

Impact

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http://en.wikipedia.org/wiki/Impact_factor

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Group Meeting

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Impact Factor (IF)

- Objective measure of *journal* “impact”
- Developed by Institute of Scientific Information (ISI)
 - Part of Thompson Scientific
- Uses info from *Journal Citation Reports*
 - 9000 journals, 60 countries
- Related factors:
 - Immediacy index, cited half-life, aggregate IF

Calculation

- IF calculated for a 2-year period, e.g.:
 - C = number citations to 2005-2006 articles in 2007
 - T = total “citable items” in 2005-2006
- $IF(2007) = C/T$

2007 IF for Select Journals

Nature - 27.851

Science - 26.372

Chem. Rev. - 22.757; #1 in chemistry

Acc. Chem. Res. - 16.214; #2 in chemistry

JACS - 7.885; #1 in total citations (295,465)

Chem. Mater. - 4.883; #1 in materials science

<http://pubs.acs.org/promo/jcr/2007/index.html>

Usage

- Most used metric in science
- Evaluate journal impact:
 - Librarians, publishers, authors, grant agencies
- Evaluate field:
 - Changes in IF across all journals in a field
- Wasn't designed for, but used to:
- Evaluate research institutes:
 - Prestigious University?
- Evaluate researcher:
 - High impact research?

Issues

- *JCR* mostly English language journals
- Narrow citation window (2 years)
- Citable items not well defined
 - Non-citable items can include citations
- Self-citation
- Reviews more cited
- Doesn't account for:
 - Context of citation
 - IF of citing journal
- Inappropriate statistics
 - Bradford not Gaussian distribution
- Some issues can be accounted for

Misuse

- Cannot evaluate individual:
 - Publication, researcher, department, institution, etc.
 - Wide variations in article quality
 - Citations vary across fields
 - Pioneers sometimes ignored
 - Industry doesn't cite as much
- Compare across fields
 - Only valid relative to others in field
- Not all research appropriate for highest-impact journals
- Citations measure popularity, not quality

Alternatives

- Article citation numbers
- Usage statistics
- The *h*-index
- The Eigenfactor

Individual Article Citations

- More relevant than IF, but
- Similar issues as IF:
 - Citation = popularity
 - Cold fusion (Fleischman) > C₆₀ (Kroto)?
 - Relative to others in field
 - Self-citation
 - Industry usage
 - Can be influenced
 - Open access

Usage Statistics

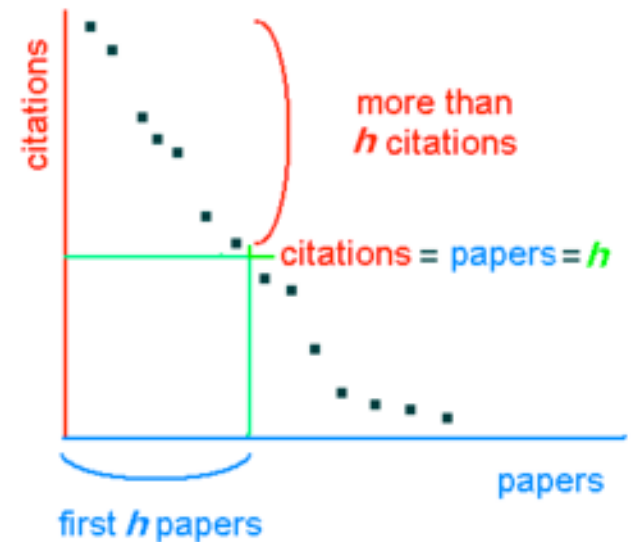
- Track downloads
 - Available immediately
- Journal usage factor in development
 - Attempt to account for:
 - Journal size
 - Month published skewing
 - Non-citable item issues

But:

- Neglects print use?
- Downloads not equivalent to use?

The h -index

- Evaluate individual:
 - Publication
 - Researcher
 - Department
 - Institution, etc.



“A scientist has index h if h of his N_p papers have at least h citations each, and the other $(N_p - h)$ papers have at most h citations each” - Jorge E. Hirsch

Proc. Natl. Acad. Sci. USA **2005**, *102*, 16569

- At least h papers with h citations each
- Emphasizes sustained quality

The *h*-index Issues

- Same citation issues:
 - Context
 - Self-citation
 - Reviews
 - Excessive authors
- Career length dependent
- Compare to others in field
- Under-emphasizes important articles
 - g-index

The Eigenfactor

- Carl Bergstrom, et. al, UW, Biology
- Journal-ranking algorithm based on network theory
 - Similar to Google PageRank
- 5-year citation window
- Accounts for:
 - Influence of citing journal
 - Differing citation standards
- Free!

<http://www.eigenfactor.org/>

Eigenfactor Results

- Article Influence Score (**AI**):
 - measure of journal's prestige, based on per article citations, comparable to Impact Factor
- Eigenfactor Score (**EF**):
 - measure of overall value from all articles published in a given journal in a year

2006 AI/EF for Select Journals

Nature - 17.563 / 1.9917

Science - 18.278 / 1.905

Chem. Rev. - 11.398 / 0.20909

Acc. Chem. Res. - 7.3706 / 0.09532

JACS - 2.6894 / 0.95902

Chem. Mater. - 2.0965 / 0.20237