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**UNIVERSITÉ
DE GENÈVE**

Design Science Research

MSc in Computer Science
MSc in Digital Systems and Services
PhD in Information Systems

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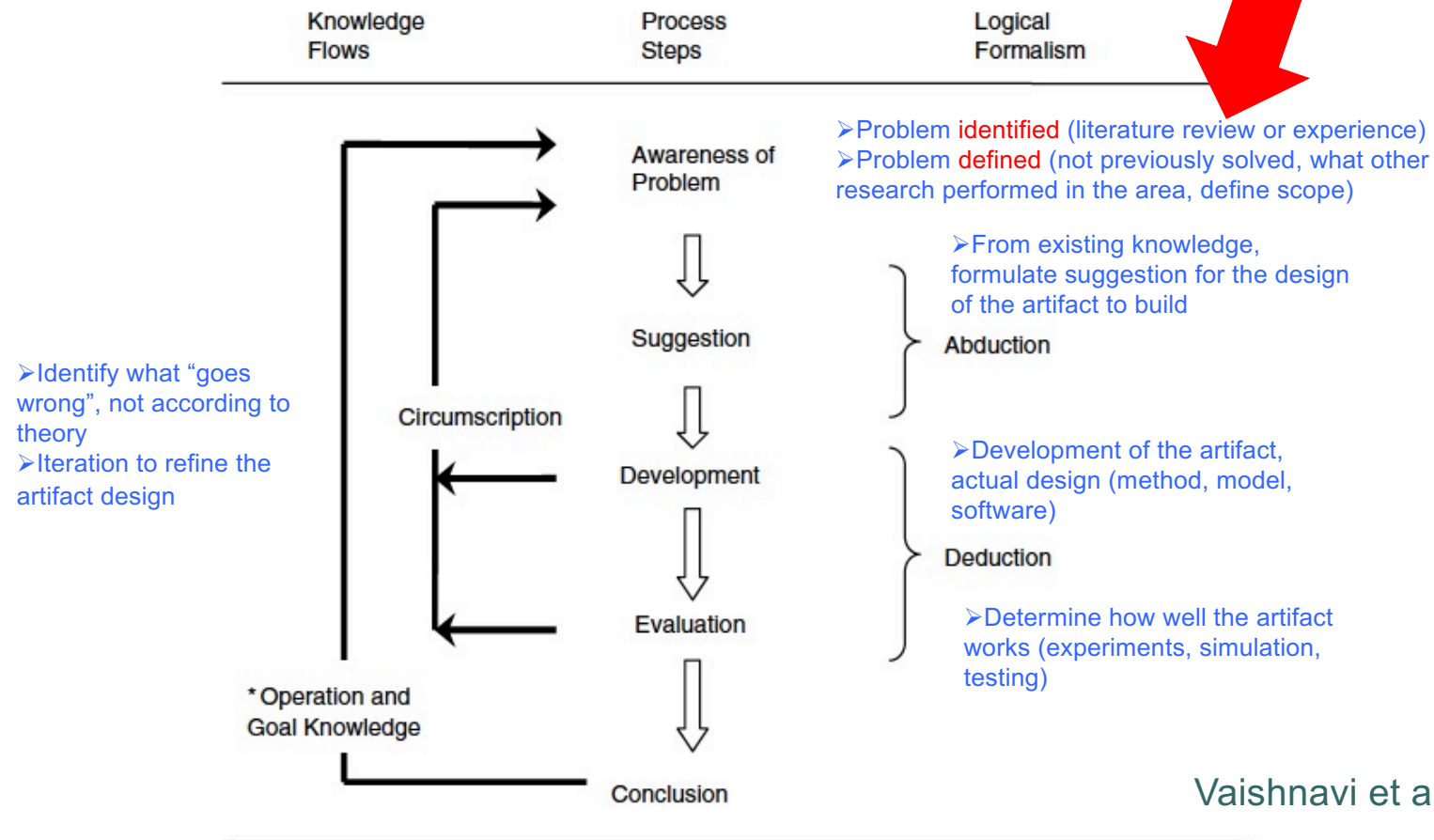
Lecture 1 - Summary

- Motivation
- Science and Research
- Different types of research
- Design science research cycle
- Types of output
- Two types of design

Lecture 2/3

- Literature review and research questions
 - Publications categories / Quality indicators
 - Literature search
 - From research domain to research questions
 - Analysing a research paper
 - Search literature review
 - Organising literature review
 - Mapping fields/subfields

Design Cycle



Vaishnavi et al.

Awareness of problem

- Identify **research domain**
 - Own interest
 - Feasibility (existing literature, resources to perform research)
- **Literature search**
 - Learn about research domain
- **Organise literature** of the area, **identify gaps** in knowledge
- Identify, define and formulate **research questions**

state of the art → has anyone ~~done~~ what
you wanted to do

Types of papers

Types of research papers

- **Position** papers
 - Idea with no proof of concept → no implementation
- **Technical** paper
 - Idea with proof of concept, prototype or implementation and evaluation
- **State of the art / literature surveys**
 - Comprehensive review of a research domain
- **User surveys**
 - Questionnaires / Studies of users satisfaction or behaviour

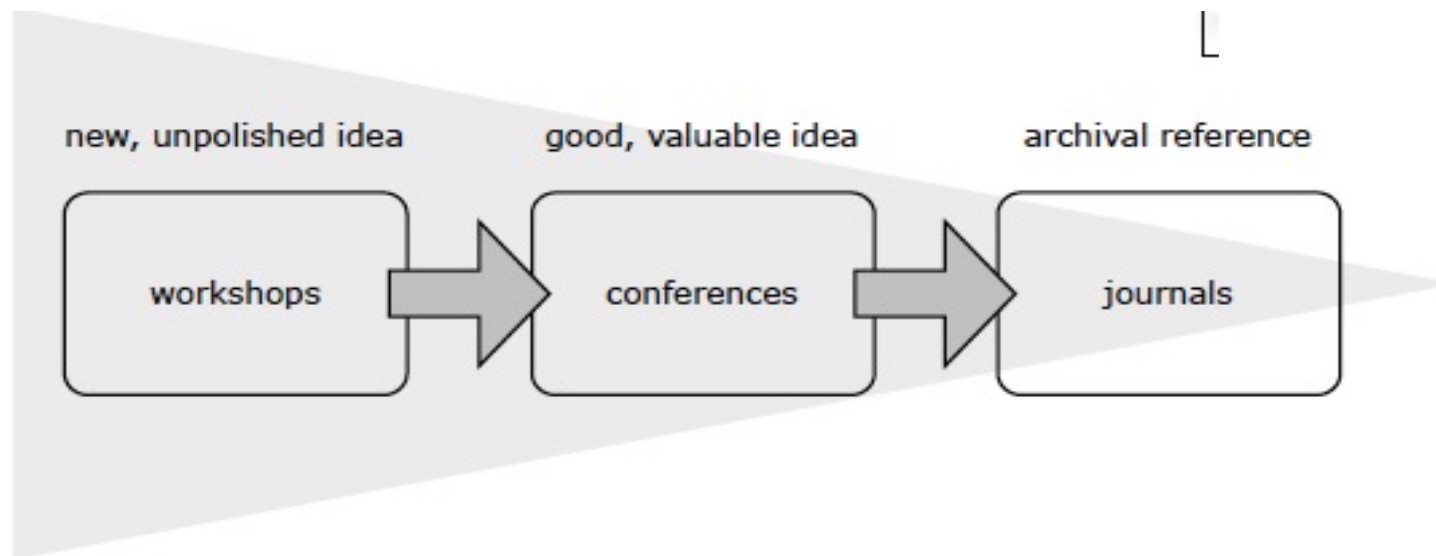
Publications categories

- Journals
 - International/~~national~~, peer reviewed
 - **Magazines** (larger audience)
 - **Transactions** (technical details)
 - Published by computing societies (ACM, IEEE) or specialised publishers (Springer, Elsevier)
- Books
 - **Monographs, handbooks**
 - For researchers, for students, for reference
 - **Chapters**
 - **Editors**

Publications categories


- Conference/Workshop proceedings
 - International / National, peer reviewed
 - Indexed
- Other
 - PhD thesis
 - MSc / BSc thesis
 - Technical Reports
 - Patents


Pipeline Model





Surveys

- ACM Computing Surveys
- <http://dl.acm.org/citation.cfm?id=J204>
- Computer Science Review (Elsevier)




ACM Computing Surveys (CSUR)
Publication:
 [CSUR](#) ACM Computing Surveys (CSUR)
[ACM](#) New York, NY, USA
[table of contents](#) ISSN:0360-0300 EISSN:1557-7341
Current Issue
[Volume 44 Issue 4 \(August 2012\)](#)
Archive
[Volume 1 Issue 1 \(March 1969\)](#) ... [Volume 44 Issue 3 \(June 2012\)](#)

 **Journal**

 **Bibliometrics**

- Downloads (6 Weeks): 16,570
- Downloads (12 Months): 168,873
- Citation Count: 33,684

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Where to find information?

- WWW
- Google scholar: <http://scholar.google.ch>
- ACM Digital Library (transactions and magazines) <https://dl.acm.org/>
- IEEE Digital Library (transactions and magazines)
 - <https://ieeexplore.ieee.org/Xplore/home.jsp>
 - <https://ieeexplore.ieee.org/browse/periodicals/title>
- Springer (online) (Incs, journals): <http://www.springer.com>
- ResearchGate: <https://www.researchgate.net>

- Google scholar citations: <http://scholar.google.com/citations>
- ISI web of knowledge: <http://www.wokinfo.com>
- Scopus: <http://www.info.sciverse.com>

Google Scholar

The screenshot shows the Google Scholar interface. At the top, the Google logo is on the left, followed by a search bar containing the text "publish or perish" and a search button. Below the search bar, the word "Scholar" is displayed in red, and the text "About 75,700 results (0.02 sec)" is shown. On the left side, there is a sidebar with a vertical red bar. The sidebar contains the following options: "Articles" (highlighted with a red bar), "Legal documents", "Any time" (with sub-options: "Since 2012", "Since 2011", "Since 2008", "Custom range..."), and "Sort by relevance" (with sub-option: "Sort by date"). The main content area displays two search results. The first result is titled "Publish or perish" in blue, followed by "G Parchomovsky - Michigan Law Review, 2000 - JSTOR" in green. The abstract text reads: "The race model has been the darling of patent economists and game theorists. 1 This model assumes that the winner, namely the first to invent, takes the patent grant with the market dominance that comes with it, whereas the second comer, in the best tradition of sports ...". Below the abstract, it says "Cited by 119 Related articles BL Direct All 5 versions". The second result is also titled "Publish or perish" in blue, followed by "P Clapham - BioScience, 2005 - BioOne" in green. The abstract text reads: "Phillip J. Clapham (phillip. clapham@ noaa. gov) is a researcher with the Alaska Fisheries Science Center, 7600 Sand Point Way, NE, Building 4, Seattle, WA 98115. He specializes in the biology, behavior, and conservation management of large whales worldwide". Below the abstract, it says "Cited by 18 Related articles All 15 versions".

Google

publish or perish

Scholar

About 75,700 results (0.02 sec)

Articles

Legal documents

Any time

Since 2012

Since 2011

Since 2008

Custom range...

Sort by relevance

Sort by date

Publish or perish

G Parchomovsky - Michigan Law Review, 2000 - JSTOR

The race model has been the darling of patent economists and game theorists. 1 This model assumes that the winner, namely the first to invent, takes the patent grant with the market dominance that comes with it, whereas the second comer, in the best tradition of sports ...

Cited by 119 Related articles BL Direct All 5 versions

Publish or perish

P Clapham - BioScience, 2005 - BioOne

Phillip J. Clapham (phillip. clapham@ noaa. gov) is a researcher with the Alaska Fisheries Science Center, 7600 Sand Point Way, NE, Building 4, Seattle, WA 98115. He specializes in the biology, behavior, and conservation management of large whales worldwide

Cited by 18 Related articles All 15 versions


<http://scholar.google.ch/>

Quality indicators

Performance/Quality indicators

- Individual papers – Nb of citations
- Journals – Impact factor/Citation index
- Conference proceedings – Impact and Acceptance rate
- Authors – h-index

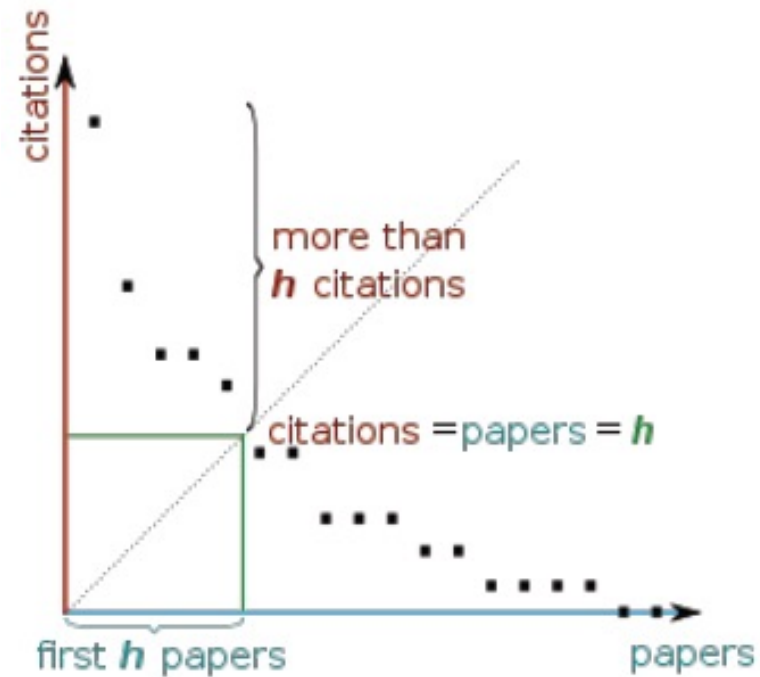
Google Scholar Metrics (journals)

| | | | |
|--|------------------------------------|-----------------|------------------|
|  <input type="text"/> <input type="button" value="Search"/> | | | |
| Scholar Top publications Learn more | | | |
| English | Title | h5-index | h5-median |
| Chinese | 1. Nature | 295 | 427 |
| Portuguese | 2. New England Journal of Medicine | 274 | 450 |
| German | 3. Science | 265 | 388 |
| Spanish | 4. RePEc | 259 | 356 |
| French | 5. arXiv | 256 | 367 |
| Italian | 6. The Lancet | 205 | 313 |
| Japanese | 7. Social Science Research Network | 205 | 290 |
| Dutch | 8. Cell | 195 | 279 |
| Korean | | | |

http://scholar.google.com/citations?view_op=top_venues

h-index

- h-index
- Productivity and impact of authors
- Scientist/journal has index h if
 - He/she has **h papers** with **at least h citations** each
 - Other papers have at most h citations



ISI Web of Knowledge

- List of journals and impact factor

JOURNAL CITATION REPORTS

Journal Citation Reports® offers a systematic, objective means to critically evaluate the world's leading journals, with quantifiable, statistical information based on citation data. By compiling articles' cited references, *JCR Web* helps to measure research influence and impact at the journal and category levels, and shows the relationship between citing and cited journals. Available in Science and Social Sciences editions.



- <http://ip-science.thomsonreuters.com/mjl/>
- http://science.thomsonreuters.com/mjl/publist_sciex.pdf
- Needs subscription

Journal Citation Reports

| Mark | Rank | Abbreviated Journal Title (linked to journal information) | ISSN | JCR Data ¹⁾ | | | | | | Eigenfactor™ Metrics ²⁾ | |
|--------------------------|------|--|-----------|------------------------|---------------|----------------------|-----------------|----------|-----------------|------------------------------------|--------------------------|
| | | | | Total Cites | Impact Factor | 5-Year Impact Factor | Immediacy Index | Articles | Cited Half-Life | Eigenfactor™ Score | Article Influence™ Score |
| <input type="checkbox"/> | 41 | J CROHNS COLITIS | 1873-9946 | 125 | 1.729 | 1.729 | 0.535 | 43 | 1.5 | 0.00044 | 0.361 |
| <input type="checkbox"/> | 42 | HEPATOL INT | 1936-0633 | 175 | 1.725 | 1.725 | 0.405 | 42 | 1.7 | 0.00119 | 0.627 |
| <input type="checkbox"/> | 43 | ANN HEPATOL | 1665-2681 | 381 | 1.674 | | 0.188 | 69 | 3.3 | 0.00149 | |
| <input type="checkbox"/> | 44 | EUR J GASTROEN HEPAT | 0954-691X | 4360 | 1.662 | 1.901 | 0.338 | 207 | 6.5 | 0.01068 | 0.502 |
| <input type="checkbox"/> | 45 | J HEPATO-BILIARY-PAN | 0944-1166 | 1744 | 1.601 | 1.733 | 0.229 | 140 | 6.1 | 0.00424 | 0.429 |
| <input type="checkbox"/> | 46 | HEPATOL RES | 1386-6346 | 1613 | 1.540 | 1.575 | 0.283 | 145 | 4.0 | 0.00619 | 0.406 |
| <input type="checkbox"/> | 47 | DIS ESOPHAGUS | 1120-8694 | 1193 | 1.493 | 1.664 | 0.283 | 106 | 4.1 | 0.00461 | 0.485 |
| <input type="checkbox"/> | 48 | DIGEST DIS | 0257-2753 | 737 | 1.487 | 1.688 | 0.000 | 80 | 5.7 | 0.00230 | 0.467 |
| <input type="checkbox"/> | 49 | CAN J GASTROENTEROL | 0835-7900 | 1225 | 1.376 | 1.738 | 0.278 | 79 | 5.3 | 0.00392 | 0.485 |
| <input type="checkbox"/> | 50 | DIGEST SURG | 0253-4886 | 1341 | 1.372 | 1.608 | 0.186 | 70 | 6.8 | 0.00312 | 0.436 |
| <input type="checkbox"/> | 51 | REV GASTROENTEROL DJ | 1533-001X | 237 | 1.275 | | 0.000 | 3 | 5.4 | 0.00085 | |
| <input type="checkbox"/> | 52 | J GASTROINTEST LIVER | 1841-8724 | 261 | 1.265 | | | | 2.6 | 0.00135 | |
| <input type="checkbox"/> | 53 | Z GASTROENTEROL | 0044-2771 | 1021 | 1.188 | 0.938 | 0.091 | 121 | 6.4 | 0.00202 | 0.193 |
| <input type="checkbox"/> | 54 | HEPATO PANCREAT DIS | 1499-3872 | 845 | 1.183 | | 0.121 | 107 | 4.2 | 0.00348 | |
| <input type="checkbox"/> | 55 | ACTA GASTRO-ENT BELG | 0001-5644 | 428 | 1.010 | 0.842 | 0.236 | 55 | 4.9 | 0.00111 | 0.106 |
| <input type="checkbox"/> | 56 | REV ESP ENFERM DIG | 1130-0108 | 713 | 0.994 | 1.183 | 0.300 | 60 | 4.6 | 0.00148 | 0.189 |
| <input type="checkbox"/> | 57 | GASTROEN CLIN BIOL | 0399-8320 | 1585 | 0.928 | 0.833 | 0.253 | 170 | 6.5 | 0.00282 | 0.161 |
| <input type="checkbox"/> | 58 | HEPAT MON | 1735-143X | 79 | 0.716 | | 0.045 | 44 | | 0.00010 | |
| <input type="checkbox"/> | 59 | HEPATO-GASTROENTEROL | 0172-6390 | 4826 | 0.669 | 0.801 | 0.035 | 368 | 7.7 | 0.00888 | 0.202 |
| <input type="checkbox"/> | 60 | TURK J GASTROENTEROL | 1300-4948 | 238 | 0.484 | | 0.250 | 12 | 4.7 | 0.00077 | |

Journal Citation Reports

- “In a **given year**, the impact factor of a journal is the **average number of citations received per paper** published in that journal during the **two preceding years**”
- Example: a journal has an impact factor of 3 in 2008, then its papers published in 2006 and 2007 received 3 citations each on average in 2008
- http://en.wikipedia.org/wiki/Impact_factor

Journal citations reports

The screenshot displays the SCImago Journal & Country Rank website interface. At the top left is the SJR logo and the text 'SCImago Journal & Country Rank'. At the top right is the Latin phrase 'EST MODUS IN REBUS' with a reference to 'Horatio (Satire 1,1,106)'. A left sidebar contains navigation links: Home, Journal Rankings, Journal Search (highlighted), Country Rankings, Country Search, Compare, Map Generator, Help, and About Us. Below these is a button 'Show this information in your own website' and a small thumbnail for 'IEEE Transactions on Mobile Computing'. The main content area features a 'Journal Search' section with a search query input field, a dropdown menu set to 'Journal Title', and a 'Search' button. Below the search bar, there is an unchecked checkbox for 'Exact phrase'. The search results for 'IEEE Transactions on Mobile Computing' are displayed, including the country 'United States', subject areas 'Computer Science' and 'Engineering', subject categories 'Computer Science (miscellaneous)' and 'Engineering (miscellaneous)' both with a Q1 label, publisher 'Institute of Electrical and Electronics Engineers', publication type 'Journals', ISSN '15361233', coverage '2002-2011', H Index '56', and a scope description: 'The IEEE Transactions on Mobile Computing (TMC) is a bimonthly journal for publishing archival research results related to mobility of [...]'.

SJR SCImago Journal & Country Rank

EST MODUS IN REBUS
Horatio (Satire 1,1,106)

Home
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Compare
Map Generator
Help
About Us

Show this information in your own website

IEEE Transactions on Mobile Computing

Journal Search

Search query

in **Journal Title**

☐ Exact phrase

IEEE Transactions on Mobile Computing

Country: United States

Subject Area: Computer Science | Engineering

Subject Category: Computer Science (miscellaneous) **Q1**, Engineering (miscellaneous) **Q1**

Publisher: Institute of Electrical and Electronics Engineers. Publication type: Journals. ISSN: 15361233

Coverage: 2002-2011

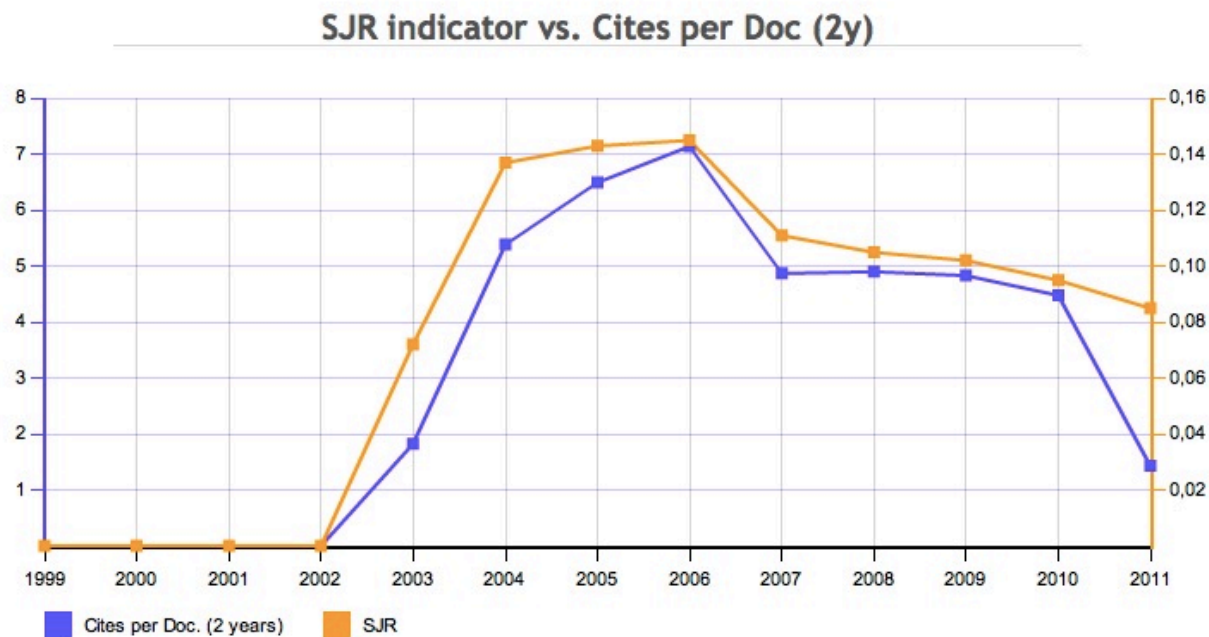
H Index: 56

Scope:

The IEEE Transactions on Mobile Computing (TMC) is a bimonthly journal for publishing archival research results related to mobility of [...]

<http://www.scimagojr.com/journalsearch.php?q=25038&tip=sid&clean=0>

Journal citations reports



<http://www.scimagojr.com/journalsearch.php?q=25038&tip=sid&clean=0>

Journal ranking



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PLEASE NOTE: ARC no longer uses the ERA2010 rankings list. CORE has not subjected journals on this list to CORE evaluation processes. Some journals have data and a decision note attached, resulting from an attempted ranking round in 2015. No commitments have currently been made by CORE regarding appropriate journal rankings.

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ERA2010 Summary:

A* - 7%

A - 17%

B - 27%

C - 46%

Other - 3%

Search by:

Source:

Search

Showing results 1 - 50 of 62

Export

| Title | Source | Rank | Changed? | FoR | Comments | Average Rating |
|---|---------|------|----------|------|----------|----------------|
| ACM Transactions on Algorithms | ERA2010 | A | No | 0802 | 0 | N/A |
| ACM Transactions on Applied Perception | ERA2010 | B | No | 0801 | 0 | N/A |
| ACM Transactions on Architecture and Code Optimization | ERA2010 | A | No | 0803 | 0 | N/A |
| ACM Transactions on Asian Language Information Processing | ERA2010 | B | No | 0804 | 0 | N/A |
| ACM Transactions on Autonomous and Adaptive Systems | ERA2010 | B | No | 0801 | 0 | N/A |
| ACM Transactions on Computational Logic | ERA2010 | A | No | 0802 | 0 | N/A |
| ACM Transactions on Computer - Human Interaction | ERA2010 | A* | No | 0806 | 0 | N/A |
| ACM Transactions on Computer Systems | ERA2010 | A* | No | 0803 | 0 | N/A |
| ACM Transactions on Database Systems | ERA2010 | A* | No | 0804 | 0 | N/A |
| ACM Transactions on Design Automation of Electronic Systems | ERA2010 | A | No | 0803 | 0 | N/A |
| ACM Transactions on Embedded Computing Systems | ERA2010 | A | No | 0803 | 0 | N/A |
| ACM Transactions on Graphics | ERA2010 | A* | No | 0801 | 1 | 5.0 |
| ACM Transactions on Information and System Security | ERA2010 | A | No | 0803 | 0 | N/A |

<http://portal.core.edu.au/jnl-ranks/>

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2019 Impact Factor: 7.990 (ranked 4/104 in Computer Science Theory & Methods)


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| Bibliometrics | Publication Years | Publication counts | Citation count | Available for Download | Downloads (6 weeks) | Downloads (12 months) | Downloads (cumulative) | Average Downloads per Article | Average Citation per Article |
| | 1969 - 2020 | 2,053 | 178,006 | 2,025 | 44,720 | 504,109 | 4,163,822 | 2,056 | 87 |

<https://dl.acm.org/journal/csur>

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1.539

Impact Factor

0.00216

Eigenfactor

0.61

Article Influence
Score



IEEE Aerospace and Electronic Systems Magazine is a monthly magazine that publishes articles concerned with the various aspects of systems for space, air, ocean, or ground environments as well as news and information of interest to IEEE Aerospace and Electronic Systems Society members.

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<https://ieeexplore.ieee.org/xpl/RecentIssue.jsp?punumber=62>

Journal Citation Reports®

The Journal Citation Reports (JCR) provide quantitative tools for ranking, evaluating, categorizing, and comparing journals. These metrics—including Impact Factor, Eigenfactor® Score and Article Influence® Score—are available where applicable. Each year, Journal Citation Reports® (JCR) from Clarivate Analytics examines the influence and impact of scholarly research journals. JCR reveals the relationship between citing and cited journals, offering a systematic, objective means to evaluate the world's leading journals.

The values displayed for the journal citation metrics fields in IEEE *Xplore* are based on the annual [Journal Citation Report from Clarivate Analytics](#).

Impact Factor

Impact Factor is the average number of times articles from a journal published in the past two years have been cited in the JCR year. The Impact Factor is a so-called *popularity* measure which relies on the crude number of citations, each of them counting the same independently of the quality of the source.

Eigenfactor® Score

Eigenfactor™ Score takes into account the number of times articles from a journal published in the last five years have been cited in the JCR year while also considering which journals have contributed these citations. Since citations are in this case weighted dependently on the source, The Eigenfactor Score belongs to the class of so-called *prestige* measures. The Eigenfactor Score represents the probability of reading a specific journal in the entire collection and therefore high-scoring journals have a greater influence in the scientific community.

Article Influence® Score

Article Influence™ Score is also a *prestige* measure and has all the features of the Eigenfactor Score, with an additional normalization to the number of published papers. Hence it can be considered the average influence of a journal's articles over the first five years after publication.

Find out more about [IEEE Journal Rankings](#).

<https://ieeexplore.ieee.org/Xplorehelp/overview-of-ieee-xplore/about-content#journal-citation-metrics>

Conferences - domains

- Networking
- Software engineering
- Computational intelligence
- Data mining
- HCI
- Virtual reality

Conference impact



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Search by:

All



Source:

CORE2018



Search

Showing results 1 - 4 of 4

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CORE2018 Summary:

A* - 4%

A - 14%

B - 26%

C - 49%

Other - 8%

Export

| Title | Acronym | Source | Rank | hasData? | Primary FoR | Comments | Average Rating |
|---|---------|----------|------|----------|-------------|----------|----------------|
| Conference on File and Storage Technologies | FAST | CORE2018 | A | No | 0804 | 0 | N/A |
| Fundamental Approaches to Software Engineering | FASE | CORE2018 | B | Yes | 0803 | 0 | N/A |
| International Joint Conference CAAP/FASE on Theory and Practice of Software Development | TAPSOFT | CORE2018 | C | No | 0803 | 0 | N/A |
| International Workshop on Fast Software Encryption | FSE | CORE2018 | B | Yes | 0804 | 1 | 5.0 |


<http://portal.core.edu.au/conf-ranks/>

Conference statistics

| Event Name | Year | Submitted | Accepted | % Accepted | Tracks | Attendees |
|------------|----------------------|-----------|----------|------------|--------|-----------|
| ACNS | 2003 | 191 | 32 | 16.8% | 2 | ~100 |
| | 2004 | 297 | 36 | 12.1% | 2 | ~150 |
| | 2005 | 158 | 35 | 22.2% | 2 | ~100 |
| | 2006 | 218 | 33 | 15.1% | 2 | ~100 |
| | 2007 | 260 | 31 | 11.9% | 2 | ~60 |
| | 2008 | 131 | 30 | 22.9% | 2 | ~80 |
| | 2009 | 150 | 32 | 21.3% | 2 | ~100 |
| | 2010 | 178 | 32 | 18.0% | 2 | ~90 |
| | 2011 | 172 | 31 | 18.0% | 2 | ~90 |
| | 2012 | 192 | 33 | 17.2% | 2 | ~120 |
| Event Name | Year | Submitted | Accepted | % Accepted | Tracks | Attendees |
| AIMS | 2007 | 54 | 13 | 24.1% | 1 | 83 |
| | 2008 | 33 | 13 | 39.4% | 1 | 50 |
| | 2009 | 28 | 12 | 42.0% | 1 | 45 |
| | 2010 | 27 | 9 | 33.3% | 1 | 41 |
| | 2011 | ?? | ? | ??.% | 1 | ?? |
| | 2012 | 23 | 10 | 43.5% | 1 | 45 |

<http://www.cs.ucsb.edu/~almeroth/conf/stats/>

Google Scholar Citations (authors)



Stephen W. Hawking [Follow](#)

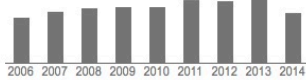
Director of Research, Centre for Theoretical Cosmology, DAMTP
applied mathematics, theoretical physics, relativity, quantum theory
No verified email

| Title | Cited by | Year |
|--|----------|------|
| Q fields tomake the vacuum expectation value $A_{-}(y)$ real. The "physical" p fields are then p S Weinberger Physical review letters | 11992 | 1967 |
| The large scale structure of space-time SW Hawking Cambridge university press | 9123 | 1973 |
| Particle creation by black holes SW Hawking Communications in mathematical physics 43 (3), 199-220 | 7673 | 1975 |
| The illustrated a brief history of time SW Hawking Random House LLC | 5022 | 1996 |
| Black hole explosions SW Hawking Nature 248 (5443), 30-31 | 3322 | 1974 |

Google Scholar

Citation indices

| | All | Since 2009 |
|-----------|-------|------------|
| Citations | 92087 | 26924 |
| h-index | 109 | 65 |
| i10-index | 292 | 179 |



| Year | Citations |
|------|-----------|
| 2006 | ~10000 |
| 2007 | ~12000 |
| 2008 | ~14000 |
| 2009 | ~16000 |
| 2010 | ~18000 |
| 2011 | ~20000 |
| 2012 | ~22000 |
| 2013 | ~24000 |
| 2014 | ~26000 |

<http://scholar.google.com/citations?user=qj74uXkAAAAJ&hl=en>

Performance indicators

- Sources
 - Google scholar citations
 - Publish or perish
 - ISI Web of knowledge
 - Scopus

Quality Indicators - Beware

- **impact factor of journal \neq impact factor of article**
- Seglen PO (1997). "Why the impact factor of journals should not be used for evaluating research". BMJ 314 (7079): 498–502.
- Joint Committee on Quantitative Assessment of Research (June 12, 2008). "Citation Statistics". International Mathematical Union.
- **#citations \neq impact**
- Carlo Ghezzi; Reflections on 40+ years of software engineering research and beyond an insider's view (ICSE 2009, keynote)
- **"The widespread practice of counting publications without reading and judging them is fundamentally flawed."**
- Parnas, D. L. 2007. Stop the numbers game. Commun. ACM 50, 11 (Nov. 2007)
- **"If used unwisely, as is increasingly the case, they discourage people (young ones in particular) right from the outset from daring to think, from exploring new paths [...]"**
- Math. Struct. in Comp. Science Editorial Board; Math. Struct. In Comp. Science (2009), vol. 19, pp. 1–4.

Summary

- Assessment of problem
- Literature review
- Paper types and quality indicators

References

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- Tutorial on research methods http://win.ua.ac.be/~sdemey/Tutorial_ResearchMethods/
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- Empirical research methods, how to be rigorous in experimentation - <http://www.cs.jhu.edu/~nasmith/erm/>
- Hevner et al. Design Science in IS Research. MIS Quarterly, 28(1), 2004
- Reading and writing papers
<http://datasearch.ruc.edu.cn/course/researchmethod/computermethod.html>
- Edward de Bono. Lateral Thinking. Penguin Books, 1990.
- Measuring impact of research
- <http://www.slideshare.net/raszewr1/measuring-your-impact>