



# Transparency in measures of scientific impact

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**What do impact metrics measure?**



## Welcome back!

Your Klout Score is steady at 44.



The Klout Score measures influence based on your ability to drive action. Every time you create content or engage you influence others. The Klout Score uses data from social networks in order to measure:

**How many people you influence** (True Reach)

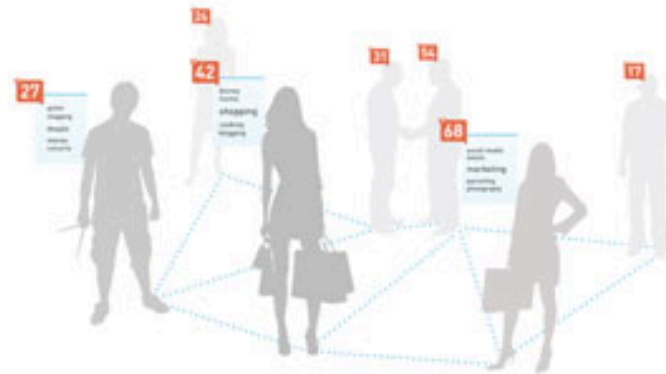
**How much you influence them** (Amplification)

**How influential they are** (Network Score)

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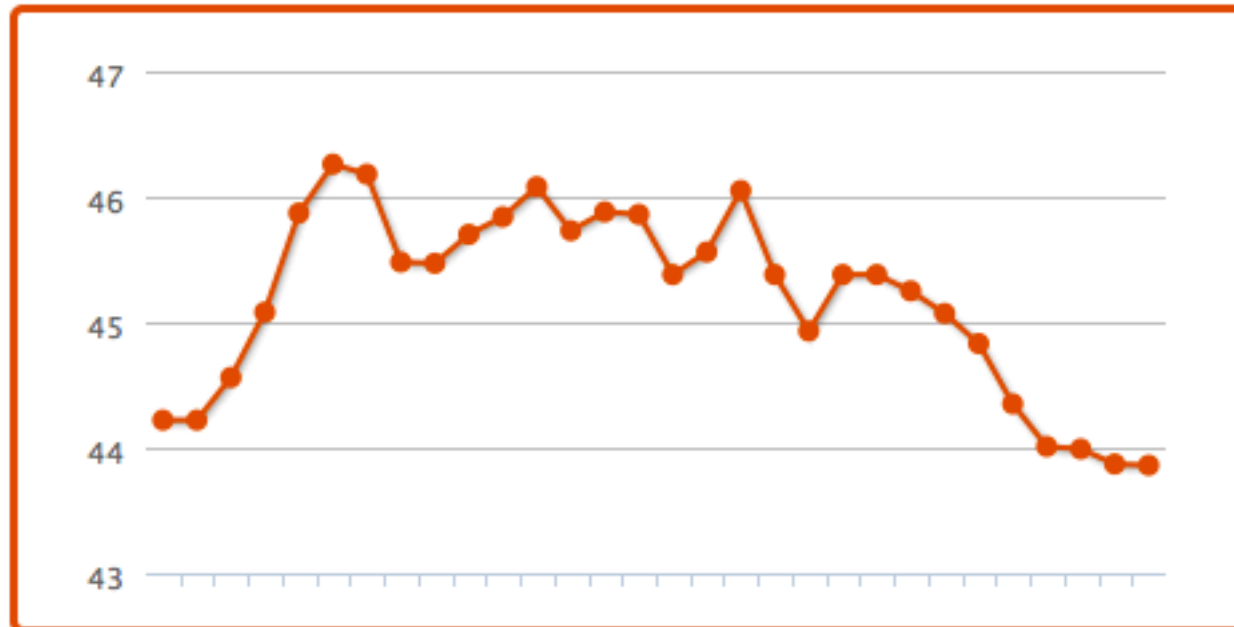
## TRUE REACH

Your True Reach is the **number of people you influence**. We filter out spam and bots and focus on the people who are acting on your content. When you post a message, these people tend to respond or share it.



# Score Analysis

You are effectively using social media to influence your network across a variety of topics



Your Score:

**43.86**

The Klout Score measures influence on a scale of 1 to 100. [Learn more](#)

# You are influential about 10 topics

Topics are generated based on users' engagement with your content. Topical i to engage their audience on a specific subject, even when their overall Klout is



## Wikipedia



Get more +Ks: [t](#) tweet • [f](#) share



## Crowdsourcing



Get more +Ks: [t](#) tweet • [f](#) share



## Italy



Get more +Ks: [t](#) tweet • [f](#) share



## Bedroom ×



Get more +Ks: [t](#) tweet • [f](#) share

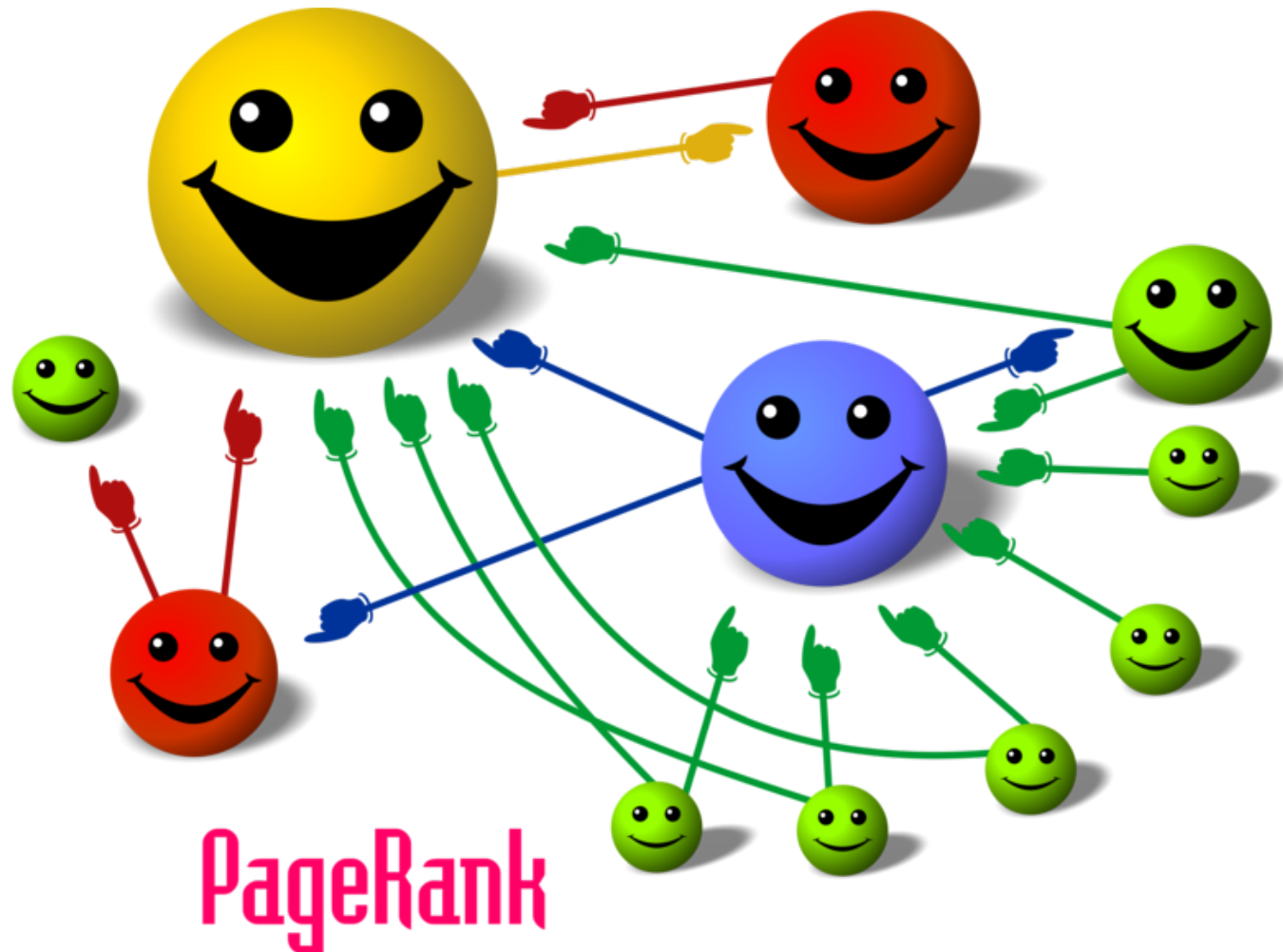
# Metric opacity

Metric disconnected from what it measures

Metric consumer can:

- Make metric-based inferences
- Compare item score over time
- Rank other items by the same metrics

# Metric opacity: PageRank



Semi-public algorithm, arbitrary adjustments.



# Metric opacity: PageRank

The 2002 Google vs Scientology case [1]

ad-hoc adjustment of rankings to comply with DMCA

SEO: reverse-engineering PageRank

The Google dance [2]

short-term fluctuation in PageRank

SEO strategies to control it

[1] McCullagh (2002). Google Yanks Anti-Church Sites, *Wired*  
<http://www.wired.com/politics/law/news/2002/03/51233>

[2] MetaMend. *What is the Google Dance?*  
<http://www.metamend.com/google-dance.html>

## Metric opacity: Journal Impact Factor

$$JIF_y = \frac{C_{y-2}^y + C_{y-1}^y}{S_{y-2} + S_{y-1}}$$

Public algorithm, arbitrary adjustments

# Metric opacity: Journal Impact Factor

Denominator variables (citable items)

Self-citation (from author-level to journal-level self-citation)

The JIF dance

Editorial policies to maximize JIF

publish more reviews

negotiate citable items

Controlling self-citation: the case of niche journals

## **Benefits of metric opacity**

Increase trust in the metric itself

Provide easy to consume impact proxy

“My website has a PageRank 7”

“You increased your Klout score by 2 points”

“I have 12 papers published in 3+ JIF journals”

Better control of gaming

## **Consequences of metric opacity**

Lack of verifiability

Metric lock-in

Metric abuse

# Metric transparency: altmetrics

Alternative measures of the impact of scientific artifacts (papers, datasets, slides) based on large-scale online data [3]

Provide transparent, verifiable impact indicators linked to data sources

Provide real-time, multidimensional, semantically rich impact indicators

Disclose areas of impact invisible to traditional bibliometrics and usage factors

Track references and reuse of scholarly contents inside and outside academia

The logo for altmetrics, featuring the word "altmetrics" in a bold, sans-serif font. The "alt" part is in a teal color, and "metrics" is in black.

[3] Priem, Taraborelli, Roth, Neylon (2010). The altmetrics manifesto, <http://altmetrics.org/manifesto>

# Metric transparency: altmetrics

altmetrics services

Reader ALPHA Meter  
[readermeter.org](http://readermeter.org)

  
[citedin.org](http://citedin.org)

total  Impact  
[total-impact.org](http://total-impact.org)

 altmetric  
[altmetric.com](http://altmetric.com)

# 129 Empirical analysis of an evolving social network.

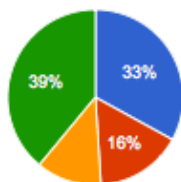
Georgi KOSSINETIS Duncan J WATTS

*Science* (311) AAAS, 2006

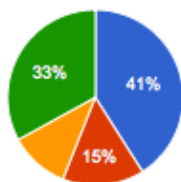
PMID: 16400149

Social networks evolve over time, driven by the shared activities and affiliations of their members, by similarity of individuals' attributes, and by the closure of short network cycles. We analyzed a dynamic social network comprising 43,553 students, faculty, and staff at a large university, in which interactions between individuals are inferred from time-stamped e-mail headers recorded over one academic year and are matched with affiliations and attributes. We found that network evolution is dominated by a combination of effects arising from network topology itself and the organizational structure in which the network is embedded. In the absence of global perturbations, average network properties appear to approach an equilibrium state, whereas individual properties are unstable.

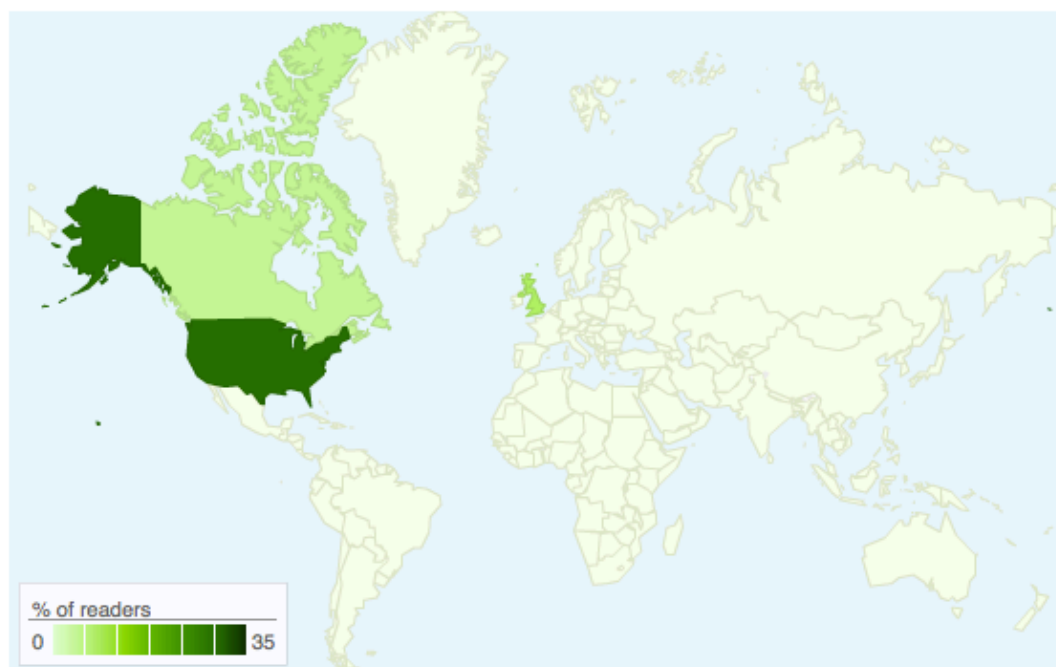
% of readers by discipline



% of readers by status



% of readers by location





## Ingestion of Lactobacillus strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve

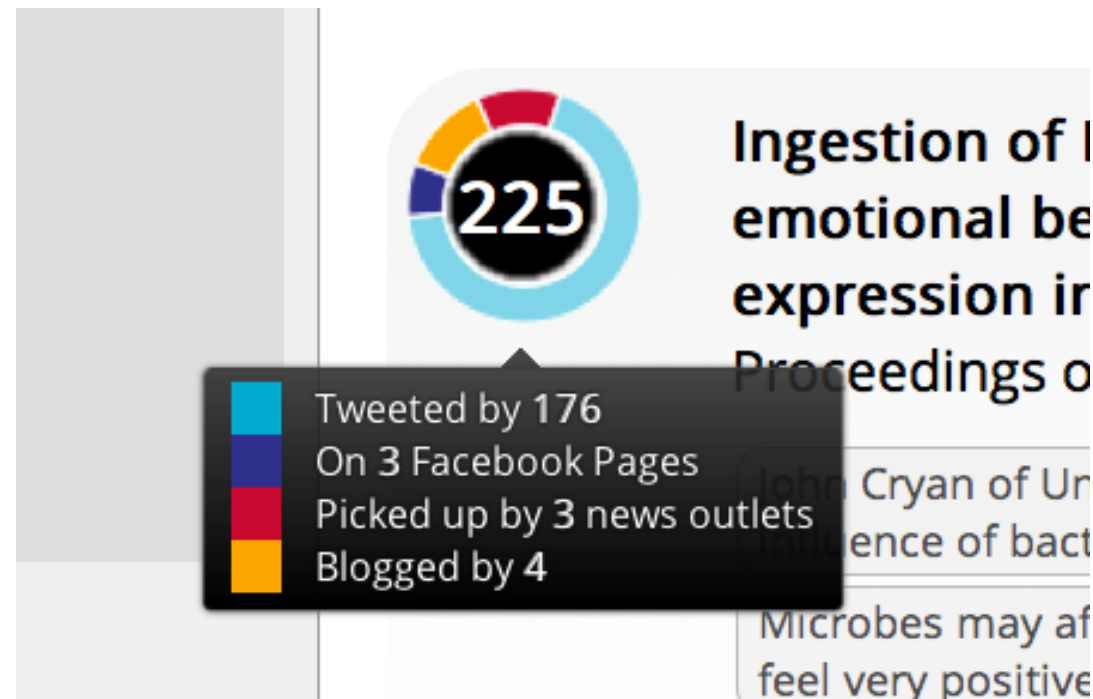
Proceedings of the National Academy of Sciences

John Cryan of University College Cork.. one author of paper on influence of bacteria on mouse behavior

Microbes may affect mood PNAS article: thx @twistedbacteria I feel very positive about probiotics

Probiotic bacteria with potential to treat anxiety and depression-related disorders? PNAS Article -

PNAS: Increased levels of probiotics changed signaling chemicals in brains, reducing stress anxiety.





# Metric transparency: altmetrics

How to **validate** altmetrics-based impact? [4]

Using altmetrics to **redefine** impact

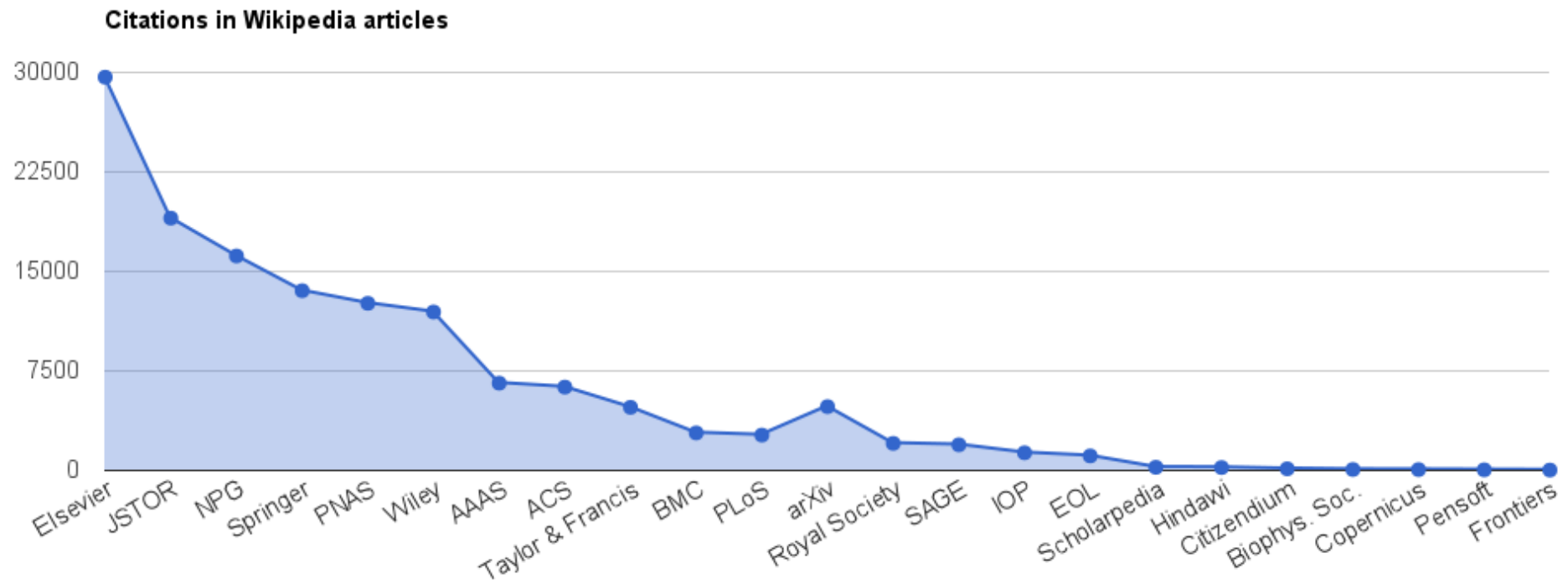
extra-academic usage (industry, education)

reuse of open scholarly contents [5]

[4] Priem et al. (2011). Evaluating altmetrics, *in preparation*

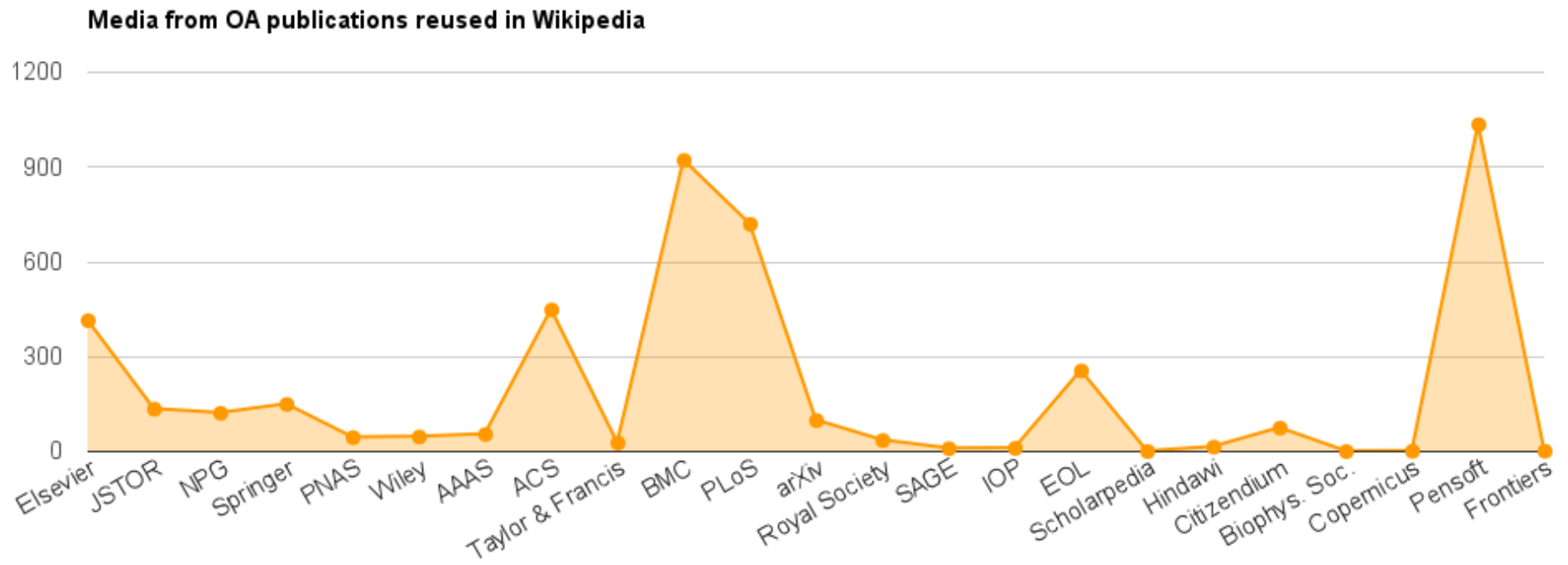
[5] Neylon (2011) Re-use as Impact. *ACM WebSci '11 Altmetrics Workshop*  
<http://altmetrics.org/workshop2011/neylon-v0/>

# Metric transparency: altmetrics



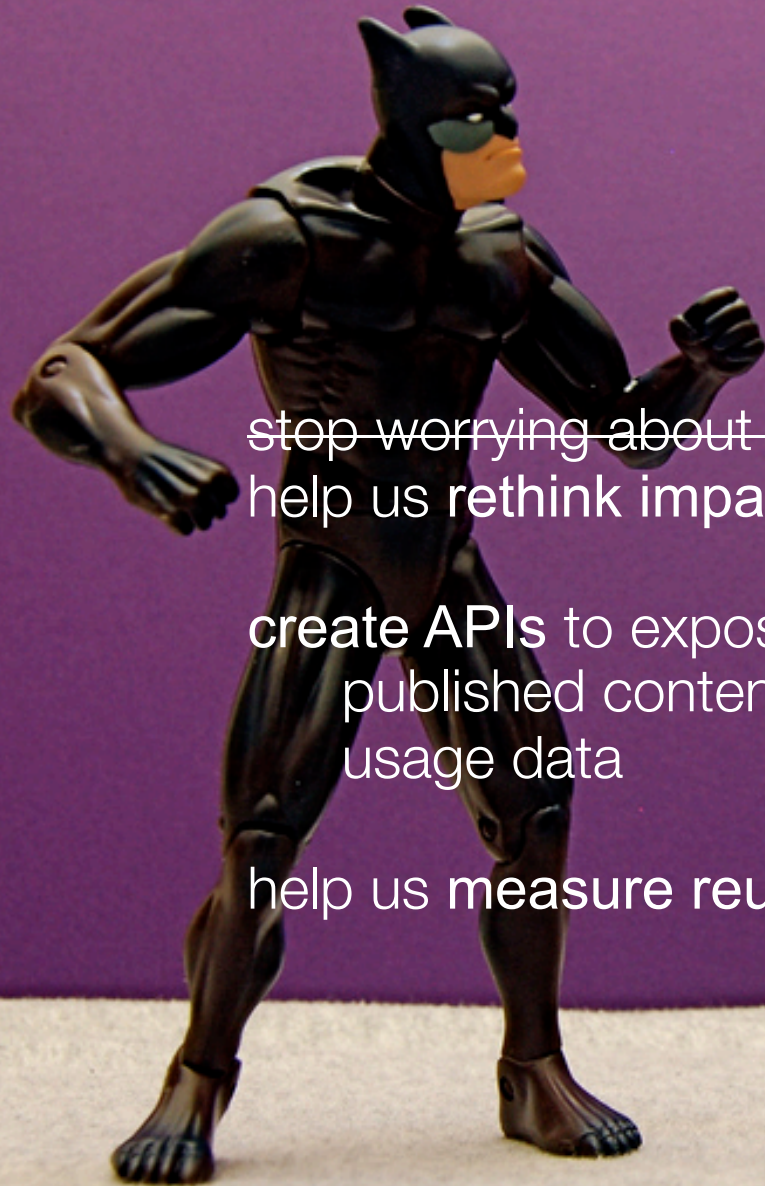
Daniel Mietchen (2011) Reusing open-access materials. [http://bit.ly/OA\\_reuse](http://bit.ly/OA_reuse)

# Metric transparency: altmetrics



Daniel Mietchen (2011) Reusing open-access materials. [http://bit.ly/OA\\_reuse](http://bit.ly/OA_reuse)

# Conclusions



~~stop worrying about impact~~  
help us rethink impact

create APIs to expose (and facilitate the reuse of)  
published contents  
usage data

help us measure reuse transparently/reproducibly



# Thanks

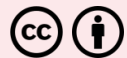
## Credits

VTVM 12 volts DC: CC-BY-NC image by 3D King

Wildcat vs. Cheetah: CC-BY image by JD Hancock

Dario Taraborelli. Transparency in measures of scientific impact

<http://nitens.org/docs/slides/coasp11.pdf>



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