# Increasing Visibility & Documenting Research Impact

ANDREA DINKELMAN – SCIENCE LIBRARIAN - UNL LIBRARIES

MARCH 8, 2016

# Outline

- Library Guide: Measure Your Research Impact
- Strategies for Increasing Visibility
- Measuring & Documenting Research Impact
  - Journal, Author, Article
- Altmetrics
- Telling Your Story

# Measure Your Research Impact
# http://unl.libguides.com/researchimpact

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## Measure Your Research Impact: Home

Enter Search Words | Search

This guide provides information and resources about how to measure research impact.

Home | Journal Impact | Author Impact | Author Identifiers | Altmetrics | Article Level Metrics | More Resources

### Why Does Research Impact Matter?

Knowing how to find evidence of research impact and document its significance is important for many types of activities:

- Promotion & tenure documentation
- Grant proposals and renewals
- Completing progress reports for funding agencies
- Department and/or program reviews

### Acknowledgement

Much of the content in this guide was taken or adapted from the guide, Measure Your Research Impact,

### What is Research Impact?

A number of research organizations have defined research impact. As defined by Research Councils UK, "impact is the demonstrable contribution that excellent research makes to society and the economy. This involves academic, societal, and economic impact." http://www.rcuk.ac.uk/innovation/impact/

The Australian Research Council definition is quite similar. "Research impact is the demonstrable contribution that research makes to the economy, society, culture, national security, public policy or services, health, the environment, or quality of life, beyond contributions to academia." http://www.arc.gov.au/research-impact-principles-and-framework

The National Science Foundation reviews proposals in terms of broader impacts criterion. These include:

- Advance discovery and understanding while promoting teaching, training, and learning
- Broaden participation of under-represented groups
- Enhance infrastructure for research and education
- Broaden dissemination to enhance scientific and technological understanding
- Benefits to society

### Questions?

Andrea Dinkelman

Email Me

# Strategies for Increasing Visibility

Image: http://www.carriedale.com/3-ways-stand-out-without-being-obnoxious/

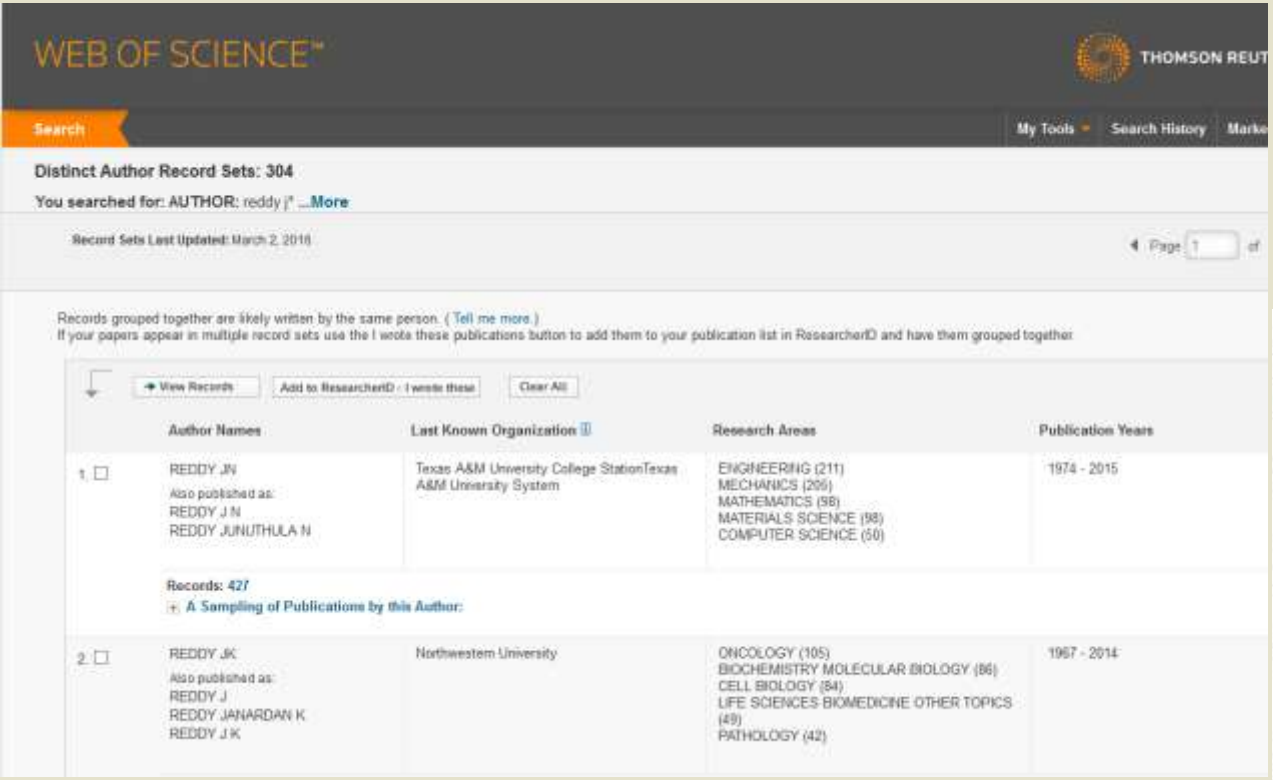
# Establish Your Identity

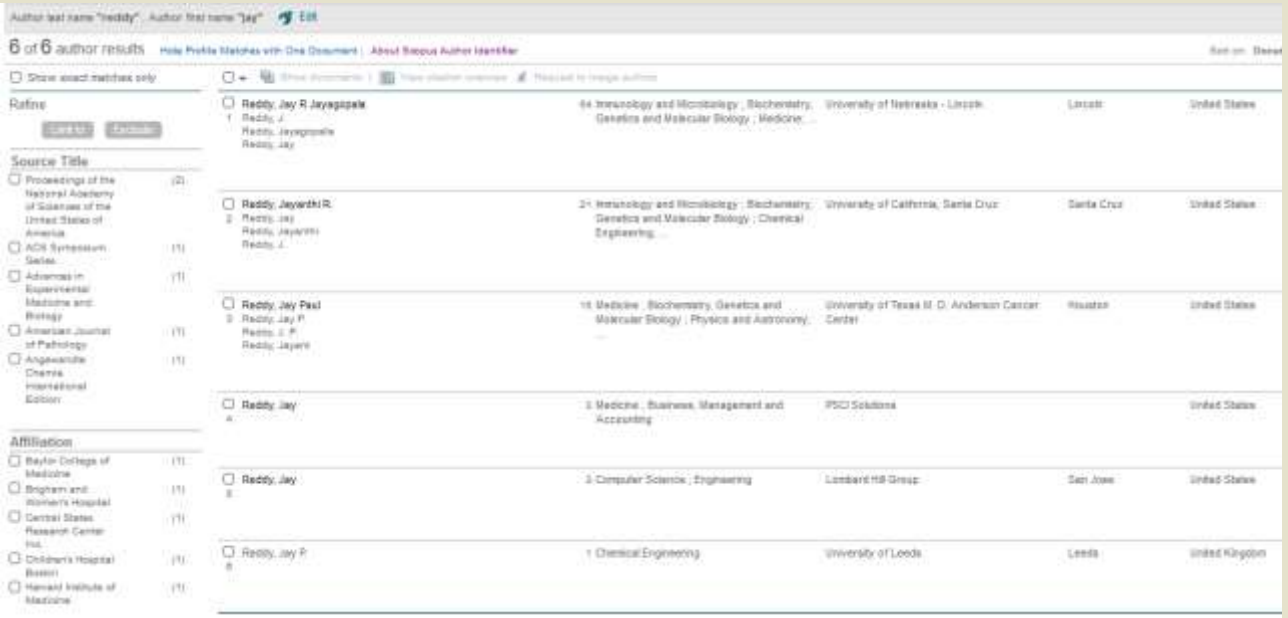
Use the same variation of your name throughout your academic and professional career. If your name is common, consider adding a middle name to distinguish it from other authors.

Distinguish yourself from other authors.

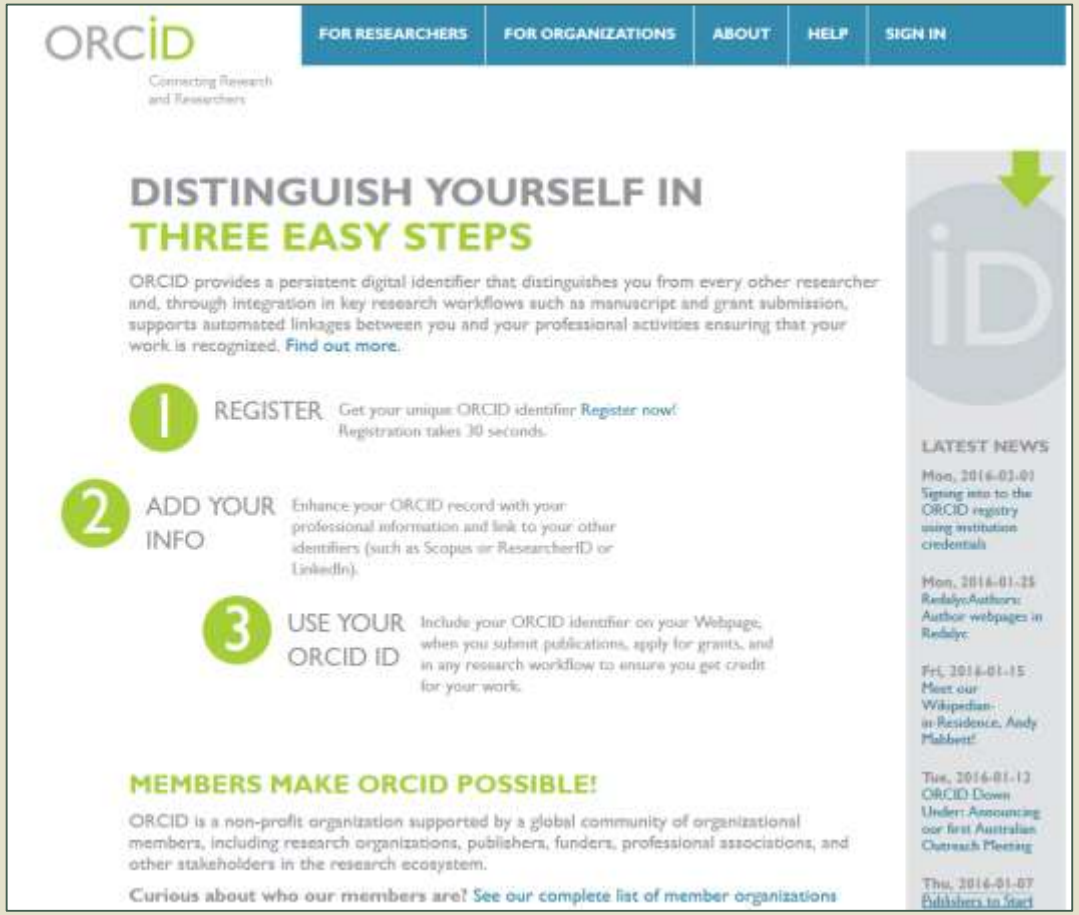
Uniqueness of a name establishes a “presence” for an author.

# Check your name in *Web of Science* and *Scopus*. Are there others with the same name?



# Register for an ORCID ID.




The Open Researcher and Contributor ID (ORCID) is an open source, non-profit effort to maintain a registry of **unique identifier numbers** for authors/investigators.

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## In Situ Detection of Autoreactive CD4 T Cells in Brain and Heart Using Major Histocompatibility Complex Class II Dextramers

By: Massilamany, C (Massilamany, Chandirasegaran)[1]; Gangaplara, A (Gangaplara, Arunakumar)[1]; Jia, T (Jia, Ting)[1]; Elowsky, C (Elowsky, Christian)[2]; Li, QS (Li, Qingsheng)[3,4]; Zhou, Y (Zhou, You)[2]; Reddy, J (Reddy, Jay)[1]

Hide ResearcherID and ORCID

| Author | ResearcherID | ORCID Number |
|---|---|---|
| Reddy, Jay | K-7200-2014 | http://orcid.org/0000-0003-4082-9254 |

JOVE-JOURNAL OF VISUALIZED EXPERIMENTS
**Issue:** 90
**Article Number:** e51679
**DOI:** 10.3791/51679
**Published:** AUG 2014
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The Journal of Immunology

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## Complement Component C5a Permits the Coexistence of Pathogenic Th17 Cells and Type I IFN in Lupus

Sudesh Pawaria*, Kritika Ramani*, Kelly Maers*, Youhua Liu†, Lawrence P. Kane‡, Marc C. Levesque* and Partha S. Biswas*

Author Affiliations

Address correspondence and reprint requests to Dr. Partha S. Biswas, Division of Rheumatology and Clinical Immunology, University of Pittsburgh, BST S725, 3500 Terrace Street, Pittsburgh PA 15261. E-mail address: psb13@pitt.edu

### Abstract

Systemic lupus erythematosus (SLE) is a type I IFN (IFN-I)–driven autoimmune disorder with exaggerated B and Th cell responses. Th17 cells, a recently identified Th cell subset, have been strongly implicated in the pathogenesis of SLE. Because IFN-I suppresses the generation and expansion of Th17 cells in an IL-27–dependent manner, it is unclear how pathogenic Th17 cells are generated in SLE in the presence of an environment characterized by high IFN-I levels. In this study, we showed that activation of c5aR on murine macrophages blocked IFN-I–mediated IL-27 production, thus permitting the development of Th17 cells. C5aR activation on IFN-I–responsive macrophages inhibits IRF-1–mediated transactivation of *IL-27* gene expression via the PI3K/Akt pathway. Consistently, C5aR-deficient mice exhibited increased IL-27 expression and fewer Th17 cells and consequently developed reduced lupus nephritis in comparison with wild-type mice. In support of these findings in mice, we found that C5a inhibited IFN-I–induced IL-27 production from macrophages of lupus subjects. Moreover, the level of serum C5a correlated with Th17 frequency in peripheral blood. Collectively, these data indicate an essential role for C5a in the generation of pathogenic Th17 responses in SLE. Thus, therapeutic strategies to block C5aR activation may be beneficial for controlling pathogenic Th17-mediated inflammation in SLE.

This article is featured in *In This Issue*, p.3179

« Previous | Next Article »
Table of Contents

This Article

Published online before print August 22, 2014, doi: 10.4049/jimmunol.1401322
The Journal of Immunology October 1, 2014 vol. 193 no. 7 3288–3295

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http://orcid.org/0000-0001-5198-516X
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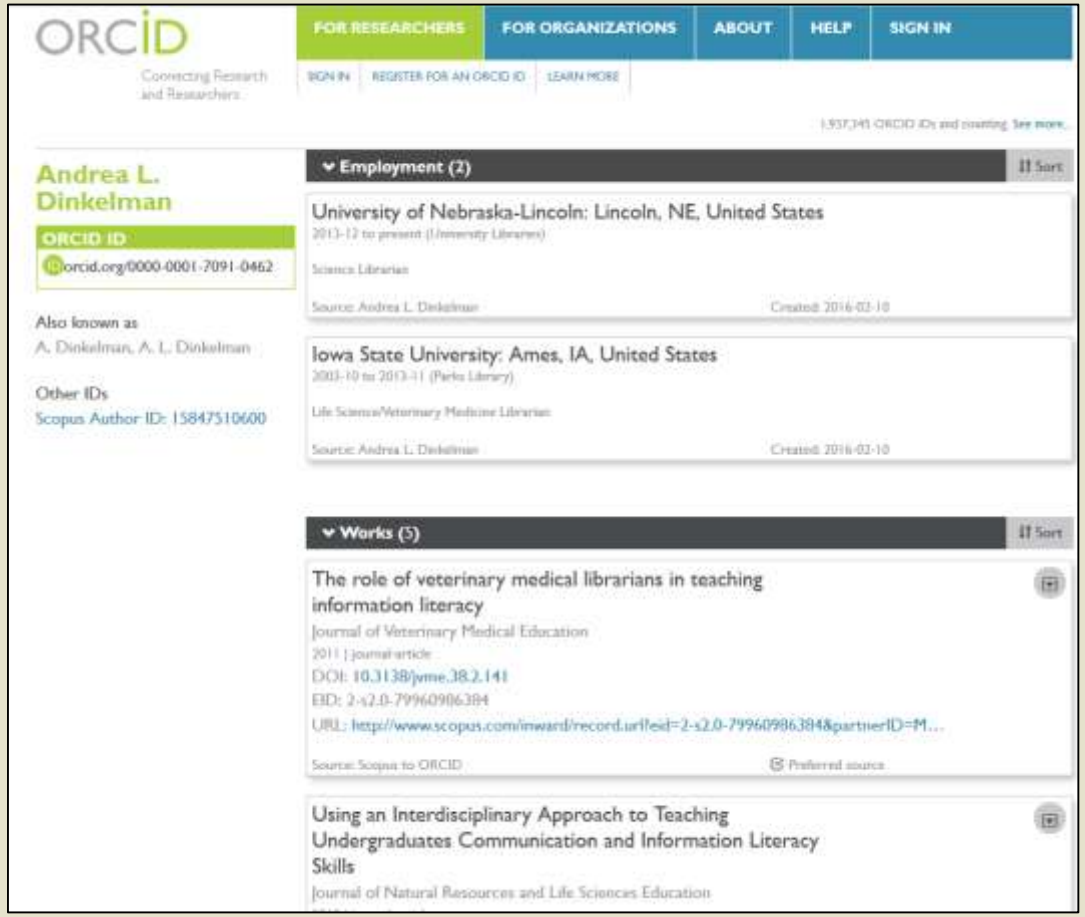
ORCID IDs are being integrated into article indexes and journals

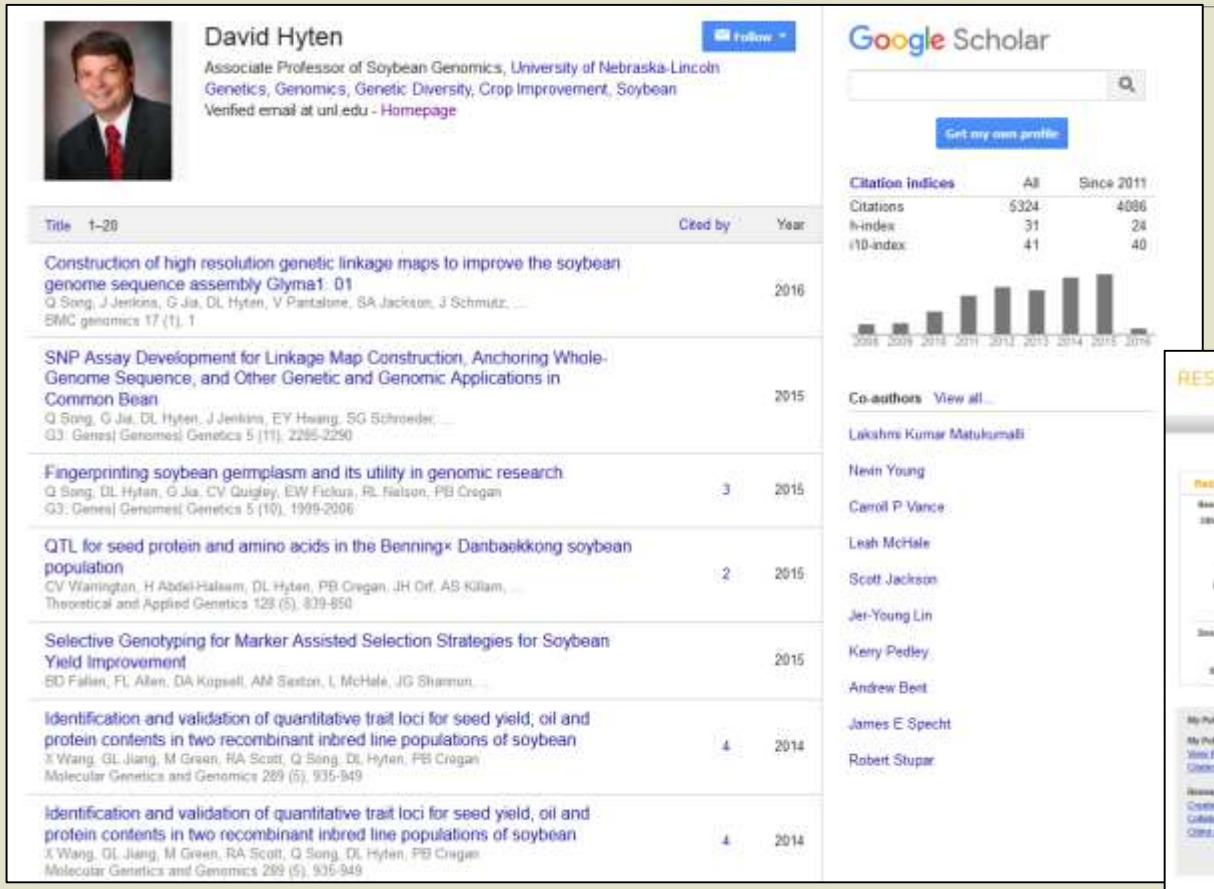
# Create academic profiles

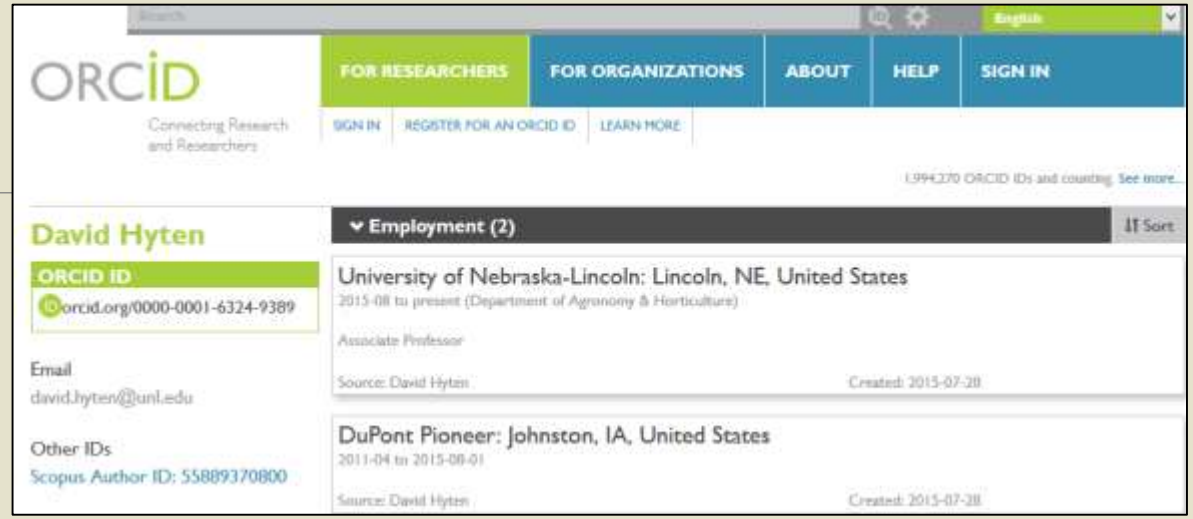



Use **open platforms** to improve search results and provide access to your work. Include links to your academic profile(s) in your email signature.

Can automatically add publications to the profile from *ResearcherID (Web of Science)* or *Scopus*.

# Open Profiles

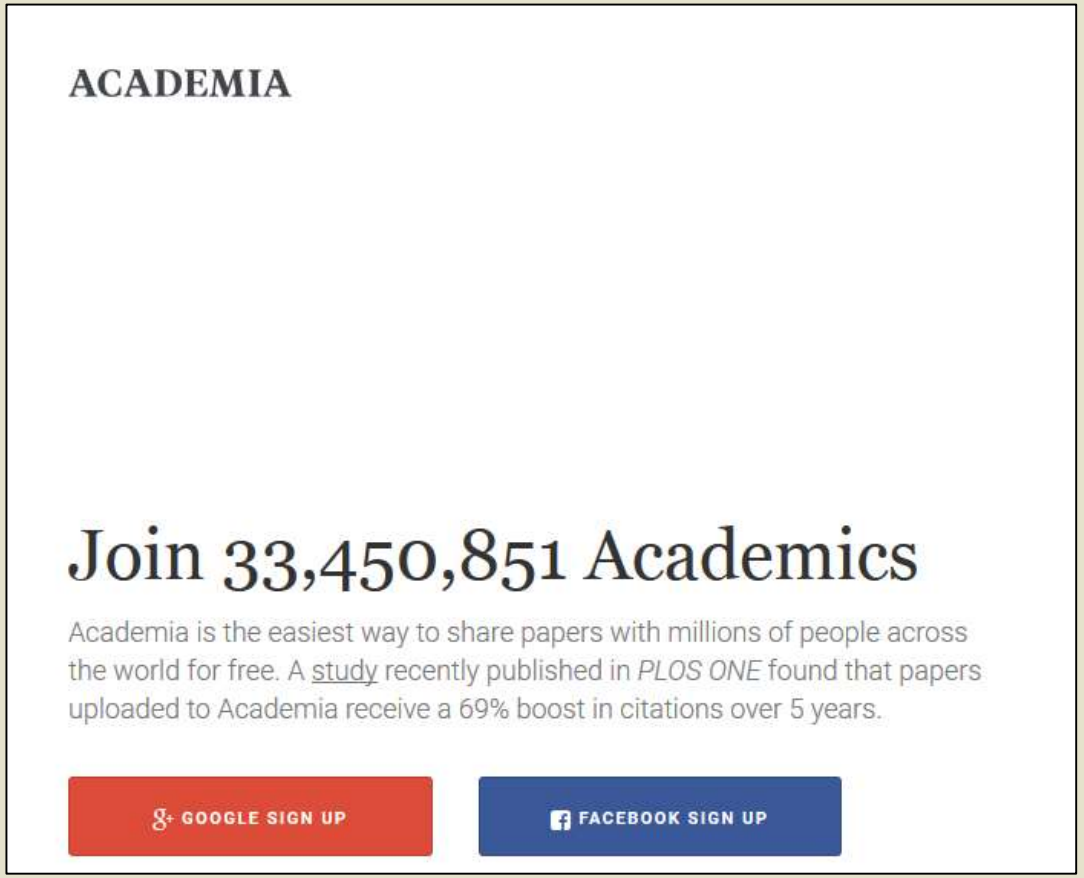


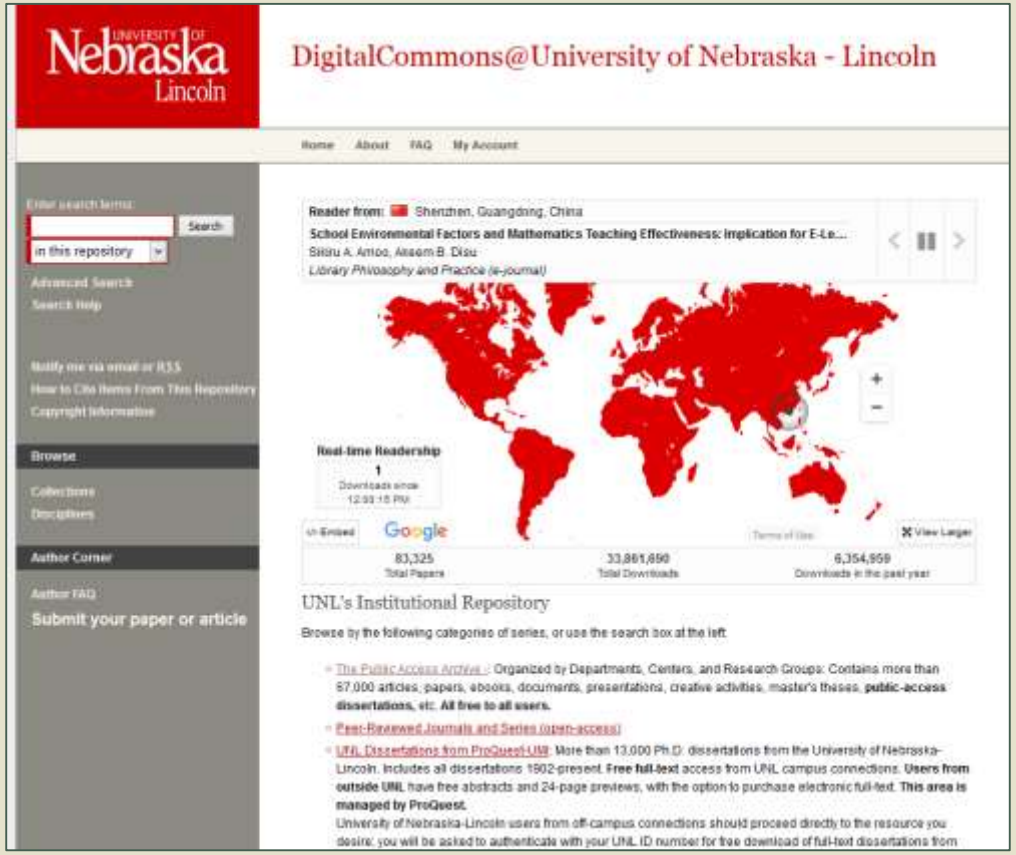

# Closed Profiles

ResearchGate

LinkedIn



# Publish in Open Access Journals and/or Self-Archive in a Repository




Open access publications have higher citation rates.

| | |
|---|---|
| Total number of studies so far | 70 |
| Studies that found a citation advantage | 46 |
| Studies that found no citation advantage | 17 |
| Studies that were inconclusive, found non-significant data or measured other things than citation advantage for articles | 7 |

*Source: http://sparceurope.org/oaca/*

# Publish and Share Research Data


https://data.nal.usda.gov/

Ag Data Commons (ADC) provides access to a wide variety of open data relevant to agricultural research. We are a centralized repository for data already on the web, as well as for new data being published for the first time.

# Measuring & Documenting Research Impact: Journal, Article, & Author


*Image: http://www.parksandrecreation.org/2013/April/Measuring-Performance--Impact-vs--Output/*

# Journal Impact

**Journal Impact Factor:** measure of the frequency with which the average article in a journal has been cited in a particular year

The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years.

**American Journal of Clinical Nutrition**

**Journal Impact Factor**

| | | | | | |
|---|---|---|---|---|---|
| Cites in 2014 to items published in: | 2013 | =1948 | Number of items published in: | 2013 | =332 |
| | 2012 | =2500 | | 2012 | =325 |
| | Sum: | 4448 | | Sum: | 657 |

Calculation: Cites to recent items / Number of recent items = 4448 / 657 = **6.770**

# Journal Citation Reports (JCR)

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## Journal Summary List

**Journals from:** subject categories NUTRITION & DIETETICS | VIEW CATEGORY SUMMARY LIST

**Sorted by:** Impact Factor | SORT AGAIN

**Journals 1 - 20 (of 77)**

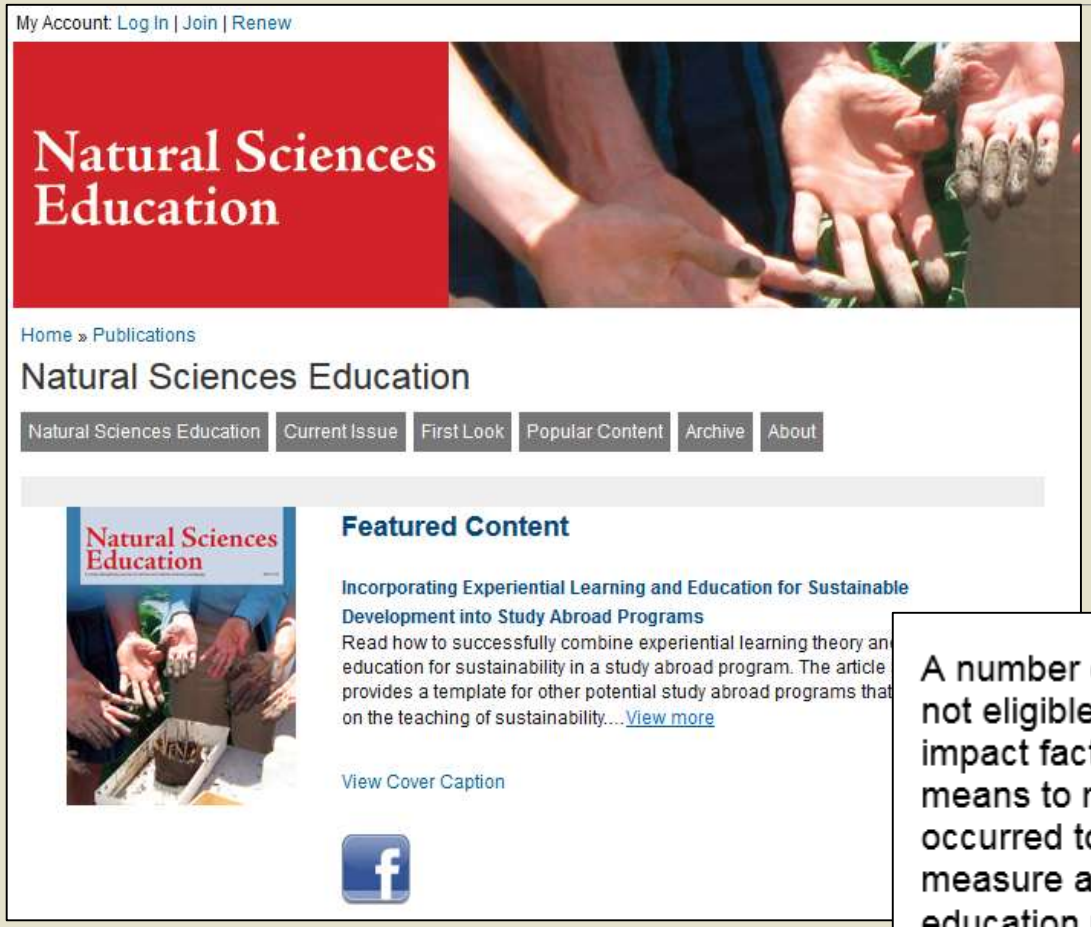
[ 1 | 2 | 3 | 4 ]

MARK ALL | UPDATE MARKED LIST

***Ranking is based on your journal and sort selections.***

| Mark | Rank | Abbreviated Journal Title (linked to journal information) | ISSN | JCR Data | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Total Cites | Impact Factor | 5-Year Impact Factor | Immediacy Index | Articles | Cited Half-life |
| ☐ | 1 | PROG LIPID RES | 0163-7827 | 4825 | 10.015 | 12.204 | 2.500 | 22 | 8.1 |
| ☐ | 2 | ANNU REV NUTR | 0199-9885 | 4699 | 8.359 | 9.660 | 0.500 | 18 | >10.0 |
| ☐ | 3 | AM J CLIN NUTR | 0002-9165 | 51613 | 6.770 | 7.328 | 1.510 | 339 | 9.6 |
| ☐ | 4 | NUTR REV | 0029-6643 | 5837 | 6.076 | 5.708 | 0.958 | 71 | 7.3 |
| ☐ | 5 | ADV NUTR | 2161-8313 | 1390 | 5.386 | 6.413 | 0.702 | 94 | 2.6 |
| ☐ | 6 | P NUTR SOC | 0029-6651 | 4458 | 5.273 | 4.321 | 0.948 | 58 | 9.4 |
| ☐ | 7 | CRIT REV FOOD SCI | 1040-8398 | 5935 | 5.176 | 6.028 | 1.250 | 112 | 8.9 |
| ☐ | 8 | INT J OBESITY | 0307-0565 | 19644 | 5.004 | 5.283 | 1.113 | 231 | 8.6 |
| ☐ | 9 | CLIN NUTR | 0261-5614 | 6603 | 4.476 | 4.533 | 0.762 | 164 | 6.4 |
| ☐ | 10 | INT J BEHAV NUTR PHY | 1479-5868 | 4829 | 4.111 | 5.596 | 0.545 | 156 | 4.2 |

# Not all journals have impact factors.




A number of times each year we are asked why NSE does not have an impact factor. NSE is not eligible for a Thomson Scientific® impact factor due to its non-technical content. Recently impact factors are being looked at from various angles. Impact factors are not always a genuine means to measure a journal's worth. In fact, some deliberate manipulation of impact factors has occurred to falsely inflate some journals' impact. In reality, impact factors are just one way to measure a journal's importance. Other significant measures include the influence it has on education policy, how widely its papers are distributed and read, and the overall number of times a paper is cited by other researchers, even beyond the two-year period used to calculate an impact factor.

https://www.agronomy.org/files/publications/nse-impact-factor.pdf

# Impact factors vary by discipline.

ISI Web of Knowledge℠

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2014 JCR Sc

Journal Summary List

Journals from: subject categories VETERINARY SCIENCES

Sorted by: Impact Factor

Journals 1 - 20 (of 133)

Ranking is based on your journal and sort selections.

| Mark | Rank | Abbreviated Journal Title (linked to journal information) | ISSN | JCR Data | | | | | | Eigenfactor® Metrics | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Total Cites | Impact Factor | 5-Year Impact Factor | Immediacy Index | Articles | Cited Half-life | Eigenfactor® Score | Article Influence® Score |
| | 1 | TRANSBOUND EMERG DIS | 1865-1674 | 1111 | 2.944 | 2.636 | 0.578 | 90 | 2.9 | 0.00413 | 0.726 |
| | 2 | MED VET ENTOMOL | 0269-283X | 2946 | 2.880 | 2.883 | 0.316 | 74 | >10.0 | 0.00313 | 0.741 |
| | 3 | VET RES | 0928-4249 | 3579 | 2.815 | 3.520 | 0.463 | 123 | 6.4 | 0.00754 | 1.016 |
| | 4 | VET COMP ONCOL | 1476-5810 | 562 | 2.733 | 2.344 | 0.429 | 35 | 4.7 | 0.00154 | 0.844 |
| | 5 | FISH SHELLFISH IMMUN | 1050-4648 | 8732 | 2.674 | 2.996 | 0.367 | 378 | 5.3 | 0.01364 | 0.348 |
| | 6 | VET MICROBIOL | 0378-1135 | 13232 | 2.511 | 2.870 | 0.557 | 409 | 8.1 | 0.02761 | 0.797 |
| | 7 | VET PARASITOL | 0304-4017 | 14372 | 2.480 | 2.635 | 0.661 | 434 | 8.7 | 0.02884 | 0.553 |
| | 8 | ILAR J | 1084-2020 | 1180 | 2.393 | 2.158 | 0.391 | 46 | 8.2 | 0.00188 | 0.849 |
| | 9 | EQUINE VET J | 0425-1644 | 3900 | 2.374 | 2.198 | 0.875 | 120 | >10.0 | 0.00652 | 0.506 |
| | 10 | ZOONOSES PUBLIC HLTH | 1863-1959 | 1169 | 2.369 | 2.189 | 0.443 | 70 | 4.2 | 0.00434 | 0.672 |
| | 11 | MED MYCOL | 1369-3786 | 3334 | 2.335 | 2.325 | 0.400 | 105 | 5.7 | 0.00811 | 0.681 |
| | 12 | PREV VET MED | 0167-5877 | 4921 | 2.167 | 2.267 | 0.465 | 226 | 7.0 | 0.00878 | 0.610 |
| | 13 | J FISH DIS | 0140-7775 | 1750 | 2.056 | 2.112 | 0.378 | 119 | 6.9 | 0.00509 | 0.590 |
| | 14 | COMP IMMUNOL MICROB | 0147-9571 | 1411 | 2.015 | 2.214 | 0.310 | 44 | 6.8 | 0.00292 | 0.643 |
| | 15 | VET CLIN N AM-FOOD A | 0749-0720 | 1406 | 2.000 | 2.217 | 0.343 | 35 | >10.0 | 0.00215 | 0.684 |
| | 16 | J MED ENTOMOL | 0022-2585 | 7238 | 1.953 | 2.009 | 0.315 | 168 | >10.0 | 0.00762 | 0.541 |
| | 17 | J VET INTERN MED | 0891-6640 | 5890 | 1.879 | 2.287 | 0.287 | 223 | 7.5 | 0.00942 | 0.626 |
| | 18 | VET PATHOL | 0300-9858 | 4488 | 1.869 | 1.979 | 0.949 | 99 | >10.0 | 0.00629 | 0.602 |
| | 19 | ANIMAL | 1751-7311 | 3146 | 1.841 | 2.040 | 0.506 | 253 | 4.1 | 0.01107 | 0.609 |
| | 20 | THERIOGENOLOGY | 0093-691X | 13332 | 1.798 | 2.154 | 0.486 | 320 | 9.0 | 0.01455 | 0.519 |

Journal of Veterinary Cardiology

Volume 17, Issue 2, June 2015, Pages 77–82

Commentary

## Weighing the impact (factor) of publishing in veterinary journals

Mary M. Christopher, DVM, PhD, Dipl ACVP, Dipl ECVCP

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doi:10.1016/j.jvc.2015.01.002



### Abstract

The journal in which you publish your research can have a major influence on the perceived value of your work and on your ability to reach certain audiences. The impact factor, a widely used metric of journal quality and prestige, has evolved into a benchmark of quality for institutions and graduate programs and, inappropriately, as a proxy for the quality of individual authors and articles, affecting tenure, promotion, and funding decisions. As a result, despite its many limitations, publishing decisions by authors often are based solely on a journal's impact factor. This can disadvantage journals in small disciplines, such as veterinary medicine, and limit the ability of authors to reach key audiences. In this article, factors that can influence the impact factor of a journal and its applicability, including precision, citation practices, article type, editorial policies, and size of the research community will be reviewed. The value and importance of veterinary journals such as the Journal of Veterinary Cardiology for reaching relevant audiences and for helping shape disciplinary specialties and influence clinical practice will also be discussed. Lastly, the efforts underway to develop alternative measures to assess the

Christopher MM. Weighing the impact (factor) of publishing in veterinary journals. J Vet Cardiol. 2015 Jun;17(2):77-82.

# Author & Article Impact

**Citation Searching Tools**: Use the following to gather information about author impact (h-index) and article impact (times cited).

- Web of Science Core Collection
- Scopus
- Google Scholar

Web of Science Core Collection & Scopus can be used to create citation reports that include “times cited” information and h-index.

**Caveat: The information obtained can vary greatly!**

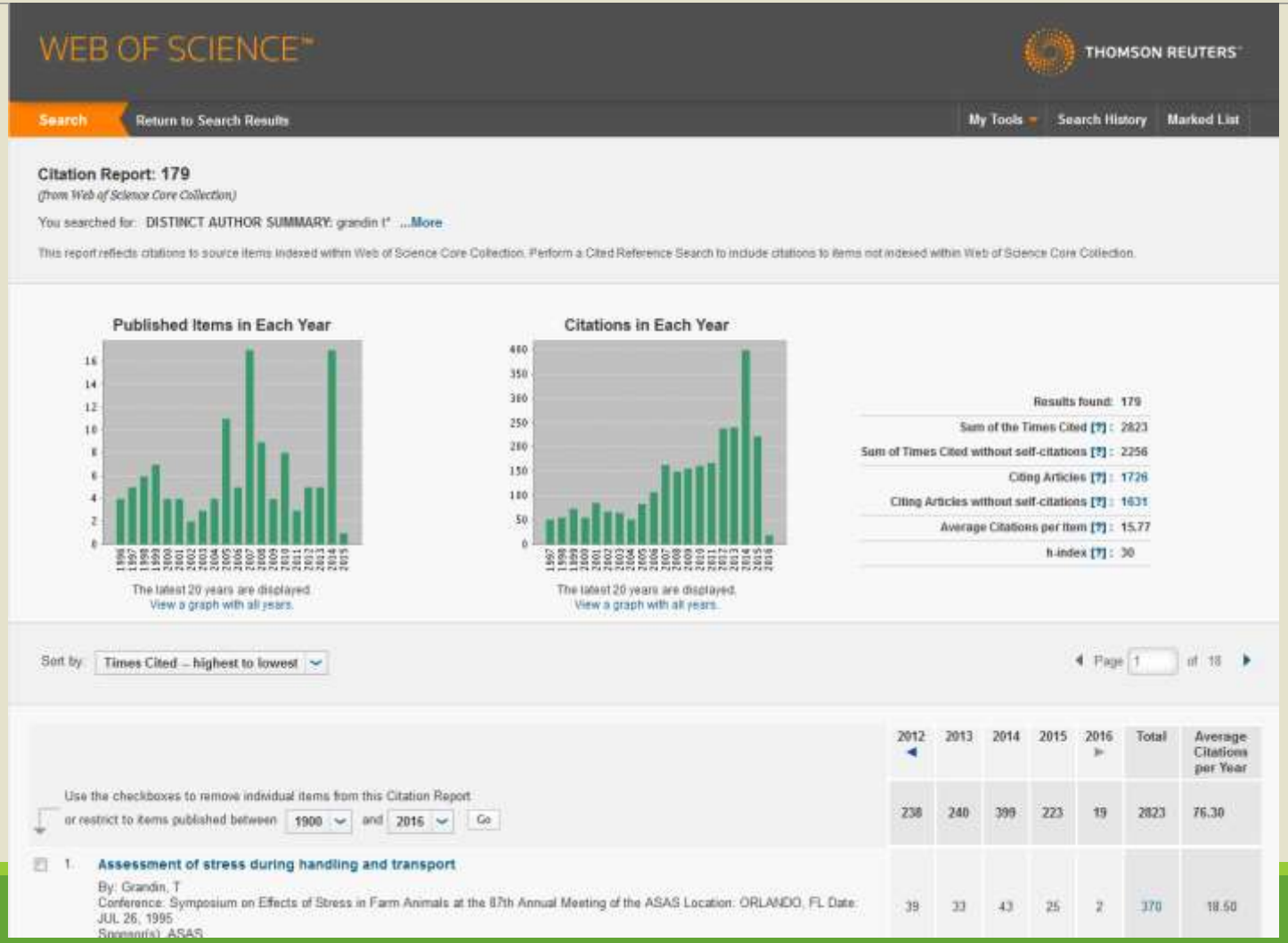
# Author Metrics

h-index

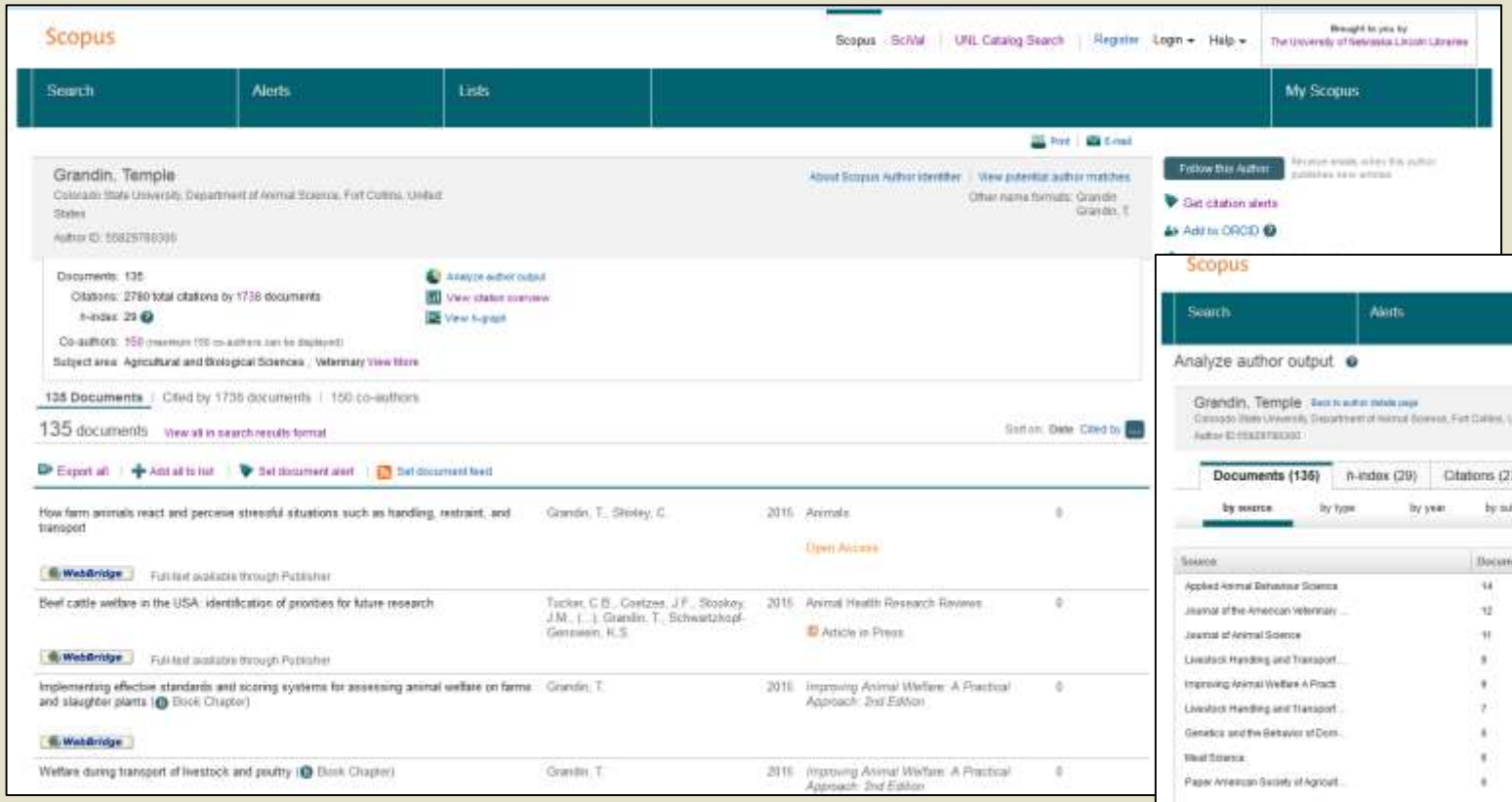
- “The h-index is an index that attempts to measure both the productivity and citation impact of the published body of work of a scientist or scholar. The index is based on the set of the scientist's most cited papers and the number of citations that they have received in other publications.” http://en.wikipedia.org/wiki/H-index

- developed by J.E. Hirsch and published in *Proceedings of the National Academy of Sciences of the United States of America* 102 (46): 16569-16572 November 15, 2005.

# Web of Science Core Collection



# Scopus


Scopus
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Alerts
Lists
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Grandin, Temple
Documents: 135
Citations: 2780 total citations by 1738 documents
h-index: 29
Co-authors: 150
135 documents
How farm animals react and perceive stressful situations such as handling, restraint, and transport
Grandin, T., Sholey, C.
2015
Animals
Beef cattle welfare in the USA: identification of priorities for future research
Animal Health Research Reviews
Implementing effective standards and scoring systems for assessing animal welfare on farms and slaughter plants
Improving Animal Welfare: A Practical Approach, 2nd Edition
Welfare during transport of livestock and poultry
Grandin, T.
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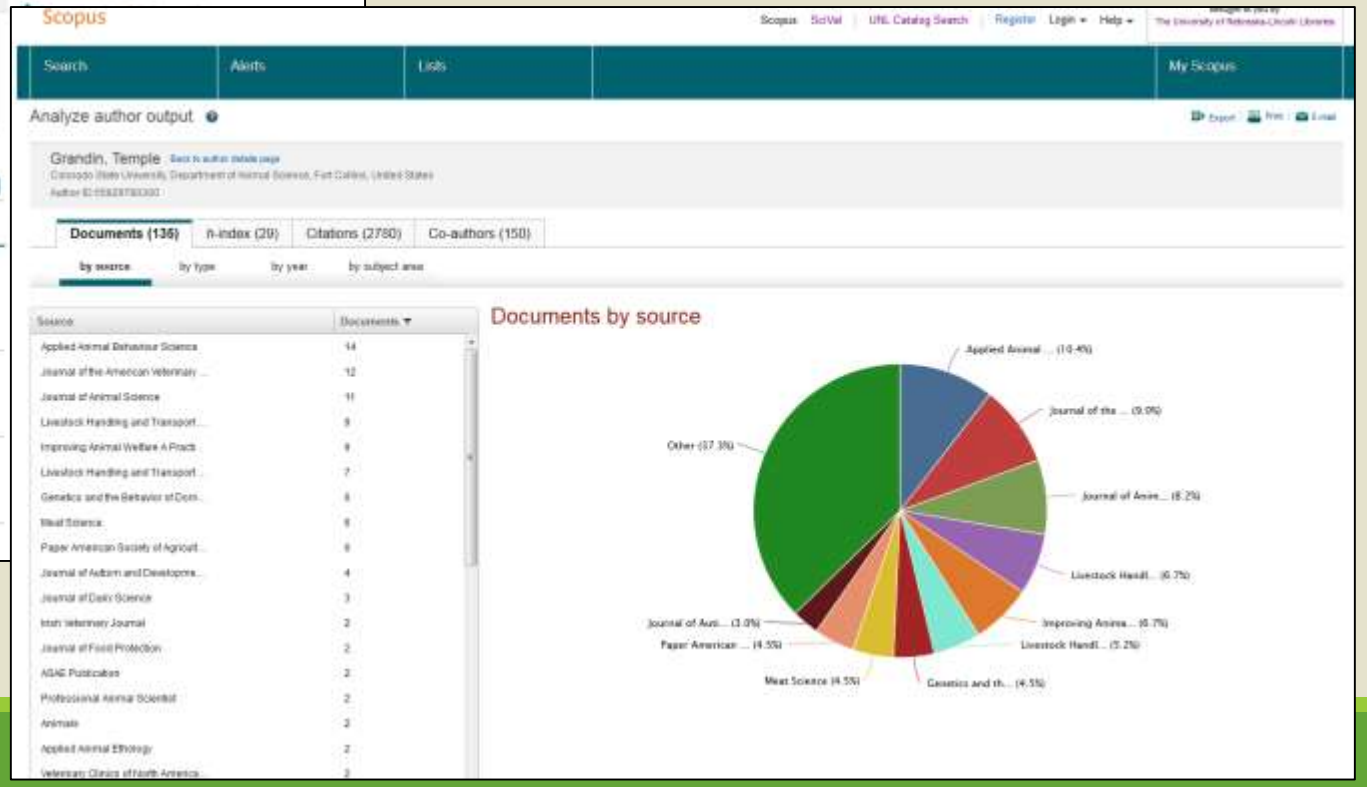
Scopus
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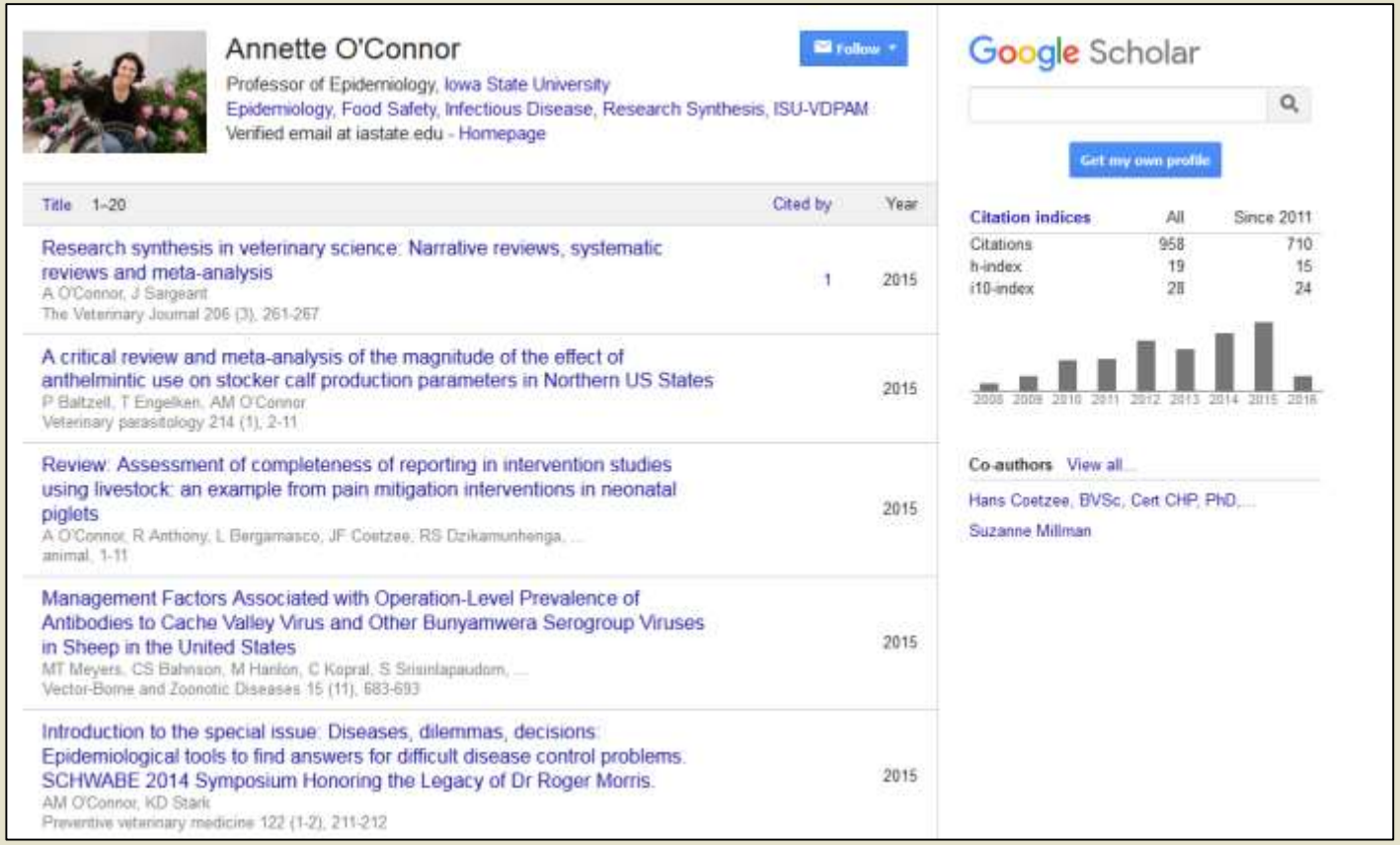
Grandin, Temple
Documents (135)
h-index (29)
Citations (2780)
Co-authors (150)
Documents by source
Applied Animal Behaviour Science
Journal of Animal Science
Livestock Handling and Transport
Meat Science
Paper American Society of Agricult...
Journal of Dairy Science
Irish Veterinary Journal
Journal of Food Protection
ASAE Publication
Professional Animal Scientist
Animals
Applied Animal Ethology
Veterinary Clinics of North America
Other (17.3%)
Meat Science (4.5%)

# Google Scholar



Annette O'Connor

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Professor of Epidemiology, Iowa State University

Epidemiology, Food Safety, Infectious Disease, Research Synthesis, ISU-VDPAM

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| Title 1-20 | Cited by | Year |
|---|---|---|
| Research synthesis in veterinary science: Narrative reviews, systematic reviews and meta-analysis<br>A O'Connor, J Sargeant<br>The Veterinary Journal 206 (3), 261-267 | 1 | 2015 |
| A critical review and meta-analysis of the magnitude of the effect of anthelmintic use on stocker calf production parameters in Northern US States<br>P Baltzell, T Engelken, AM O'Connor<br>Veterinary parasitology 214 (1), 2-11 | | 2015 |
| Review: Assessment of completeness of reporting in intervention studies using livestock: an example from pain mitigation interventions in neonatal piglets<br>A O'Connor, R Anthony, L Bergamasco, JF Coetzee, RS Dzikamunhenga, ...<br>animal, 1-11 | | 2015 |
| Management Factors Associated with Operation-Level Prevalence of Antibodies to Cache Valley Virus and Other Bunyamwera Serogroup Viruses in Sheep in the United States<br>MT Meyers, CS Bahnson, M Hanlon, C Kopral, S Srisutapaudom, ...<br>Vector-Borne and Zoonotic Diseases 15 (11), 683-693 | | 2015 |
| Introduction to the special issue: Diseases, dilemmas, decisions: Epidemiological tools to find answers for difficult disease control problems. SCHWABE 2014 Symposium Honoring the Legacy of Dr Roger Morris.<br>AM O'Connor, KD Stark<br>Preventive veterinary medicine 122 (1-2), 211-212 | | 2015 |

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| Citation indices | All | Since 2011 |
|---|---|---|
| Citations | 958 | 710 |
| h-index | 19 | 15 |
| i10-index | 28 | 24 |

2008 2009 2010 2011 2012 2013 2014 2015 2016

Co-authors View all...

Hans Coetzee, BVSc, Cert CHP, PhD,...

Suzanne Millman

i10-index: The number of publications with at least 10 citations. This metric is unique to Google Scholar.

# Article-Level Metrics

- Metrics based on **use** of the work or its **subsequent application.**
- **Examples:**
  - **Views** online
  - **Downloads**
  - **Citations** to works in **published** literature
    - Citations represent formal knowledge transfer of research findings via published literature
- Some publishers provide this information (e.g. PLoS, Biomed Central, Elsevier/ScienceDirect via author's dashboard, UNL Digital Commons)

# Article-Level Metrics

4471
Total accesses

Online Download Statistics By Month

| | Abstract/Extract | Full-Text | PDF |
|---|---|---|---|
| TOTAL DOWNLOADS | 1718 | 105 | 196 |
| TOTAL DOWNLOADS 2014 | 1718 | 105 | 196 |
| Nov 2014 (month to date) | 13 | 1 | 1 |
| Oct 2014 | 92 | 14 | 12 |
| Sep 2014 | 74 | 15 | 8 |
| Aug 2014 | 89 | 9 | 6 |
| Jul 2014 | 94 | 16 | 6 |
| Jun 2014 | 138 | 17 | 16 |
| May 2014 | 326 | 15 | 29 |
| Apr 2014 | 443 | 16 | 47 |
| Mar 2014 | 449 | 2 | 71 |

- Citing Articles

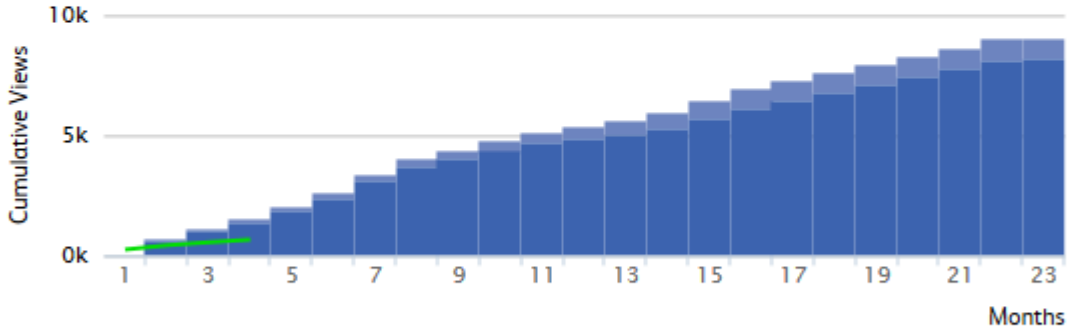
View citing article information
Citing articles via CrossRef
Citing articles via Scopus (11)
Citing articles via Web of Science (11)
Citing articles via Google Scholar

## Viewed

Total Article Views
**9,060**
Jan 29, 2013 (publication date) through Nov 7, 2014*

| | HTML Page Views | PDF Downloads | XML Downloads | Totals |
|---|---|---|---|---|
| PLOS | 7,060 | 1,080 | 33 | 8,173 |
| PMC | 652 | 235 | n.a. | 887 |
| Totals | 7,712 | 1,315 | 33 | 9,060 |

**17.05%** of article views led to PDF downloads




Compare average usage for articles published in 2013 in the subject area:

Agriculture | Show reference set

*Although we update our data on a daily basis, there may be a 48-hour delay before the most recent numbers are available. PMC data is posted on a monthly basis and will be made available once received.

## Cited

| SCOPUS | crossref | PMC | ISI Web of SCIENCE | Europe PubMed Central |
|---|---|---|---|---|
| 20 | 11 | 9 | 13 | 10 |

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# Altmetrics

"The study and use of **non-traditional scholarly impact measures** that are based on activity in web-based environments."

--PLOS Altmetrics Collection, http://www.ploscollections.org/article/browseIssue.action?issue=info:doi/10.1371/issue.pcol.v02.i19

# Altmetrics

- Attention to research outputs in non-traditional sources, e.g. policy documents, news, blogs and social media
- *Indicators* of research impact
- Help understand how research is being received and used
- Complementary to traditional citation-based analysis

**ACADEMIC ATTENTION**

Journal Impact Factor
Citation counts
H-index
Number of publications

Traditional bibliometrics

+

**BROADER ATTENTION**

Mentions in news reports
References in policy
Mentions in social media
Wikipedia citations
Reference manager readers… etc.

Alternative metrics
**"altmetrics"**

https://help.altmetric.com/support/solutions/articles/6000086851-altmetric-for-publishers-training-and-promotional-pack

# Why altmetrics?

- Real-time, immediate feedback on attention to scholarly content
- Track attention to a broad range of research outputs, e.g. articles, posters, data sets, working papers
- Showcase attention to a research output beyond academia
- Provide a more coherent understanding of research attention

"Altmetrics expand our view of what impact looks like, but also of what's making the impact. This matters because **expressions of scholarship are becoming more diverse**."

*-J. Priem, D. Taraborelli, P. Groth, C. Neylon (2010), Altmetrics: A manifesto, 26 October 2010. http://altmetrics.org/manifesto*

Journal of Experimental Biology

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EDITORIAL

## Article-level metrics – it's not just about citations

Michaela J. P. Handel

Journal of Experimental Biology 2014 217: 4271-4272; doi: 10.1242/jeb.117150

Article | Figures & tables | Info & metrics | PDF

The burden on modern-day researchers is huge – not only do they have to plan and carry out their research and teach/train the future generation of researchers but also there is increasing pressure to publish and publicise the outcome of their research while obtaining funding for future studies. Research institutions and funding bodies are becoming ever more demanding in their assessment of research quality, which in turn impacts career progression and research funding. In addition to proving that their work is read and cited by their scientific peers, it is becoming increasingly important for researchers to show the societal impact of their research (public interest yields funding).

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PERSPECTIVE

## Article-Level Metrics and the Evolution of Scientific Impact

Cameron Neylon, Shirley Wu

Published: November 17, 2009 • DOI: 10.1371/journal.pbio.1000242

nature International weekly journal of science

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Archive > Volume 493 > Issue 7431 > Comment > Article

*NATURE* | COMMENT

## Altmetrics: Value all research products

Heather Piwowar

*Nature* **493**, 159 (10 January 2013) | doi:10.1038/493159a
Published online 09 January 2013

PDF | Citation | Reprints | Rights & permissions | Article metrics

**A new funding policy by the US National Science Foundation represents a sea-change in how researchers are evaluated, says Heather Piwowar.**

**Subject terms:** Publishing • Policy • Media formats

What a difference a word makes. For all new grant applications from 14 January, the US National Science Foundation (NSF) asks a principal investigator to list his or her research "products" rather than "publications" in the biographical sketch section. This means that, according to the NSF, a scientist's worth is not dependent solely on publications. Data sets, software and other non-traditional research products will count too.

There are more diverse research products now than ever before. Scientists are developing and releasing better tools to document their workflow, check each other's work and share information, from data repositories to post-publication discussion systems. As it gets easier to publish a wide variety of material online, it should also become easy to recognize the breadth of a scientist's intellectual contributions.

But one must evaluate whether each product has made an impact on its field — from a data set on beetle growth, for instance, to the solution to a colleague's research problem posted on a question-and-answer website. So scientists are developing and assessing alternative metrics, or

# Scopus Altmetrics

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PLoS ONE

Volume 8, Issue 1, 29 January 2013, Article number e54092

Open Access

## Acaricide, Fungicide and Drug Interactions in Honey Bees (Apis mellifera) (Article)

Johnson, R.M., Dahlgren, L., Siegfried, B.D., Ellis, M.D.

Department of Entomology, University of Nebraska - Lincoln, NE, United States

View additional affiliations

View references (76)

### Abstract

Background: Chemical analysis shows that honey bees (Apis mellifera) and hive products contain many pesticides derived from various sources. The most abundant pesticides are acaricides applied by beekeepers to control Varroa destructor. Beekeepers also apply antimicrobial drugs to control bacterial and microsporidial diseases. Fungicides may enter the hive when applied to nearby flowering crops. Acaricides, antimicrobial drugs and fungicides are not highly toxic to bees alone, but in combination there is potential for heightened toxicity due to interactive effects. Methodology/Principal Findings: Laboratory bioassays based on mortality rates in adult worker bees demonstrated interactive effects among acaricides, as well as between acaricides and antimicrobial drugs and between acaricides and fungicides. Toxicity of the acaricide tau-fluvalinate increased in combination with other acaricides and most other compounds tested (15 of 17) while amitraz toxicity was mostly unchanged (1 of 15). The sterol biosynthesis inhibiting (SBI) fungicide prochloraz elevated the toxicity of the acaricides tau-fluvalinate, coumaphos and fenpyroximate, likely through inhibition of detoxicative cytochrome P450 monooxygenase activity. Four other SBI fungicides increased the toxicity of tau-fluvalinate in a dose-dependent manner, although possible evidence of P450 induction was observed at the lowest fungicide doses. Non-transitive interactions between some acaricides were observed. Sublethal amitraz pre-treatment increased the toxicity of the three P450-detoxified acaricides, but amitraz toxicity was not changed by sublethal treatment with the same three acaricides. A two-fold change in the toxicity of tau-fluvalinate was observed between years, suggesting a possible change in the genetic composition of the bees tested. Conclusions/Significance: Interactions with acaricides in honey bees are similar to drug interactions in other animals in that P450-mediated detoxication appears to play an important role. Evidence of non-transitivity, year-to-year variation and induction of detoxication enzymes indicates that pesticide interactions in bees may be as complex as drug interactions in mammals. © 2013 Johnson et al.

### Indexed keywords

**EMTREE drug terms:** acaricide; amitraz; coumafos; cytochrome P450; fenpyroximate; fluvalinate; fungicide; prochloraz; thymol; unclassified drug

**EMTREE medical terms:** Apis mellifera; article; chemical interaction; chemical pest control; controlled study; detoxification; enzyme induction; enzyme inhibition; LD 50; nonhuman; protein function

**MeSH:** Acaricides; Animals; Anti-Infective Agents; Beekeeping; Bees; Cytochrome P-450 Enzyme System; Drug Interactions; Fungicides, Industrial; Honey; Metabolic Detoxication, Drug; Nitriles; Pesticides; Pyrethrins; Toluidines; Varroidae

*Medline is the source for the MeSH terms of this document.*

**Chemicals and CAS Registry Numbers:** amitraz, 33089-61-1; coumafos, 56-72-4; cytochrome P450, 9035-51-2; fluvalinate, 69409-94-5; prochloraz, 67747-09-5; thymol, 89-83-8;Acaricides; Anti-Infective Agents; Cytochrome P-450 Enzyme System, 9035-51-2; Fungicides, Industrial; Nitriles; Pesticides; Pyrethrins; Toluidines; amitraz, 33IAH50175; fluvalinate, 364G5G03VC

ISSN: 19326203 Source Type: Journal Original language: English

DOI: 10.1371/journal.pone.0054092 PubMed ID: 23382889 Document Type: Article

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### References (76)

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Bogdanov, S.

1 Contaminants of bee products

(2006) Apidologie, 37 (1), pp. 1-18. Cited 188 times.

http://www.apidologie.org/articles/apidologie/pdf/2006/01/hal01...

Cited by 54 documents

Are bee diseases linked to pesticides? - A brief review
Sánchez-Bayo, F., Goulson, D., Pennacchio, F.
(2016) Environment International

Divergent forms of endoplasmic reticulum stress trigger a robust unfolded protein response in honey bees
Johnston, B.A., Hooks, K.B., McKinsey, M.
(2016) Journal of Insect Physiology

Measuring cytochrome P450 activity in aquatic invertebrates: a critical evaluation of in vitro and in vivo methods
Gottardi, M., Kienzler, A., Cedergreen, N.
(2016) Ecotoxicology

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Johnson, R.M., Ellis, M.D., Mullin, C.A.
(2010) Apidologie

Honey bee toxicology
Johnson, R.M.
(2015) Annual Review of Entomology

Standard methods for toxicology research in Apis mellifera
Medrzycki, P., Giffard, H., Aupinel, P.
(2013) Journal of Apicultural Research

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Metrics

54 Citations

9.83 Field-Weighted Citation Impact

80 Mendeley Readers

19 Tweets

3 Posts on Facebook

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# Scopus Metric Details

Scopus

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Metric details

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Acaricide, Fungicide and Drug Interactions in Honey Bees (Apis mellifera) Back to article

(2013) PLoS ONE, 8(1), art. no. e54992.

Overview | Citations | Scholarly Activity Mendeley, CiteULike, etc. | Social Activity Twitter, Facebook, etc.

## Overview

About Snowball Metrics

| Citation Count | Field-Weighted Citation Impact | Citation Benchmarking |
|---|---|---|
| 54 | 9.83 | 99th percentile |
| Cited by in Scopus | | Compared to Agricultural and Biological Sciences (all) articles of the same age and document type |

| Mendeley | Twitter | Facebook |
|---|---|---|
| 80 Readers | 19 Tweets | 3 Posts |

## Engagement highlights

**Scholarly Activity** - 80 readers from 1 source

Downloads and posts in common research tools

MENDELEY

Mendeley: 80 Readers
Top Discipline: Biological Sciences
Top Demographic: Other

Save to Mendeley

**Benchmark highlights**

Based on 80 readers from 1 source

Compared to Agricultural and Biological Sciences (all) articles of same age and document type

All Scholarly Activity - 80

View all Scholarly Activity

**Social Activity** - 22 mentions from 2 sources

Mentions characterized by rapid, brief engagement on platforms used by the general population, such as Twitter, Facebook, and Google +.

19 tweets from 14 accounts

3 Facebook posts from 3 accounts

**Benchmark highlights**

Based on 22 mentions from 2 sources

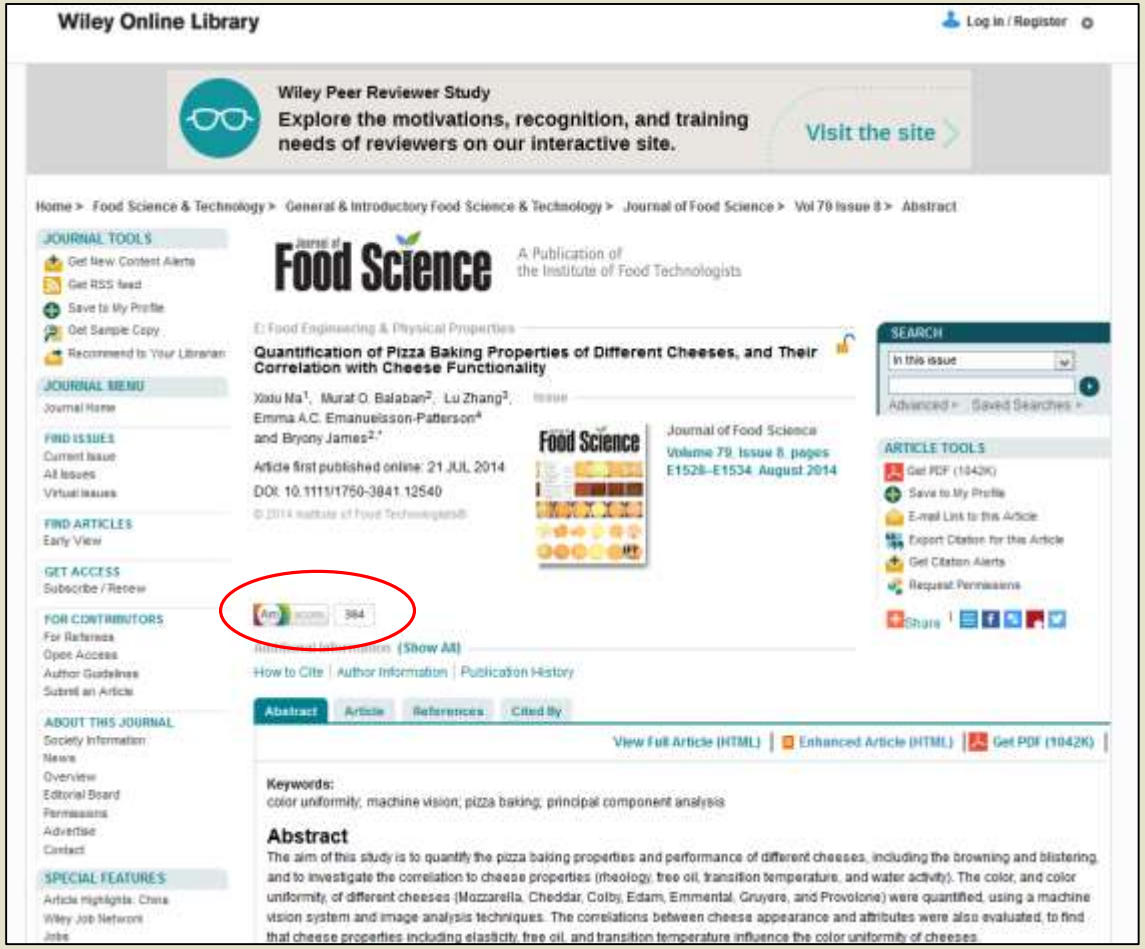
Compared to Agricultural and Biological Sciences (all) articles of same age and document type

All Social Activity - 22

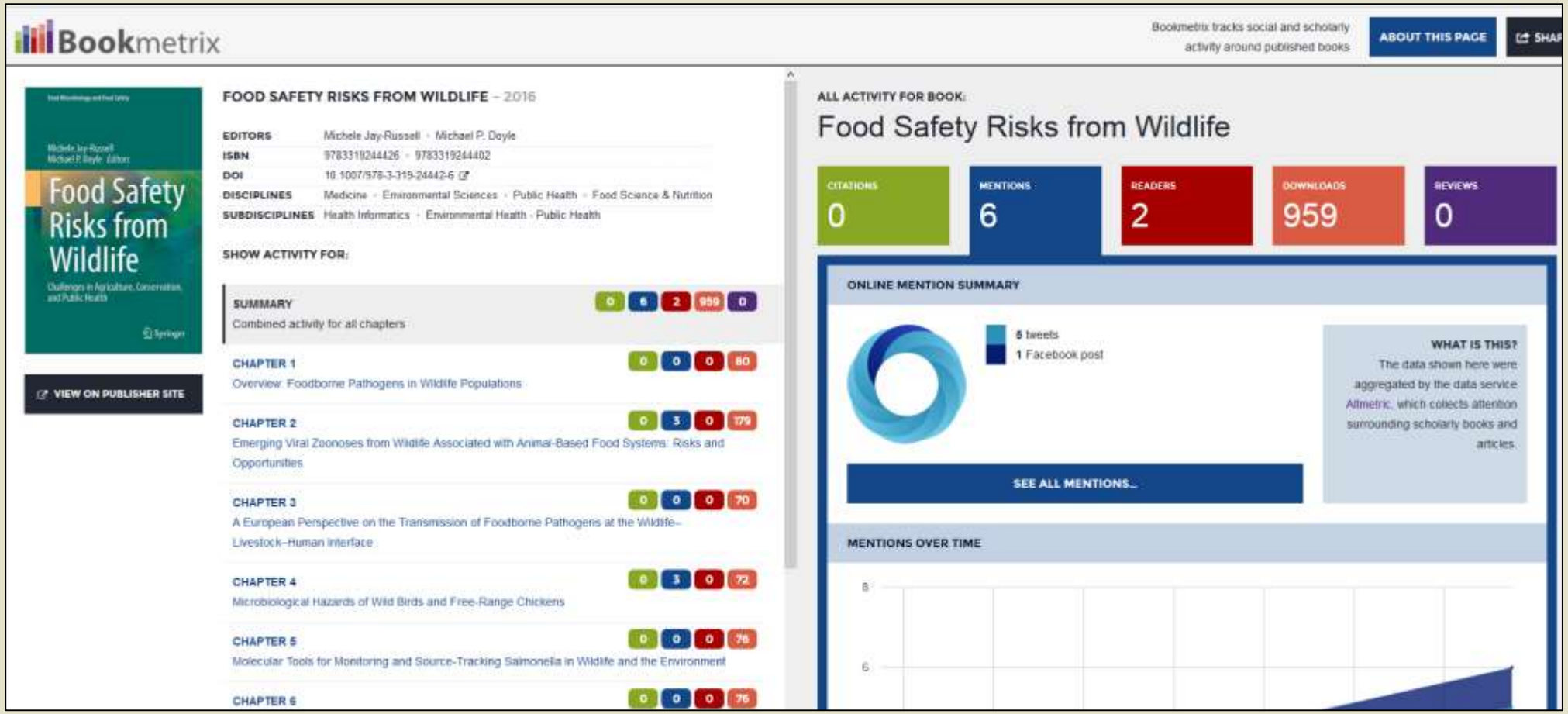
View all Social Activity

Select data provided by altmetric.com

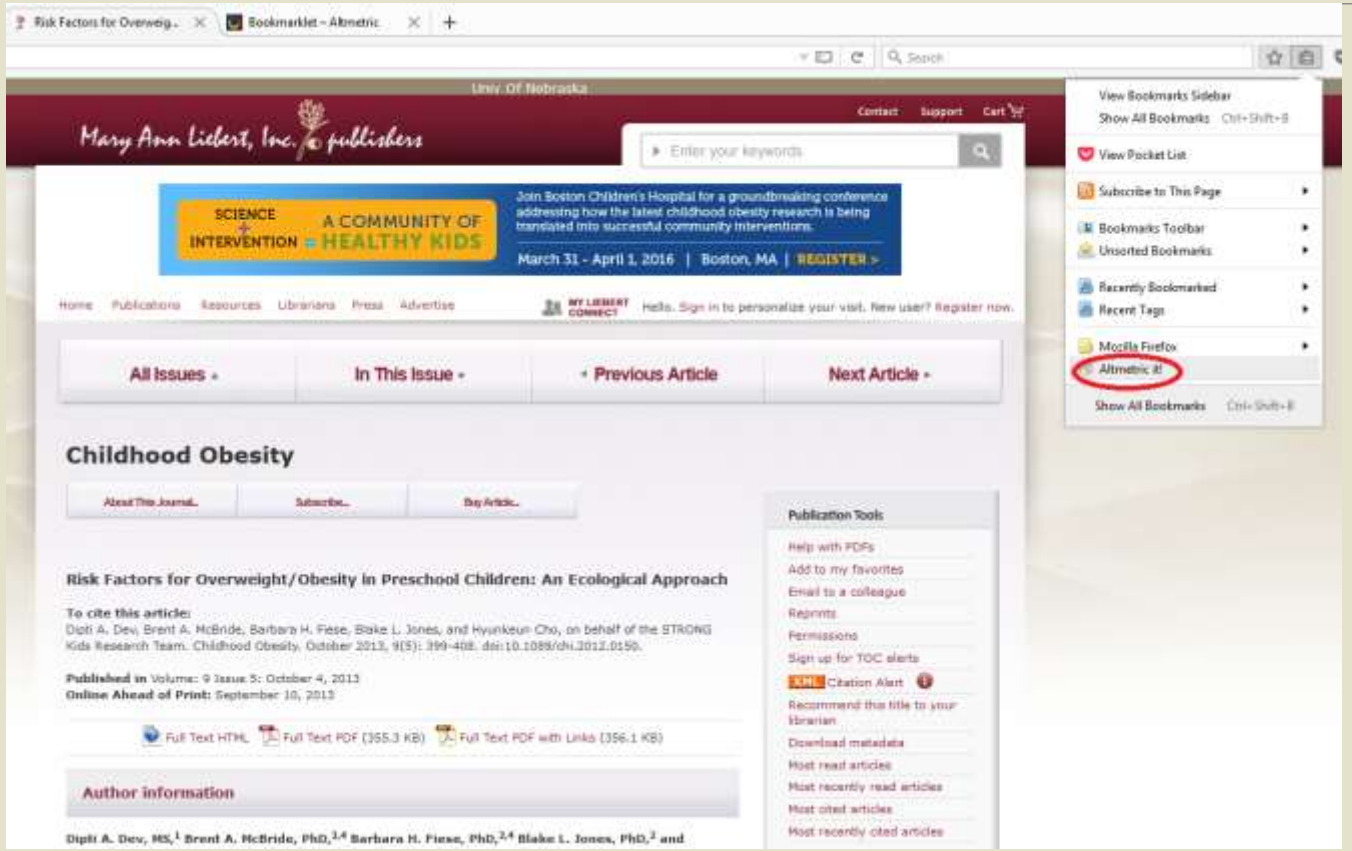
# Altmetrics: Journal of Food Science




# Springer: Providing book metrics



# Altmetric Bookmarklet





https://www.altmetric.com/products/free-tools/bookmarklet/

# Telling Your Story

**Office of Academic Affairs | University of Nebraska-Lincoln**
**Documentation Format for Promotion and/or Tenure**

**III. Appendices** (to be prepared by candidate)

Candidates should only include:

- Significant and relevant information
- Information referred to in the Candidate Section
- Information required by your college

A. Possible examples of supporting evidence for the quality and effectiveness of teaching:
   1. Student evaluations
   2. Course portfolio
   3. Number of undergraduate advisees
   4. Curriculum/course development
   5. Student achievement/outcomes
   6. Number of graduate students produced
   7. International activity
   8. SOTL activities (Scholarship of Teaching and Learning)

B. Possible examples of supporting evidence of the quality of scholarly, professional, and creative activity:
   1. Publications (including electronic)
   2. Performances/exhibitions
   3. Reviews
   4. Citations
   5. Funded grant proposals

C. Possible examples of supporting evidence of the quality and significance of professional and institutional service, outreach activities:
   1. Editorships
   2. Committee service (Department, College, University)
   3. Leadership in professional organizations
   4. Community service related to assignment

D. Possible examples of supporting evidence of the quality and significance of extension activities:
   1. EARS (Extension Accomplishments Reporting System)
   2. Citations
   3. Programming highlights and impacts
   4. Publications
   5. Funded grant proposals

Documentation Format for Promotion and/or Tenure
http://svcaa.unl.edu/faculty/promotion-tenure

Check with your department for additional guidelines, recommendations, and best practices.

# CV

Trevor Branch, University of Washington
Included Web of Science & Google Scholar metrics. Included some altmetrics for specific publications.



## 3.1 Peer-Reviewed Journal Articles

Summary: 59 papers, 27 first-authored, 862 pages, 15 pages per paper.
Since starting as assistant professor: 33 papers, 8 first-authored.
Metrics (Web of Science): 1615 citations, 30 citations per item, h-index 16.
Metrics (Google Scholar): 3185 citations, i10-index 48, h-index 26.

*Note 1: superscripts indicate collaborators in the School of Aquatic and Fishery Sciences since being appointed an assistant professor (2010): colleagues[1], graduate students in my lab[2], other graduate students[3], research staff[4], and post-docs[5].*

*Note 2: citation counts in bold and annotations are from Web of Science, using Cited Reference Search for unlisted journals.*

*2014 (7)*

59. Monnahan[2], C. C., T. A. Branch, and A. E. Punt[1]. 2014. Do ship strikes threaten the recovery of endangered eastern North Pacific blue whales? Marine Mammal Science doi: 10.1111/mms.12157, 19 pages. **Highest Altmetric score (309) of any paper published in Marine Mammal Science, reflecting widespread media coverage** *(20% of effort, idea, funding, supervision)*
58. Melnychuk, M. C., T. E. Essington[1], T. A. Branch, S. S. Heppell, O. P. Jensen, J. S. Link, S. J. D. Martell, A. M. Parma, J. G. Pope, and A. D. M. Smith. 2014. Which design elements of individual quota fisheries help to achieve management objectives? Fish and Fisheries doi: 10.1111/faf.12094, 17 pages. *(5% of total effort)*
57. Szuwalski[3], C. S., K. A. Vert-pre[3], A. E. Punt[1], T. A. Branch, and R. Hilborn[1]. 2014. Examining common assumptions about recruitment: a meta-analysis of recruitment dynamics for worldwide marine fisheries. Fish and Fisheries doi:10.1111/faf.12083, 16 pages. *(5% of total effort)*
56. Stachura[3], M. M., T. E. Essington[1], N. J. Mantua, A. B. Hollowed, M. A. Haltuch, P. D. Spencer, T. A. Branch, and M. J. Doyle. 2014. Linking Northeast Pacific recruitment synchrony to environmental variability. Fisheries Oceanography 23:389-408, 20 pages. *(5% of total effort)*
55. Monnahan[2], C. C., T. A. Branch, K. M. Stafford, Y. V. Ivashchenko, and E. M. Oleson. 2014. Estimating historical eastern North Pacific blue whale catches using spatial calling patterns. PLOS ONE 9:e98974, 21 pages. *(30% effort, idea, funding, writing, supervision)*
54. Double, M. C., V. Andrews-Goff, K. C. S. Jenner, M.-N. Jenner, S. M. Laverick, T. A. Branch, and N. J. Gales. 2014. Migratory movements of pygmy blue whales (*Balaenoptera musculus brevicauda*) between Australia and Indonesia as revealed by satellite telemetry. PLOS ONE 9:e93578, 11 pages. *(5% effort, prediction, analysis, writing)*
53. Hilborn[1], R., D. J. Hively[4], O. P. Jensen[5], and T. A. Branch. 2014. The dynamics of fish populations at low abundance and prospects for rebuilding and recovery. ICES Journal of Marine Science doi:10.1093/icesjms/fsu035, 11 pages. *(10% effort, analysis, writing)*

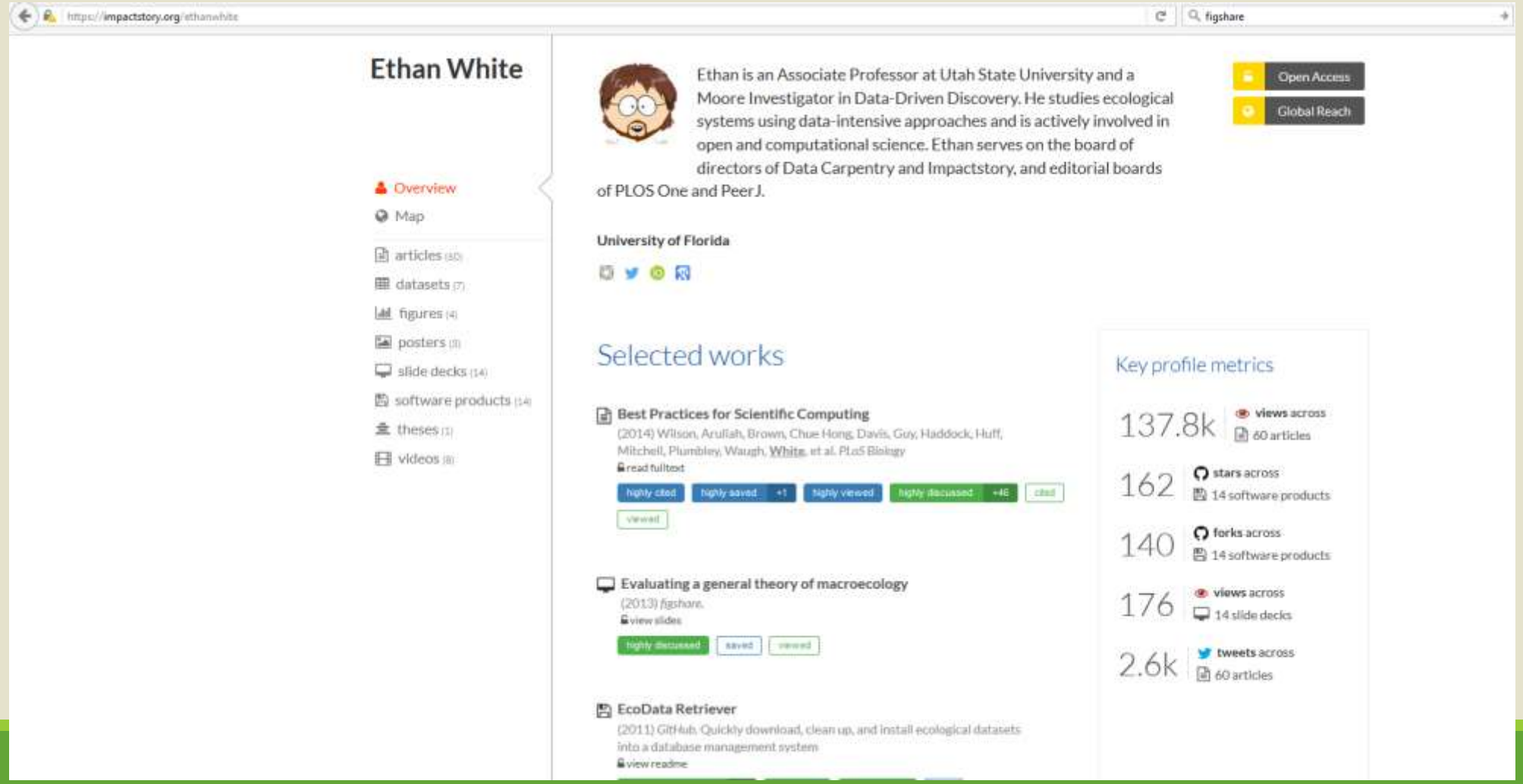
https://drive.google.com/file/d/0BzVyoVbp68fZU2tqTVNfZHlaMDlVczRJb0VZWXB1VjdDMHBV/view

# CV

Ethan White,
http://whitelab.weecology.org/user/3

Includes links to publications, slide decks, software via GitHub

# Impact Story Profile: https://impactstory.org/ethanwhite




Cost: $5/month

# Using Metrics: Grant Proposals- Describing Relevant Publications

Delgado-Baquerizo, M., F. T. Maestre, et al. 2013. Decoupling of soil nutrient cycles as a function of aridity in global drylands. *Nature* 502: 672-676.

Using the network of sites deployed in the framework of the BIOCOM project, this study reports a negative effect of aridity on the concentration of organic C and total N, but a positive effect on that of inorganic P, in dryland soils worldwide. Aridity was negatively related to plant cover, which may favor the dominance of physical (i.e. wind-blown sands that abrade exposed rock surfaces) over biological (i.e. litter decomposition) processes. The results of this study indicate that the predicted increase in aridity with climate change by the end of this century will uncouple the C, N and P cycles in dryland soils, thus negatively affecting the provision of key ecosystem services by drylands, such as the buildup of soil fertility and carbon fixation.

This article has attracted lots of attention from scientists since its publication, as it was the object of a "News & Views" in Nature (Wardle, 2013, *Nature* 502: 628-629), and has been viewed more than 6300 times since its publication two months ago (see http://goo.gl/EuHYOv for details). This article has also been widely discussed in the social media, as indicated by an Altmetric score of 151, which makes it scoring higher than 99% of its contemporaries and includes it into the top 5% of all the articles tracked by Altmetric (more than 1,730,000; see http://goo.gl/f3fu3A for details). This study has also received substantial attention by newspapers, magazines, web pages and blogs from around the world (see http://goo.gl/CU2hSR for a selection of news).

Source: http://maestrelab.blogspot.com.es/2014/11/how-i-use-altmetrics-data-in-my.html

# Research Lab Website

EMERGENCY MEDICINE
Washington University School of Medicine in St. Louis

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- Lab Home
- Podcasts
- Projects
- Publications
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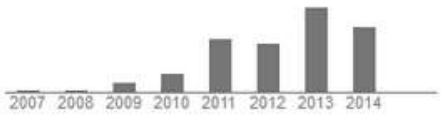
- Videos

## Christopher R. Carpenter, MD,: Emergency Medicine Research Lab Home


Dr. Christopher R. Carpenter, M.D., has over 55 publications indexed in SCOPUS. The publication types include 26 articles, nine notes, seven editorials, three letters, one book, one Book Chapter and one conference paper, published in over 22 different journals. His co-authors represent three different countries from affiliations such as Johns Hopkins University, Harvard Medical School, McMaster University, Universität Bern, to name a few. Dr. Carpenter's 55 documents have been cited 372 times in 283 subsequent publications. The citations represent nine publication types published in over 160 different journals, ten languages, and authors from over 30 countries representing various affiliations world-wide. His Google Scholar h-Index is 14, which places him within the Top 5% of EM clinical researchers in the United States. He also has authored ten textbook chapters and co-authored his first textbook in 2013.

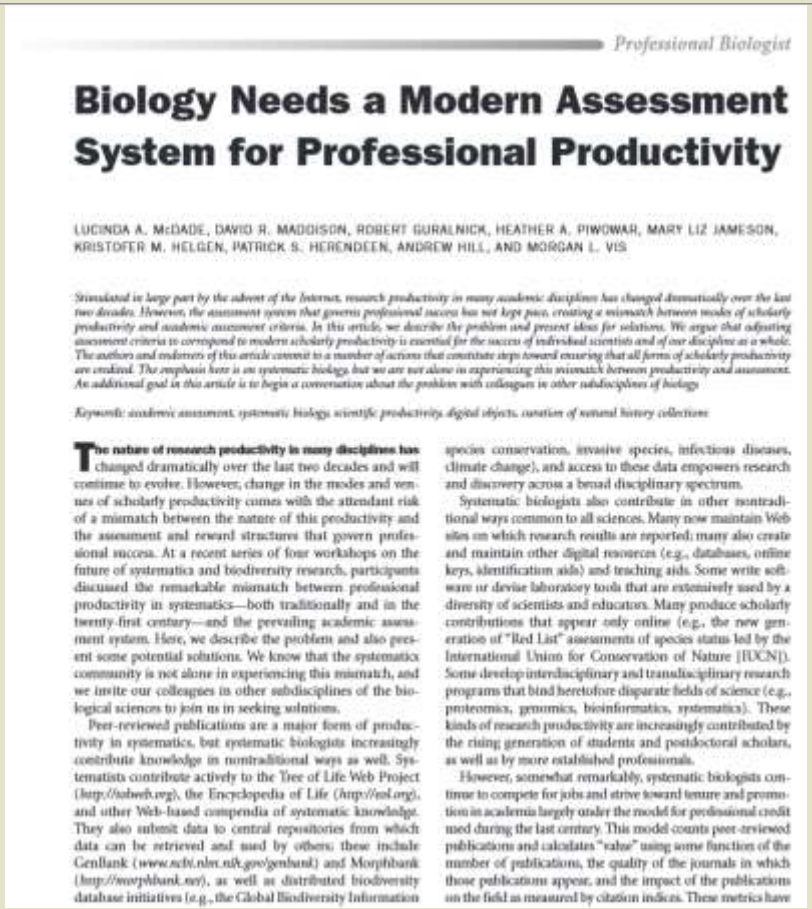
Currently, he is an Associate Editor for *Academic Emergency Medicine* and *Annals of Internal Medicine's ACP Journal Club*. He served as Guest Editor for *Clinics in Geriatric Medicine*. *You can review his publication portfolio on Google Scholar, ORCID, or Researcher ID.*

| Citation indices | All | Since 2009 |
|---|---|---|
| Citations | 776 | 742 |
| h-index | 17 | 17 |
| i10-index | 25 | 25 |




http://emed.wustl.edu/carpenter_christopher/LabHome.aspx

# Research Impact: Expanding the Definition



Professional Biologist

## Biology Needs a Modern Assessment System for Professional Productivity

LUCINDA A. McDADE, DAVID R. MADDISON, ROBERT GURALNICK, HEATHER A. PIWOWAR, MARY LIZ JAMESON, KRISTOFER M. HELGEN, PATRICK S. HERENDEEN, ANDREW HILL, AND MORGAN L. VIS

*Stimulated in large part by the advent of the Internet, research productivity in many academic disciplines has changed dramatically over the last two decades. However, the assessment system that governs professional success has not kept pace, creating a mismatch between modes of scholarly productivity and academic assessment criteria. In this article, we describe the problem and present ideas for solutions. We argue that adjusting assessment criteria to correspond to modern scholarly productivity is essential for the success of individual scientists and of our discipline as a whole. The authors and endorsers of this article commit to a number of actions that constitute steps toward ensuring that all forms of scholarly productivity are credited. The emphasis here is on systematic biology, but we are not alone in experiencing this mismatch between productivity and assessment. An additional goal in this article is to begin a conversation about the problem with colleagues in other subdisciplines of biology.*

*Keywords: academic assessment, systematic biology, scientific productivity, digital objects, curation of natural history collections*

**The nature of research productivity in many disciplines has** changed dramatically over the last two decades and will continue to evolve. However, change in the modes and venues of scholarly productivity comes with the attendant risk of a mismatch between the nature of this productivity and the assessment and reward structures that govern professional success. At a recent series of four workshops on the future of systematics and biodiversity research, participants discussed the remarkable mismatch between professional productivity in systematics—both traditionally and in the twenty-first century—and the prevailing academic assessment system. Here, we describe the problem and also present some potential solutions. We know that the systematics community is not alone in experiencing this mismatch, and we invite our colleagues in other subdisciplines of the biological sciences to join us in seeking solutions.

Peer-reviewed publications are a major form of productivity in systematics, but systematic biologists increasingly contribute knowledge in nontraditional ways as well. Systematists contribute actively to the Tree of Life Web Project (http://tolweb.org), the Encyclopedia of Life (http://eol.org), and other Web-based compendia of systematic knowledge. They also submit data to central repositories from which data can be retrieved and used by others; these include GenBank (www.ncbi.nlm.nih.gov/genbank) and Morphbank (http://morphbank.net), as well as distributed biodiversity database initiatives (e.g., the Global Biodiversity Information species conservation, invasive species, infectious diseases, climate change), and access to these data empowers research and discovery across a broad disciplinary spectrum.

Systematic biologists also contribute in other nontraditional ways common to all sciences. Many now maintain Web sites on which research results are reported; many also create and maintain other digital resources (e.g., databases, online keys, identification aids) and teaching aids. Some write software or devise laboratory tools that are extensively used by a diversity of scientists and educators. Many produce scholarly contributions that appear only online (e.g., the new generation of "Red List" assessments of species status led by the International Union for Conservation of Nature [IUCN]). Some develop interdisciplinary and transdisciplinary research programs that bind heretofore disparate fields of science (e.g., proteomics, genomics, bioinformatics, systematics). These kinds of research productivity are increasingly contributed by the rising generation of students and postdoctoral scholars, as well as by more established professionals.

However, somewhat remarkably, systematic biologists continue to compete for jobs and strive toward tenure and promotion in academia largely under the model for professional credit used during the last century. This model counts peer-reviewed publications and calculates "value" using some function of the number of publications, the quality of the journals in which those publications appear, and the impact of the publications on the field as measured by citation indices. These metrics have

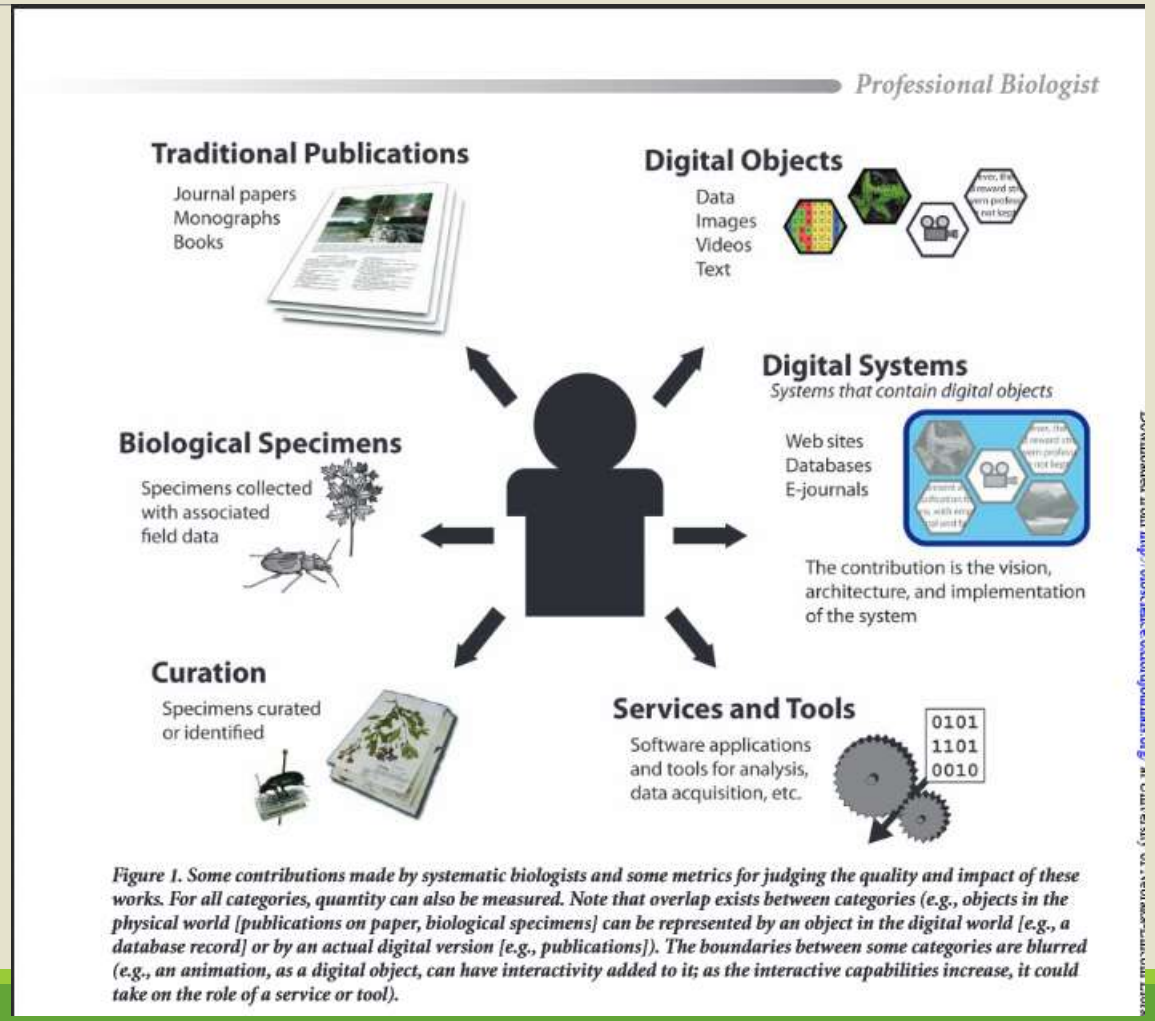



*Figure 1. Some contributions made by systematic biologists and some metrics for judging the quality and impact of these works. For all categories, quantity can also be measured. Note that overlap exists between categories (e.g., objects in the physical world [publications on paper, biological specimens] can be represented by an object in the digital world [e.g., a database record] or by an actual digital version [e.g., publications]). The boundaries between some categories are blurred (e.g., an animation, as a digital object, can have interactivity added to it; as the interactive capabilities increase, it could take on the role of a service or tool).*

Lucinda A. McDade, David R. Maddison, Robert Guralnick, Heather A. Piwowar, Mary Liz Jameson, Kristofer M. Helgen, Patrick S. Herendeen, Andrew Hill, and Morgan L. Vis . Biology Needs a Modern Assessment System for Professional Productivity BioScience (2011) 61 (8): 619-625 doi:10.1525/bio.2011.61.8.8

# Becker Medical Library Model for Assessment of Research Impact

ASSESSING THE IMPACT OF RESEARCH

A Bernard Becker Medical Library Project

THE MODEL //
HOW TO USE //
ENHANCING YOUR IMPACT //
INFORMATION AND RESOURCES //

THE MODEL FOR ASSESSMENT OF RESEARCH IMPACT IS A FRAMEWORK FOR TRACKING DIFFUSION OF RESEARCH OUTPUTS AND ACTIVITIES TO LOCATE INDICATORS THAT DEMONSTRATE EVIDENCE OF BIOMEDICAL RESEARCH IMPACT.

**Advancement of Knowledge**

How were research output and activities USED? How was AWARENESS of research output demonstrated?

**Clinical Implementation**

How was TRANSLATION of research output and activities into clinical applications demonstrated?

**Legislation and Policy**

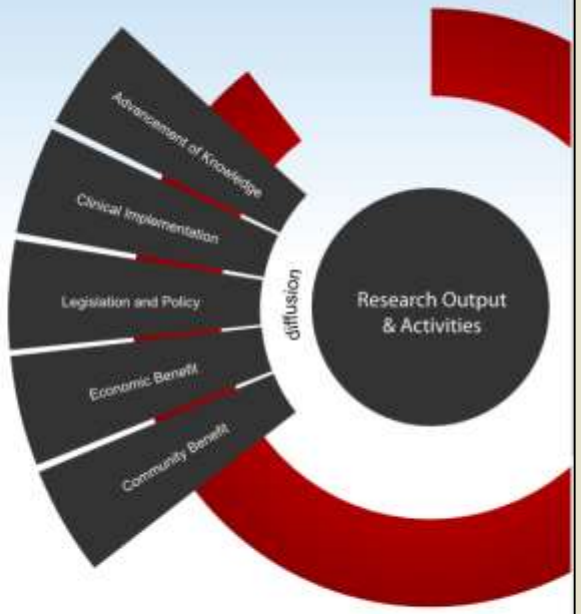
How did research output and activities INFLUENCE or RESULT in enactment of public law, guidelines, standards or policy?

**Economic Benefit**

What economic outcomes were PRODUCED from research output and activities?

**Community Benefit**

How was community health ENHANCED as a result of research output and activities?




https://becker.wustl.edu/impact-assessment

Sarli CC, Dubinsky EK, Holmes KL. Beyond citation analysis: a model for assessment of research impact. J Med Libr Assoc. 2010 Jan;98(1):17-23. doi: 10.3163/1536-5050.98.1.008. PubMed PMID: 20098647

| **RESEARCH OUTPUTS AND ACTIVITIES** | **Research Outputs and Activities** are products and/or activities resulting from basic or clinical biomedical research. |
|---|---|
| **Indicators** | **Examples** |
| **Biological Materials** | Biological material identified or developed as a result of the research study. |
| **Books or Book Chapters** | Books or book chapters resulting from the research study. |
| **Collaborations** | Collaborative relationships resulting from the research study. Collaborative relationships can be classified in a number of ways:<br>• Type of collaboration?<br>  ○ Number of collaborations<br>  ○ Number of departments or disciplines represented<br>  ○ Number of institutions represented<br>  ○ Duration<br>• Type of partner?<br>  ○ Community |

| **COMMUNITY BENEFIT** | **Community Benefit** is the enhancement of well-being to the community as a result of research outputs and/or activities. |
|---|---|
| Indicators | Evidence |
| **Awareness and Identification of Risk Factors** | Research study findings lead to public awareness of risk factors of a disease, disorder, condition or behavior.<br>Research study findings lead to identification of risk factors of a disease, disorder, condition or behavior. |
| **Consumer Health Information** | Research study findings result in patient decision materials to assist with healthcare decision-making.<br>Research study findings are cited in materials for patients or the public. |
| **Health Care Quality Access and Evaluation** | Research study findings result in increased performance, quality, and consistency in the delivery of health care services. |
| **Health Promotion** | Research study findings leads to enhancement of health promotion activities among community members. |
| **Lifestyle Intervention** | Research study findings leads to identification of a lifestyle intervention. |
| **Measurement Instruments** | Measurement instrument generated by the research study used by consumers. |
| **Partnerships** | Research study forms partnership with Community or other group to address a community-based need. |
| **Pharmaceutical Preparations** | Drug generated by the research study used by consumers. |
| **Private Healthcare Benefit Plans** | Research study cited in private insurance benefit plan in support of coverage. |
| **Public Healthcare Benefit Plans** | Research study cited in a public insurance benefit plan in support of coverage. |
| **Standard of Care** | Research study findings result in clinically effective approach in the standard of care for a disease, disorder or condition. |

Examples of Outputs and Activities

| | | |
|---|---|---|
| Academic/Professional Status | Editor-In-Chief of a Journal | Licenses |
| Administrative Activities | Evaluation Activities | Material Transfer Agreements |
| Advisory Council Memberships | Funding Agency Council | Media Activities |
| Algorithms | Grant Awards: Co-Investigator | Medical Devices |
| Animal Research Protocols | Grant Awards: Current | Membership and/or Service (elected or volunteer) in Professional Organizations |
| Audio or Video Products | Grant Awards: Dollar Amount (Total) | Membership to an Elected Society |
| Awards | Grant Awards: Funded | Mentoring Activities |
| Biological Materials | Grant Awards: In Preparation | Methodology |
| Book Editor | Grant Awards: Key Personnel | National Awards or Prizes |
| Book Reviewer | Grant Awards: Multiple-Principal Investigator | National Committee Service |
| Books/Book Chapters | Grant Awards: Principal Investigator | Outreach Efforts |
| Case Reports | Grant Awards: Renewed | Pamphlets, Handouts, or Other Educational Materials |
| Certifications | Grant Awards: Submitted | Patents |
| Clinical Activities | Grant Awards: Type of Award (federal, state, private, industry, foundation) | Pharmaceuticals |
| Clinical Guidelines | Grant Awards: Under Review | Policy Documents |
| Clinical Methods for Improved Clinical Care | Grant Reviewer | Publications |
| Clinical Research Protocol | Grey Literature | Research Training Efforts |
| Clinical Teaching Activities | Guideline Development | Review Articles |
| Collaborations | Honorific Lectures | Reviewer or Advisor for a Dissertation |
| Committee Activities (local, regional or national) | Honors or Awards | Scientific Advisory Board Membership |
| Community Advisory Board | Intellectual Property | Software |
| Community-Based Activity or Service | Inventions | Study Sections |
| Computer Programs | Investigational New Drug (IND) Applications | Symposia |
| Conference or Meeting Organizer | Invited Articles | Systematic Reviews |
| Conference Proceedings/Meeting Abstracts | Invited Book Editor | Task Force Participation |
| Consultancy Efforts | Invited Letters | Teaching Activities |
| Continuing Education | Invited Presentations | Technical Reports |
| Contributed Presentations | Invited Systematic Reviews | Tenure Status |
| Course Evaluations | Journal Advisory Board | Testimony/Expert Witness |
| Curricula Development | Journal Articles (animal vs. human) | Textbooks |
| Data | Journal Editor | Trade Publications |
| Data and Research Materials | Journal Reviewer | Training Program Efforts |
| Editor of a Special Journal Issue | Laboratory Techniques or Methods | Volunteer Activities |
| | | White Papers |

http://beckerguides.wustl.edu/impact/outputs

# Questions?

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Measure Your Research Impact guide:
http://unl.libguides.com/researchimpact

# Discussion Questions

1. Do you use social media for your research? If yes, why do you find them useful? What do you use them for?

2. What methods/strategies are you currently using to track and document research impact?

3. Have you encountered any challenges/issues in tracking/documenting research impact?

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3: Piwowar H. Altmetrics: Value all research products. Nature. 2013 Jan 10;493(7431):159. doi: 10.1038/493159a. PubMed PMID: 23302843.

4: Carpenter CR, Cone DC, Sarli CC. Using publication metrics to highlight academic productivity and research impact. Acad Emerg Med. 2014 Oct;21(10):1160-72. doi: 10.1111/acem.12482. PubMed PMID: 25308141.