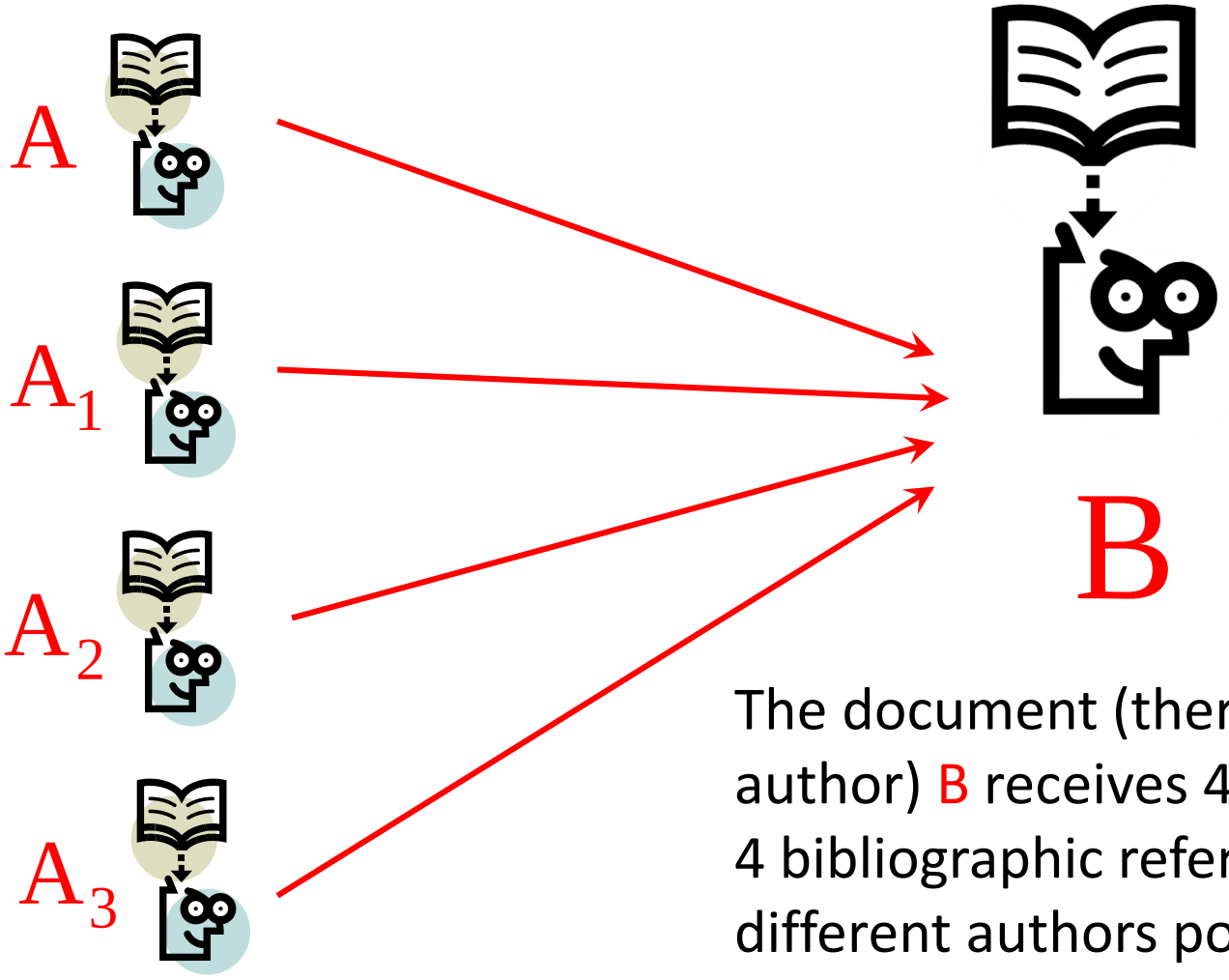
Example 1



From A's point of view, entity R is a bibliographic reference

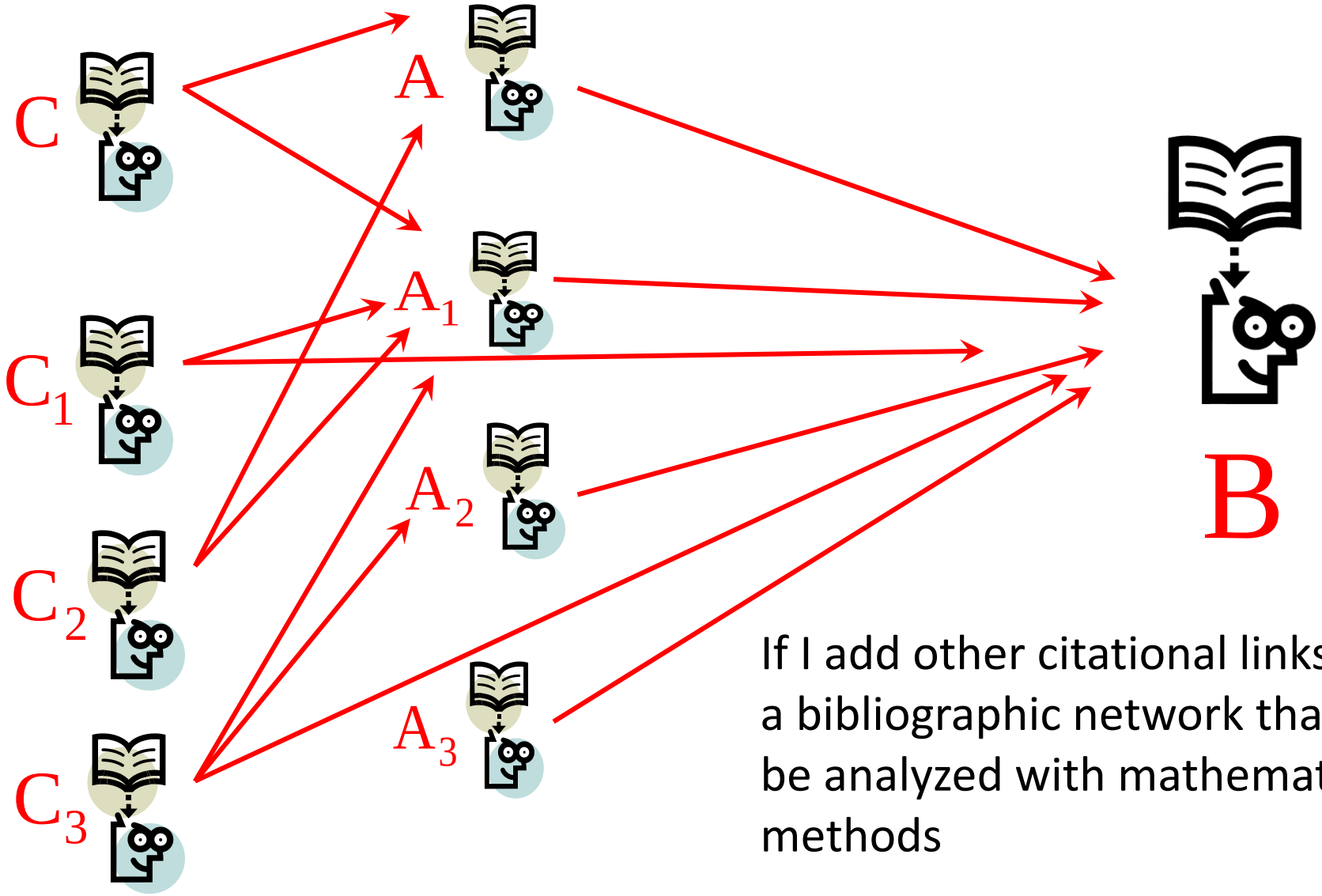
From B's point of view, entity R is a bibliographic citation

Example 2



The document (therefore the author) B receives 4 citations, or 4 bibliographic references from different authors point to B

Example3



If I add other citational links I get a bibliographic network that can be analyzed with mathematical methods

The basis of bibliometry: the citation

- Different citational styles and purposes exist according to the disciplinary sectors. The gradual development of the habit of citing one's own or other scholars' writings inevitably led to the use of citation data and, consequently, to evaluate a work in relation to the number of citations obtained.

- With the increase in the amount of scientific production, the quote becomes "the current currency in the trade of official scientific communication. Small denomination coin (it costs little to quote), but with a not indifferent symbolic purchasing power "(N. De Bellis, The bibliographic citation in the age of its technical reproducibility)

Citations are not all the same and do not have (or should not have) an identical "weight".

- The amount of citations accumulated by a scientific work depends on various factors (disciplinary area, type of work, language of publication, even the position of the article in the magazine)

- San Matteo effect: To those who have, it will be given, and it will be in abundance: but to those who have not, even what they have will be taken away.

 tendency to the progressive accumulation of resources, funding, citations in a small number of subjects, projects, scientific works

San Matteo effect

"Success seems to generate success. A document that has been cited multiple times is more likely to be cited again than a poorly cited document would have. An author of numerous publications is more likely to publish than one that has been less prolific. A newspaper that has often been consulted for some purpose is more likely to be consulted again than one that has been little used “

Derek J. De Solla Price (1976), A general theory of bibliometric and other cumulative advantage processes, “Journal of the American Society for Information Science”, 27, n. 5, p. 292-306

Interinstitutional Style Guide

- Since 2001 the Publications Office has acted as the official agency assigning the following identifiers to publications issued by European Union institutions, bodies and organizations: international standard book number (ISBN); international standard serial number (ISSN) for serial publications and other continuing resources; and digital object identifier (DOI). These international identifiers are used to classify publications all over the world in an unequivocal and exclusive way. An internal identifier (catalogue number) is also assigned for every product (book, leaflet, poster, etc.) in any format (paper, electronic, CD/DVD, etc.).
- In order for an identifier to be assigned to a work, the originating services must provide the Publications Office with two physical copies of the work, in addition to sending the electronic version (PDF).
- The Publications Office automatically assigns an identifier whenever it receives a publication request.

Publications Office of the European Union
'Style guide' Coordination
A.1, MER 199/199 A
2, rue Mercier
L-2985 Luxembourg
LUXEMBOURG
Tel. +352 2929-44034/42888/44826

see: http://publications.europa.eu/code/en/en-240400.htm

Identifiers assigned by the Publications Office

- ***International standard book number (ISBN)***
- ***International standard serial number (ISSN)***
- ***Digital object identifier (DOI)***

ISBN

- The ISBN is a 13-digit numerical sequence used internationally for the classification of books (the coding prior to 2007 is still used, consisting of a number of digits equal to 10 in which the last character may possibly contain the capital letter X). It is defined by an ISO standard, derived from the English SBN coding of 1967. Although not mandatory, its use has now become essential for the placing of the book product on the channels of large retailers.

- Each ISBN code uniquely identifies each specific edition of a book (but not the simple reprints, which maintain the same code as the edition to which they refer) and, once assigned, can no longer be reused.

- To get an ISBN you need to pay a «fee».

https://www.isbn-international.org/

ISBN location and display

The ISBN, which must always appear on the product itself, has since 1 January 2007 comprised 13 digits organized into five groups, preceded by the prefix ISBN followed by a space:

- **Group 1**: prefix or EAN (European Article Numbering);

  these are the first three digits of the ISBN, introduced from 2007; indicate that you are in the presence of a book (the prefixes currently available are 978 and 979);

- **Group 2**: group identifier (92 = international organizations);

  language group - is the identifier of the country or linguistic area of the publisher; can use 1 to 5 digits

- **Group 3**: publisher identifier (author code);

  identification of the publisher or editorial brand; can use 2 to 7 digits.

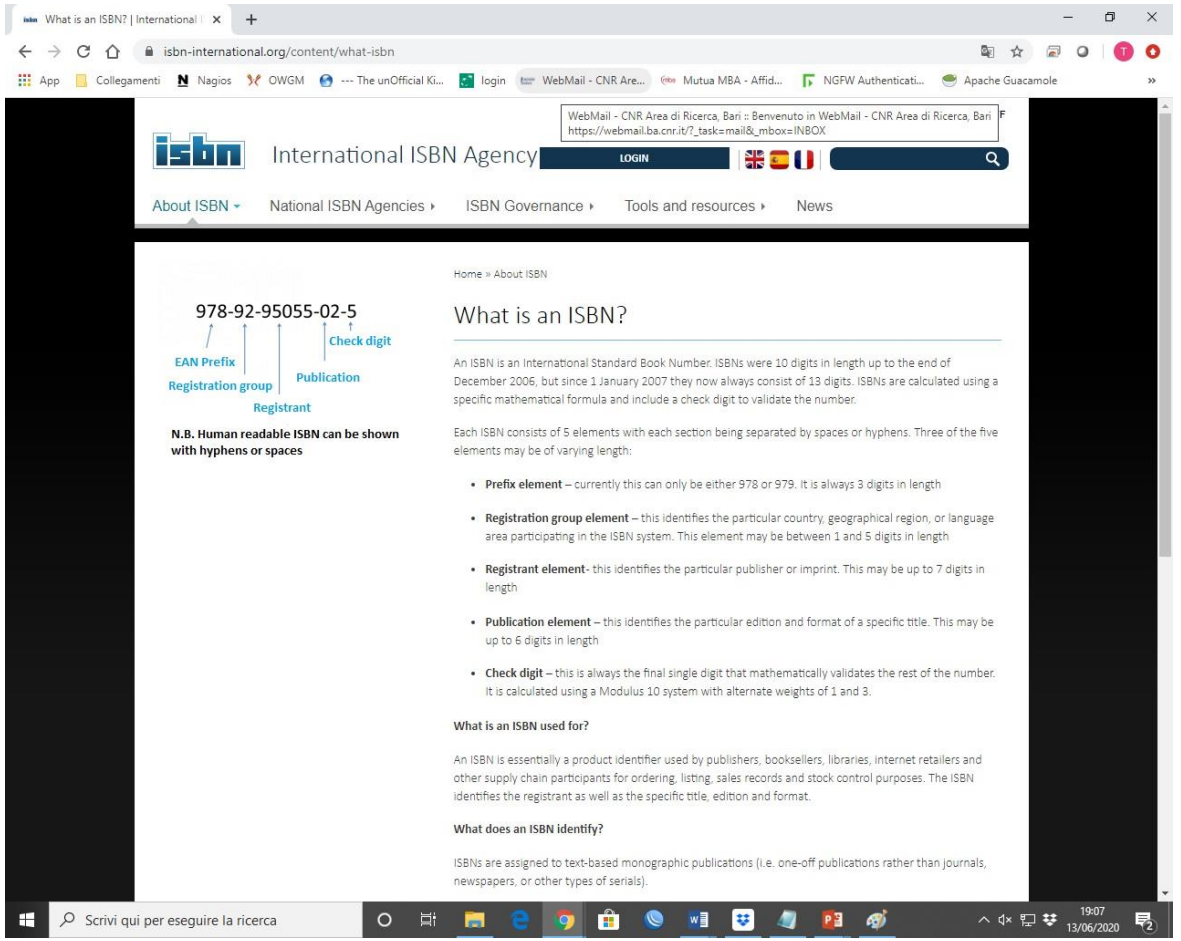
- **Group 4**: title identifier (within the publisher's production);

  the book ID can use from 1 to 6 digits.

- **Group 5**: check digit.

  Control character - it is the last digit of the ISBN (in the "old" ISBN-10 codes, in addition to the numbers from 0 to 9, the Roman 10 was also used, ie the "X") and is used to verify that the code it has not been read or transcribed incorrectly (which can always happen, especially when using automatic tools such as barcode readers).

  i.e. **ISBN 978-92-79-00077-5**



Electronic publications or other types of non-printed products

For online publications, the ISBN must be included on the title screen or its equivalent, and/or on the screen displaying the copyright notice.

For any other product (CD-ROM, DVD, etc.), the ISBN must appear on a label permanently affixed to the product or, if that is not possible, on the lower portion of all the product's permanent packaging (box, sleeve, holder, etc.). The ISBN must also be included in all metadata contained within the publication or product. In the case of a publication in different formats, only one ISBN is required if they are packaged together; if they are distributed separately, each version must be assigned an ISBN. Furthermore, all ISBNs must be listed together in each version, with a brief indication of the format, as in the following example:

Print	ISBN 978-951-45-9693-3
PDF	ISBN 978-951-45-9694-0
EPUB	ISBN 978-951-45-9695-7
HTML	ISBN 978-951-45-9696-4

The ISBN must also be indicated on any material accompanying the publication.

Useful ISBN links

International ISBN agency:
https://www.isbn-international.org
ISBN Users' Manual:
https://www.isbn-international.org/content/isbn-users-manual
ISBN FAQs:
https://www.isbn.org/faqs_general_questions

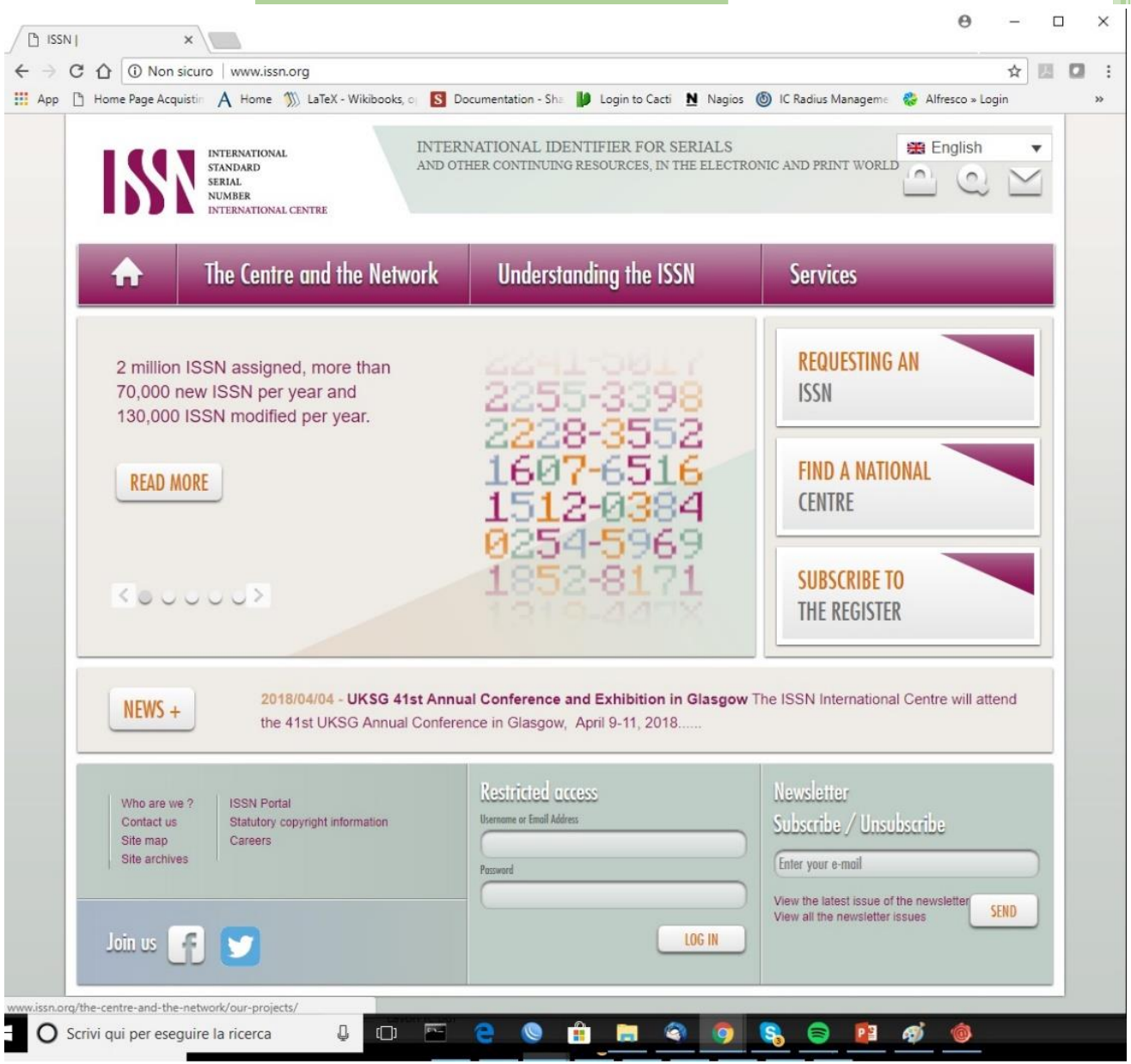
EAN.UCC system:
https://www.gs1.org/
ISO 2108:2017: international standard book number (ISBN):
https://www.iso.org/standard/65483.html
ISO list of members
https://www.iso.org/members.html

ISSN

- The **ISSN** is the international number that identifies publications in series (periodicals, such as newspapers or magazines, book collections, yearbooks, etc.), printed or electronic, and allows univocal identification even in the event that there are multiple publications with the same title.

- The ISSN identifies the title of the entire serial publication, but not that of the individual issue of a magazine or the individual volume of a series. Each National Center is responsible for the editorial production of its own country, all grouped in an international network coordinated by the International Center. The syntax of the code and the mechanism for assigning to publications differ from that of the ISBN.

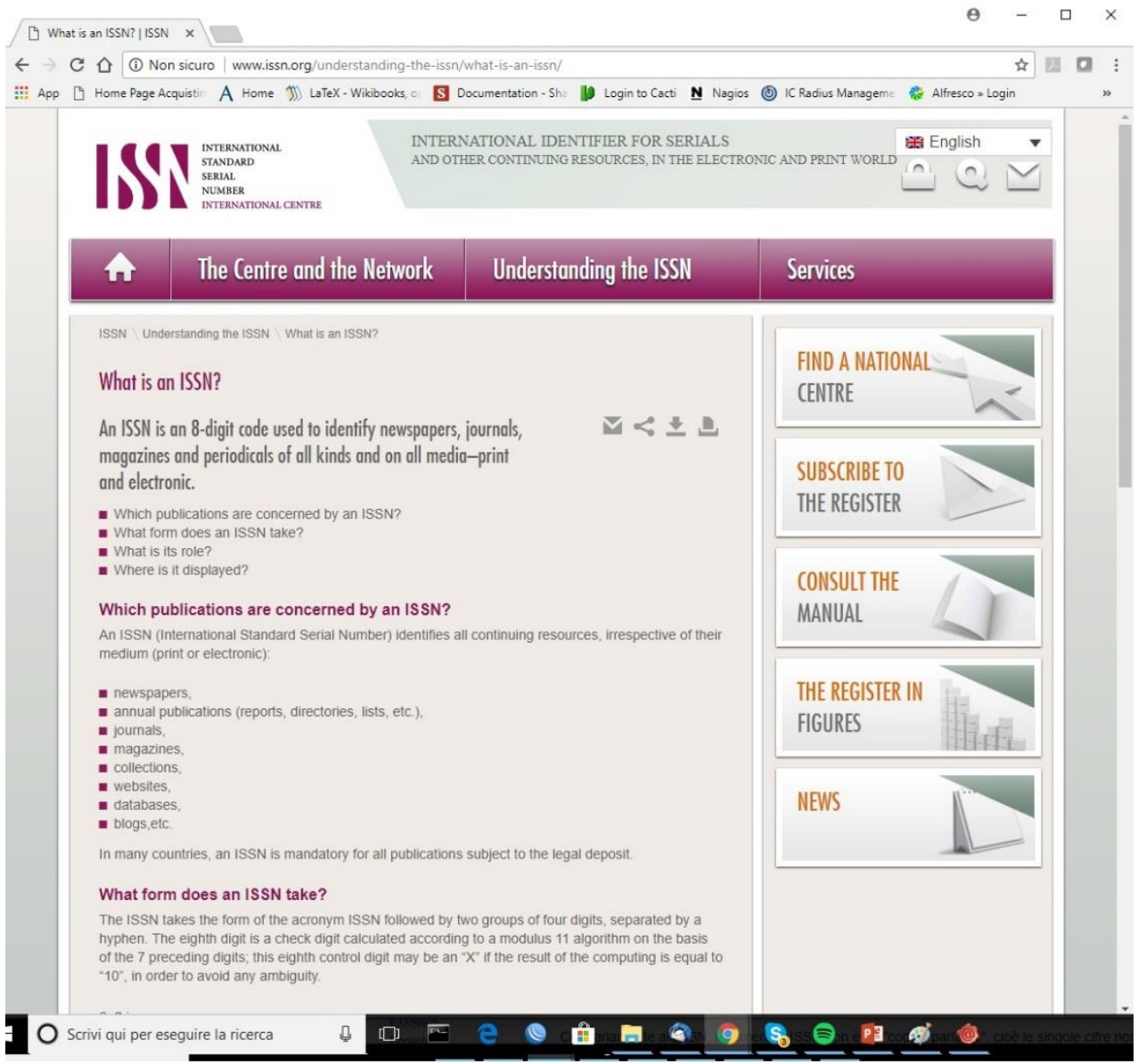
- For Italy, the body responsible for assigning the ISSN is the National Research Council.



- The ISSN is made up of the characters 'ISSN' followed by two groups of four digits, separated by a dash. The last digit, located in eighth position, serves as a control code and can have a value from 1 to 10; the value 10 is represented by an "X".di quattro cifre, separati da un trattino.

- Contrary to the ISBN, the ISSN number is not a "speaking code“; the single digits do not correspond to a specific coding, but are attributed sequentially, regardless of the country of origin, the language, etc. Each ISSN has a key title as well as a start date for the publication. The end date is normally set at "9999".

- The key title consists of the name of the publication and, possibly, a qualifier (often the place of publication) used in cases where it is necessary to distinguish the title of the publication from others that are the same. For example, ISSN 2282-2259 is associated with the key title "Smart eLab (Ed. CNR Istituto di Cristallografia)"



- The allocation of an ISSN has no legal meaning or value with regard to the copyright of the work concerned or its content.
- An ISSN is assigned exclusively for:
  - the entire lifespan of a title;
  - each language version;
  - each edition (monthly, annual, etc.);
  - each separate format.
- In the case of multiple volumes, an ISSN is assigned to the key title, regardless of the number of volumes it comprises. An ISSN can also be assigned to a collection of monographs as such, with an ISBN being assigned to each volume in the collection.
- The ISSN is permanently associated with a ‘key title’, created by the ISSN network at the time the resource is registered. The key title is unique to each specific continuing resource.
- A new ISSN (and a new key title) must be assigned to a continuing resource if:
  - the title changes significantly;
  - the format is changed.
- Any supplement or sub-series that may accompany a continuing resource must be assigned its own ISSN (and thus a specific key title).

ISSN location and display

- An ISSN is composed of two groups of four digits (Arabic numerals) separated by a hyphen and preceded by the letters ISSN followed by a space. The last character (the control character) may be an X:

  ISSN 0251-1479

  ISSN 1831-855X
- The ISSN must be printed clearly on or in the first issue of a serial publication and on or in any subsequent issue, as well as on or in each version of an ongoing integrating resource.
- Where an ISSN is accompanied by another identifier, such as an ISBN in the case of a volume in a collection, the two numbers must appear together, each identified by the required prefix (ISBN, ISSN, DOI, etc.).
- If a continuing resource has been assigned several ISSNs for different titles (such as the title of a main collection and the titles of its sub-collections), all the ISSNs must be printed on the resource, and be distinguished by the inclusion of (for example) the complete or abridged title in brackets.

  Print ISSN 1562-6585

  HTML ISSN 1063-7710
- For printed works, the ISSN must appear on each issue, in the upper right-hand corner of the cover or, if that is not possible, printed clearly and visibly on one of the following (in order of preference): title page, sleeve, data box, back cover, copyright page or masthead area.
- For works in electronic format (online works, CD-ROM, etc.), it must be included on the title screen or, if that is not possible, on the main menu, and also, if possible, on any label permanently affixed to the publication. If it is not possible to display the ISSN on the product or its label, it must appear on the container.
- For online resources, the ISSN must also appear in the metadata (in the identification field).

Linking ISSN (ISSN-L)

- Pursuant to ISO 3297:2017 (ISSN), a linking ISSN (ISSN-L) is assigned to a continuing resource to link together the various medium versions of the resource, regardless of the number of versions (each version must itself be assigned a separate ISSN).
- The ISSN-L is composed of a sequence of two groups of four digits separated by a hyphen and preceded by the letters ISSN-L followed by a space, as in the following example:

  ISSN-L 0251-1479
- An ISSN-L must be changed when the titles of all medium versions of a resource undergo a major change at the same time. A new ISSN is then assigned to each separate version and a new ISSN-L to the collection.

Useful ISSN links

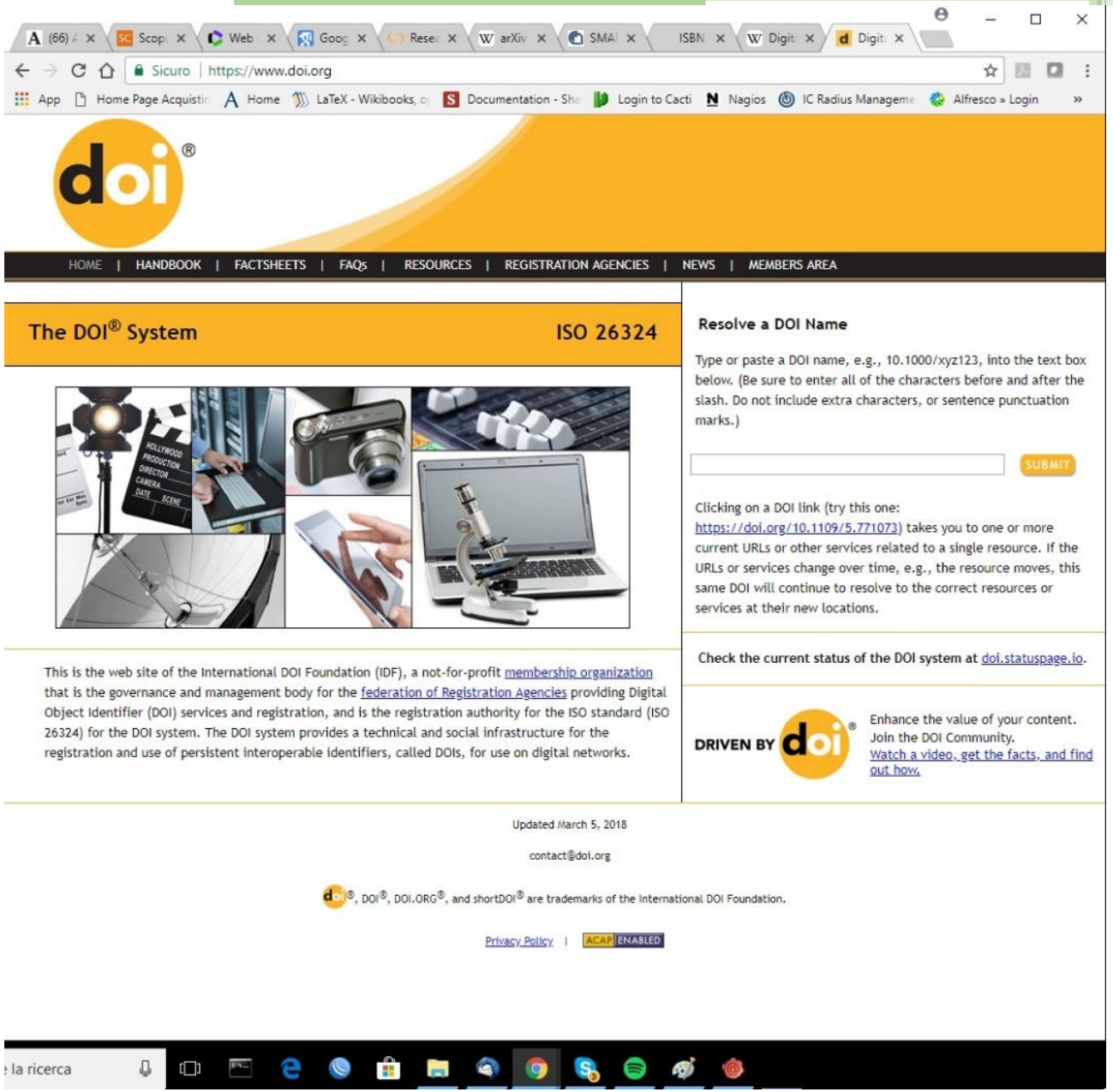
- ISSN International Centre:
  https://www.issn.org
- ISSN Manual:
  https://www.issn.org2-23364-ISSN-Manual.php
- ISO 3297:2017: international standard serial number (ISSN)
  https://www.iso.org/standard/73322.html
- ISO standards can be obtained from ISO members, a list of which is available from the ISO website
  https://www.iso.org/members.html

DOI

- The **Digital Object Identifier** is a standard that allows the lasting identification, within a digital network, of any entity that is the object of intellectual property and to associate the related reference data, the metadata, according to a structured and extensible scheme.

- DOI differs from common Internet indicators, such as URLs, in that it identifies an object directly, as a first-class entity, and not simply through some of its attributes, such as the place where the object is located.

- The DOI differs from common intellectual property identifiers such as those related to bibliographic standards (ISBN, ISRC, etc.), in that it is immediately operable on the net and can be used for the development of specific services such as search engines, certificates of authenticity, etc. ..



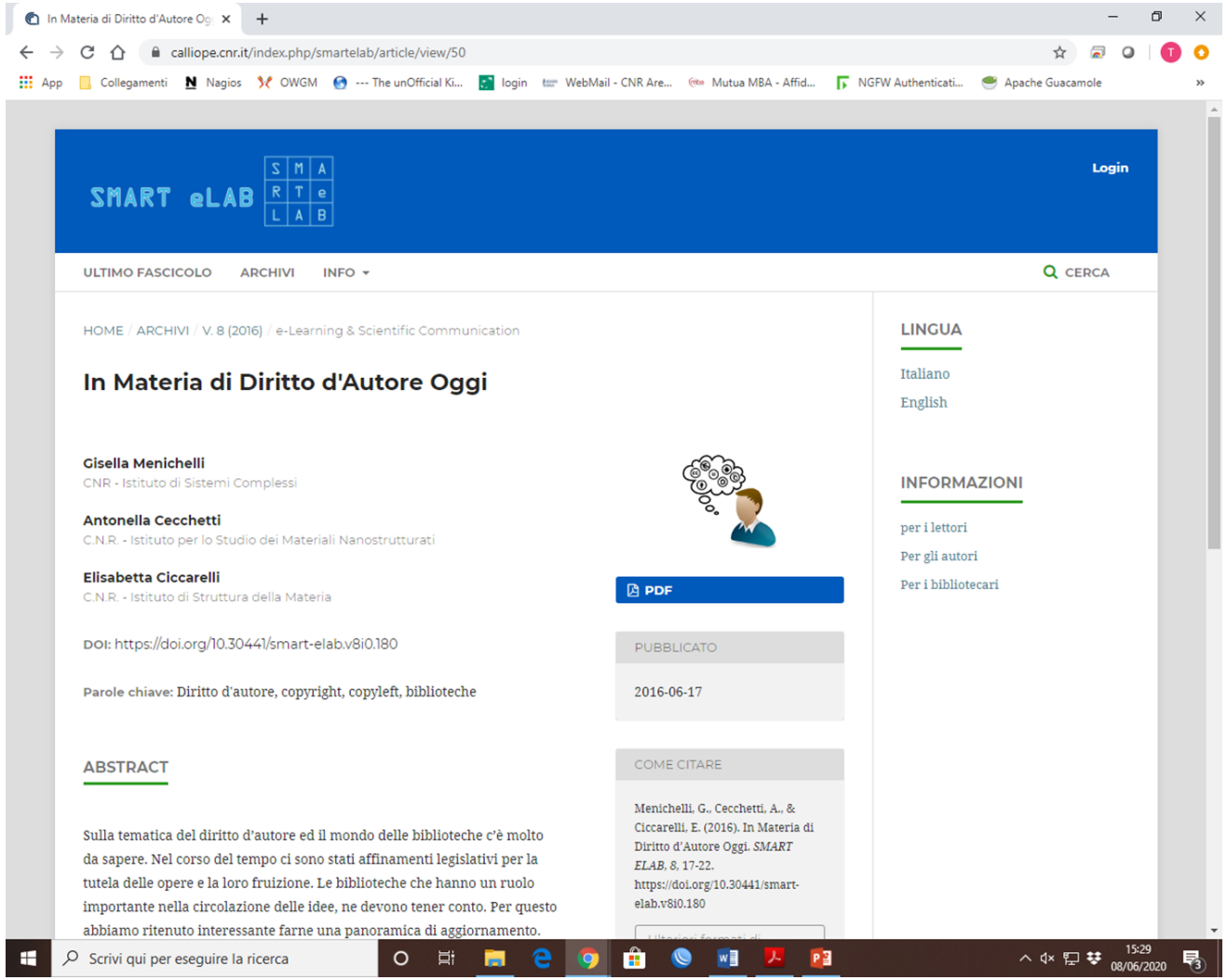
What can be identified by a DOI

- A DOI identifier can be registered on any form of intellectual property expressed in any digital environment.

- Intellectual property includes both digital content and content published on physical media: DOIs can be used to identify texts, images, audio or video resources, software, etc.

- An object can be arbitrarily identified at any level of granularity. This means that, for example, a DOI can be registered on the head of a magazine, on its single issue, on the single article of a given issue, on the single table of a given article.

https://doi.org/10.30441/smart-elab.v8i0.180



Research evaluation identifiers

Scientific Identifiers

The most commonly used scientific identifiers are:

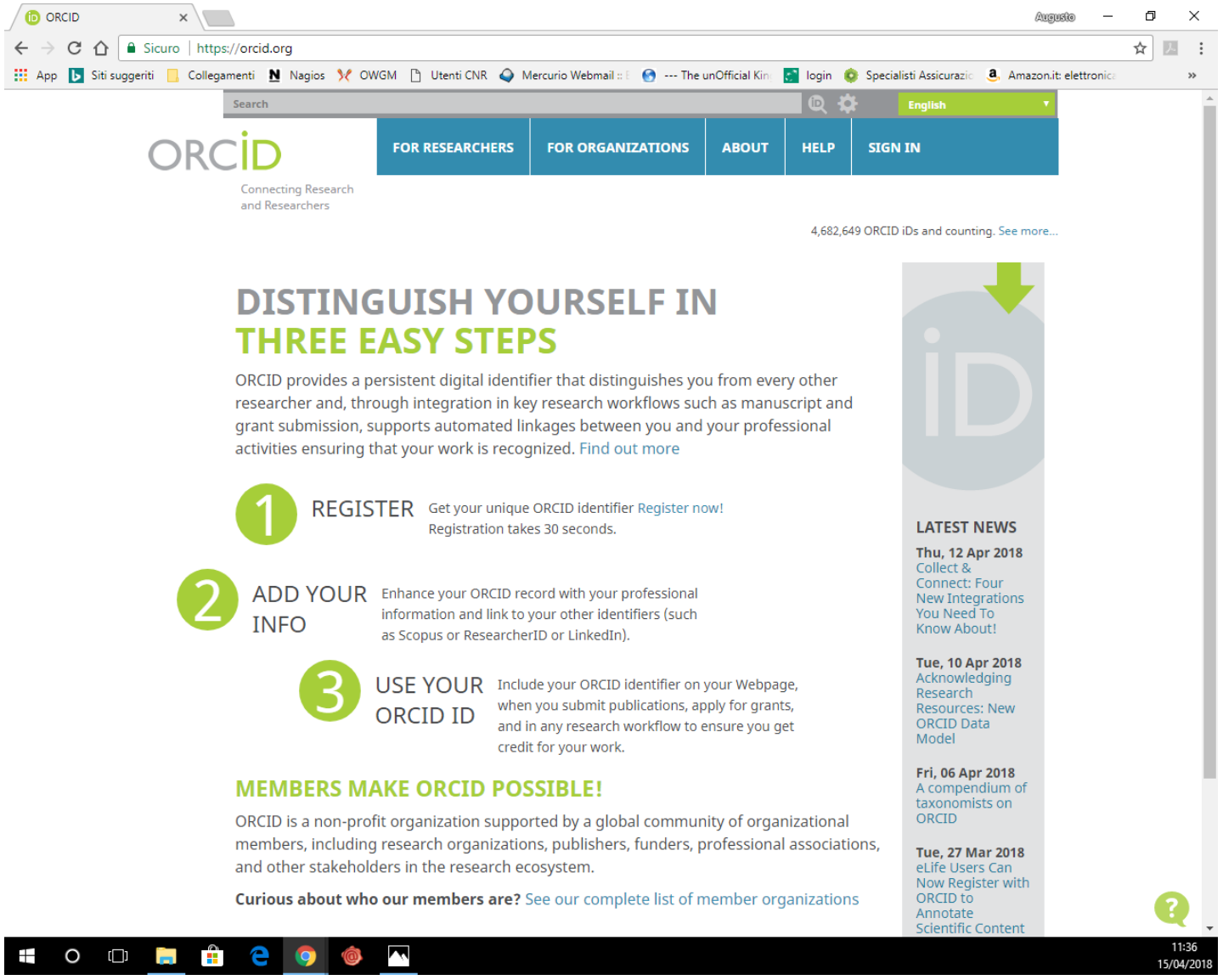
- **ORCID**,
- **WoS ResearcherID**
- **Scopus AuthorID**.

The three identifiers communicate and can be integrated with each other.

ResearcherID and AuthorID are "proprietary" identifiers or linked to the use of a specific database-owned platform. Both allow researchers to manage the lists of publications that are indexed in the two databases, to keep track of the citations received from their works and to monitor their h-index, avoiding identification errors.

ORCID

- The **Open Researcher and Contributor ID** (ORCID) is a non-proprietary alphanumeric identifier for the unique identification of scientists and other authors of the scientific literature.
- It responds to the problem of distinguishing the contributions of different authors in the case of homonyms, of surnames that change (for example after a marriage), of different abbreviations for the first name or of transliterations from different writing systems.
- It provides a stable identifier for people in analogy to the role played by Digital Object Identifiers (DOI) for content.
- ORCID launched its service on October 16, 2012, issuing the first user identifiers.



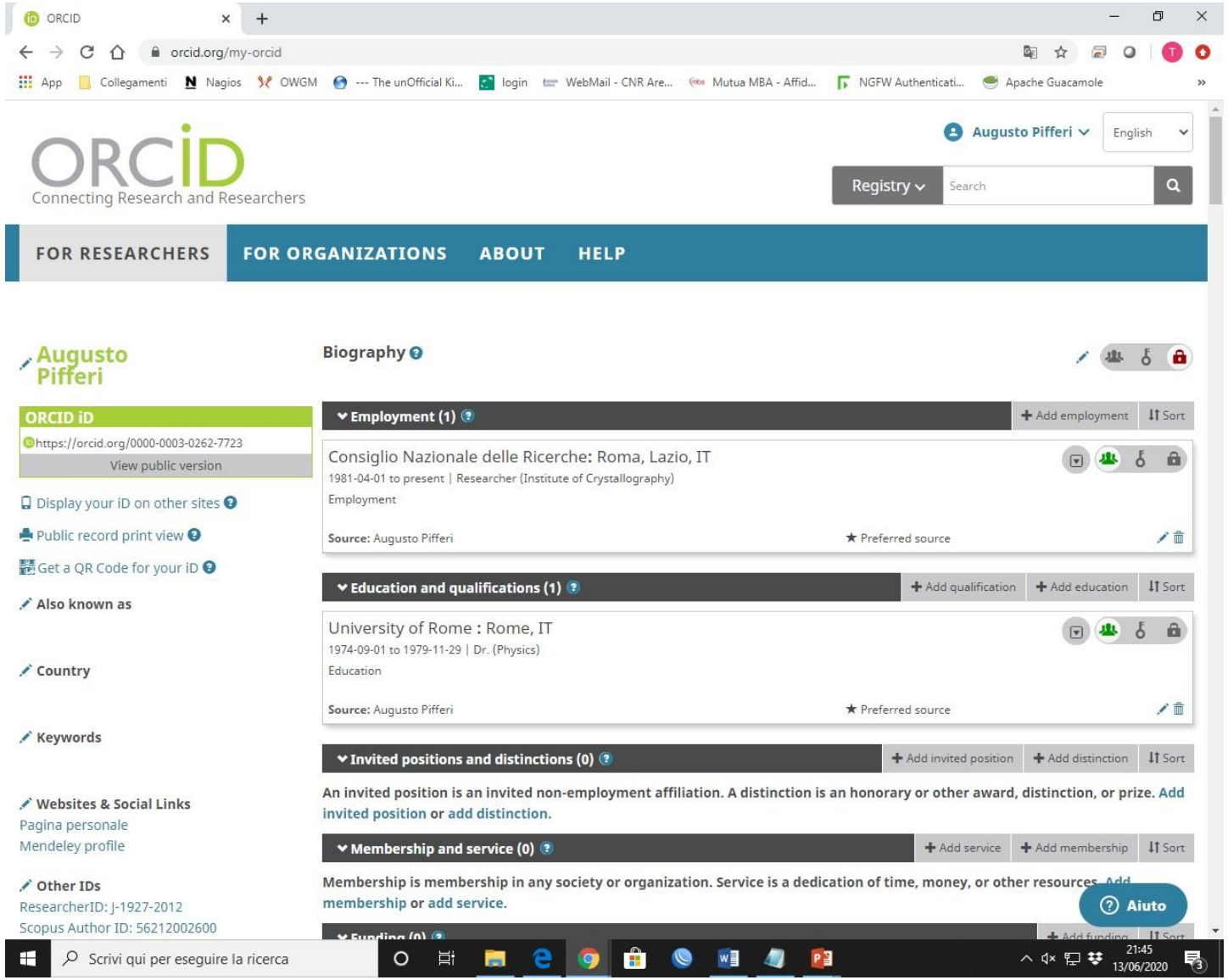
- ORCID is a nonprofit organization helping create a world in which all who participate in research, scholarship and innovation are uniquely identified and connected to their contributions and affiliations, across disciplines, borders, and time.

- ORCID is governed by a Board of Directors representative of our membership, with wide stakeholder representation. ORCID is supported by a dedicated and knowledgeable professional staff.

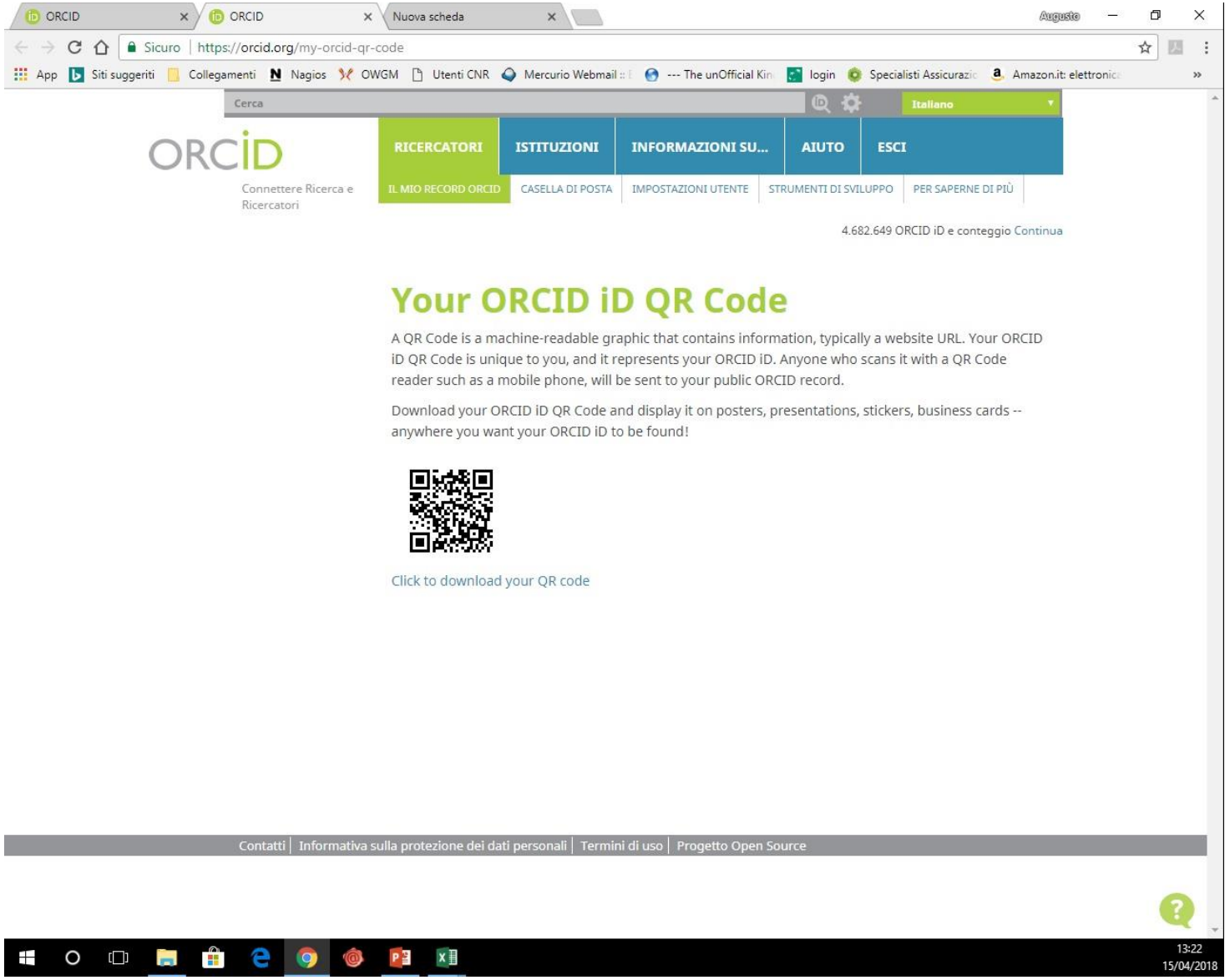
- ORCID membership is open to any organization interested in integrating ORCID identifiers. All member fees are used to sustain and develop ORCID for the benefit of the research community.

- ORCID serves a broad stakeholder community that includes individuals, research and scholarly organizations, data repositories and libraries, publishers, patent offices, service providers, and more…

The purpose of ORCID is to encourage the transition from Science to e-Science, where scientific publications can be sieved to extract hidden links and ideas in the ever-growing volume of scientific literature. Another suggested use is to provide each researcher with a digital curriculum vitae that provides a picture of his or her contribution to science that goes far beyond the simple list of publications. The idea is that other organizations can use the ORCID open access database to build upon their services.

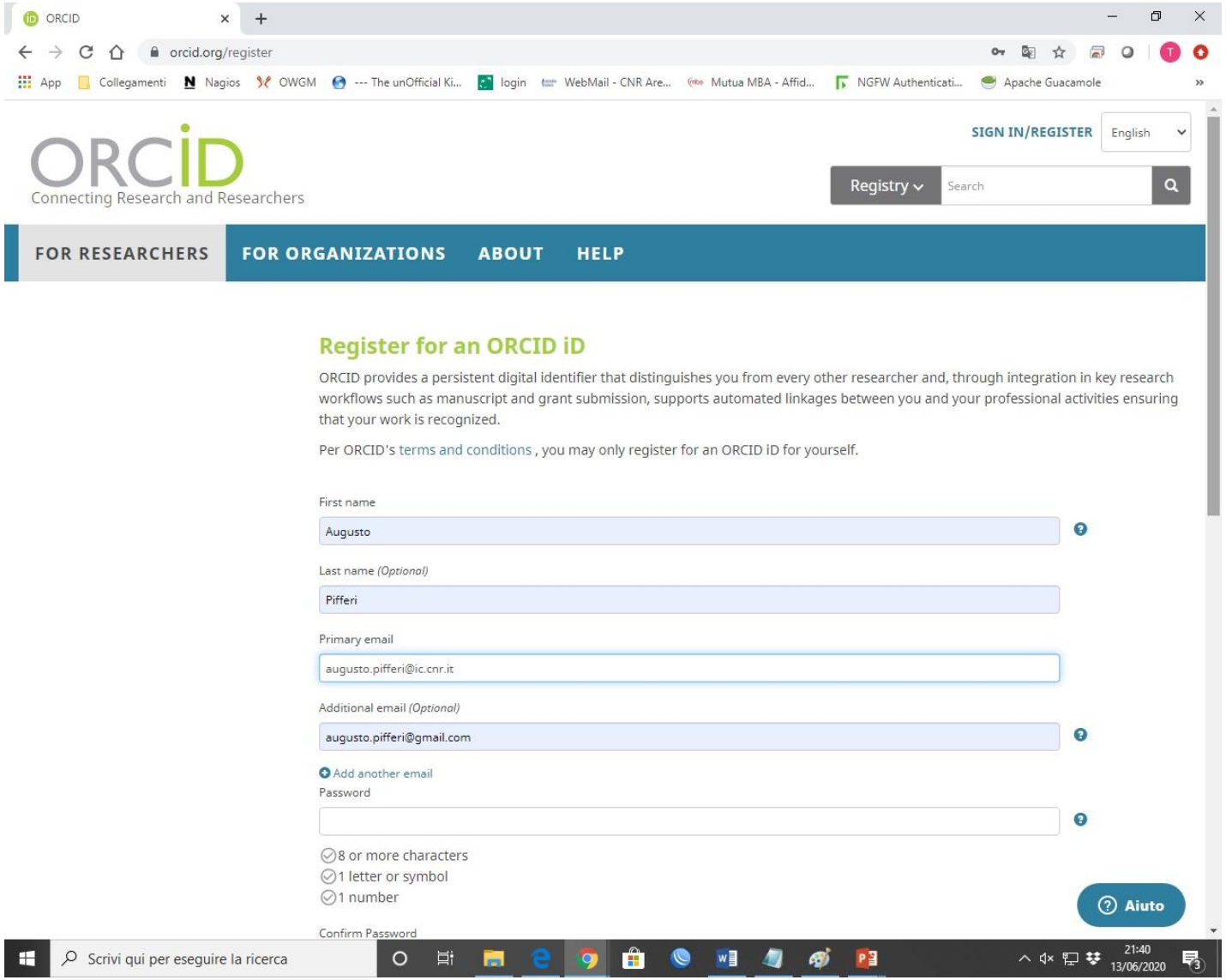


- In an editorial published in Nature it was noted that ORCID, in addition to marking the contribution that researchers make to the articles, could also be assigned to the datasets that he helped generate, comments on posts published on his colleagues' blogs, drafts of articles not yet published, changes to Wikipedia pages and much more.
- In April 2014, ORCID announced that it will begin collaborating with Consortia Advancing Standards in Research Administration Information to register and recognize peer review contributions.



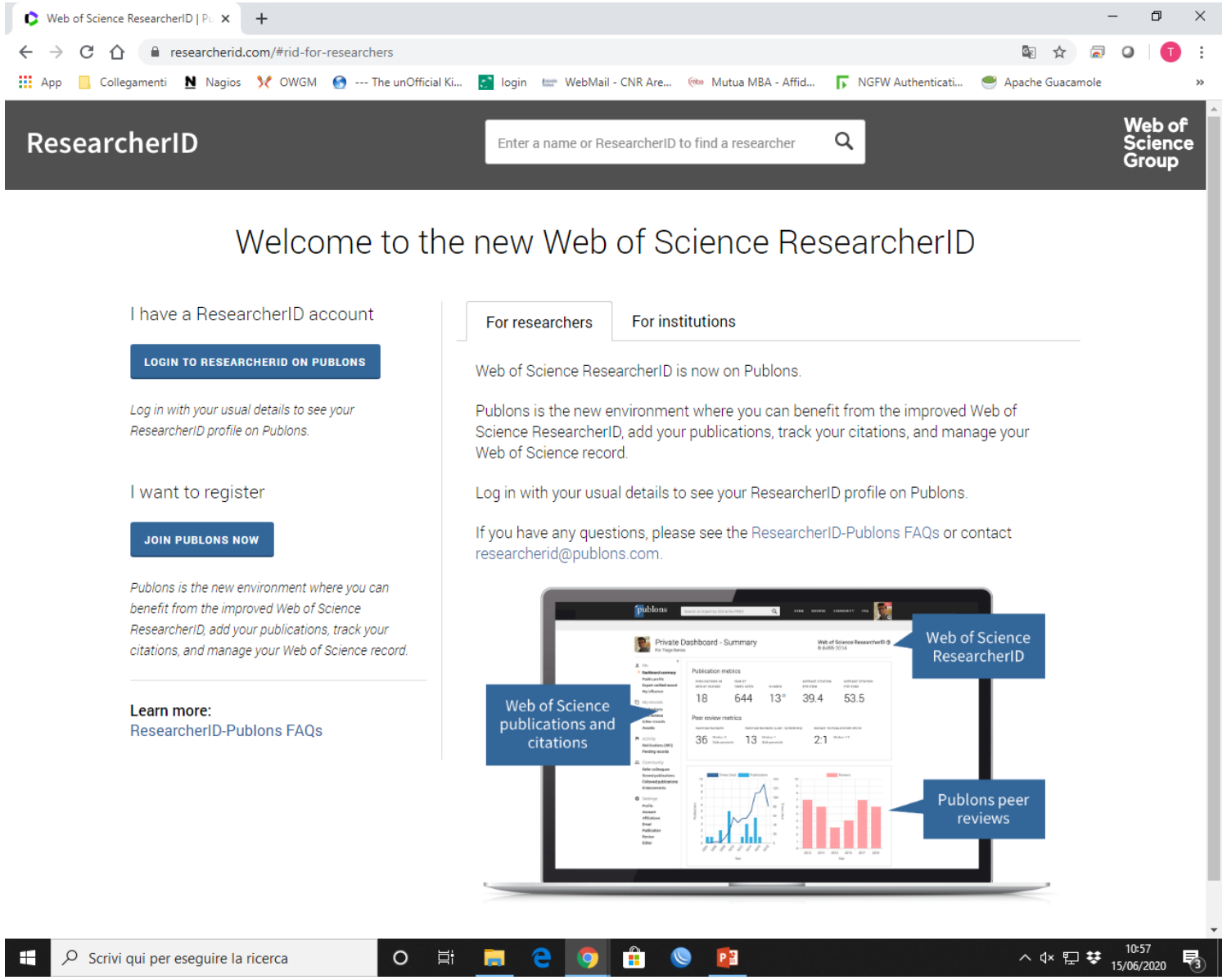
How to create your own ORCID

- Connect to the ORCID portal.
- Click on the Register Now option contained in the menu proposed in point 1.
- Type the information required by the registration procedure and press Register. In addition to the personal information, the procedure asks you to indicate how to view your profile and the preferred notification methods for the exchange of communications.

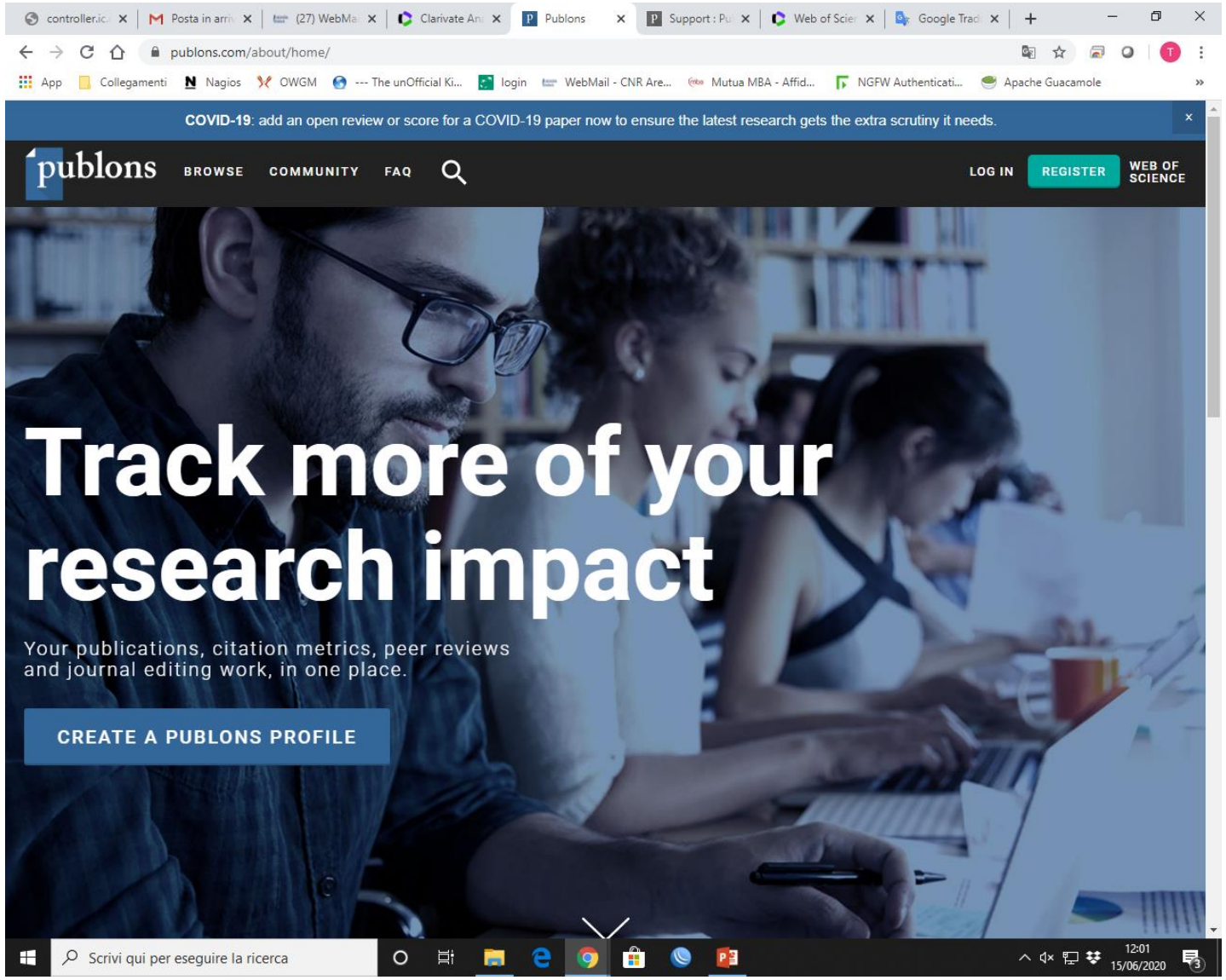


WoS ResearcherID

- **ResearcherID** provides a solution to the author's ambiguity problem within the academic research community. Each member is assigned a unique identifier to allow researchers to manage their lists of publications, track their cited times, counts and h-indexes, identify potential collaborators and avoid author identification errors.
- Web of Science ResearcherID is now on Publons.
- Publons is the new environment where you can benefit from the improved Web of Science ResearcherID, add your publications, track your citations, and manage your Web of Science record.

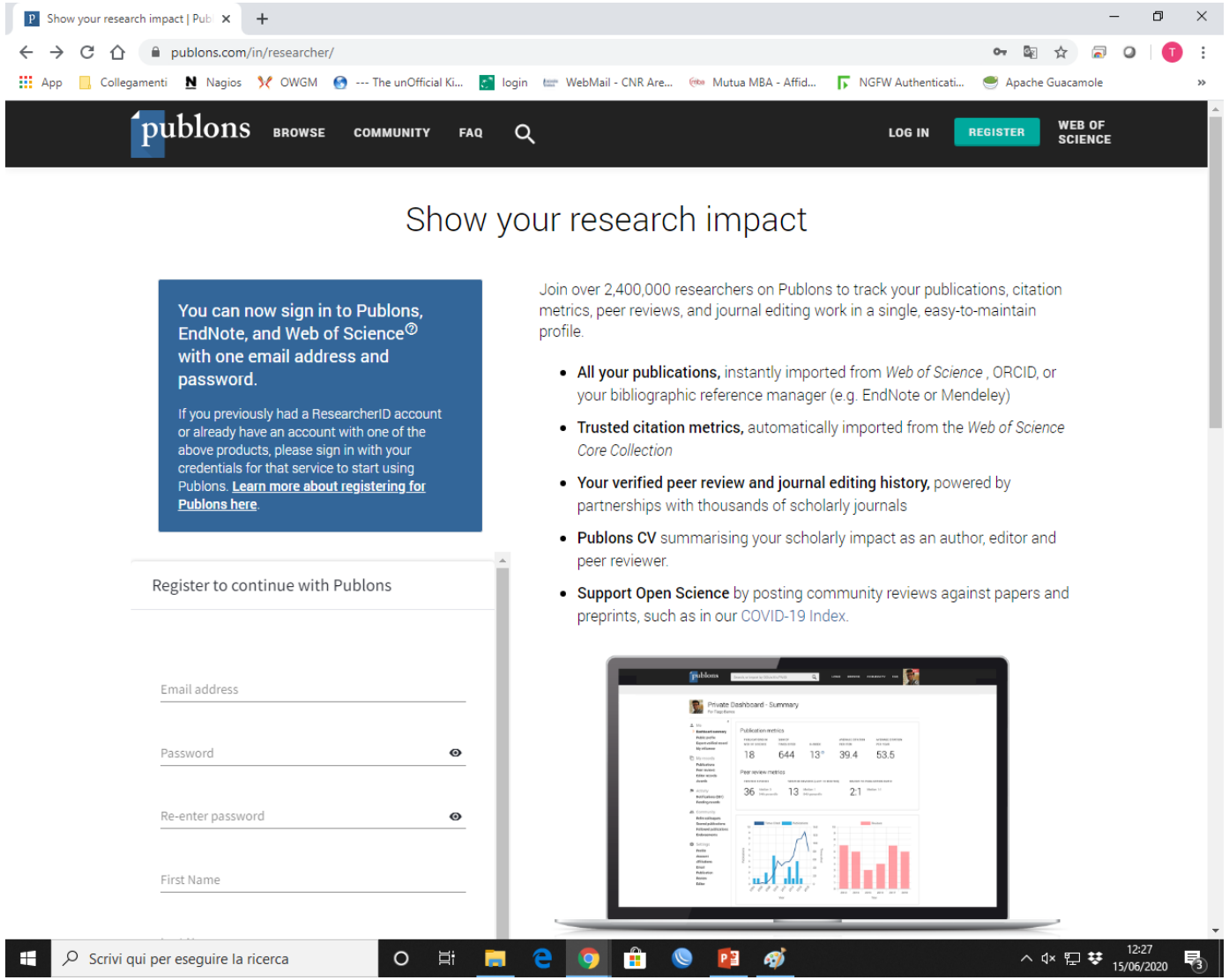


- ResearcherID information, now Publons, integrates with the Web of Science and is ORCID compliant, allowing you to claim and show your publications from a single account. Search the registry to find collaborators, examine publication lists and explore how research is used around the world!



How to create your own ResearcherID in Publons

- Connect to the **Publons** database.
- Click on the Register option contained in the Sign in menu.
- Type the information required by the registration procedure and press Continue.

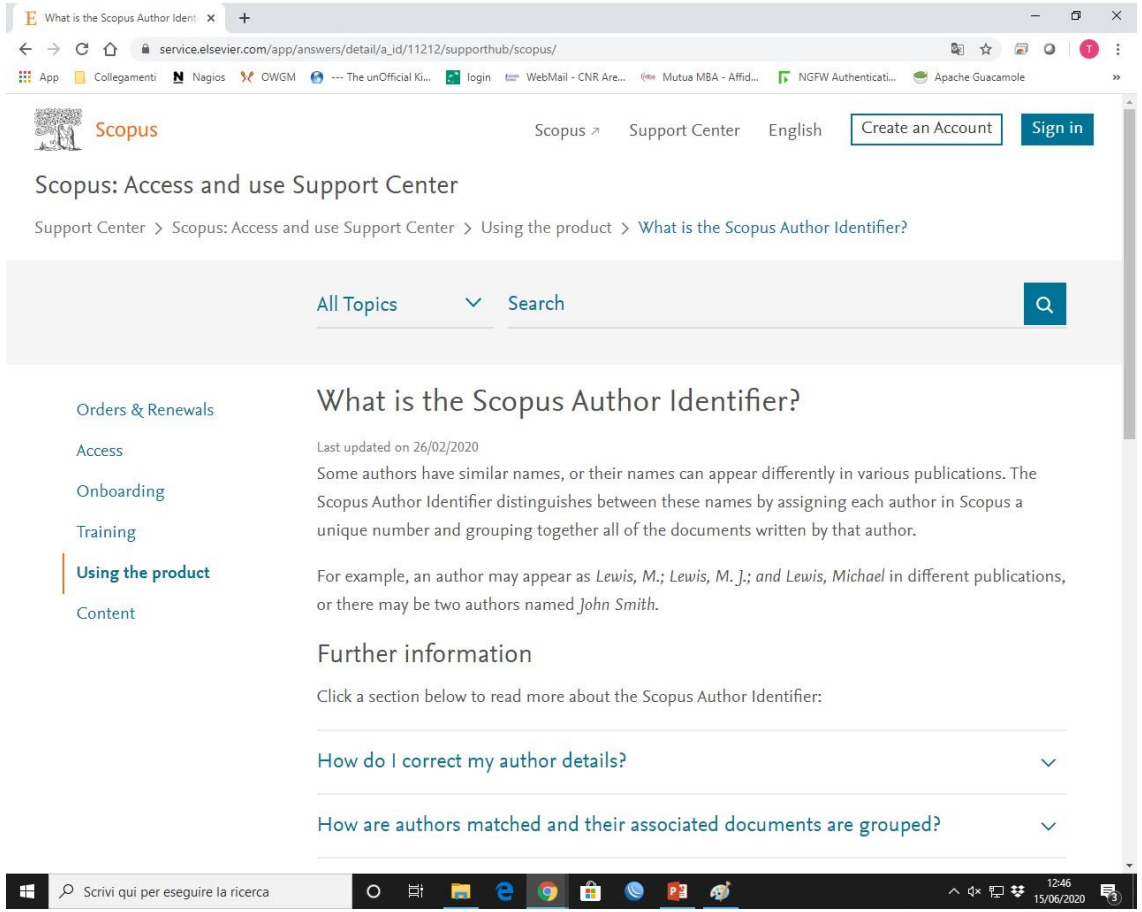


SCOPUS AuthorID (Elsevier)

What is the Elsevier Scopus Author Identifier?

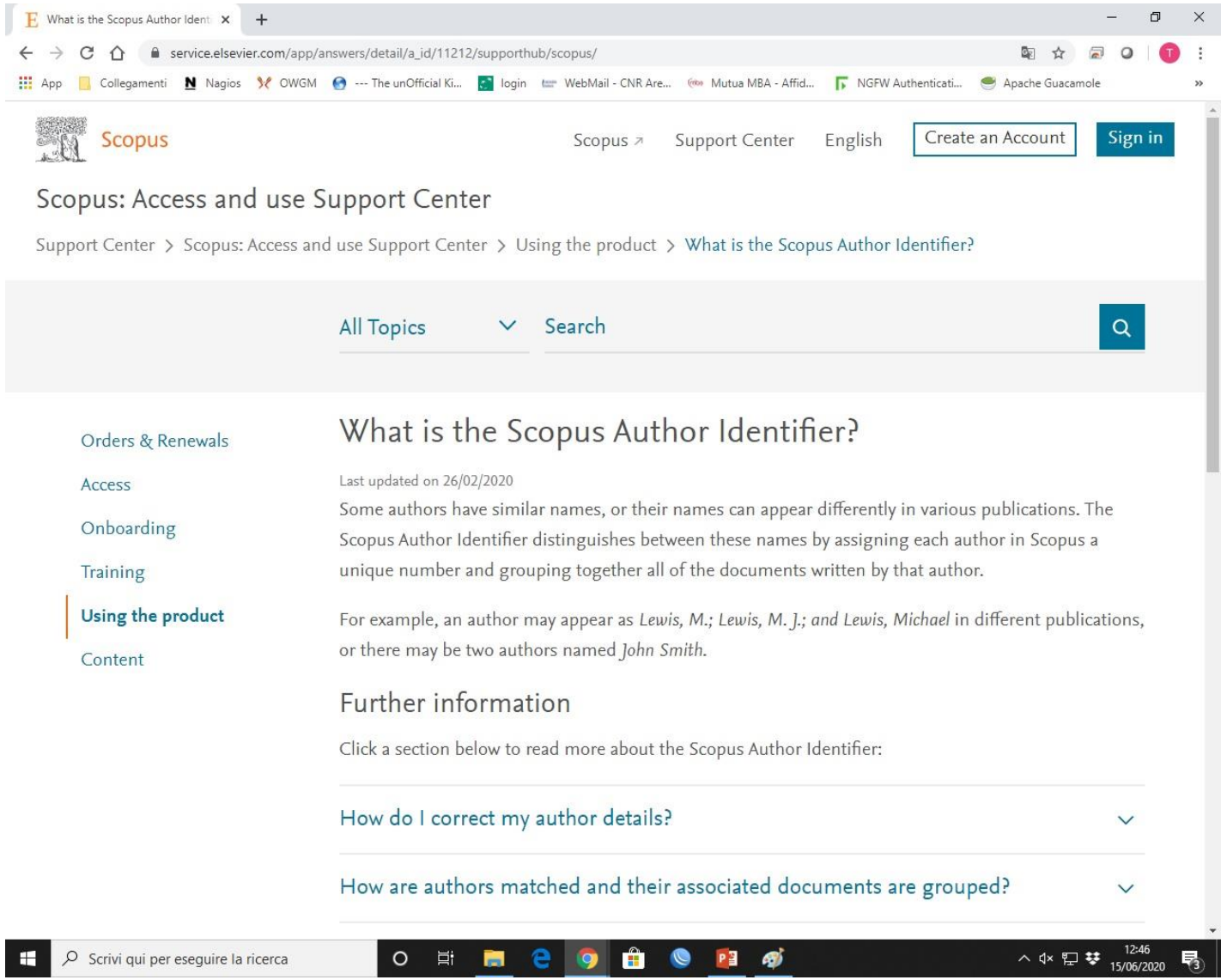
- Some authors have similar names, or their names can appear differently in various publications. The Scopus Author Identifier distinguishes between these names by assigning each author in Scopus a unique number and grouping together all of the documents written by that author.

- For example, an author may appear as Lewis, M.; Lewis, M. J.; and Lewis, Michael in different publications, or there may be two authors named John Smith.



How to create your own AuthorID in Scopus

- Connect to the **Scopus** database.
- Click on the Register option contained in the menu (at the top right of the menu bar).
- Type the information required by the registration procedure and press Register.
- AuthorID will be automatically generated



Journal & Country Rank

IMPACT FACTOR

- In academic publishing, the impact factor (IF) is a synthetic index, owned by Thomson Reuters, which measures the average number of citations received in a particular year from articles published in a scientific journal over the previous two years.
- In general, the IF is part of the so-called scientometric indices subject to a growing number of studies and research whose limits and potentials are the subject of scientometry, a scientific discipline - with some dedicated journals - which aims to develop indices to evaluate research. There is currently no generally accepted and valid mathematical method for evaluating research. It was originally created for use by libraries (bibliometric index) which had to choose the most popular magazines to activate subscriptions and not to evaluate the quality of the different magazines. Its use for a supposed magazine evaluation is the most recent of its applications.
- Magazine selection is done at the discretion of Thomson Reuters; the main features that allow a scientific journal to be taken into consideration for the measurement of the IF are:

  - punctuality in the publication of the files;
  - the application of an editorial evaluation process of the articles based on peer review;
  - the presence of an abstract and bibliographic information in English (although most of the journals surveyed are published entirely in English) as well as lists of references in the articles in Latin characters and reported according to international publishing conventions;
  - the internationality of the authors;
  - the interest in the scientific content also in relation to the current coverage of the specific thematic category or to the discussion of emerging topics;
  - the presence of citations data in the magazine (or on the authors who write to you) in the database of citations of the journals already registered by Thomson Reuters.

CALCULATION of the IMPACT FACTOR

Example of calculating the impact factor of a magazine for 2008

- Citations in 2008, in any census journal, of articles published in the journal considered in:

  2007 = 32

  2006 = 43

  Totale biennio: 75

- Number of articles published in the journal taken into consideration in:

  2007 = 86

  2006 = 69

  Totale biennio: 155

- Calculation of the IF 2008 for the magazine considered:

  2008 citations of articles published in the biennium 2006-07 75

  ---------- = ----- = 0,484

  Total articles published in the biennium 2006-07 155

- In the comparison between two journals of the same thematic category, a higher impact factor for a journal indicates that in the previous two years the journal contains articles that in the calculation year of the IF were on average more cited than the other.

- Not all of these criteria are related to the magazine's supposed scientific value; in particular, the first and last criteria have very little to do with scientific authoritativeness. Coverage is frequently reviewed, continually leading to the entry of new journals and the leaking of already registered journals. In general, however, the overall number of magazines and the degree of coverage tend to grow.

- Thomson Reuters provides in the **Journal Citation Reports** (JCR) the calculation of the IF and the ranking of a particular magazine in a homogeneous set of journals by thematic category, for a wide range of different research sectors.

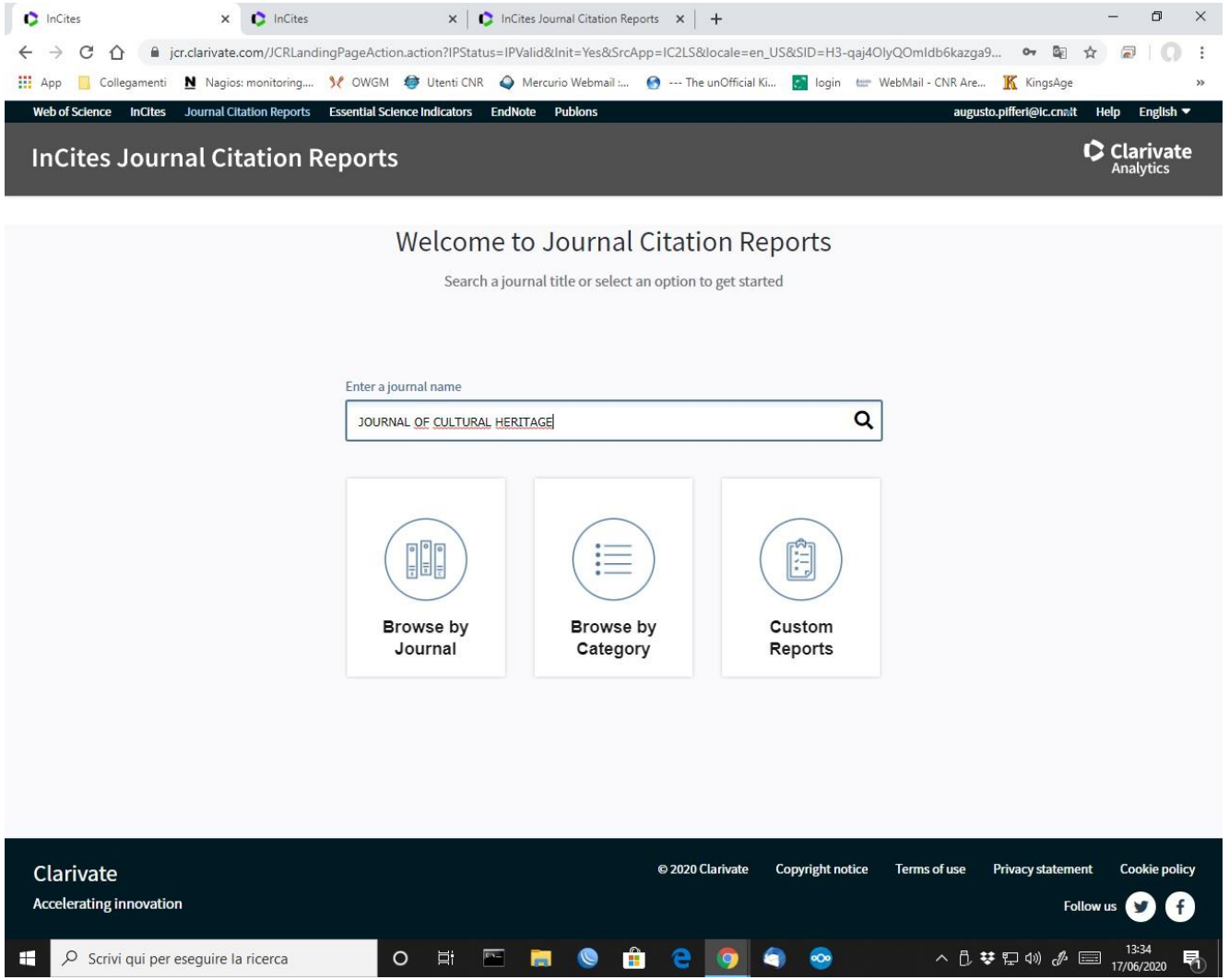
- Italian legislation (Ministerial Decree of 28 July 2009, art. 3 paragraph 4) considers the impact factor as an additional parameter for the evaluation of the qualifications presented in the competitions, limited to the scientific-disciplinary sectors in which their use is recognized at international level.

- However, the method and, above all, its application are not without criticism. It should be noted that Thomson Reuters itself considers abuse of the application of the IF for the evaluation of the individual researcher or of the impact generated on the scientific community by a single article. It also does not recommend the use of this index to estimate the "absolute value" of a magazine and to make comparisons between different scientific fields. The only valid use of the IF is, according to its creators, the classification of magazines within its thematic category of reference, which however should not be based only on the IF but also on other indices such as Immediacy Index, Total Cites , Total Articles and Citation Half-Life, which should be used together for a multidimensional evaluation of cataloged journals.

Journal Citation Reports (JCR)

The JCR, in addition to the magazine's Impact Factor, provides for each individual title other bibliometric indexes obtained from the ISI citation databases, which can also be used by teachers and researchers to identify the periodicals to which they submit their work for publication; among these indicators, we highlight here:

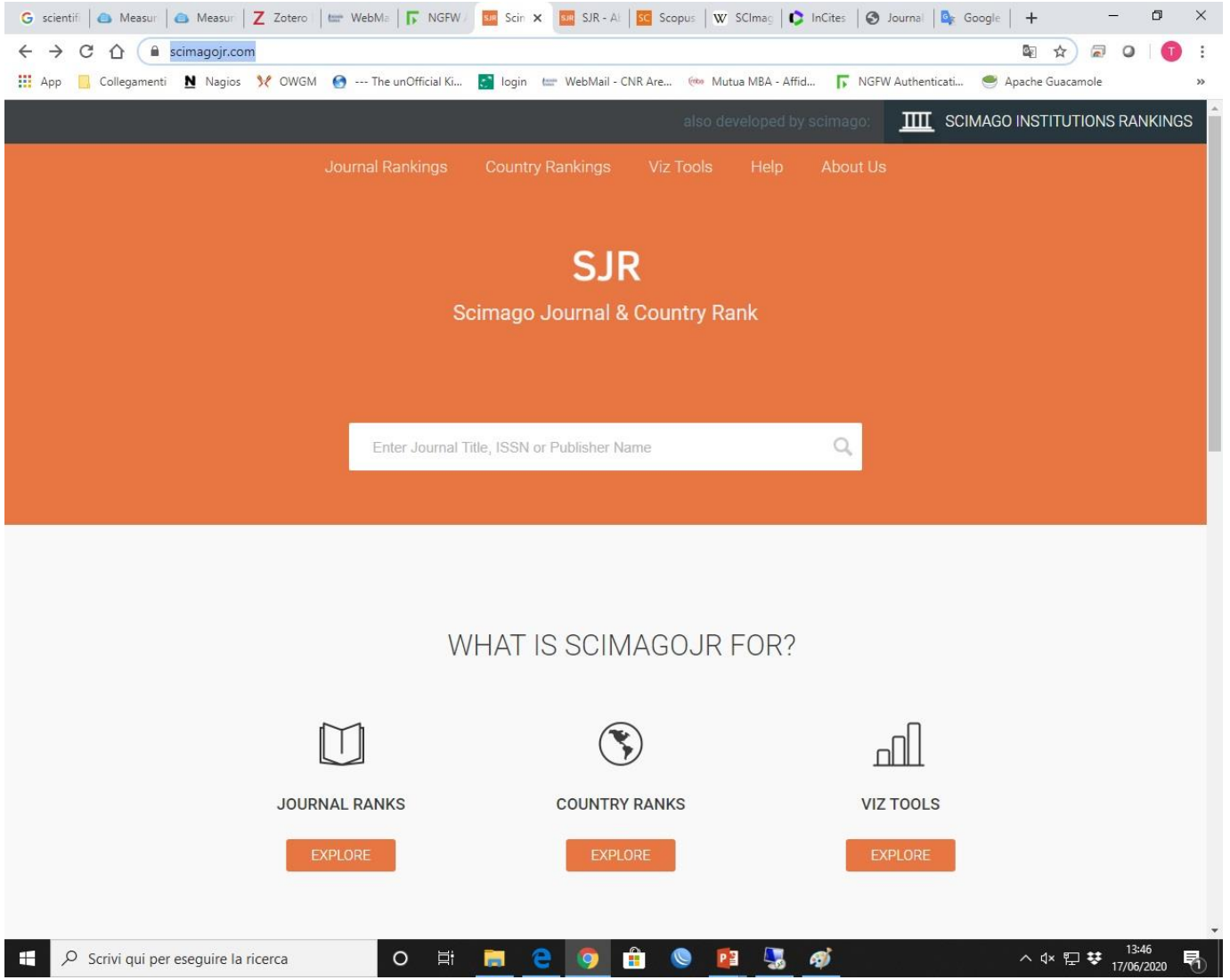
- the 5-year Journal Impact Factor: the IF calculated on the publications of the five years preceding that of reference;
- the Journal Immediacy Index: expresses the average number of citations received by the articles in the year of publication, or the "immediacy" with which they are received by the scientific community);
- the Journal Cited Half-Life: expresses the median age of the articles of the journal in question mentioned in the reference year, or provides an indication of the persistence over time of the citations; the data is calculated by counting backwards, from the reference year, in how many years 50% of the magazine's total citations are reached.



SCImago Journal & Country Rank

The SCImago Journal & Country Rank is a publicly available portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database (Elsevier B.V.). These indicators can be used to assess and analyze scientific domains. Journals can be compared or analysed separately. Country rankings may also be compared or analysed separately. Journals can be grouped by subject area (27 major thematic areas), subject category (313 specific subject categories) or by country. Citation data is drawn from over 34,100 titles from more than 5,000 international publishers and country performance metrics from 239 countries worldwide. The SJCR allows you also to embed significative journal metrics into your web as a clickable image widget

This platform takes its name from the SCImago Journal Rank (SJR) indicator (PDF), developed by SCImago from the widely known algorithm Google PageRank™. This indicator shows the visibility of the journals contained in the Scopus® database from 1996.



Science Citation Index

- The Science Citation Index (SCI) is a citation index originally produced by the Institute for Scientific Information (ISI) and created by Eugene Garfield. It was officially launched in 1964. It is now owned by Clarivate Analytics (previously the intellectual and scientific property of Thomson Reuters). The larger version (Science Citation Index Expanded) covers over 8,500 important and significant journals, across 150 disciplines, from 1900 to today. These are alternately described as the world's leading science and technology journals due to a rigorous selection process.

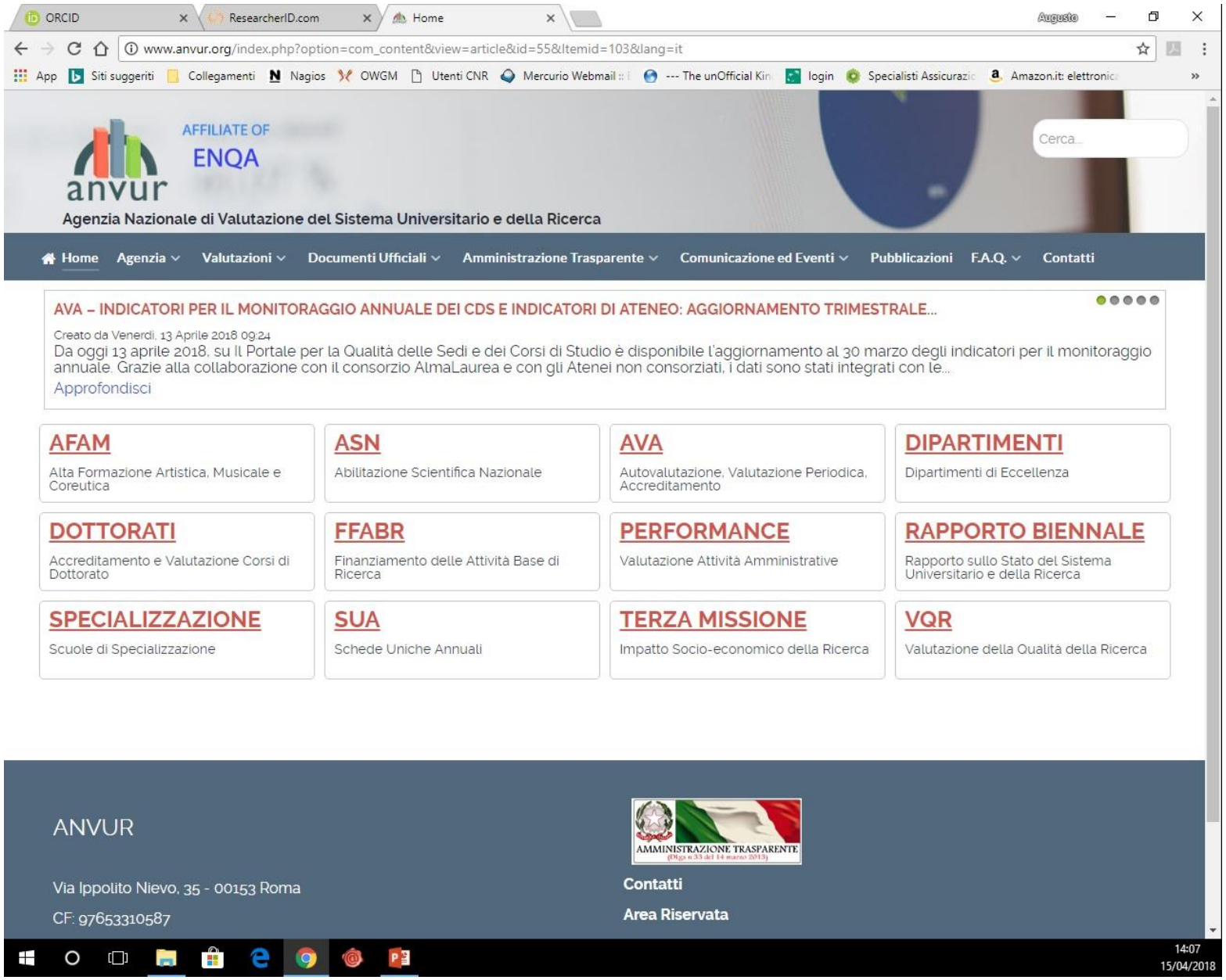
- The index is available online through various platforms, such as Web of Science and SciSearch. (There are also CDs and printed editions covering fewer magazines). This database allows a researcher to identify which subsequent articles cited a particular previous article, or cited articles from a particular author, or were cited more frequently. Thomson Reuters also markets several subsets of this database, termed "Specialty Citation Indexes", such as the Neuroscience Citation Index and the Chemistry Citation Index.

Italian Research Quality Assessment

ANVUR

The National Agency for the Evaluation of the University and Research System (acronym ANVUR) is a public body of the Italian Republic, supervised by the Ministry of Education, University and Research (MIUR). The institution, established in 2006 with headquarters in Rome, is responsible for evaluating the activity of universities in Italy.

The institution assesses the quality of the processes, results and products of management, training and research activities, including technology transfer, universities and research bodies supervised by MIUR.



To this end, the ANVUR assessment is carried out, inter alia:

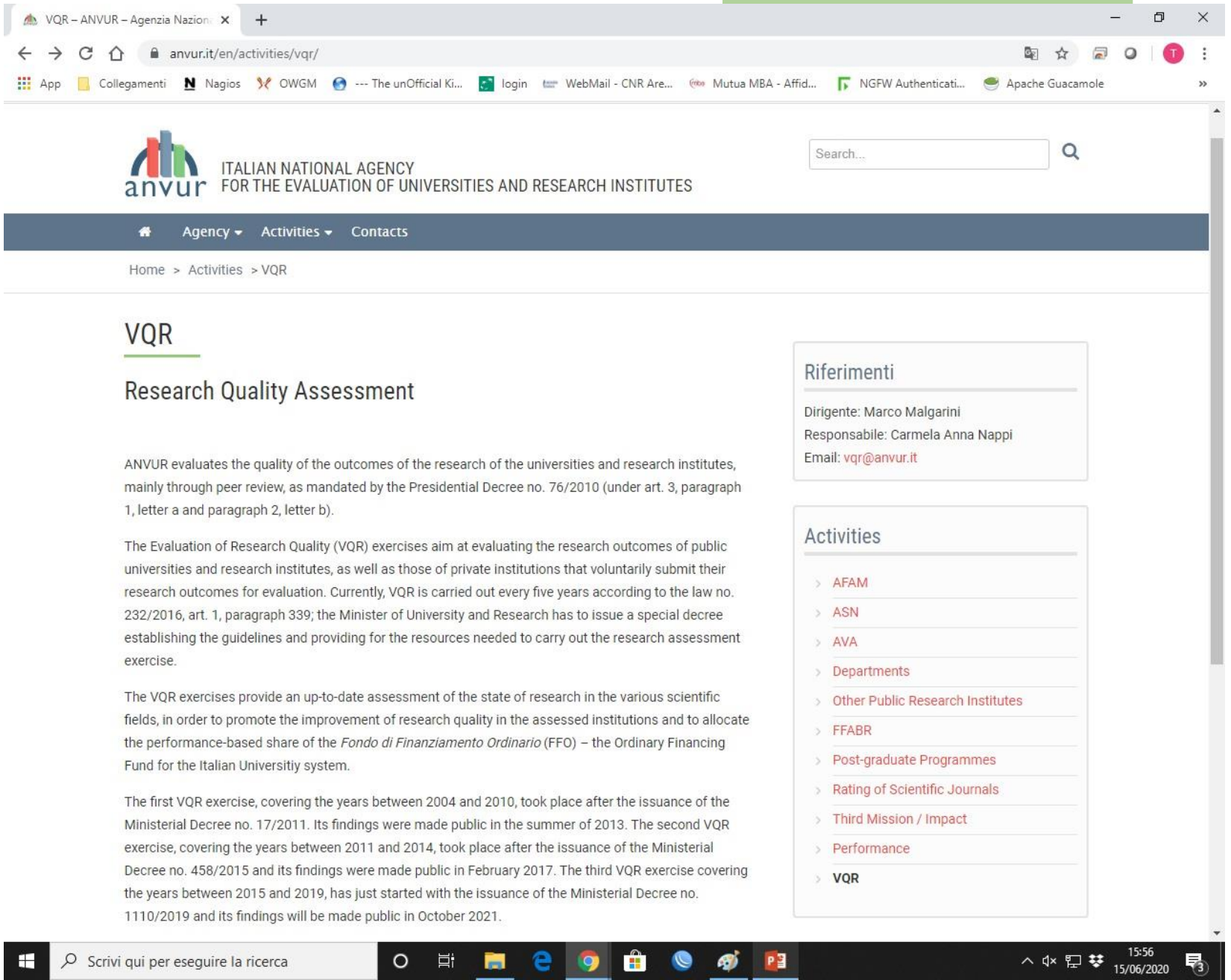
- the efficiency and effectiveness of teaching, also with reference to the learning outcomes and subsequent job placement of the students
- the quality of the research products, mainly assessed through peer-reviews
- the ability to attract external funding and to activate collaborations and exchange of researchers
- the adequacy of public communication relating to educational offerings, student services, assessment results

In carrying out its activities, the Agency uses the most appropriate criteria, methods and indicators for each type of evaluation, also in reference to different disciplinary areas, taking into account those defined by the independent Commission for evaluation, transparency and integrity of public administrations, as well as experiences developed and shared nationally and internationally. The Agency prepares uniform procedures for recording students' assessment of courses; proposes the criteria for the evaluation of structures and courses of study for the purpose of periodic accreditation, the requirements for the establishment of new universities or new offices, and for the activation of study courses. It elaborates the parameters for the allocation of state loans, including the determination of the essential levels of performance and the unit costs related to specific types of services. It also assesses the efficiency of public funding programs and the results of program agreements. Finally, the Agency prepares a biennial report on the state of the university system and research: the first of these reports was made public in March 2014.

Activities carried out by ANVUR include:

- Research Quality Assessment (VQR);
- the definition of the criteria and parameters for the national scientific qualification (ASN);
- the procedures for the Self-Assessment, Periodic Evaluation and Accreditation of university study courses (AVA).

VQR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FOR THE EVALUATION OF UNIVERSITIES AND RESEARCH INSTITUTES
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VQR
Research Quality Assessment
ANVUR evaluates the quality of the outcomes of the research of the universities and research institutes, mainly through peer review, as mandated by the Presidential Decree no. 76/2010 (under art. 3, paragraph 1, letter a and paragraph 2, letter b).
The Evaluation of Research Quality (VQR) exercises aim at evaluating the research outcomes of public universities and research institutes, as well as those of private institutions that voluntarily submit their research outcomes for evaluation. Currently, VQR is carried out every five years according to the law no. 232/2016, art. 1, paragraph 339; the Minister of University and Research has to issue a special decree establishing the guidelines and providing for the resources needed to carry out the research assessment exercise.
The VQR exercises provide an up-to-date assessment of the state of research in the various scientific fields, in order to promote the improvement of research quality in the assessed institutions and to allocate the performance-based share of the Fondo di Finanziamento Ordinario (FFO) – the Ordinary Financing Fund for the Italian Universitiy system.
The first VQR exercise, covering the years between 2004 and 2010, took place after the issuance of the Ministerial Decree no. 17/2011. Its findings were made public in the summer of 2013. The second VQR exercise, covering the years between 2011 and 2014, took place after the issuance of the Ministerial Decree no. 458/2015 and its findings were made public in February 2017. The third VQR exercise covering the years between 2015 and 2019, has just started with the issuance of the Ministerial Decree no. 1110/2019 and its findings will be made public in October 2021.
Riferimenti
Dirigente: Marco Malgarini
Responsabile: Carmela Anna Nappi
Email: vqr@anvur.it
Activities
AFAM
ASN
AVA
Departments
Other Public Research Institutes
FFABR
Post-graduate Programmes
Rating of Scientific Journals
Third Mission / Impact
Performance
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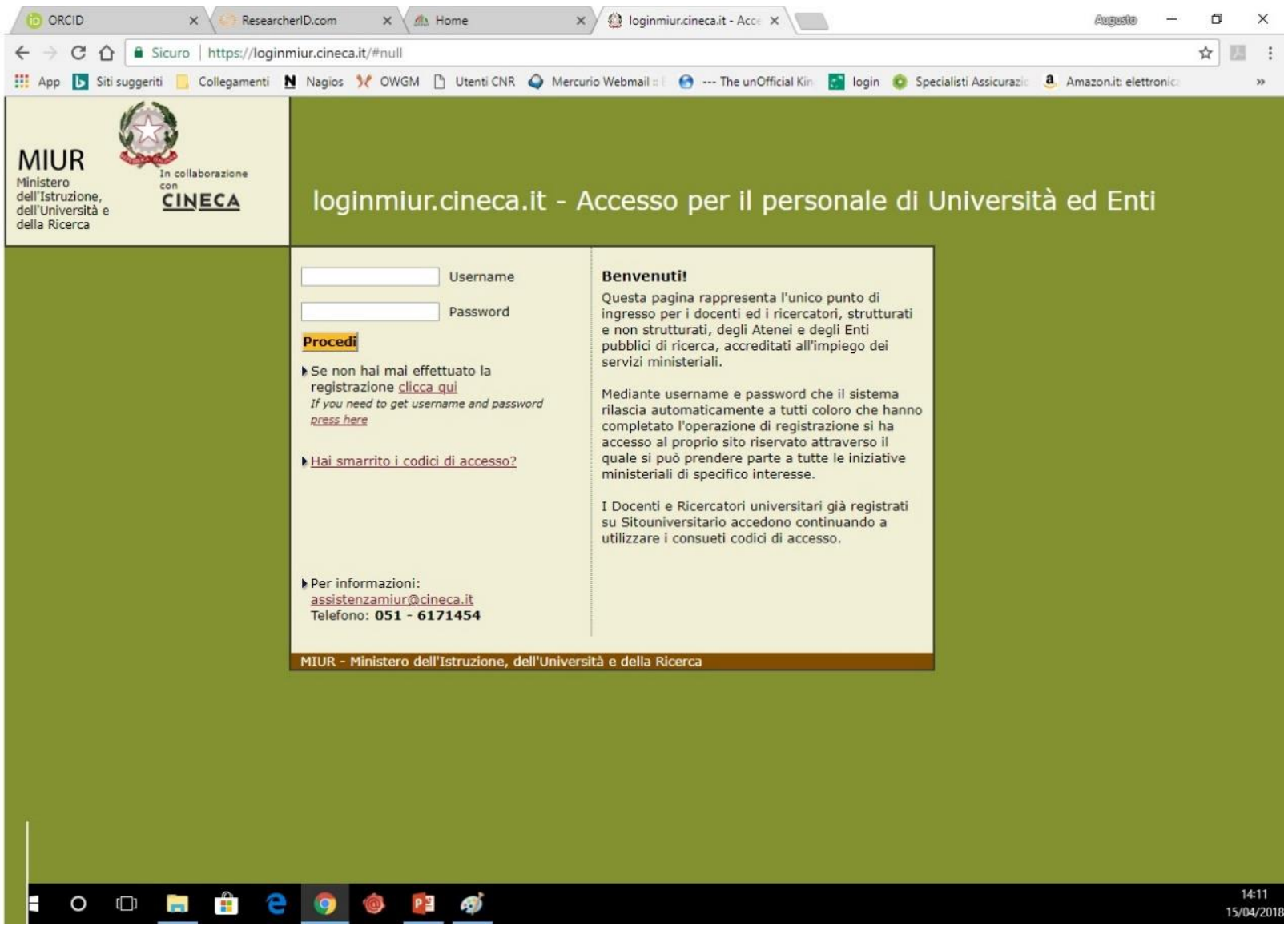
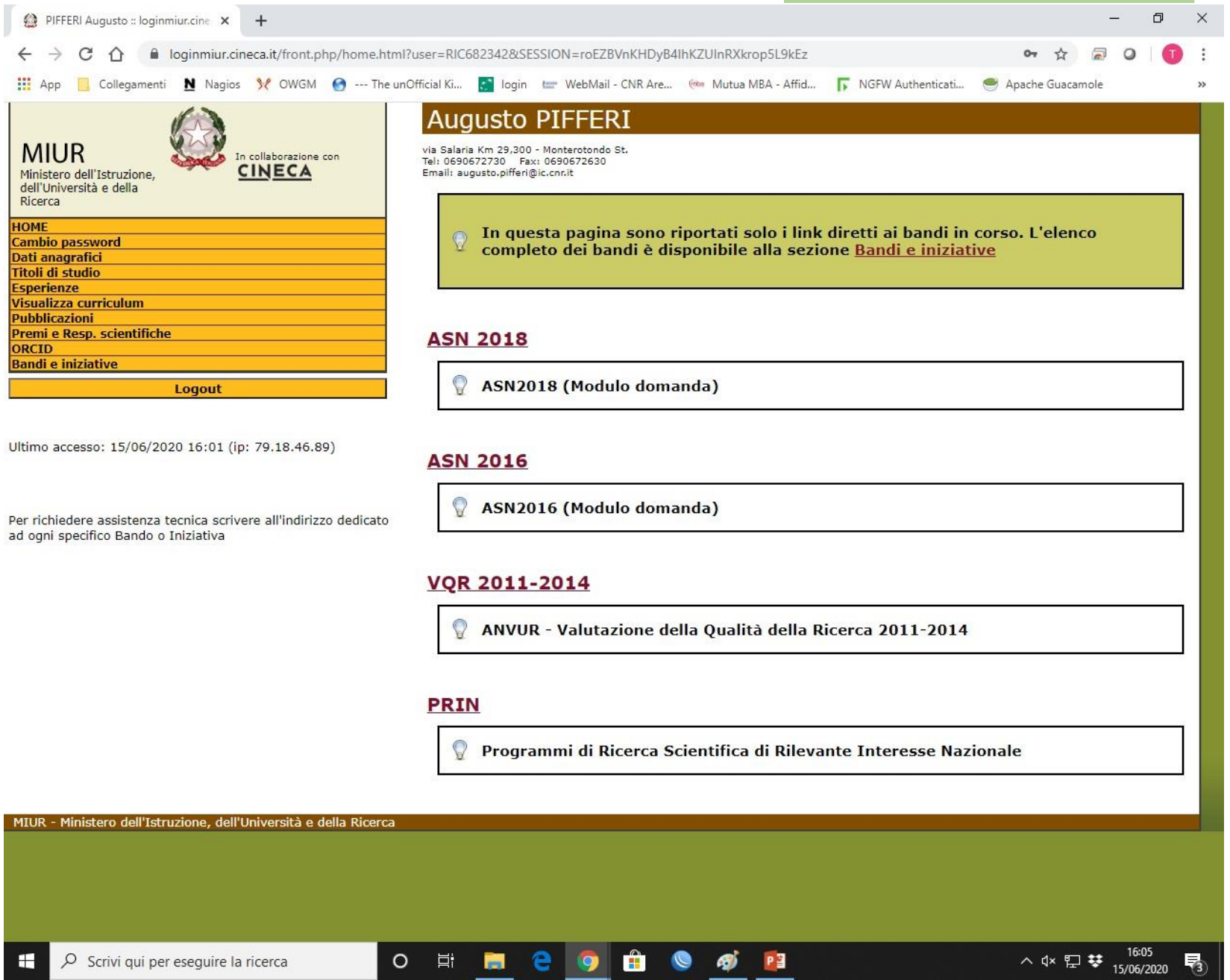
- The only entry point for teachers and researchers, both structured and unstructured, of universities and public research bodies, accredited for the use of ministerial services.

- By username and password that the system automatically releases to all those who have completed the registration operation, you have access to your private site through which you can take part in all ministerial initiatives of specific interest.

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Per richiedere assistenza tecnica scrivere all'indirizzo dedicato ad ogni specifico Bando o Iniziativa
Augusto PIFFERI
via Salaria Km 29,300 - Monterotondo St.
Tel: 0690672730 Fax: 0690672630
Email: augusto.pifferi@ic.cnr.it
In questa pagina sono riportati solo i link diretti ai bandi in corso. L'elenco completo dei bandi è disponibile alla sezione Bandi e iniziative
ASN 2018
ASN2018 (Modulo domanda)
ASN 2016
ASN2016 (Modulo domanda)
VQR 2011-2014
ANVUR - Valutazione della Qualità della Ricerca 2011-2014
PRIN
Programmi di Ricerca Scientifica di Rilevante Interesse Nazionale
MIUR - Ministero dell'Istruzione, dell'Università e della Ricerca
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Qualifica Primo tecnologo
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Struttura Istituto di cristallografia
Modifica
Periodo 01/03/1981 - oggi
Posizione Tecnologo presso Ente di ricerca
Qualifica Primo tecnologo
Nome e indirizzo istituzione Consiglio Nazionale delle Ricerche - Piazzale Aldo Moro, 7 - Roma
Struttura Istituto di cristallografia
Modifica
Periodo 31/12/2006 - 31/12/2006
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Qualifica Tecnologo
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Modifica
Periodo 01/03/1981 - 31/12/2006
Posizione Ricercatore presso Ente di ricerca
Qualifica Ricercatore
Nome e indirizzo istituzione Consiglio Nazionale delle Ricerche - Piazzale Aldo Moro, 7 - Roma
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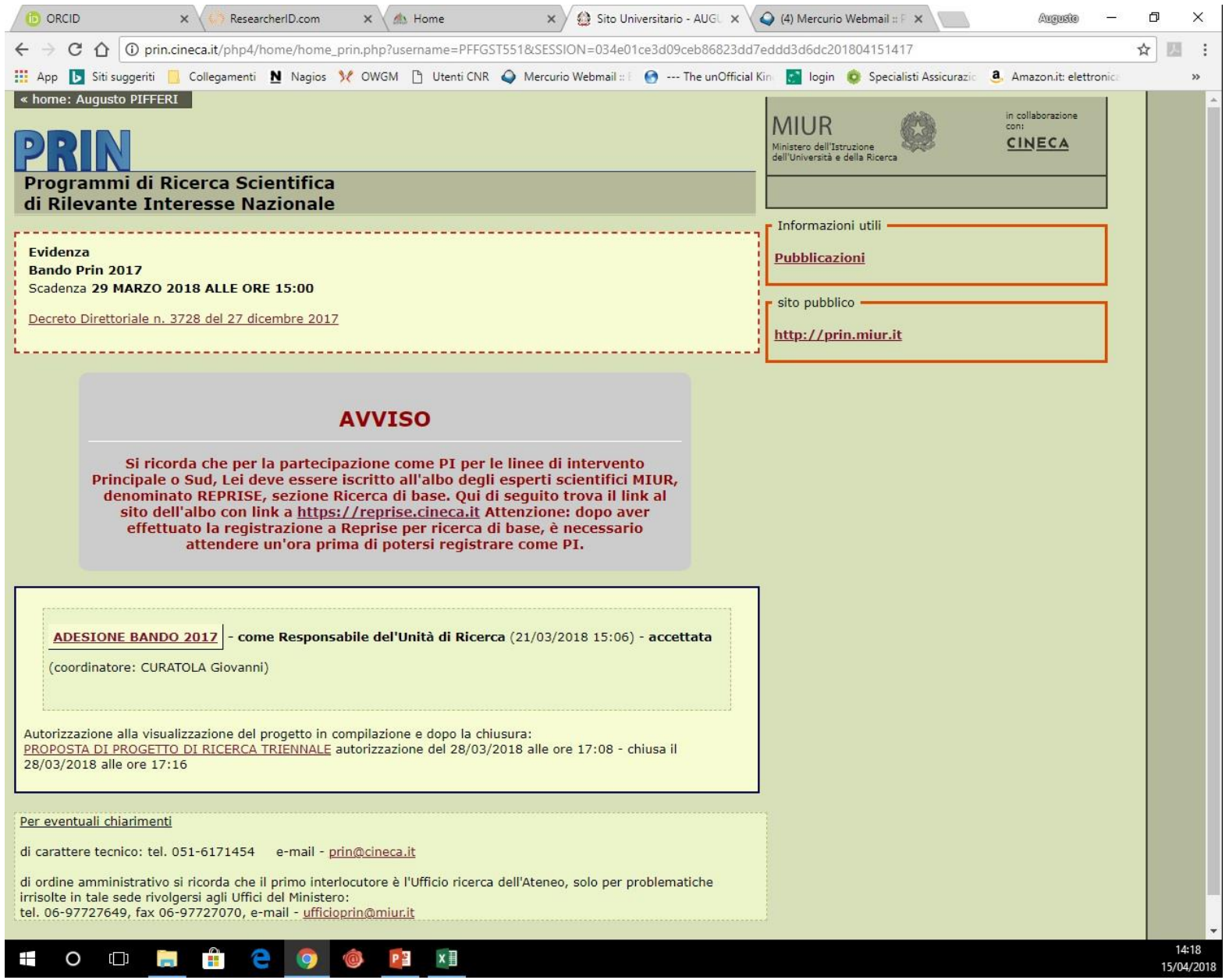


Scholars evaluation

H-Index

Proposed in 2005 by the physicist Jorge E. Hirsh, it is used internationally to measure the individual performance of individual authors, whose productivity and degree of incidence it quantifies through publications.
It is calculated based on the number of publications and the number of citations received: an author has H-Index equal to x, if x of his n works have received at least x citations each (for example: an author has the H-Index = 8 if he produced 8 works that were each cited at least 8 times).

How to search for it with SCOPUS (since 1996)

1. access the Scopus citation database
2. select "Autor Search"complete the fields with the author's name and start the search with "Search"
3. the following page will show a list of authors with similar names: it is necessary to check it and select only the records that exactly correspond to the author sought
4. click on "View citation overview"
5. the following page will show on the right the calculated H-Index and the link for the graph
6. if irrelevant articles are present, you can delete them by ticking them and clicking on X "Delete" to obtain the recalculated H-Index

- **How to search for it with WEB OF SCIENCE (since 1975)**

1. access the Web of Science citation database
2. in correspondence with "Author" insert the surname and the initial of the name followed by * (for example: Pifferi A *)
3. if necessary, you can delimit the period for which you want to calculate
4. click on "Search" to start the search
5. use the commands visible on the left to correctly direct the search (for example: Authors, Years, etc.) and start it again by clicking "Refine"
6. to open the page, click in the right corner on "Create Citation Report)
7. check the accuracy of the articles, removing the irrelevant ones with a tick, and click on "Go" next to the years range boxes
8. the following page will show the statistics graphs and, on the right, the calculated H-Index

G-Index

The bibliometric indicator G-Index, created by Leo Egghe, was created to give greater weight to the most cited articles.

Its formula for calculation is:

the G-index is the largest order number (when articles are classified in descending order by number of citations received) such that the first g articles have received (overall) at least g2 citations.

the Scopus and WoS databases do not currently provide this indicator.

G-Index

TC	r		ΣTC	r2	
47	1		47	1	
42	2		89	4	
37	3		126	9	
36	4		162	16	
21	5		183	25	
18	6		201	36	
17	7		218	49	
16	8		234	64	
16	9		250	81	
16	10		266	100	
15	11		281	121	
13	12		294	144	
13	**13**	**H-Index=13**	307	169	
13	14		320	196	
13	15		333	225	
12	16		345	256	
12	17		357	289	
12	18		369	324	
12	**19**		**381**	**361**	**G-Index=19**
11	20		392	400	

TC = total citations per article

r = rank article (number), sorted by decreasing number of citations per article

ΣTC = progressive sum of citations, starting from the article with rank equal to 1 onwards

r 2 = rank article (number) squared

To calculate the G-index using Scopus or WoS data

1. Query the database and retrieve all the articles published by the author
2. Sort the articles by decreasing number of citations by article
3. Export data (Num. Citations) to an excel worksheet
4. Create the rank column and raise its values to the square, thus obtaining the columns r and r2 shown in the example
5. Carry out the progressive sum of the citations starting from the article with rank equal to 1, thus obtaining the ΣTC column shown in the example
6. Compare the values of r2 line by line and ΣTC. The last line in which ΣTC will be greater than or equal to r2 will be the row whose value of r will correspond to the G-index (line 19 in the example)

Hc-Index

The contemporary H-index has been introduced to correct some limitations of the H-index, e.g. the penalization of younger scientists and of disciplinary areas reporting a lower number of citations.

The contemporary H-index is not provided by citational databases and it has to be calculated, using the same calculation of the H-index with the addition of the following corrective formula:

(4 x n. of document's citations) / (current year - document's publication year + 1)

Hc-index = contemporary H-index

1. Define a reference year (t)
2. Take all the articles published by an author based on the period to be analyzed
3. For each article, take the corresponding year of publication
4. For each article take the citations received
5. To calculate normalized citations: (n. citations X 4) / (reference year - year of publication of the article + 1)

As a consequence, the citations received in more recently published articles have a greater weight than the citations received on articles published in past years.
Obtained all the citations normalized by year of publication, we calculate the contemporary Hc-index.
The decimal results are all rounded up.
Arrange the normalized citations in a column in descending order and tile a column with the growing article number.
The contemporary H-index will be the value of column “n. article "whose subsequent value exceeds that of the "normalized citations" column

normalized citations	# article	
170	1	
80	2	
65	3	
40	4	
20	5	
10	6	**Hc-Index=6**
5	7	
2	8	
2	9	
1	10	

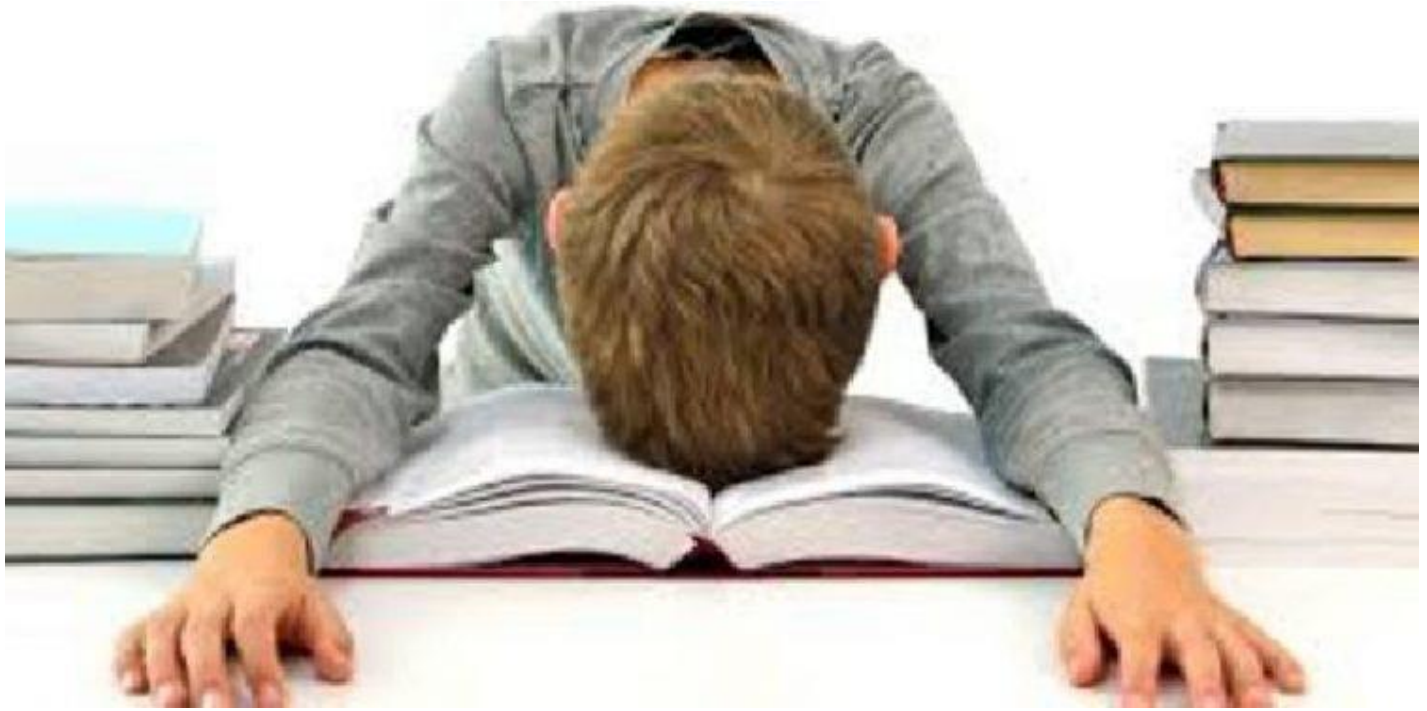
Example n. 1

- Publication year = 2010
- Citations received = 85
- Reference year 2014
- (85 * 4) / (2014-2010) +1 =340/5 = 68

Example n. 2

- Year of publication = 2013
- Citations received = 85
- Reference year = 2014
- (85 * 4) / (2014-2013) + 1 = 340/2 = 170

Thanks for your attention



Questions & Answer