RCR Summer Seminar Series

Introduction to Research Metrics and Impact

Terry Selfe Suzanne Stapleton Tara Cataldo





Agenda

- Introduction
- Item level metrics
- Author level metrics
- Container (journals, books, etc.) level metrics
- Conclusion
- Q&A
- Breakout rooms
- Slides and resources will be available afterward





Ojectives

- Describe how metrics are used to assess research impact
- Identify sources for commonly used metrics for item level, author level and journal level impact assessment
- Appraise the appropriate contextual use of research metrics





Poll: What research metrics have you explored?





Research Metrics and Bias







Item Level Metrics





Item level

- Posters / Presentations
 - Abstracts
 - Conference proceedings
- Journal articles
- Book chapters
- Books
 - Item or container







Citation count

- What is it?
 - The number of times your article was cited
 - Specific to database
- What are its uses?
 - Show that others have used your work
 - Raw numbers
- Where do I find it?
 - Google Scholar
 - DimensionsWeb of Science





Citation count in Google Scholar

- Cited By
- https://scholar.google.com



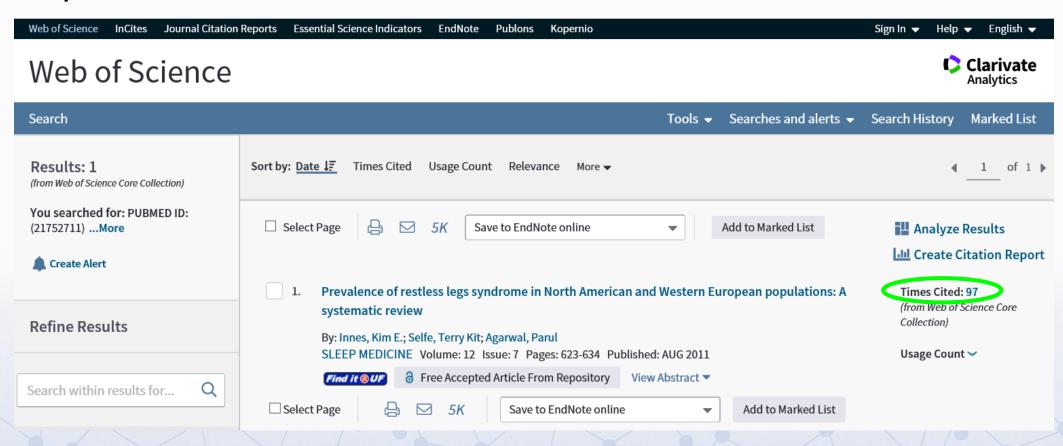
Citation count in Dimensions

- Total Citations
- https://www.dimensions.ai/



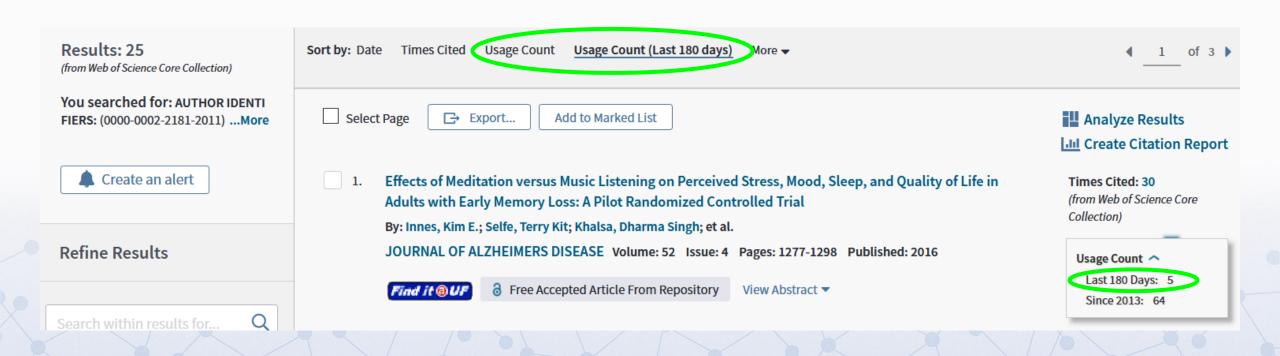
Citation count in Web of Science

- Times Cited
 - By articles in WOS Core Collection



Usage Count in Web of Science

- Look at the Usage Count for
 - Newer article(s) getting looked at even if not cited
 - Older article(s) currently getting attention (Last 180 days)



Dimensions record: Additional metrics



Embed badge

What is this page?

Share



Yoga for Adults with Type 2 Diabetes: A Systematic Review of Controlled Trials

 Publication
 Article in Journal of Diabetes Research, published December 2015

 Authors
 Kim E Innes, Terry Kit Selfe

FCR and RCR are normalized to 1.0

atents and grants.

Summary

Citations

Citing research categories



This is the public page for a publication record in Dimensions, a free research insights platform that brings together information about funding, scholar

This publication in **Journal of Diabetes Research** has been cited **58 times**. 55% of its citations have been received in the past two years, which is **higher than you might expect**, suggesting that it is currently receiving a lot of interest

Compared to other publications in the same field, **this publication is extremely highly cited** and has received approximately **14 times more citations** than average.









https://badge.dimensions.ai/details/id/pub.1001271554

Altmetrics



TOM GAULD

https://twitter.com/tomgauld/status/808268915335897088

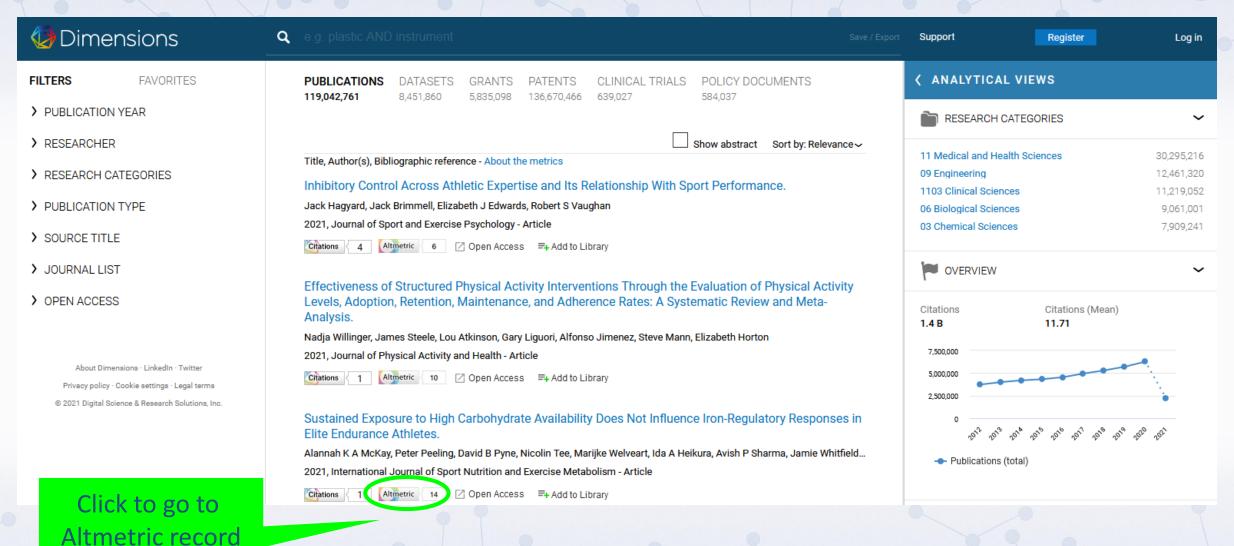
Altmetrics

- What is it?
 - Alternative metrics count things such as number of times your article was tweeted about or covered in a news source or blog
- What are its uses?
 - Show how your work has been covered
 - More immediate feedback re: interest in article
 - Can reflect impact beyond the academy
- Where do I find it?
 - DimensionsPublons





Altmetrics in Dimensions

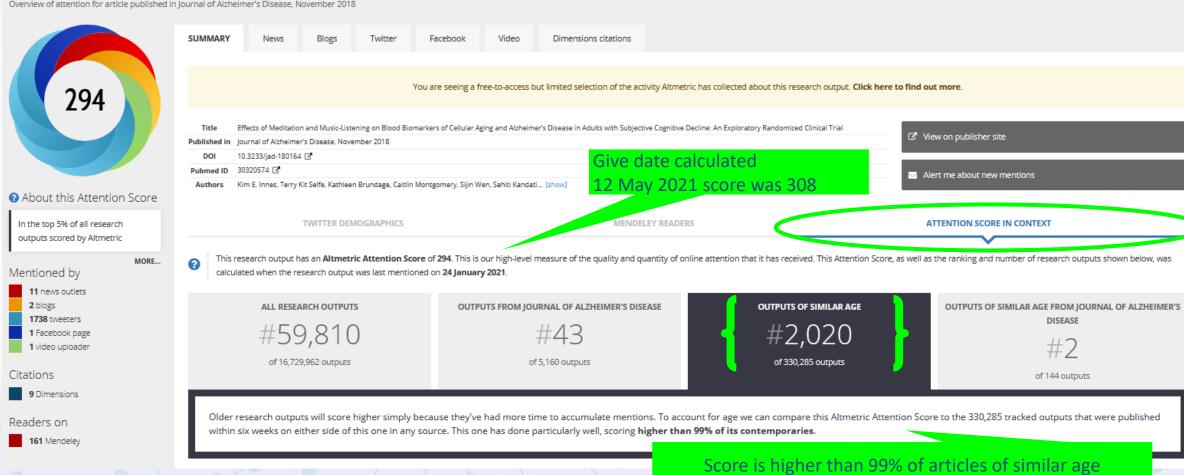


https://app.dimensions.ai/discover/publication

Altmetric Record

Effects of Meditation and Music-Listening on Blood Biomarkers of Cellular Aging and Alzheimer's Disease in Adults with Subjective Cognitive Decline: An Exploratory Randomized Clinical Trial

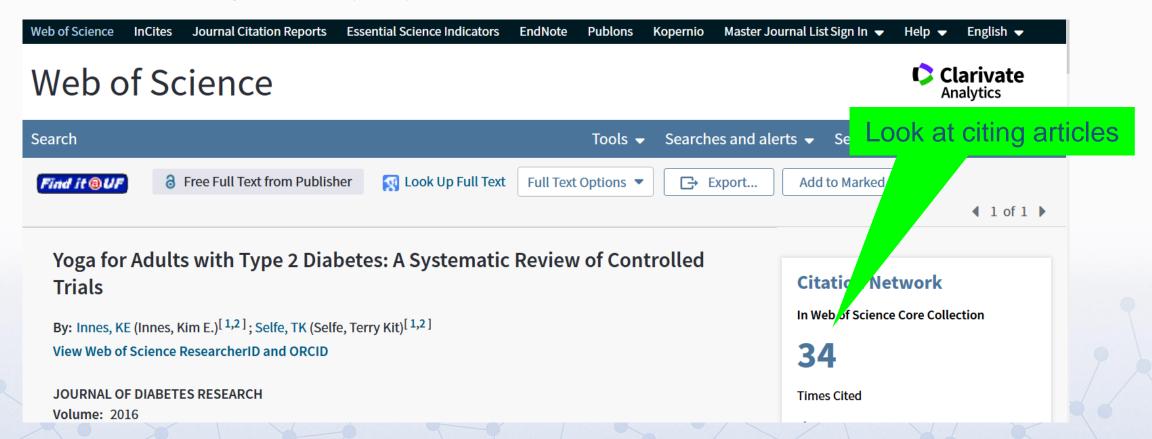
Overview of attention for article published in Journal of Alzheimer's Disease. November 2018



https://dimensions.altmetric.com/details/49869269#score

Beyond the Numbers

- Look at the articles citing yours in WoS, GS, Dimensions
 - Anything you want to draw attention to?
 - E.g., International reach; Cited by influential articles/sources
 - Practice guidelines, policy statements, etc.

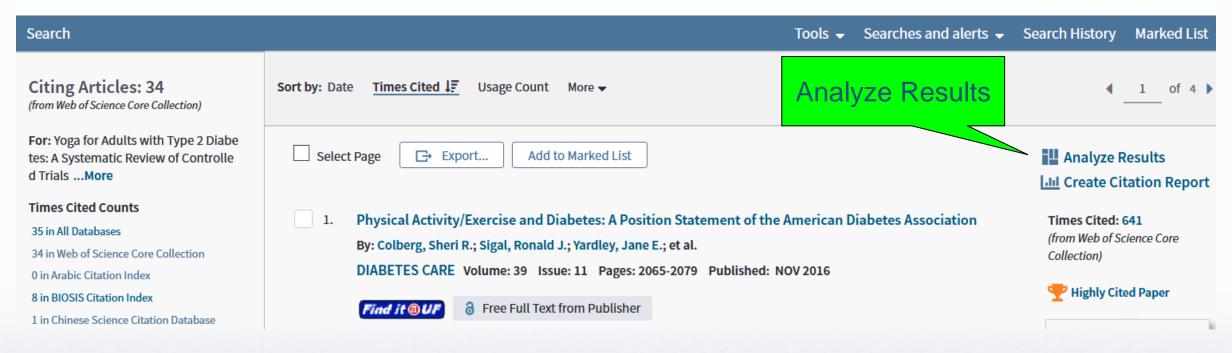


WoS Citing Articles

Web of Science InCites Journal Citation Reports Essential Science Indicators EndNote Publons Kopernio Master Journal List Sign In ▼ Help ▼ English ▼

Web of Science

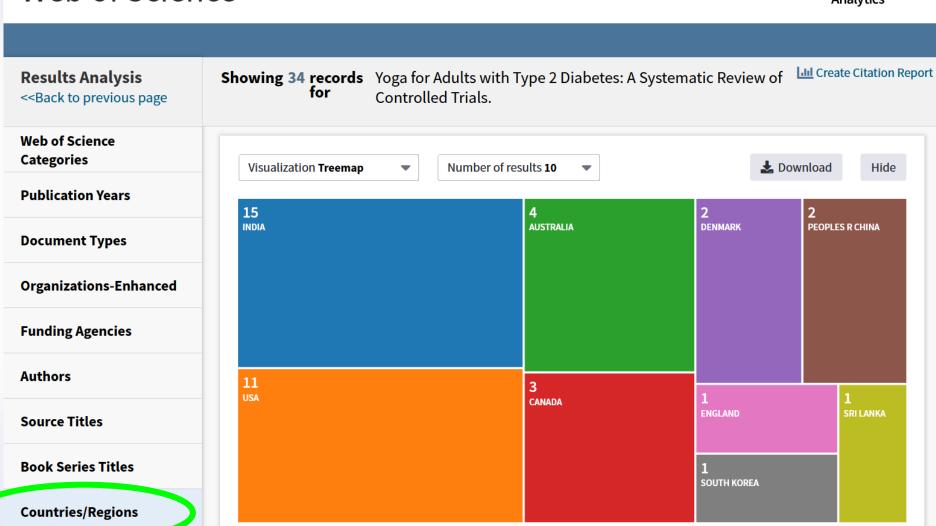




WoS Citing Articles

Web of Science





WoS Citing Articles

InCites Journal Citation Reports Essential Science Indicators EndNote Publons Web of Science Kopernio Master Journal List Sign In 🔻 🚺 Clarivate Web of Science Look through titles for influential articles **Analytics** Tools Searches and alerts Search History Search Marked List Citing Articles: 34 Times Cited 1 Sort by: Date More of 4 (from Web of Science Core Collection) For: Yoga for Adults with Type 2 Diabe Select Page \Box Add to Marked List Analyze Results tes: A Systematic Review of Controlle d Trials ... More Lill Create Citation Report **Times Cited Counts** Physical Activity/Exercise and Diabetes: A Position Statement of the American Diabetes Association Times Cited: 641 35 in All Databases (from Web of Science Core By: Colberg, Sheri R.; Sigal, Ronald J.; Yardley, Jane E.; et al. 34 in Web of Science Core Collection Collection) DIABETES CARE Volume: 39 Issue: 11 Pages: 2065-2079 Published: NOV 2016 0 in Arabic Citation Index Tighly Cited Paper 8 in BIOSIS Citation Index Free Full Text from Publisher Find it @ UF Position statement of ADA 1 in Chinese Science Citation Database Highly cited Key Points from the Updated Guidelines on Exercise and Diabetes Times Cited: 19 (from Web of Science Core By: Colberg, Sheri R. Collection) FRONTIERS IN ENDOCRINOLOGY Volume: 8 Article Number: 33 Published: FEB 20 2017 Usage Count ✓ Free Full Text from Publisher Find it @ UF

Dimensions has 58 citing articles vs. 34 in WoS



Publication - Article

Yoga for Adults with Type 2 Diabetes: A Systematic Review of Controlled Trials

Journal of Diabetes Research, 2016, 6979370 - December 2015 https://doi.org/10.1155/2016/6979370 /

Authors

Kim E Innes - West Virginia University; University of Virginia Health System Corresponding Author

Terry Kit Selfe - West Virginia University; University of Virginia Health System

Abstract

A growing body of evidence suggests yogic practices may benefit adults with type 2 diabetes (DM2). In this systematic review, we evaluate available evidence from prospective controlled trials regarding the effects of yoga-based programs on t. To identify qualifying studies, we searched nine databases and identified articles. Controlled trials that did not target adults with

es, meiuded only addits with type i diabetes, were under two-week duration, or did not include quantitative outcome

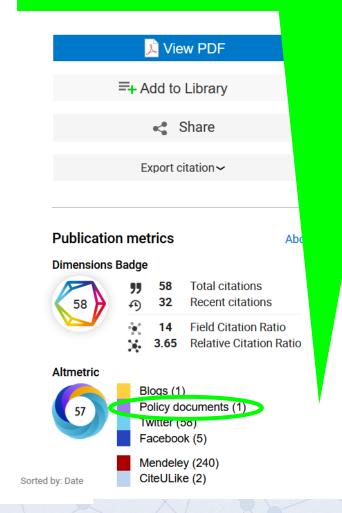
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Acknowledgements

This work was performed at West Virginia University and was supported by the National Center for Complementary and Alternative Medicine [Grant no. 1-K01-AT004108 to KEI] and West Virginia University (Faculty Incentive Award).

Publication citations - 58 Show all

Go to Altmetric policy document



https://app.dimensions.ai/details/publication/pub.1001271554







Author Level Metrics





How do you show off your achievements?

- Awards & Recognitions
- Grants & Funding
- Publications
- Evidence of Expert Opinion
- Impact of Research

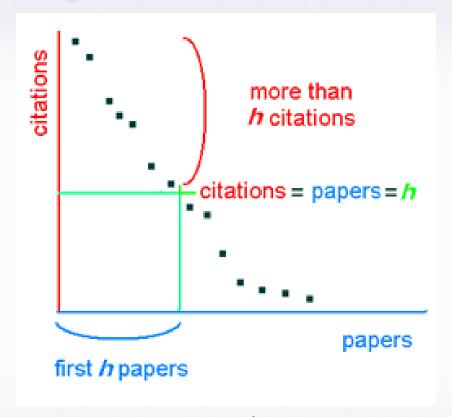






Impact of Research with the h-index

- J. E. Hirsch developed this metric to indicate "cumulative impact and relevance" of a researcher
- index h, defined as the number of papers with a citation number higher or equal to h



Hirsch, JE. 2005, doi:10.1073/pnas.0507655102

Image: https://images.app.goo.gl/ZZP4bTLtLyFb3t3aA





How to calculate your h-index

- 1. Collect your publications and the citation counts to each publication
- 2. Rank publications in order of most-cited to least-cited
- 3. Determine the rank of the publication where the number of citations is equal to, or greater than the rank.

RCR On Campus	

Publication	Citations
Rank	(number)
1	256
2	53
3	28
4	17
5	8
6	8
7	6
8	4
9	3
10	3
11	3
12	2



Examples where to find your h-index

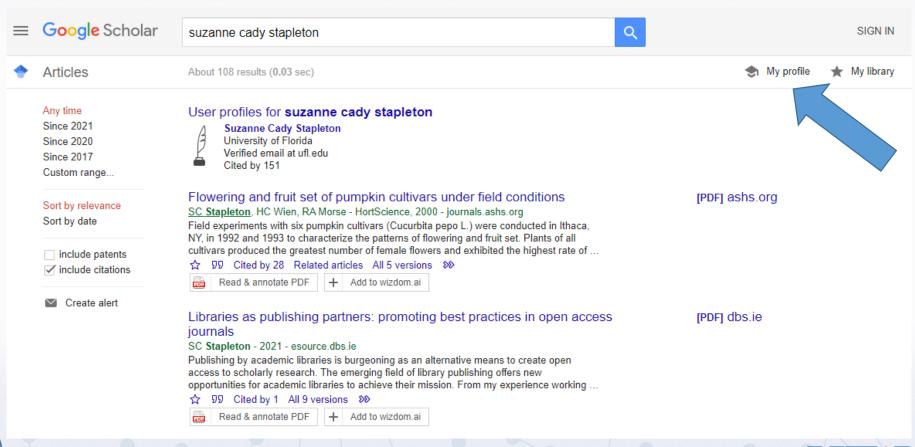
- Google Scholar (My Profile)
- Web of Science (create citation report)
- Scopus (NA at UF)
- Publish or Perish (https://harzing.com/resources/publish-or-perish)





Google Scholar (My Profile)

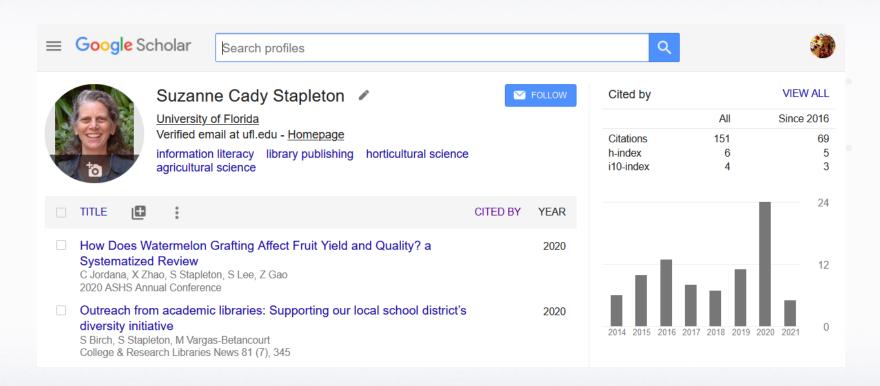








h-index sources: Google Scholar Profile



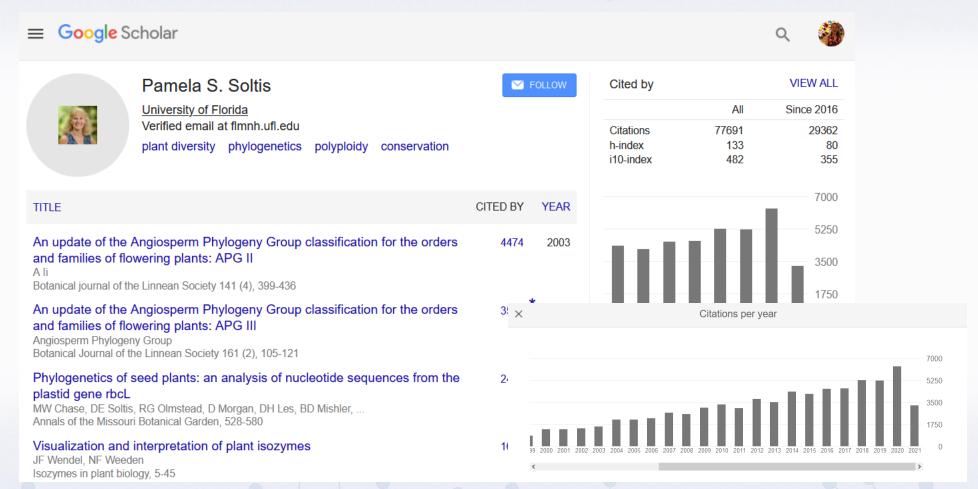
h-index

i10 index (only in Google Scholar; number of publications with at least 10 citations)





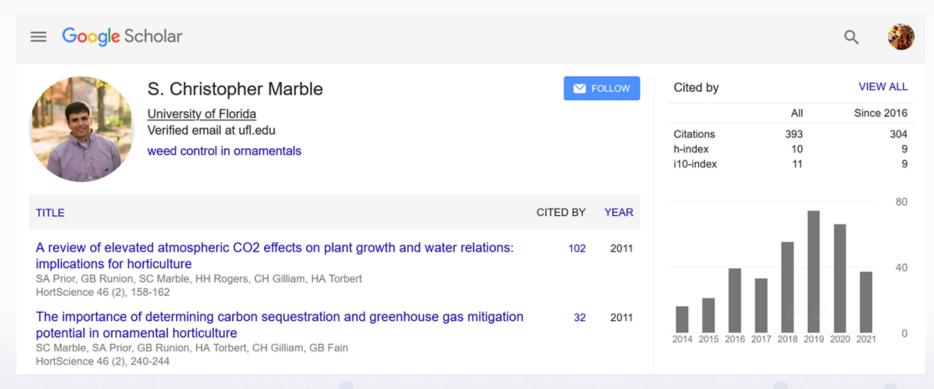
Google Scholar Profile: Established Scholar





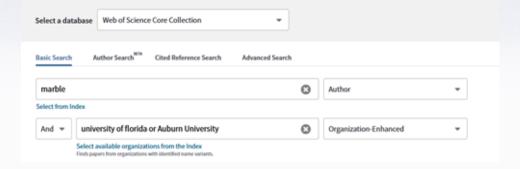


Google Scholar Profile: Early Career Scholar





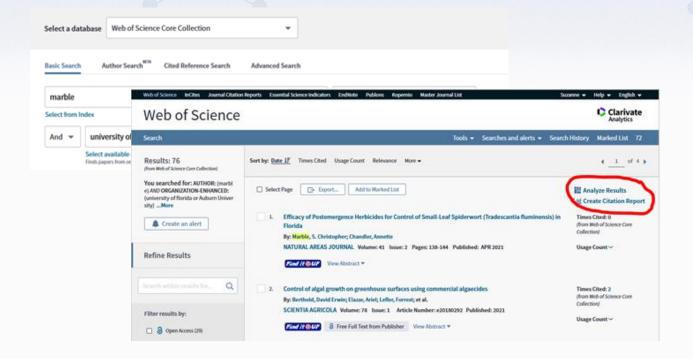




- 1. Search for Author
- 2. Analyze results
- 3. Create Citation Report



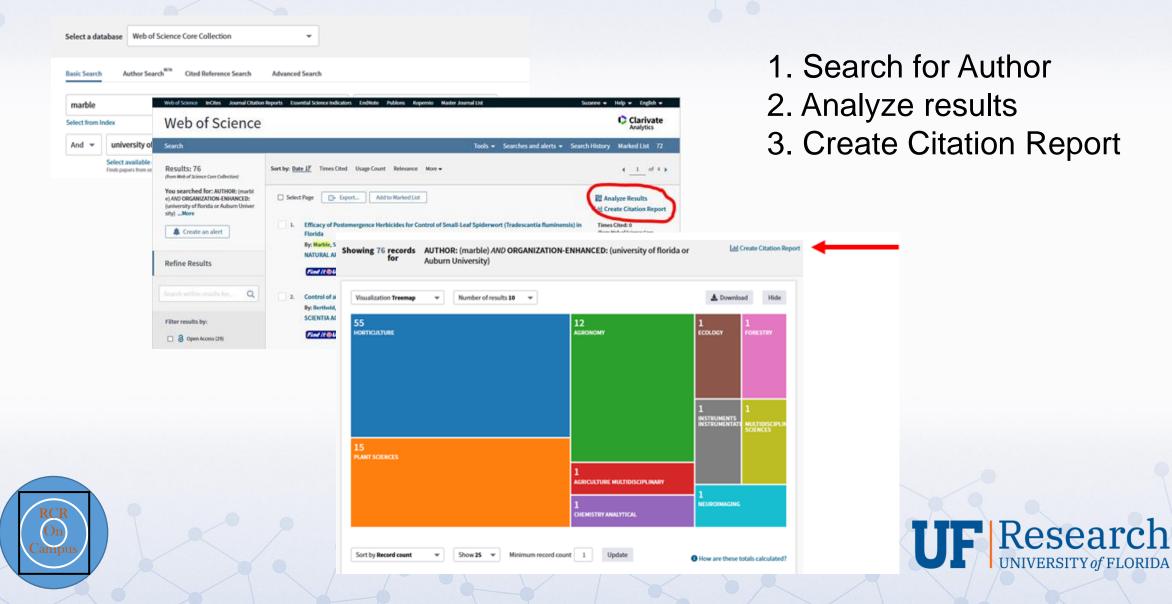


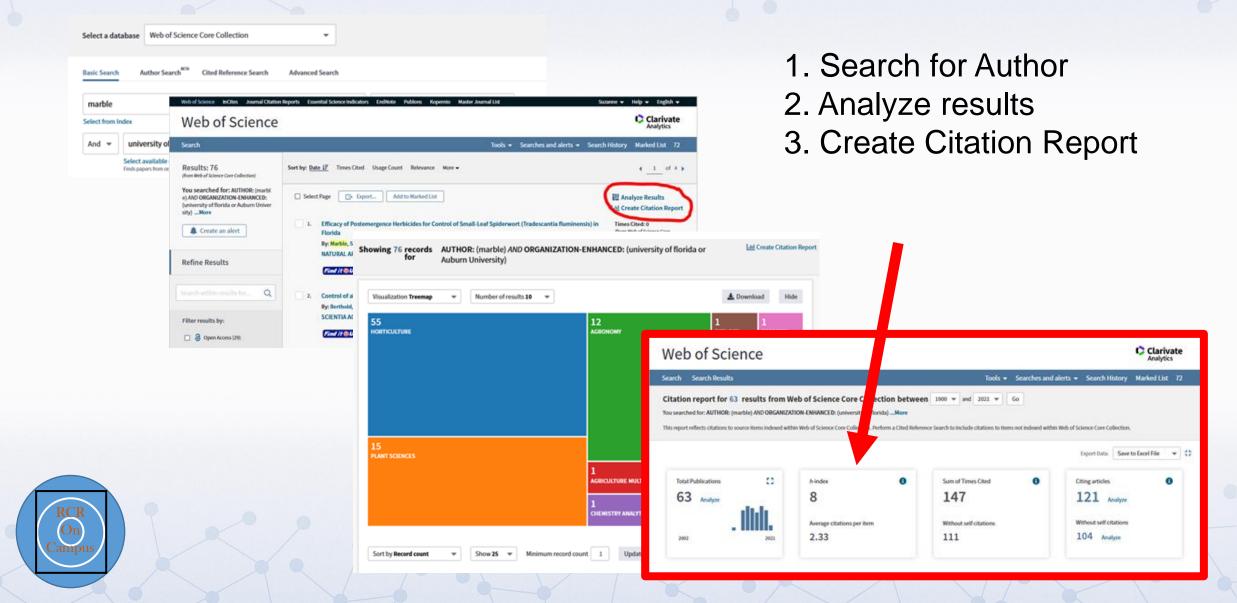


- 1. Search for Author
- 2. Analyze results
- 3. Create Citation Report

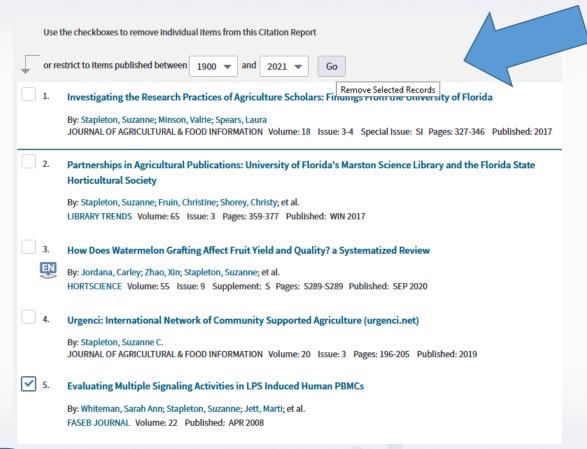








Clean your data





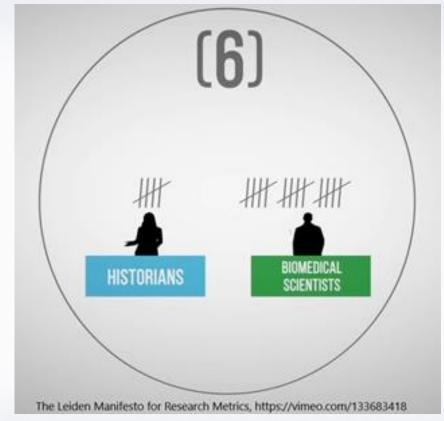
- 1. ORCiD
- 2. Web of Science Researcher ID
- 3. Scopus Author ID

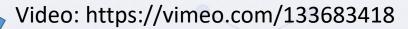




Problems with the h-index

- Varies with source of data
- Discipline publishing & citation patterns
- Career stage of researcher
- Highly cited papers underrecognized
- Other types of research impact











Variations to the *h*-index

Egghe's g-index: more weight to highly-cited papers

Zhang's e-index: aims to reveal citation patterns

Contemporary h-index: more weight to recent papers

Age-weighted citation rate: adjusted to age of paper

hl, norm: normalized to account for number of co-authors



etc...



Always provide context

It make take some research to gather the data to contextualize your h-index





One metric, alone, is not enough

"Although I argue that a high h is a reliable indicator of high accomplishment, the converse is not necessarily always true"... "the h-index should be only one of many elements used in evaluating scientific achievement of an individual"

Hirsch (2005)











Container Level Metrics





Container level metrics - Journals

Journal metrics

- Impact Factor (™) Journal Citation Reports
- Eigenfactor
- Scimago journal rankings
- H-Index (Scimago)
- H5-Index (Google Scholar)





Impact Factor

Found in Journal Citation Reports (JCR) database

Web of Science journals only

Trademark of Clarivate Analytics (formerly Thomson Reuters, formerly ISI)

JCR Guide - https://clarivate.libguides.com/jcr

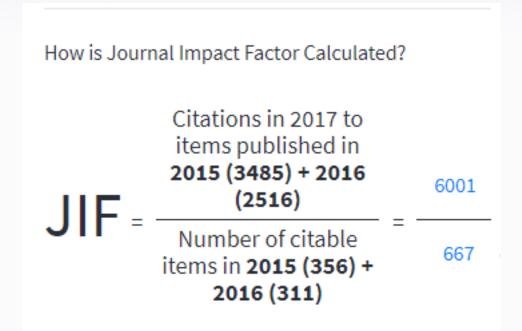
Requires an institutional subscription to access





Impact Factor

2017 impact Factor =





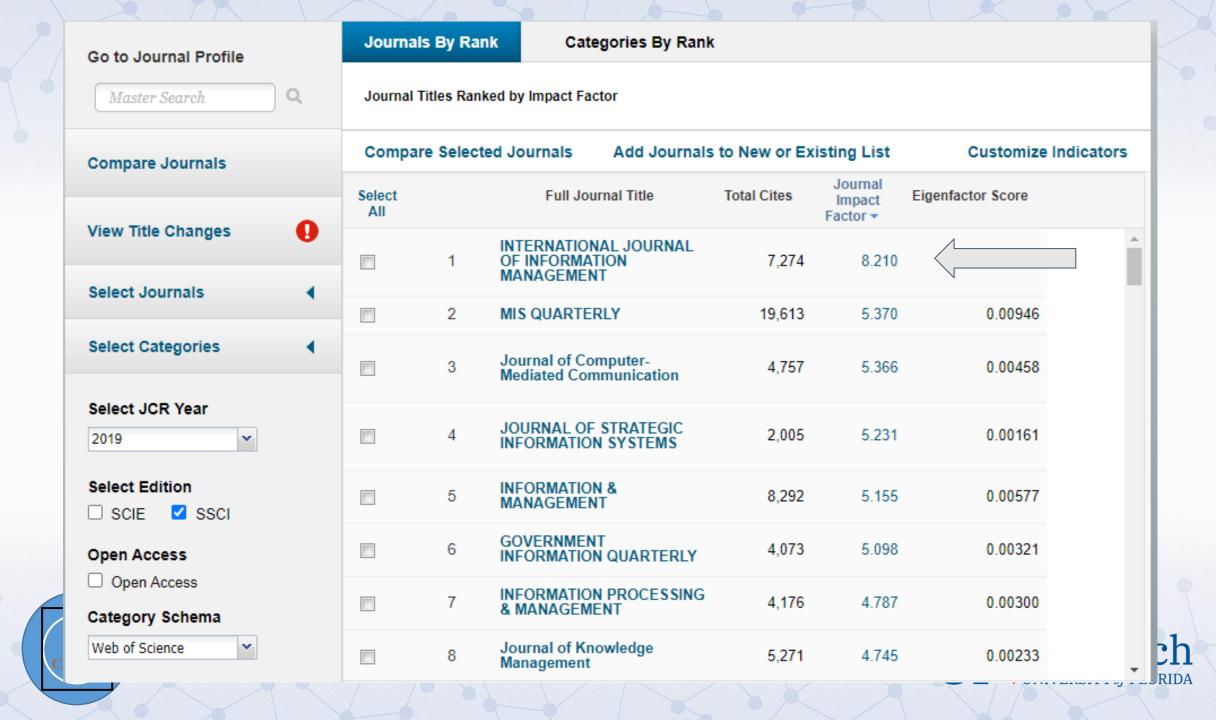


Is 5.728 a good impact factor?

No







Journal Citation Indicator



Dr Elizabeth Gadd ♥ @LizzieGadd · May 22

It's about time we had more journal citation metrics. Said no-one ever.

Clarivate Web of Science @webofscience · May 20

Today we're pleased to introduce the Journal Citation Indicator: a new, field-normalized measurement of journal citation impact that can be easily interpreted and compared across disciplines. Coming soon with this year's JCR release - read about it here: bddy.me/2S6MC1Q



Scimago ranking

Found in Scimago Journal & Country Rank database

Scopus journals only

Copyright owner: Elsevier

Open Access





Container level metrics - Books



Created by Sarote Impheng from Noun Project

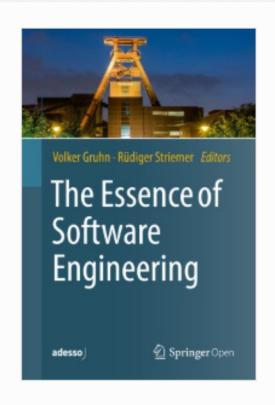
Books

- Book Citation Index (not available at UF)
- Individual publishers
- Library usage





Book Citations Example



The Essence of Software Engineering

Editors (view affiliations)

Volker Gruhn, Rüdiger Striemer

Open Access Book

14 21 153k

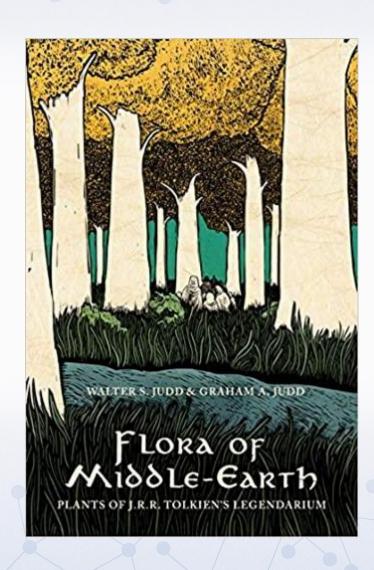
Citations Mentions Downloads



Springer e-book



Ask a Librarian



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- <u>WorldCat</u> 203 libraries
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Responsible Use of Metrics





Guidance re: Responsible Use of Metrics

LEIDEN MANIFESTO FOR RESEARCH METRICS

Home

Video version

Translations

Blog

10 principles to guide research evaluation with 23 translations, a video and a blog

Research evaluation has become routine and often relies on metrics. But it is increasingly driven by data and not by expert judgement. As a result, the procedures that were designed to increase the quality of research are now threatening to damage the scientific system. To support researchers and managers, five experts led by Diana Hicks, professor in the School of Public Policy at Georgia Institute of Technology, and Paul Wouters, director of CWTS at Leiden University, have proposed 10 principles for the measurement of research performance: the Leiden Manifesto for Research Metrics published as a comment in Nature.

Hicks, Wouters, Waltman, de Rijcke, Rafols, Nature, April 23, 2015

http://www.leidenmanifesto.org/

Guidance re: Responsible Use of Metrics

- Leiden Manifesto: 10 principles to guide research evaluation
 - 1. Quantitative eval should support qualitative, expert assessment
 - 2. Measure performance against the research missions of the institution, group, or researcher.
 - 3. Protect excellence in locally relevant research.
 - 4. Keep data collection and analytical processes open, transparent and simple.
 - 5. Allow those evaluated to verify data and analysis.

https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351





Guidance re: Responsible Use of Metrics

- Leiden Manifesto (cont.)
 - 6. Account for variation by field in publication and citation practices.
 - 7. Base assessment of individual researchers on a qualitative judgement of their portfolio.
 - 8. Avoid misplaced concreteness and false precision.
 - 9. Recognize the systemic effects of assessment and indicators.
 - 10. Scrutinize indicators regularly and update them.

https://www.nature.com/news/bibliometrics-the-leiden-manifesto-for-research-metrics-1.17351



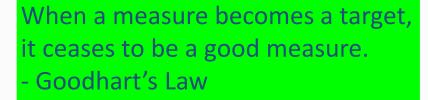


Issues with Metrics

- Risk of becoming a substitute for qualitative assessment
- Some can place early career researchers at a disadvantage
- Some metrics not used as intended
 - E.g., using journal-level metric for assessing item/author impact
 - DORA: San Francisco Declaration on Research Assessment 2012
- Some metrics differ widely across fields
 - Always give context
 - E.g., top 1%, 99th percentile
 - Use field normalized metrics when appropriate
 - E.g., RCR, FCR
- Risk of corruption pressures

Researchers (and others) playing to the metric

- Claiming authorship
- Quid pro quo citing







Research Misconduct



U.S. Department of **Health & Human Services**

www.hhs.gov

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Google Custom Search...





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RCR Resources - Programs -

Policies & Regulations - Assurance Program -

Home » Case Summary: Lin, Yibin



Case Summary: Lin, Yibin

Yibin Lin, Ph.D., University of Texas Health Science Center: Based on the report of an assessment conducted by the University of Texas Health Science Center (UTHealth), Respondent's admission, and analysis conducted by the Office of Research Integrity (ORI) in its oversight review, ORI found that Yibin Lin, Ph.D. (Respondent), former postdoctoral fellow, McGovern Medical School, UTHealth, engaged in research misconduct in research supported by U.S Public Health Service (PHS) funds, specifically National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH), grant R01 Al125216.

ORI found that Respondent engaged in research misconduct by knowingly and intentionally falsifying, fabricating, and plagiarizing data and text reported in the following published papers, which have been retracted, and manuscripts:



Misconduct Case Summaries



Newsletter



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'...falsifying, fabricating, and plagiarizing data and text..."



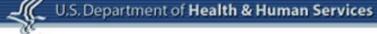
PHS Administrative Action Bulletin Board L 5



Annual Report System

https://ori.hhs.gov/content/case-summary-lin-yibin

Research Misconduct





Home

About ORI - News & Events - Research Misconduct -

Home » Case Summary: Lin, Yibin

Case Summary: Lin, Yibin

"...created fictitious author names... without listing himself as an author... to improve his citation metrics."

10 year ban

ORI finds that Respondent knowingly and intentionally falsified, fabricated, and plagiarized the whole content of six (6) papers and eight (8) manuscripts, falsely created fictitious author names and affiliations without listing himself as an author to disguise himself from being the offender, and submitted them for publication in bioRxiv and medRxiv, open access preprint repositories, by falsely assembling random paragraphs of text, tables, and figures from previous publications and manuscripts to improve his citation metrics.

Dr. Lin entered into a Voluntary Exclusion Agreement (Agreement) and agreed to the following:

- 1. Because the Respondent also attempted to deceive the online publication sites bioRxiv and *medRxiv* by creating fictitious author names and affiliations without listing himself as an author, Respondent agreed to exclude himself voluntarily for a period of ten (10) years beginning on January 7, 2021, from any contracting or subcontracting with any agency of the United States Government and from eligibility for or involvement in nonprocurement programs of the United States Government referred to as "covered transactions" pursuant to HHS' Implementation (2 C.F.R. Part 376) of OMB Guidelines to Agencies on Governmentwide Debarment and Suspension, 2 C.F.R. Part 180 (collectively the "Debarment Regulations"); and
- 2. Respondent agreed to exclude himself voluntarily from serving in any advisory capacity to PHS including, but not limited to, service on any PHS advisory committee, board, and/or peer review committee, or as a consultant for a period of ten (10) years, beginning on January 7, 2021.

https://ori.hhs.gov/content/case-summary-lin-yibin

Research Misconduct

Case Summary: Lin, Yibin

Published Papers

- Efficient Method for Genomic DNA Mutagenesis in E. coli. bioRxiv 2020. doi: https://doi.org/10.1101/2020.05.16.097097.
- A simple and efficient method for in vitro site directed mutagenesis. bioRxiv 2020. doi: https://doi.org/10.1101/2020.05.16.100107.
- A restriction-free method for gene reconstitution. bioRxiv 2020. doi: https://doi.org/10.1101/2020.05.20.107631.

bioRxiv preprint doi: https://doi.org/10.1101/2020.05.16.100107; this version posted May 17, 2020. The copyright holder for this preprint (which was not certified by peer review) is the author/funder. All rights reserved. No reuse allowed without permission.

A simple and efficient method for *in vitro* site-directed mutagenesis

Dave Palis, and Frank Huang*

*Correspondence: Frank Huang; fhuang@uab.cat



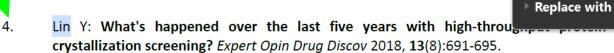
Initat de Biofísica, Departament de Bioquímica i de Biologia Molecular,

e Medicina, and Centre d'Estudis en Biofísica, Universitat Autònoma de

Barcelona, 08193 Bellaterra, Barcelona, Spain.

bioRxiv preprint doi: https://doi.org/10.1101/2020.05.16.100107; this version posted May 17, 2020. The copyright has not certified by peer review) is the author/funder. All rights reserved. No reuse allowed without

References



Find (6/9)

Previous

- 5. Liu H, Naismith JH: An efficient one-step site-directed deletion, insertion, single and multiple-site plasmid mutagenesis protocol. *BMC Biotechnol* 2008, **8**:91.
- 6. Zeng F, Hao Z, Li P, Meng Y, Dong J, Lin Y: A restriction-free method for gene reconstitution using two single-primer PCRs in parallel to generate compatible cohesive ends. BMC Biotechnol 2017, 17(1):32.
- 7. Garcia-Nafria J, Watson JF, Greger IH: IVA cloning: A single-tube universal cloning system exploiting bacterial In Vivo Assembly. Sci Rep 2016, 6:27459.
- 8. Edelheit O, Hanukoglu A, Hanukoglu I: Simple and efficient site-directed mutagenesis using two single-primer reactions in parallel to generate mutants for protein structure-function studies. BMC Biotechnol 2009, 9:61.
- Xia Y, Chu W, Qi Q, Xun L: New insights into the QuikChange process guide the use of Phusion DNA polymerase for site-directed mutagenesis. Nucleic Acids Res 2015, 43(2):e12.
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- 11. Zheng L, Lin Y, Lu S, Zhang J, Bogdanov M: Biogenesis, transport and remodeling of lysophospholipids in Gram... pative bacteria. Biochim Biophys Acta Mol Cell Biol Lipids 2017, 1862(11):1404-1413.
- Zheng L, Baumann U, Reyl "...to improve his citation metrics." saturation mutagenesis prot
- Qi D, Scholthof KB: A one-ste This one cited 8 papers by Lin Y fragment deletion, insertion, and substitution mutagenesis. J virol internous 2008,

https://www.biorxiv.org/content/biorxiv/early/2020/05/17/2020.05.16.100107.full.pdf

Make your publications count

- Do good work and ensure your article reflects the study rigor
 - o Follow reporting standards and address all recommended items
- Publish in journals that reach your intended audience
 - Choose a journal that is read and respected in the field
 - JIF rank can indicate highly cited journals
 - Consider journals that appear in a database common in the field
 - Your article can't have impact if it can't be found
- If particular metrics are important to you, publish in journals that support them, e.g.,
 - If using h-index from WoS, be sure journal is indexed in WoS
 - If Journal Impact Factor is important, be sure the journal has one and it ranks where you want it to be









Choose Your Breakout Room (15 mins.)

- **Item Level** Terry will be demonstrating how to find citing articles in Dimensions
- Author Level Suzanne will be comparing the h-index in Web of Science and Google Scholar for scholars in different disciplines
- Container Level Tara will be exploring the Journal Citation Reports database, home of the Impact Factor and other metrics
- Main Room Michelle will be hosting an open Q&A





Choose Your Breakout Room (15 mins.)







We're back





Tell Your Story





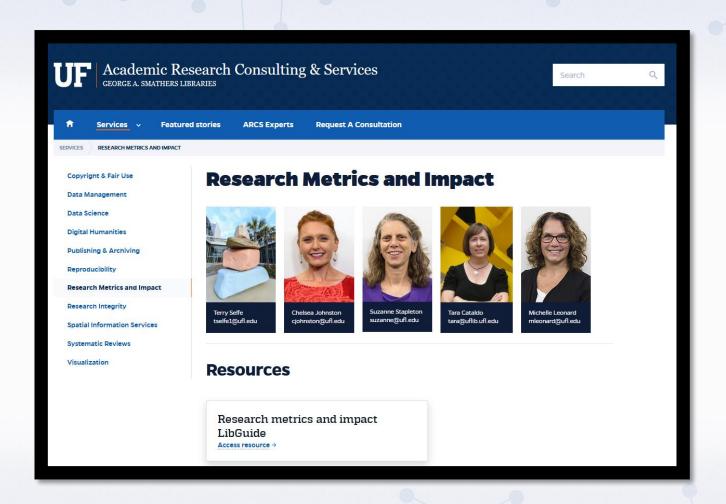
Share quantitative AND qualitative descriptions of the impacts of your scholarship.





Academic Research Consulting & Services Research Metrics Team https://arcs.uflib.ufl.edu/services/research-metrics/

Research Metrics LibGuide https://guides.uflib.ufl.edu/metrics







Resource List - Item Level

- Literature databases
- Web of Science http://webofknowledge.com/WOS
- Google Scholar https://scholar.google.com/
- Dimensions https://app.dimensions.ai/discover/publication
- Altmetrics https://www.altmetric.com/
- PlumX https://plumanalytics.com/learn/about-metrics/
- iCite https://icite.od.nih.gov/





Resource List - Author Level

- Web of Science http://webofknowledge.com/WOS
- Web of Science Build Your Profile -https://clarivate.libguides.com/authors/portfolio
- Google Scholar Citations -https://scholar.google.com/intl/en/scholar/citations.html
- Google Scholar Metrics -https://scholar.google.com/intl/en/scholar/metrics.html
- Publish or Perish https://harzing.com/resources/publish-or-perish
- Benefits of nominating yourself and your work
 - e.g. doi: 10.1126/science.caredit.a1700044)



Resource List – Container Level

- Journal Citation Reports https://jcr.clarivate.com/
- Scimago https://www.scimagojr.com/
- WorldCat https://universityofflorida.on.worldcat.org/discovery





Additional Resources

Responsible Use of Research Metrics:

- Declaration on Research Assessment (DORA) https://sfdora.org/
- Leiden Manifesto http://www.leidenmanifesto.org/

Others:

- Metrics Toolkit https://www.metrics-toolkit.org/
- Literature, e.g. *Scientometrics* (the journal) https://www.springer.com/journal/11192
- Initiatve for Open Citations https://i4oc.org/





More questions? Discussion?





Thank you!

• Please take the survey at:

https://ufl.qualtrics.com/jfe/form/SV 1WVLQUcrykr7YFM





If You Suspect Research Misconduct...

Research Misconduct means fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results.

Questionable Research Practices are reports of careless, irregular, or contentious research practices, as well as authorship disputes, may not meet the standard for research misconduct but may be a research integrity violation.

Make a **confidential report** to the UF Research Integrity Officer (RIO)

Cassandra C. Farley (352) 273-3052 | cfarley@ufl.edu

You may also report anonymously UF Compliance Hotline: 877-556-5356



Still not sure if it is Misconduct or a QRP? The RIO can help you better understand the situation. You can speak in hypotheticals as you consider making an official allegation.



