Utilizing citation networks to explore and measure scientific influence

B. Ian Hutchins, Ph.D.

George Santangelo, Ph.D.

Office of Portfolio Analysis, DPCPSI, OD, NIH

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Abandoning Impact Factor: a growing consensus

Meeting the needs of funding agencies and the scientific community

- **Limitations of commonly used bibliometrics in measuring/comparing the value of a publication or group of publications:**
  - ✓ *Publication Counts*: field-dependent, use-independent
  - ✓ *Impact Factor*: journal-level metric
  - ✓ *Citation Rates*: field- and journal-dependent
  - ✓ *h-index*: field-dependent, time-dependent

- **Considerations**
  - ✓ Assumption: Citation of a publication reveals value to or influence on the citer
    - ✓ Citation rates are an indication of the breadth and speed of the diffusion of knowledge
  - ✓ Need: An article-level metric that is independent of field, journal, and time

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Calculating the Relative Citation Ratio

How many citations per year compared to **peer articles** in the **same field**?

$$RCR = \frac{Article\ Citation\ Rate}{Expected\ Citation\ Rate}$$

NIH-funded articles

Expected cites per year (based on peers' performance)
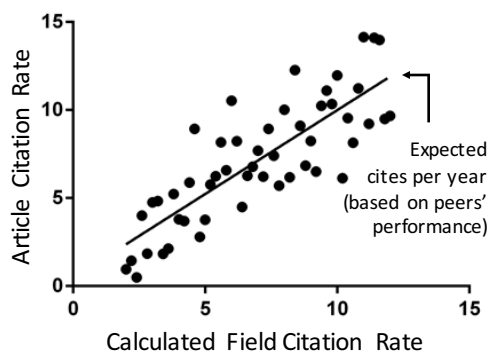
Co-citation networks embody a field

Publications of NIH investigators with continuous R01 funding from FY2003 to FY2010

The publicly available *iCite* tool: input any paper(s) in PubMed and calculate their Relative Citation Ratios (RCRs)

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iCite

New Analysis

Percentiles for NIH-funded publications

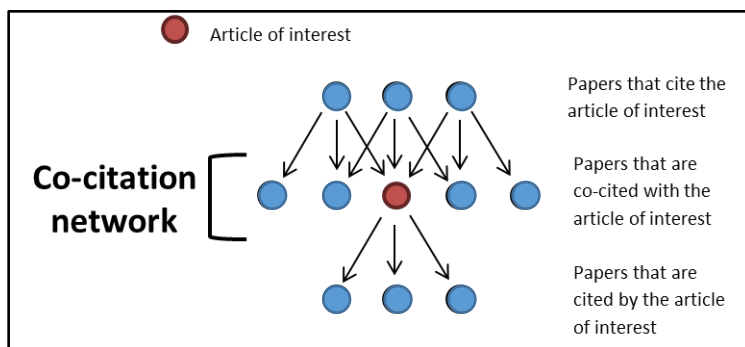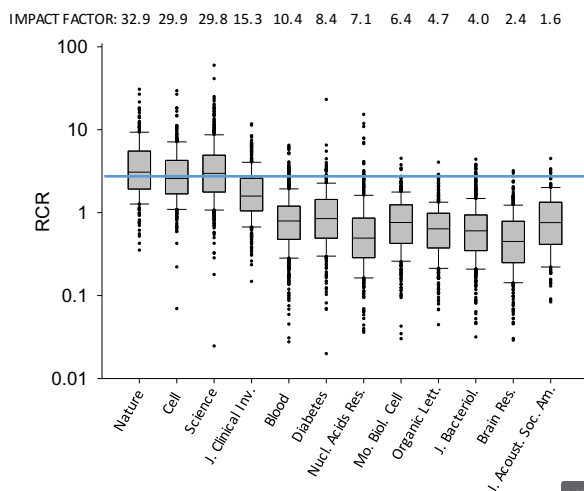| Top %	0.1%	1%	5%	10%	30%	40%	50%	60%	80%	90%
RCR	30.65	11.21	5.18	3.55	2.29	1.29	1.00	0.77	0.39	0.21

Results

Not all requested data was found. View details
Roll over table headers for definitions

Total Pubs	Pubs/Year	Cites/Year				Relative Citation Ratio (RCR)				Weighted RCR
		MAX	MEAN	SEM	MED	MAX	MEAN	SEM	MED	
19	1.00	22.33	6.15	1.35	4.91	4.12	1.26	0.27	0.97	23.90

Graphs

RCR distribution   Pubs per year   Weighted RCR per year

https://icite.od.nih.gov

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- *iCite* developers
    - Jason Palmer, OPA
    - Fai Chan, OPA
    - Rob Harriman, OPA
- OPA Staff

- Contact: B. Ian Hutchins (bruce.hutchins@nih.gov)
- More details on bioRxiv:
  http://biorxiv.org/content/early/2015/10/22/029629

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