

# CSC 595 Research Methods



How to do a literature search?

# Relevant sources of information

## Where to search?

- Bibliographic (and citation) databases (PubMed, Scopus, Web of Science, Dimensions, SCIndeks)
- Full-text databases (publishers' platforms) and individual journals
- EBSCO Discovery
- Google Scholar
- Repositories and aggregators
- ...

Advantages of bibliographic databases: normalized metadata; author's keywords + terms from controlled vocabularies

Search multiple sources!



## Managing CS Literature

- There are too many conferences, workshops, symposium one has to keep track of
  - At least in most areas
  - Same for journals, newsletters, bulletins etc.
  - There is a huge amount of CS literature
  - Including Theses, online books, technical reports...
  - Agree?

# Managing CS Literature



- **Solution**
- Make extensive use of existing literature search tools
- Assuming that you know what your research focus is...
- Started this process ... with [Saudi Digital library](#)

# Assessing Relevance



- **Journals**

- What are the leading journals in your area ?
- Are papers of sufficiently high quality ?
- Are members of editorial board active researchers ?
- Does the journal have a reasonable impact factor?
- Is it refereed?

- **Conferences**

- Can you identify leading conferences covering your area?
- What are the acceptance rates?
- What is the quality of the papers accepted?

# Impact Factor



- The impact factor, **IF**
- **What is the Impact Factor?**
- Measure reflecting average number of citations to articles published in science and social science journals
- Frequently used as a proxy for relative importance of journal within its field,
  - Journals with higher impact factors deemed more important than those with lower ones
  - Impact factors calculated yearly for those journals indexed in
  - Thomson Reuter's Journal Citation Reports

# Impact Factor

- Impact factor was devised by Eugene Garfield,
- Founder of **Institute for Scientific Information** (ISI), now part of Thomson Reuters
- By indexing scholarly work by citation, Garfield allowed researchers to track
  - What other works **a paper** has referenced, and
  - How many times others have cited **a paper**
- By counting citations, “Impact Factor” could be measured, assigning an indicator of quality to more influential works

## Article on Impact of Impact Factor

<https://clarivate.com/essays/history-citation-indexing/>

# Impact Factor



“ Even if there were no other use for a citation index than that of minimizing the citation of poor data, the index would be well worth the effort required to compile it”

Garfield wrote in his 1955 paper

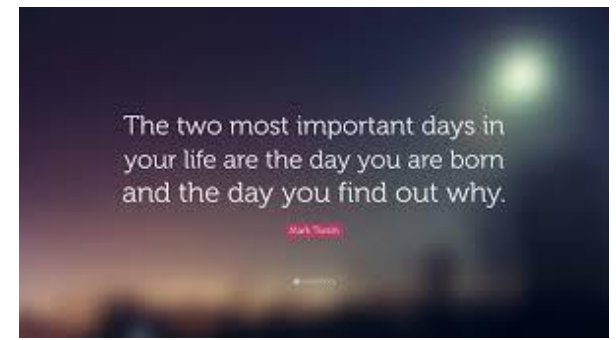
“Citations are an acknowledgment of **intellectual debt**

For example, **Web of Science** lets researchers instantly recognize works that are well regarded by their peers

That way, they know they are basing their work on quality research.”



# Assessing Author Relevance



- **Authors**
  - Identify leading individual researchers/authors working in your area
  - In what journals do they regularly publish?
  - Who is the most cited author(s)?
  - Who publishes the most?
  - Who produces students?
  - Where are their students employed?

# Identifying Notable Authors

- Not as easy as a journal citation index
  - Look at number of times author cited
  - Also, the quality of conferences
  - Body of work from this author
  - His/Her graduate students
  - His/Her institution, prestigious or not
- All of the above will provide some clues as to the importance of the author in his/her field
- Also something called h-index and g-index
  - Library Explains **h-index**, **g-index** and **i-10index**



## Conferences vs. Journals

# Conferences vs. Journals in CS

- Which are Better?
- Conferences are Better?
  - Conferences have higher status
    - It is self-perpetuating since best researchers want to send their papers to conferences rather than journals
  - Conferences provide higher visibility and greater impact
    - Many people will attend your talk, you will have the opportunity to answer questions, and people will talk to both you and to one another in the hallways
    - Even disregarding the event itself, more non-attendees read conference proceedings than read journals

# Conferences vs. Journals



- **Conferences have higher quality**
  - Acceptance rates to good conferences are often around 10%, at least in software engineering .. whereas even best journals are less selective
    - There does exist low-quality conferences (and journals), but if your c.v. is cluttered with them, then you will appear to be incapable of good work (even if the work you published in those venues really is good!), and your good publications will not stand out
    - A good rule of thumb is that the best conferences are sponsored by ACM or IEEE

# Conferences vs. Journals



- **Conferences are more timely**
  - It can take years for a journal publication to appear (or even for reviews to come back),
  - Whereas turnaround time for conference reviews is a few months, and proceedings also appear quickly
- **Conferences have higher standards of novelty**
  - Journals often only require 20-30% of the material to be new, compared to an earlier conference version



# Conferences vs. Journals



- Why journals are better

- Journals may have longer page limits

- If you have too many experimental results to fit in a conference publication, then a journal affords an opportunity to include them
- You can also include proofs that are too long (or boring) for a shorter publication.

- Journal reviews tend to be more detailed

- A journal reviewer may spend days on a paper, whereas a conference reviewer cannot afford to do so for each of the many papers he or she is assigned

# The Case for Journals

- **Journals have higher acceptance rates**
  - More chance to get your research published
  - Same is true of workshops
  - Good venues for people who are just starting their research careers
- **Some lesser-ranked universities evaluate faculty on basis of journal publications**
  - Because Dean of Engineering is unable or unwilling to understand computer science
  - A top-ranked CS department can convince the dean to use the proper evaluation metric



# Case for Journals



- Best papers at a conference are often solicited for expedited journal publication
  - Whether you accept this invitation should be based on factors above, such as whether there is value to the community of an expanded version of the paper, and how much more work it is to prepare the journal version

<http://www.cs.washington.edu/homes/mernst/advice/conferences-vs-journals.html>

# A Study that Confirms This

- **As stated previously**
  - Published yearly by Thomson ISI
    - Journal Citation Report (JCR) by counts of the citations from articles of thousands of journals
  - Research results in computer science are often published in high-quality conferences which are **not** covered by the JCR citation databases
  - List of Impact Factors

<http://www.sciencegateway.org/rank/index.html>

# Sources of CS Articles

We have access to a lot of it through the Saudi Digital library

## ACM and IEEE

- ACM and IEEE has **most** of their work on-line in their digital libraries
- You can access to the ACM or IEEE digital library through our library site

# Web of Science® - ISI Thomson Reuters

- (WoS, formerly ISI Web of Knowledge) is a search platform that combines abstract databases of publications in scientific journals and patents, including databases that take into account the mutual citation of publications, developed and provided by Thomson Reuters.
- Web of Science covers materials on natural, technical, social, humanities and arts.
- The platform has built-in capabilities to search, analyze and manage bibliographic information.

# Web of Science® - ISI Thomson Reuters

## Resources on the Web of Science platform

### Database:

- Web of Science Core Collection
- Current Contents Connect
- BIOSIS Citation Index
- Data Citation index
- KCI-Korean Journal Database
- Russian Science Citation Index
- SciELO Citation Index
- Zoological Record
- Derwent Innovations Index
- Medline



# Web of Science® - ISI Thomson Reuters

For a formal assessment of the effectiveness of scientific activity of scientists, a number of scientometric indicators are applied (for example, the number of publications, the Hirsch index, the same h-index, etc.). There are several alternative systems that calculate these indicators, each of which has its advantages and disadvantages : eLIBRARY.ru, Google Scholar.



# Web of Science® - ISI Thomson Reuters

## Impact factor

- ❑ (IF, or IF) is a numerical indicator of the importance of a scientific journal. Since the 1960s, it has been calculated annually by the Institute for Scientific Information (ISI), which was acquired by Thomson Corporation in 1992 and is now called Thomson Scientific, and is published in the journal Journal Citation Report.
- ❑ According to the IF, the level of journals is assessed, the quality of the articles published in them, provides financial support to researchers and accepts employees for work. Impact factor has, though a large, but ambiguously estimated impact on the evaluation of research results.

# Web of Science® - ISI Thomson Reuters

## Method of calculation

The calculation of the impact factor is based on a three-year period. For example, the impact factor of the magazine in 2019  $I_{2019}$  is calculated as follows:

$I_{2019} = A / B$ , where: A - number of citations during 2019 in Scientific Information, articles published in this journal in 2017-2018; B is the number of articles published in this journal in 2017-2018.

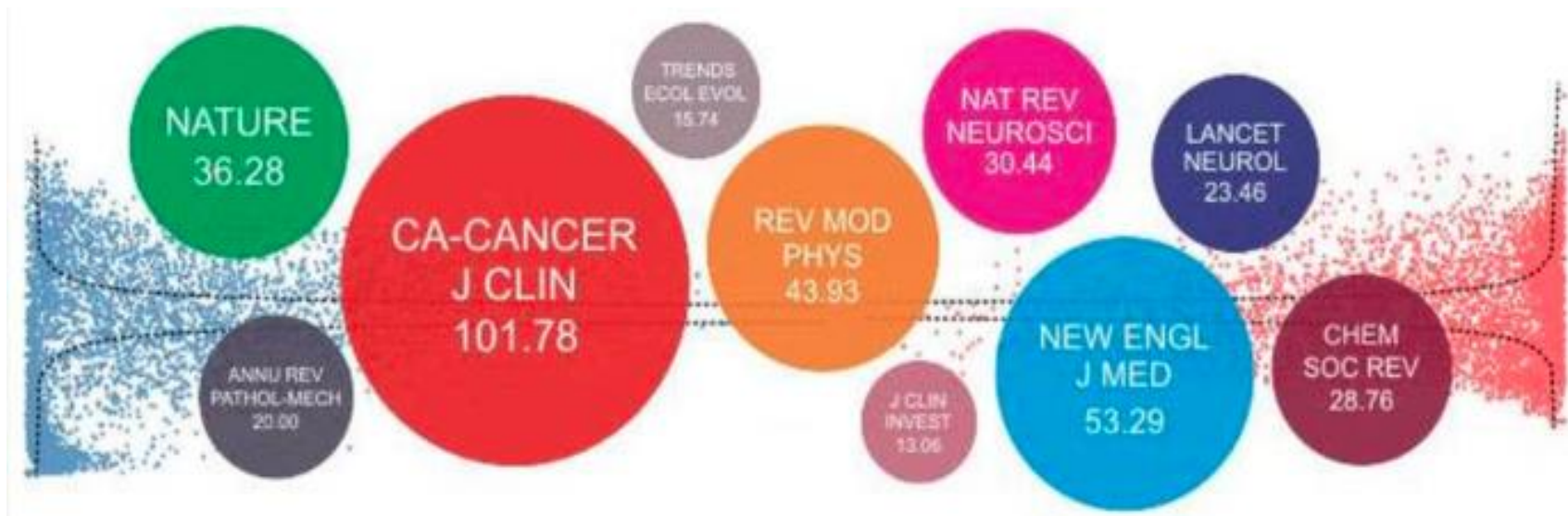




# Web of Science® - ISI Thomson Reuters

## Advantages and disadvantages

The journal's IF depends on the field of research and its type; From year to year it can vary significantly, for example, dropping to extremely low values when changing the name of the journal and so on. Nevertheless, for today IF is one of the important criteria by which it is possible to compare the level of scientific research in close fields of knowledge.



# Web of Science® - ISI Thomson Reuters

## The positive properties of the impact factor:

- Wide coverage of scientific literature - more than 8,400 journals from 60 countries are indexed;
- The results are public and easily accessible;
- Simplicity in understanding and use;
- Journals with high IF usually have a more stringent peer review system than logs with low IF.

# Other sources



- **Google Scholar** : <http://scholar.google.com/>

Google Scholar, search specifically for scholarly literature, including peer-reviewed papers, theses, books, preprints, abstracts and technical reports from all broad areas of research ... kind of broad

# More Sources

# CiteSeer<sup>x</sup>

<http://citeseer.ist.psu.edu/>

- CiteSeer is a scientific literature digital library and search engine focuses primarily on literature in computer and information science
- Can see both documents and citations of those who cited it

# More Sources

Wiley Online library



<https://onlinelibrary-wiley-com.sdl.idm.oclc.org/>

Springer Journals



<https://link-springer-com.sdl.idm.oclc.org/journals/a/1>

# Summary

## Literature review more than a summary of literature

- Your interpretation of how the literature relates to your problem
- You to critically review others research and point out where your research differs
- Allows readers to put into context your work
- Creates interest in your research

# Summary Conferences vs. Journals

- **Conferences**

- More impact in the CS field
- Many more conferences than journals
- More current results, more papers

- **Journals**

- Longer time to publication
- More thorough review process
- Longer, more thorough papers (in general)