

# understanding the impact of your research software

federica b. bianco

Center for Urban Science and Progress, NYU

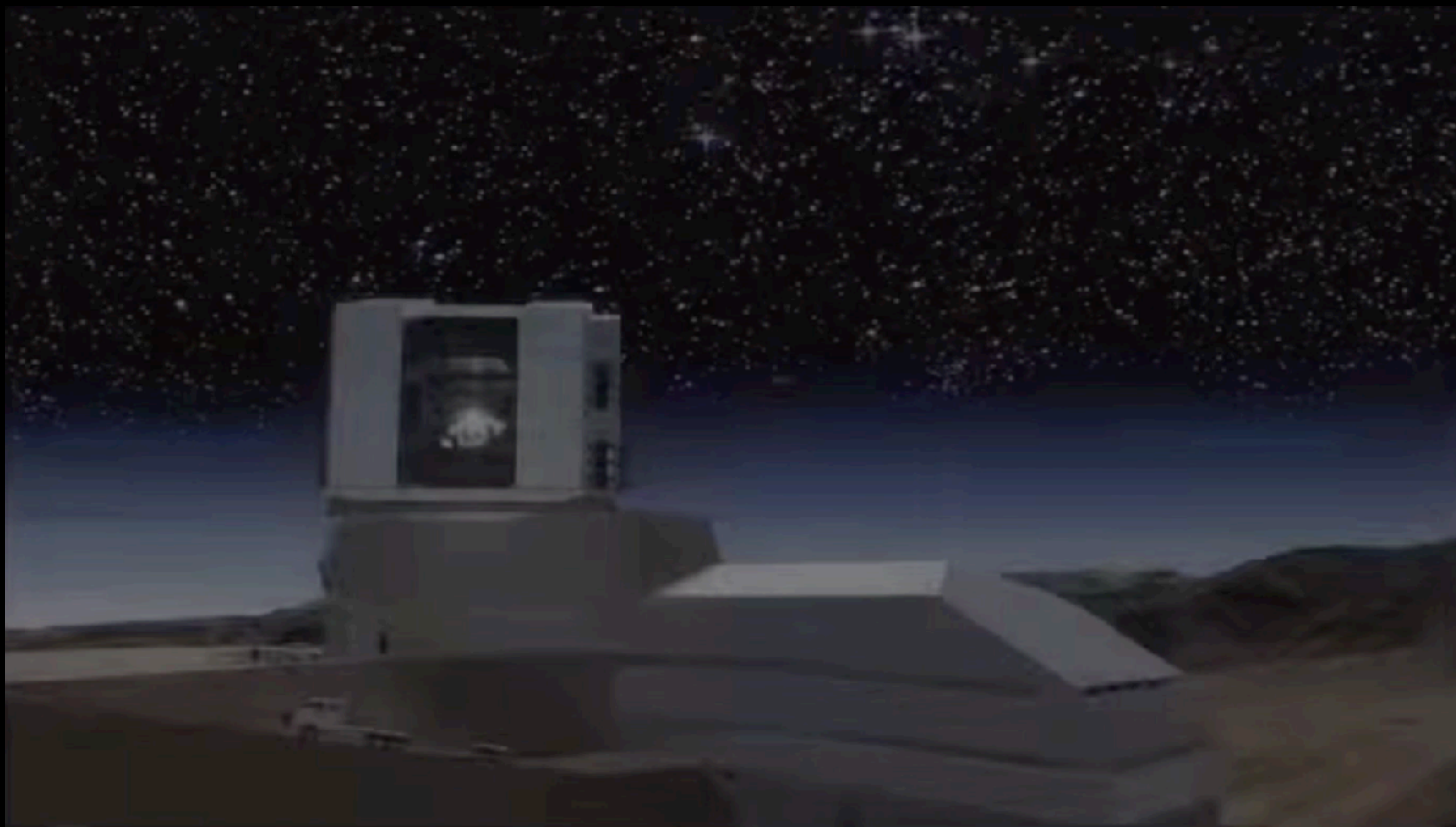
Center for Cosmology and Particle Physics, NYU

Science Collaborations Coordinator, LSST

LSST Transient and Variable Stars Science Collaborations Co-Chair







*Astrophysical transients expert (!?)  
Center for Cosmology  
and Particle Physics NYU  
LSST Science Collaborations Chair*



*Urban Scientists  
Center for Urban Science  
and Progress, NYU*



---

# *problem statement*

Academia is a merit based system

*tries to be*  
Academia is a merit based system  
*recognition*

## Science Code Manifesto

**Manifesto** Discussion Endorse Resources About

Software is a cornerstone of science. Without software, twenty-first century science would be impossible. Without better software, science cannot progress.

But the culture and institutions of science have not yet adjusted to this reality. We need to reform them to address this challenge, by adopting these five principles:

<b>Code</b>	All source code written specifically to process data for a published paper must be available to the reviewers and readers of the paper.
<b>Copyright</b>	The copyright ownership and license of any released source code must be clearly stated.
<b>Citation</b>	Researchers who use or adapt science source code in their research must credit the code's creators in resulting publications.
<b>Credit</b>	Software contributions must be included in systems of scientific assessment, credit, and recognition.
<b>Curation</b>	Source code must remain available, linked to related materials, for the useful lifetime of the publication.

### Founding Signatories

Nick Barnes

Climate Code Foundation

David Jones

Climate Code Foundation

Peter Norvig

Director of Research, Google Inc

Cameron Neylon

Science in the Open

Rufus Pollock

Open Knowledge Foundation

Joseph Jackson

Open Science Alliance

Victoria Stodden

Columbia University

Peter Suber

Berkman Fellow, Harvard University

# Of course you should cite the software you use!

<http://sciencecodemanifesto.org/>

federica bianco NYU

## Science Code Manifesto

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Of course you should cite the software you use!  
but it's not always obvious how

<http://sciencecodemanifesto.org/>

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# Influence == citation ?

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Journal of the Association for Information Science and Technology / Volume 67, Issue 9

RESEARCH ARTICLE

## Software in the scientific literature: Problems with seeing, finding, and using software mentioned in the biology literature

James Howison , Julia Bullard 

First published: 13 May 2015

<https://doi.org/10.1002/asi.23538>

Cited by:13



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**90 papers randomly selected in bio**

- **did they use software**
- **did they cite software**
- **how did they cite software**

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GASP VII. SIGNS OF GAS INFLOW ONTO A LOPSIDED GALAXY

BENEDETTA VULCANI,<sup>1,2</sup> BIANCA M. POGGIANTI,<sup>2</sup> ALESSIA MORETTI,<sup>2</sup> MICHELA MAPELLI,<sup>2</sup> GIOVANNI FASANO,<sup>2</sup> JACOPO FRITZ,<sup>2</sup> YARA JAFFÉ,<sup>4</sup> DANIELA BETTONI,<sup>2</sup> MARCO GULLIEUSZIK,<sup>2</sup> AND CALLUM BELLHOUSE<sup>5,4</sup>

*Facilities:* VLT(MUSE)

*Software:* KUBEVIZ, ESOREX, SINOPSIS, IRAF, CLOUDY, pyqz, IDL, Python

Mention Type	Example
Cite to Publication	... was calculated using biosys (Swofford & Selander 1981).
Cite to Project Name or Website	... using the program Autodecay version 4.0.29 PPC (Eriksson 1998). Reference List has: ERIKSSON, T. 1998. Autodecay, vers. 4.0.29 Stockholm: Department of Botany.
Like Instrument	... calculated by t-test using the Prism 3.0 software (GraphPad Software, San Diego, CA, USA).
URL in text	... freely available from <a href="http://www.cibiv.at/software/pda/">http://www.cibiv.at/software/pda/</a> .
In-text name mention only	... were analyzed using MapQTL (4.0) software.
Not even name mentioned	... was carried out using software implemented in the Java programming language.



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## THE ASTROPHYSICAL JOURNAL

### GASP. VII. Signs of Gas Inflow onto a Lopsided Galaxy

Benedetta Vulcani<sup>1,2</sup> , Bianca M. Poggianti<sup>2</sup> , Alessia Moretti<sup>2</sup> , Michela Mapelli<sup>2</sup>, Giovanni Fasano<sup>2</sup>, Jacopo Fritz<sup>3</sup> , Yara Jaffé<sup>4</sup>, Daniela Bettoni<sup>2</sup> , Marco Gullieuszik<sup>2</sup> , and Callum Bellhouse<sup>4,5</sup> 

Published 2018 January 11 • © 2018. The American Astronomical Society. All rights reserved.  
[The Astrophysical Journal, Volume 852, Number 2](#)

**Facilities:** VLT(MUSE)

**Software:** KUBEVIZ, ESOREX, SINOPSIS, IRAF, CLOUDY, pyqz, IDL, Python



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Journal of the Association for Information Science and Technology / Volume 67, Issue 9

RESEARCH ARTICLE

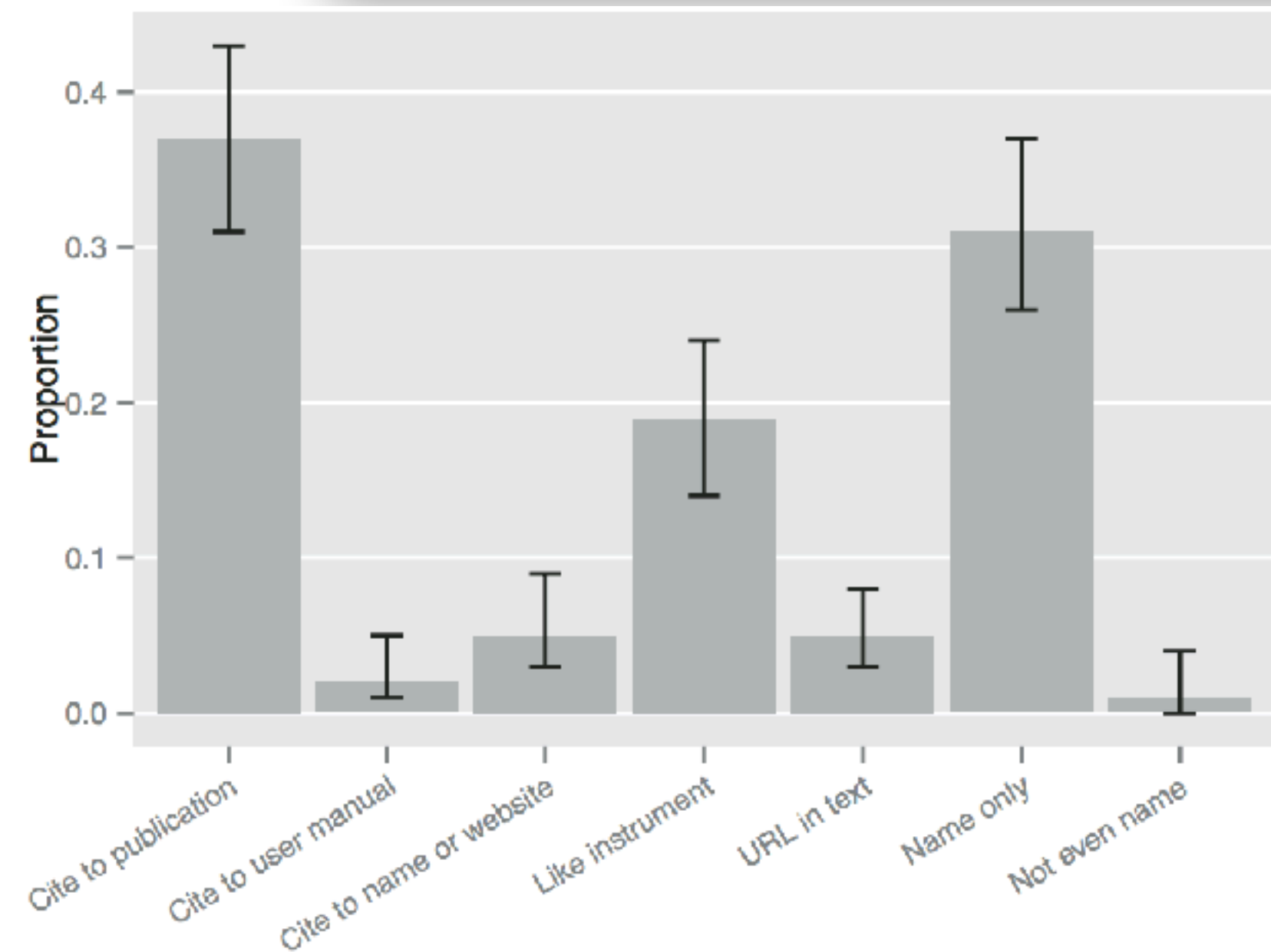
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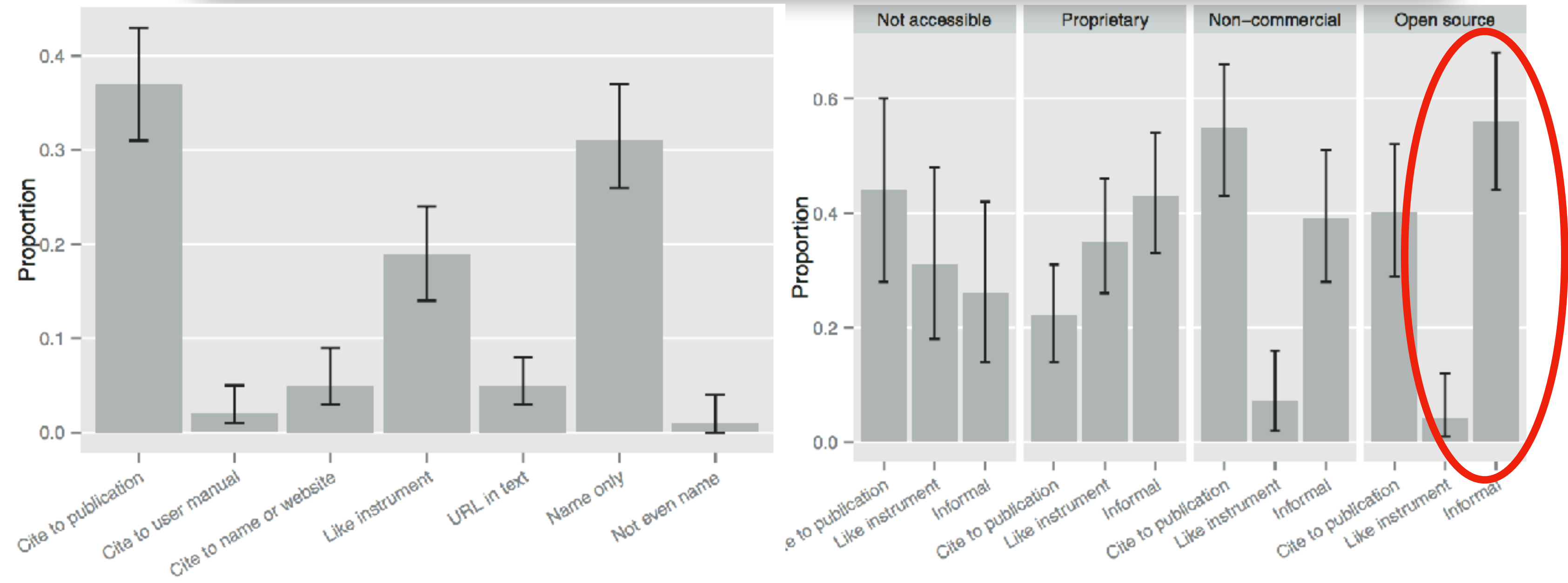
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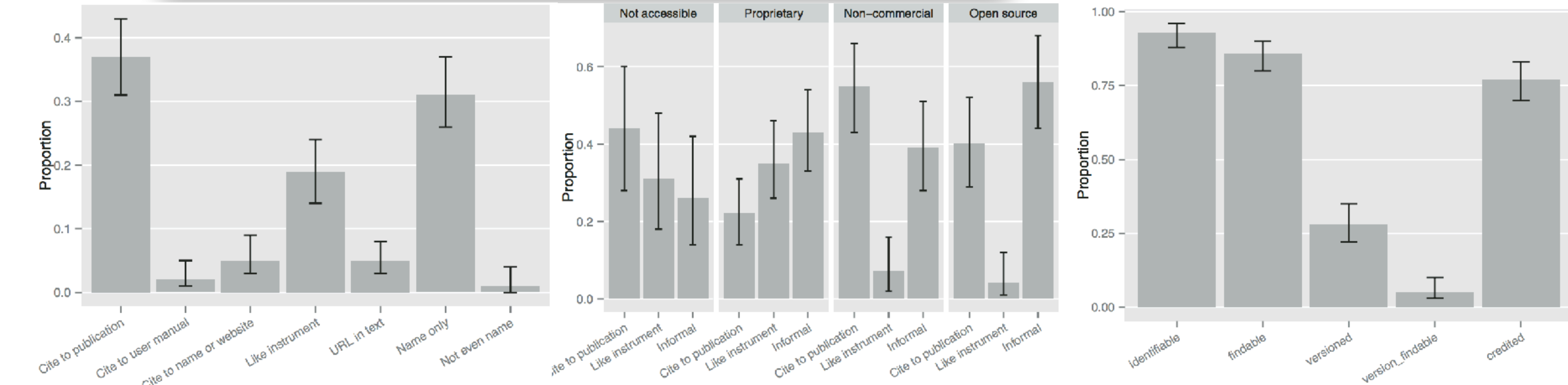
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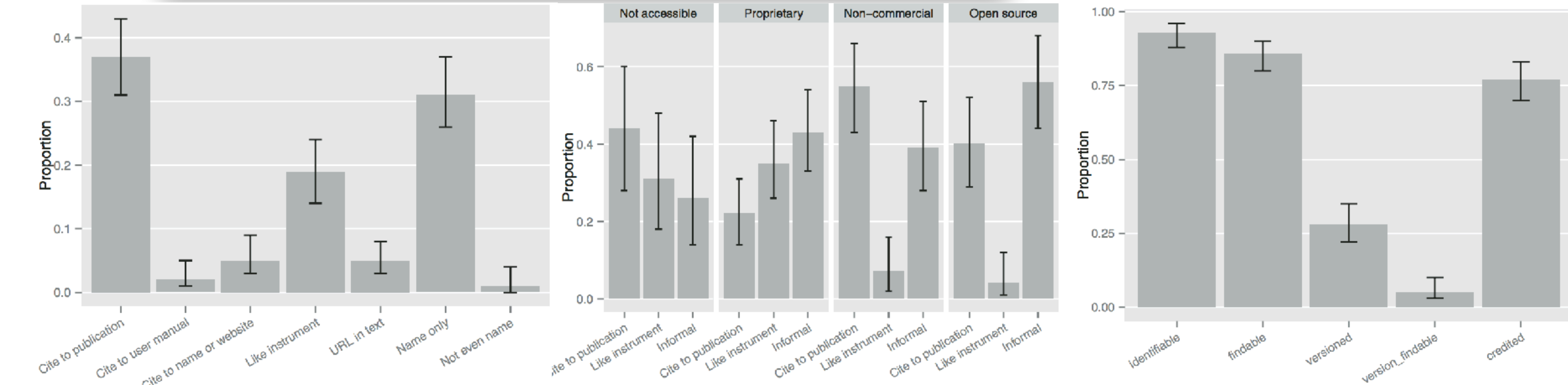
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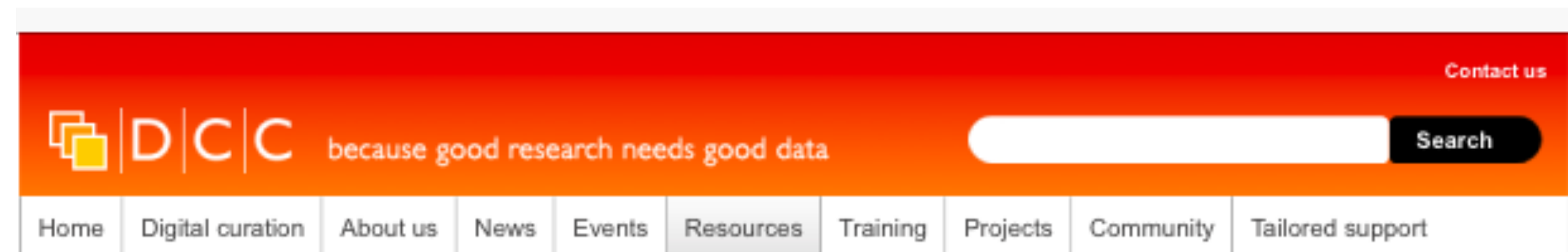
James Howison✉, Julia Bullard✉

First published: 13 May 2015  
<https://doi.org/10.1002/asi.23538>  
Cited by:13



# Influence == citation ?

## We have seen this problem before: how to measure the impact of research data?



Home > Resources > How Guides > Track Data Impact Metrics

### In this section

Briefing Papers

#### How-to Guides & Checklists

Appraise & Select Research Data for Curation

Cite Datasets and Link to Publications

Develop RDM Services

Develop a DMP

Discover Requirements

Five Steps to Decide What Data to Keep

Five Things You Need to Know About RDM and the Law

License Research Data

Track Data Impact with Metrics

Using RISE

Where to keep research data

### How to Track the Impact of Research Data with Metrics

This guide will help you to track and measure the impact of research data, whether your own or that of your department/institution. It provides an overview of the key impact measurement concepts and the services and tools available for measuring impact. After discussing some of the current issues and challenges, it provides some tips on increasing the impact of your own data. This guide should interest researchers and principal investigators working on data-led research, administrators working with research quality assessment submissions, librarians and others helping to track the impact of data within institutions.

By Alex Ball (DCC), Monica Duke (DCC)

Published: 29 June 2015

Browse the guide below or [download the PDF](#).

### Open Science case studies



Can openness among researchers benefit science? Read more about the three-month study funded by RIN and NESTA, which examined the motivation for – and advantages of – sharing data, and records of the research process and results.

[Read more](#)

[Write a Lay Summary](#)

[Developing RDM Services](#)

[Curation Lifecycle Model](#)

[Curation Reference Manual](#)

[Policy and legal](#)

[Data Management Plans](#)

[Tools](#)

[Case studies](#)

[Repository audit and assessment](#)

[Standards](#)

[Publications and presentations](#)

[Roles](#)

[Curation journals](#)

[Informatics research](#)

[External resources](#)

[Online Store](#)

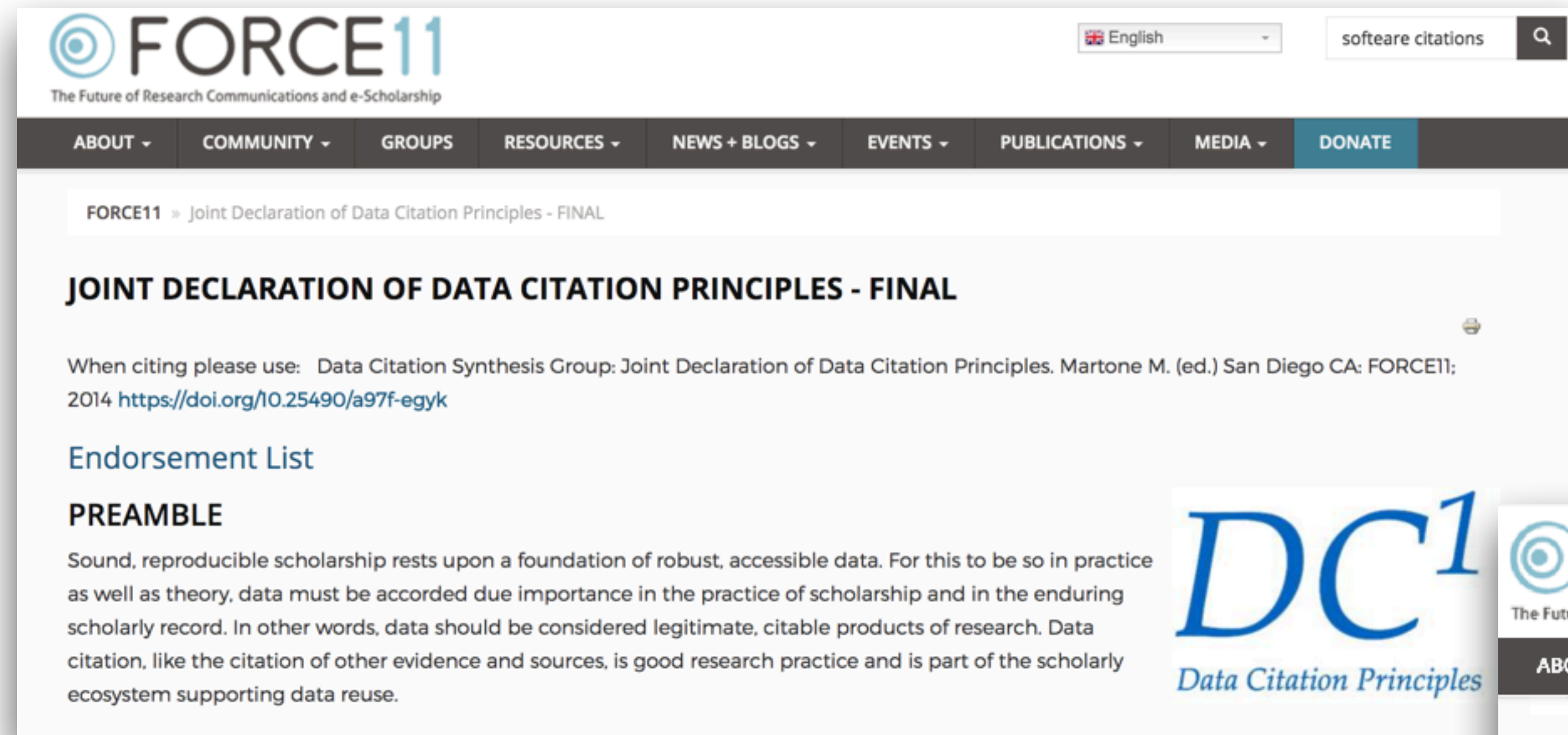
Please cite as: Alex Ball, Monica Duke (2015). 'How to Track the Impact of Research Data with Metrics'. DCC How-to Guides. Edinburgh: Digital Curation Centre. Available online: <http://www.dcc.ac.uk/resources/how-guides>

### Contents

- [Why measure the impact of research data?](#)
- [Impact measurement concepts](#)
- [Impact measurement services](#)
- [Current issues and challenges](#)
- [Tips for raising research data impact](#)
- [Acknowledgements](#)
- [Further information](#)
- [Notes](#)



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FORCE11 The Future of Research Communications and e-Scholarship

English

software citations

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FORCE11 » Joint Declaration of Data Citation Principles - FINAL



## JOINT DECLARATION OF DATA CITATION PRINCIPLES - FINAL

When citing please use: Data Citation Synthesis Group: Joint Declaration of Data Citation Principles. Martone M. (ed.) San Diego CA: FORCE11; 2014 <https://doi.org/10.25490/a97f-egykh>

Endorsement List

### PREAMBLE

Sound, reproducible scholarship rests upon a foundation of robust, accessible data. For this to be so in practice as well as theory, data must be accorded due importance in the practice of scholarship and in the enduring scholarly record. In other words, data should be considered legitimate, citable products of research. Data citation, like the citation of other evidence and sources, is good research practice and is part of the scholarly ecosystem supporting data reuse.



FORCE11 The Future of Research Communications and e-Scholarship

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## SOFTWARE CITATION PRINCIPLES (PUBLISHED 2016)

This paper has been published in *PeerJ Computer Science*. Please cite it as:  
Smith AM, Katz DS, Niemeyer KE, FORCE11 Software Citation Working Group.  
(2016) Software Citation Principles. *PeerJ Computer Science* 2:e86.  
DOI: [10.7717/peerj-cs.86](https://doi.org/10.7717/peerj-cs.86)

ARFON M. SMITH<sup>1</sup>, DANIEL S. KATZ<sup>2</sup>, KYLE E. NIEMEYER<sup>3</sup>, AND THE FORCE11 SOFTWARE CITATION WORKING GROUP

Corresponding author: Daniel S. Katz<sup>2</sup>, [d.katz@ieee.org](mailto:d.katz@ieee.org).

<sup>1</sup>GitHub, Inc., San Francisco, California, United States

<sup>2</sup>National Center for Supercomputing Applications & Electrical and Computer Engineering Department & School of Information Sciences, University of Illinois at Urbana-Champaign, Urbana, Illinois, United States

<sup>3</sup>School of Mechanical, Industrial, and Manufacturing Engineering, Oregon State University, Corvallis, Oregon, United States



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*solutions (maybe)*

Influence == citation ?



NATURE | TOOLBOX

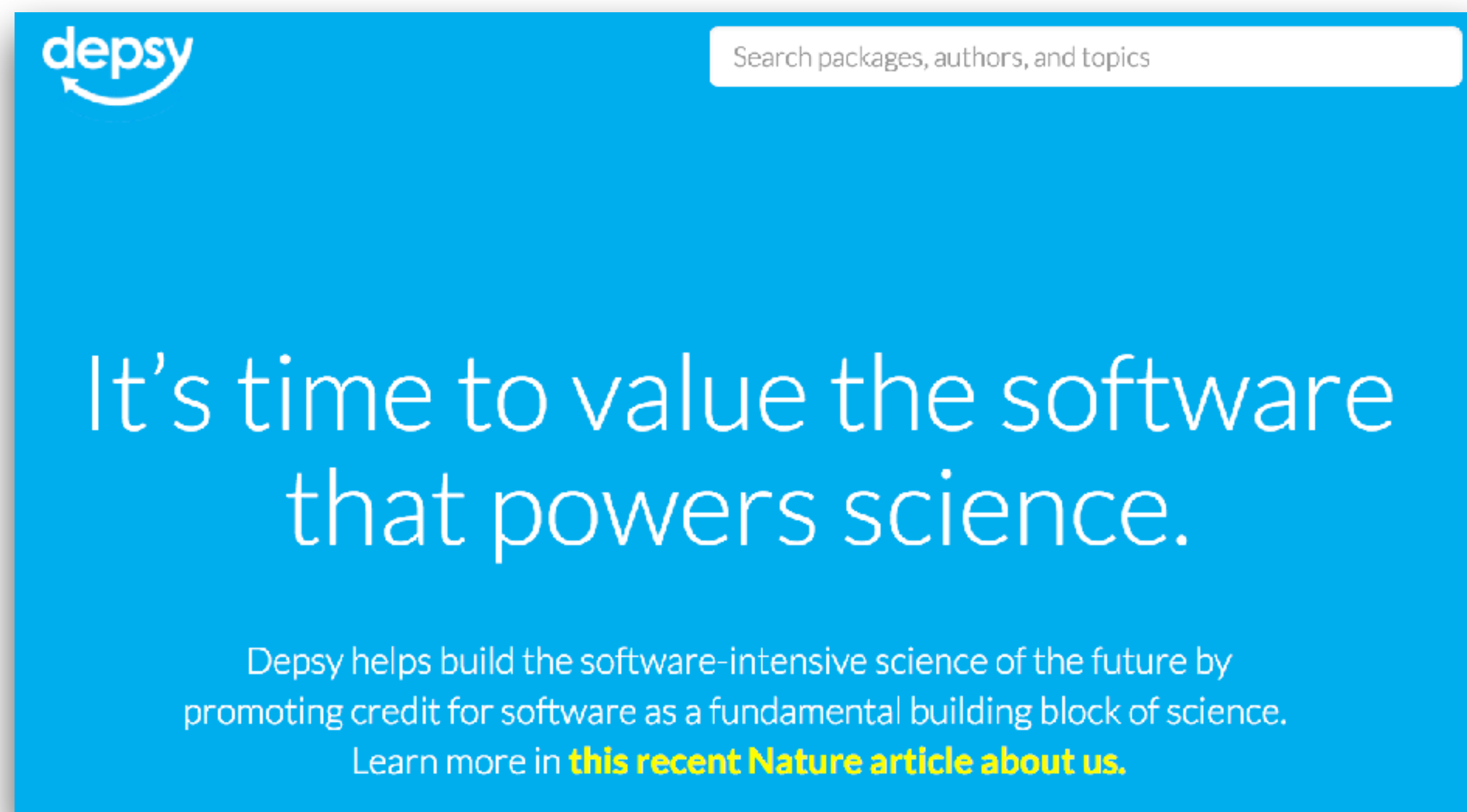


## The unsung heroes of scientific software

Creators of computer programs that underpin experiments don't always get their due — so the website Depsy is trying to track the impact of research code.

**Dalmeet Singh Chawla**

<http://depsy.org/>



Influence == citation ?



NATURE | TOOLBOX



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Dalmeet Singh Chawla



depsy @depsy\_org · Mar 4

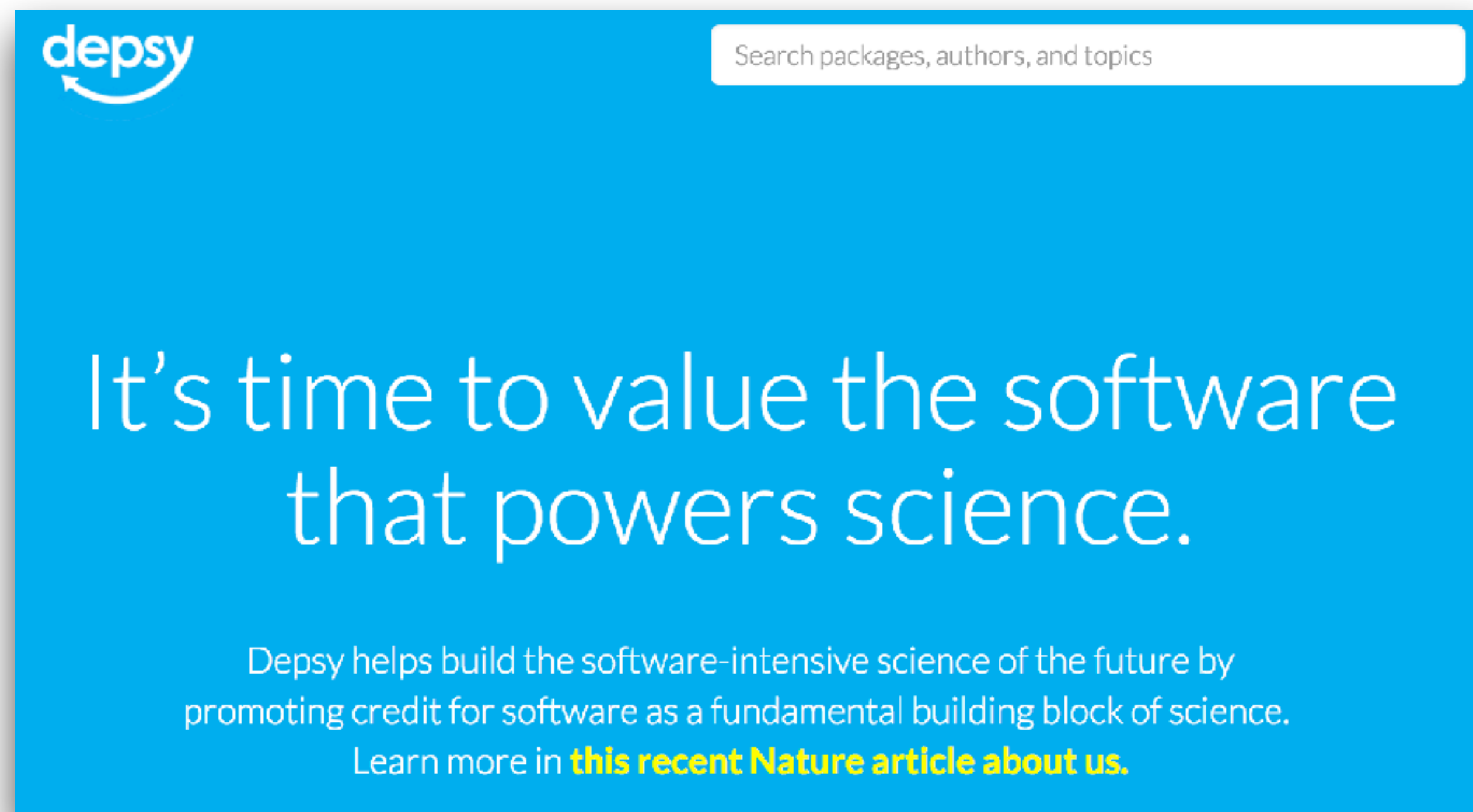
The Depsy project is officially concluded. Website will stay up, but maintenance ending. Thanks so much to the NSF for funding this idea; we learned a lot and feel grant was successful. Focus now moves to our Sloan-funded followup project:



**Collaborating on a \$635k grant to improve credit fo...**

We're thrilled to announce Impactstory will be collaborating with James Howison at the University of Texas-Austin on a project to improve research software...

[blog.impactstory.org](http://blog.impactstory.org)





<http://depsy.org/>

Depsy helps build the software-intensive science of the future by promoting credit for software as a fundamental building block of science.

**astropy** 

Astropy is a package intended to contain core functionality and some common tools needed for perfor...



**100** percentile impact overall

Compared to all research software on PyPI, based on relative downloads, software reuse, and citation.

 Downloads

 **1.5M** 99 percentile

Based on latest downloads stats from PyPI.

 Citations

 **1** 100 percentile

Based on term searches in ADS (0) and Europe PMC (1)

[Read more about how we got this number.](#)

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astropy

Astropy is a package intended to contain core functionality and some common tools needed for perfor...



emcee

emcee ===== \*\*The Python ensemble sampling toolkit for affine-invariant MCMC\*\* .. image:: http://i...



35 contributors

- Dan Foreman-Mackey
- Will Meierjürgen Farr
- David W. Hogg
- Jeremy Sanders
- Manodeep Sinha



100 percentile impact overall

Compared to all research software

Downloads 1.5M 99 percentile

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Citations 1 100 percentile

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99 percentile impact overall

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Downloads 49.1k 92 percentile

Based on latest downloads stats from PyPI.

Citations 0 100 percentile

Based on term searches in ADS (0) and Europe PMC (0)  
Read more about how we got this number.

Dependency PageRank Reused by 176 projects

5.70 99 percentile

Measures how often this package is imported by PyPI and GitHub projects, based on its PageRank in the dependency network

gptools Gaussian process regression with derivative constraints and predictions.

VESPA Calculate astrophysical false positive probabilities for transiting

http://depsy.org/

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Based on term searches in

#	Bibcode	Cites	Date	List of Links					his	
	Authors	Title		Access Control Help						
1	<input type="checkbox"/> <a href="#">2013PASP..125..306F</a>	1616.000	03/2013	<a href="#">A</a>	<a href="#">E</a>	<a href="#">F</a>	<a href="#">X</a>	<a href="#">R</a>	<a href="#">C</a>	<a href="#">O</a> <a href="#">U</a>
	Foreman-Mackey, Daniel; Hogg, David W.; Lang, Dustin; Goodman, Jonathan	emcee: The MCMC Hammer								
2	<input type="checkbox"/> <a href="#">2016JOSS....1...24F</a>	124.000	06/2016	<a href="#">A</a>	<a href="#">E</a>			<a href="#">R</a>	<a href="#">C</a>	<a href="#">U</a>





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Citations 1 100 percentile

Based on term searches in

TheCannon

Data-driven stellar parameters and abundances from spectra



Not research software

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did we guess wrong?

Downloads 3.3k

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Citations 0

Based on term searches in ADS (0) and Europe PMC (0)

Read more about how we got this number.

4 contributors

- Anna Ho
- Morgan Fouesneau
- David W. Hogg
- HWRix

Dependency PageRank 0.00



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Compared to all research software

Downloads



Based on latest downloads stats

Citations



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adegenet

Toolset for the exploration of genetic and genomic data. Adegnet provides formal (S4) classes for s...



Compared to all research software on CRAN , based on relative downloads, software reuse, and citation.

Downloads



Based on latest downloads stats from CRAN.

Citations



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Read more about how we got this number.



Tags

genetics



<http://depsy.org/>

Depsy helps build the software-intensive science of the future by promoting credit for software as a fundamental building block of science.

astropy 🎓

Astropy is a package intended to contain core functionality and some common tools needed for perfor...



100 percentile impact overall

Compared to all research software

Downloads 1.5M 99 percentile

Based on latest downloads stats

Citations 1 100 percentile

Based on term searches in

emcee 🎓

emcee ===== \*\*The Python ensemble sampling toolkit for affine-invariant MCMC\*\* .. image:: http://i...



99 percentile impact overall

Compared to all research software

Downloads 49.1k 92 percentile

Based on latest downloads stats

Citations 0 100 percentile

Based on term searches in

OSMnx



0 contributors

0 percentile impact overall  
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Downloads 0

Based on latest downloads stats from PyPI.

Citations 0

Based on term searches in ADS (0) and Europe PMC (0)  
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# OSMnx: Python for Street Networks

Check out the [journal article](#) about OSMnx.

OSMnx is a Python package for downloading administrative boundary shapes and street networks from OpenStreetMap. It allows you to easily construct, project, visualize, and analyze complex street networks in Python with NetworkX. You can get a city's or neighborhood's



```
1 | import osmnx as ox
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```



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```



 [gboeing / osmnx](#)

 Unwatch ▾

76

★ Unstar

933

🔗 Fork

158

 Code

 Issues 3

 Pull requests 1

 Projects 0

 Wiki

 Insights



Depsy is dead... long live Depsy (and deep learning!)

## Collaborating on a \$635k grant to improve credit for research software

- ≡ We're thrilled to announce Impactstory will be collaborating with [James Howison at the University of Texas-Austin](#) on a project to improve research software by helping its creators get proper credit for their work. The project will be funded by a three-year, \$635k grant from the Alfred P. Sloan foundation.

We'll be working with James and his lab to make a huge database of every research software project used in every paper in the biomedicine, astronomy, and economics literatures. This database will be filled in using a deep learning system that'll automatically extract both [formal and informal mentions](#) of software, after being trained on a large, manually-coded [gold standard dataset](#).



help your users help you

---

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

help your users help you

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- Get a DOI



fedhere / sparklpy

Unwatch 1 Star 1 Fork 0

Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

module to create Tufte-style spark line plots [Edit](#)

[Add topics](#)

51 commits 2 branches 1 release 1 contributor MIT

Branch: master New pull request Create new file Upload files Find file Clone or download

fedhere Update README.md Latest commit 75a6f3a just now

LICENCE.txt	Create LICENCE.txt	2 years ago
README.md	Update README.md	just now
setup.py	enable limits switch for magnitude + big fixes	2 years ago
sparkleme.py	style fixes	2 years ago
sparkletest.ipynb	enable limits switch for magnitude + big fixes	2 years ago
sparklines_example.png	updated example figure	2 years ago

README.md

### sparklpy

DOI 10.5281/zenodo.35387 health 89%

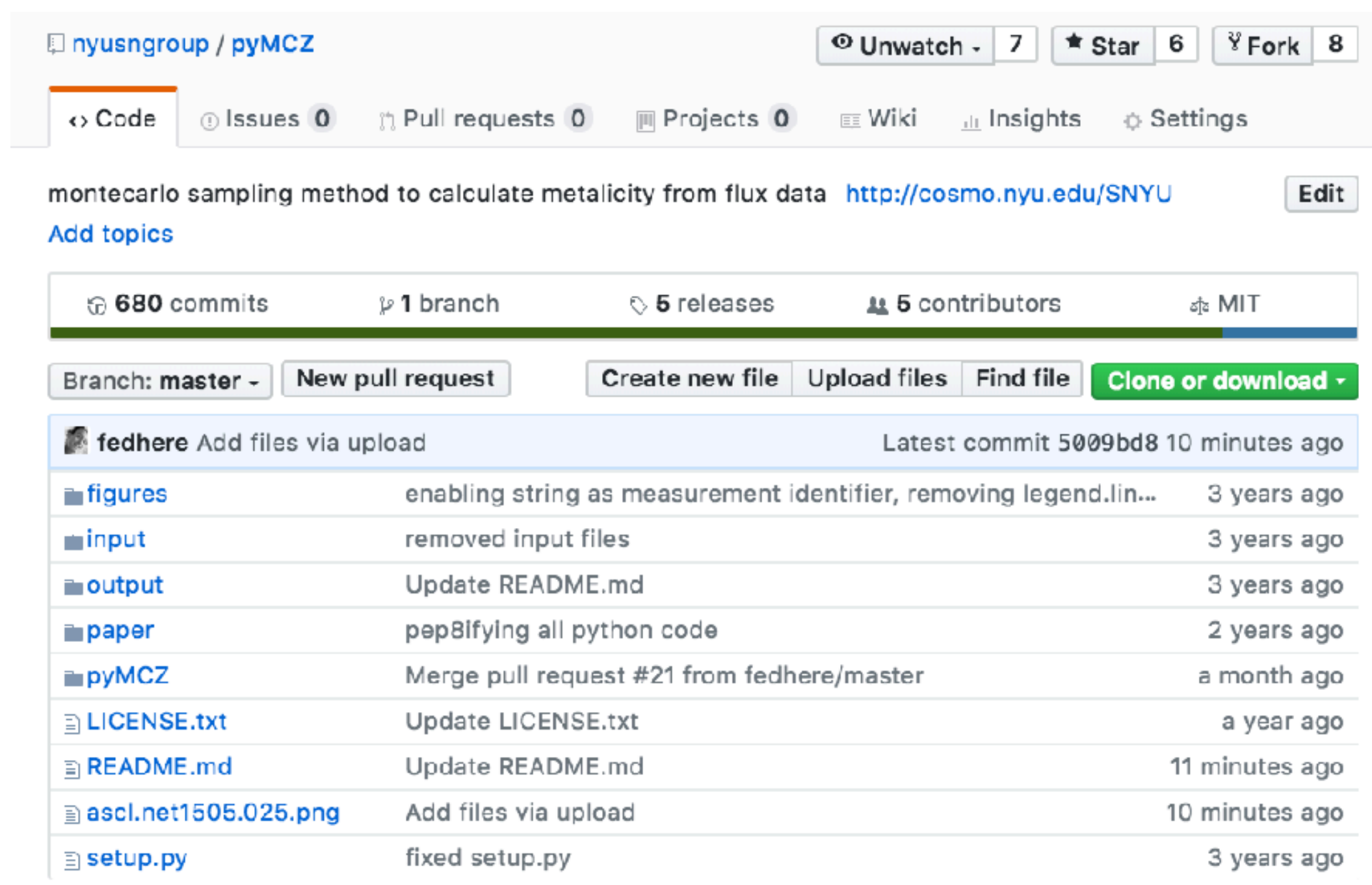
module to create Tufte-style spark line plots for time series, including astronomical ones (in magnitude!)

help your users help you

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- Get a DOI
- Give users instructions on how to cite your software



nyusngroup / pyMCZ

Unwatch 7 Star 6 Fork 8

<> Code Issues 0 Pull requests 0 Projects 0 Wiki Insights Settings

montecarlo sampling method to calculate metalicity from flux data <http://cosmo.nyu.edu/SNYU> Edit

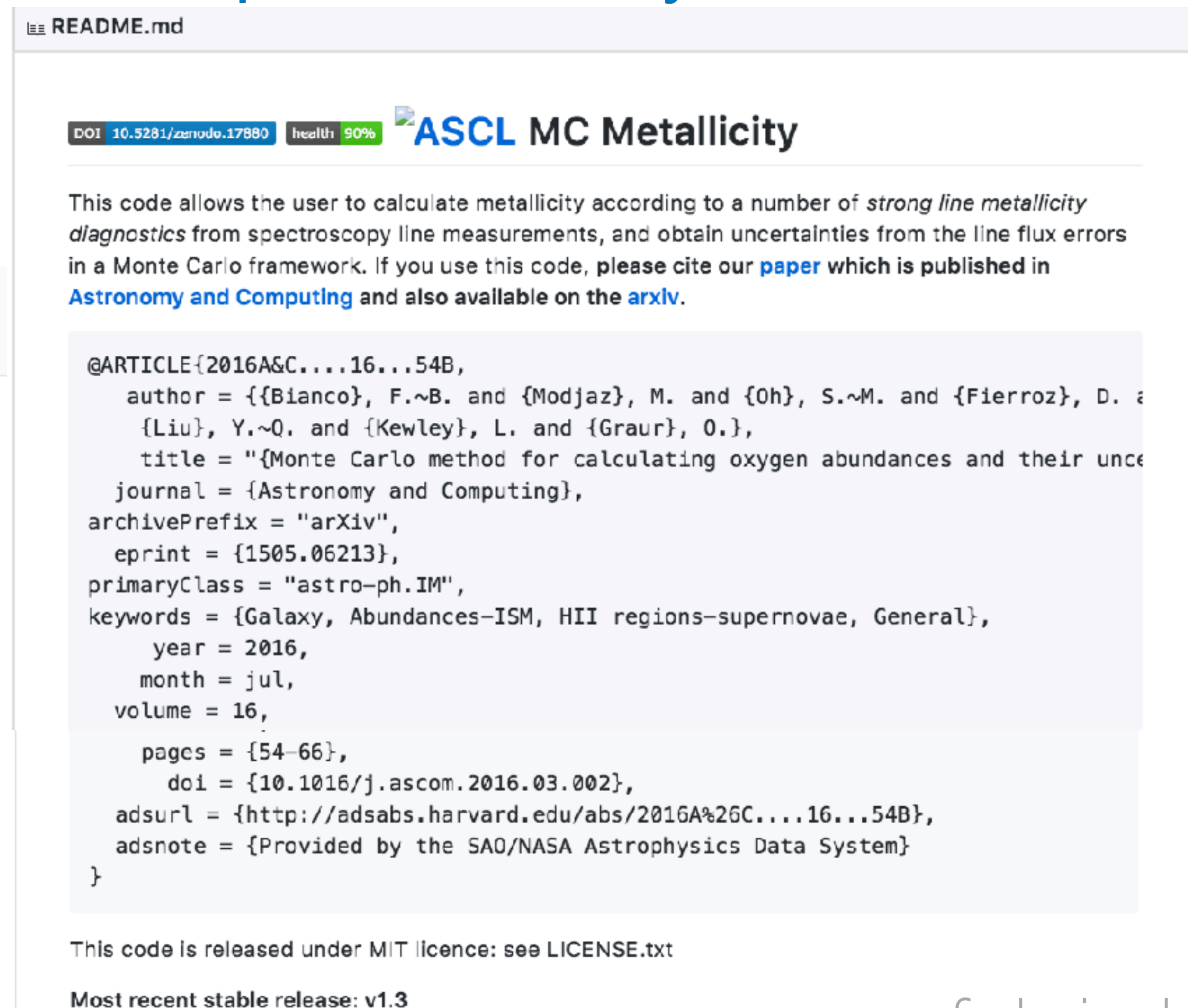
Add topics

680 commits 1 branch 5 releases 5 contributors MIT

Branch: master - New pull request Create new file Upload files Find file Clone or download

fedhere Add files via upload Latest commit 5009bd8 10 minutes ago

figures	enabling string as measurement identifier, removing legend.lin...	3 years ago
input	removed input files	3 years ago
output	Update README.md	3 years ago
paper	pep8ifying all python code	2 years ago
pyMCZ	Merge pull request #21 from fedhere/master	a month ago
LICENSE.txt	Update LICENSE.txt	a year ago
README.md	Update README.md	11 minutes ago
ascl.net1505.025.png	Add files via upload	10 minutes ago
setup.py	fixed setup.py	3 years ago



README.md

DOI 10.5281/zenodo.17880 health 90% ASCL MC Metallicity

This code allows the user to calculate metallicity according to a number of *strong line metallicity diagnostics* from spectroscopy line measurements, and obtain uncertainties from the line flux errors in a Monte Carlo framework. If you use this code, please cite our [paper](#) which is published in [Astronomy and Computing](#) and also available on the [arXiv](#).

```
@ARTICLE{2016A&C....16...54B,
  author = {{Bianco}, F.~B. and {Modjaz}, M. and {Oh}, S.~M. and {Fierroz}, D. and {Liu}, Y.~Q. and {Kewley}, L. and {Graur}, O.},
  title = "{Monte Carlo method for calculating oxygen abundances and their uncertainties}",
  journal = {Astronomy and Computing},
  archivePrefix = "arXiv",
  eprint = {1505.06213},
  primaryClass = "astro-ph.IM",
  keywords = {Galaxy, Abundances-ISM, HII regions-supernovae, General},
  year = 2016,
  month = jul,
  volume = 16,
  pages = {54-66},
  doi = {10.1016/j.ascom.2016.03.002},
  adsurl = {http://adsabs.harvard.edu/abs/2016A%26C....16...54B},
  adsnote = {Provided by the SAO/NASA Astrophysics Data System}
}
```

This code is released under MIT licence: see LICENSE.txt

Most recent stable release: v1.3



maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- **Get a DOI**
- **Give users instructions on how to cite your software**



Dan F-M  
@exoplaneteer

PSA: Please use the preferred citation method for any open source code that you use in a paper – it's an academic tool builder's livelihood!

7/29/17, 7:14 PM

33 Retweets 58 Likes



Dan F-M @exoplanet... · 7/29/17

Replying to @exoplaneteer

e.g. the preferred citation for corner.py is described here: [corner.readthedocs.io/en/latest/#att...](https://corner.readthedocs.io/en/latest/#att...) and similar requests exist for many other packages.



3



3



5



Dan F-M @exoplanet... · 7/29/17

I spend a lot of time supporting corner.py even though it "isn't science" and it pains me to see how many papers use it without attribution!



2



2



11



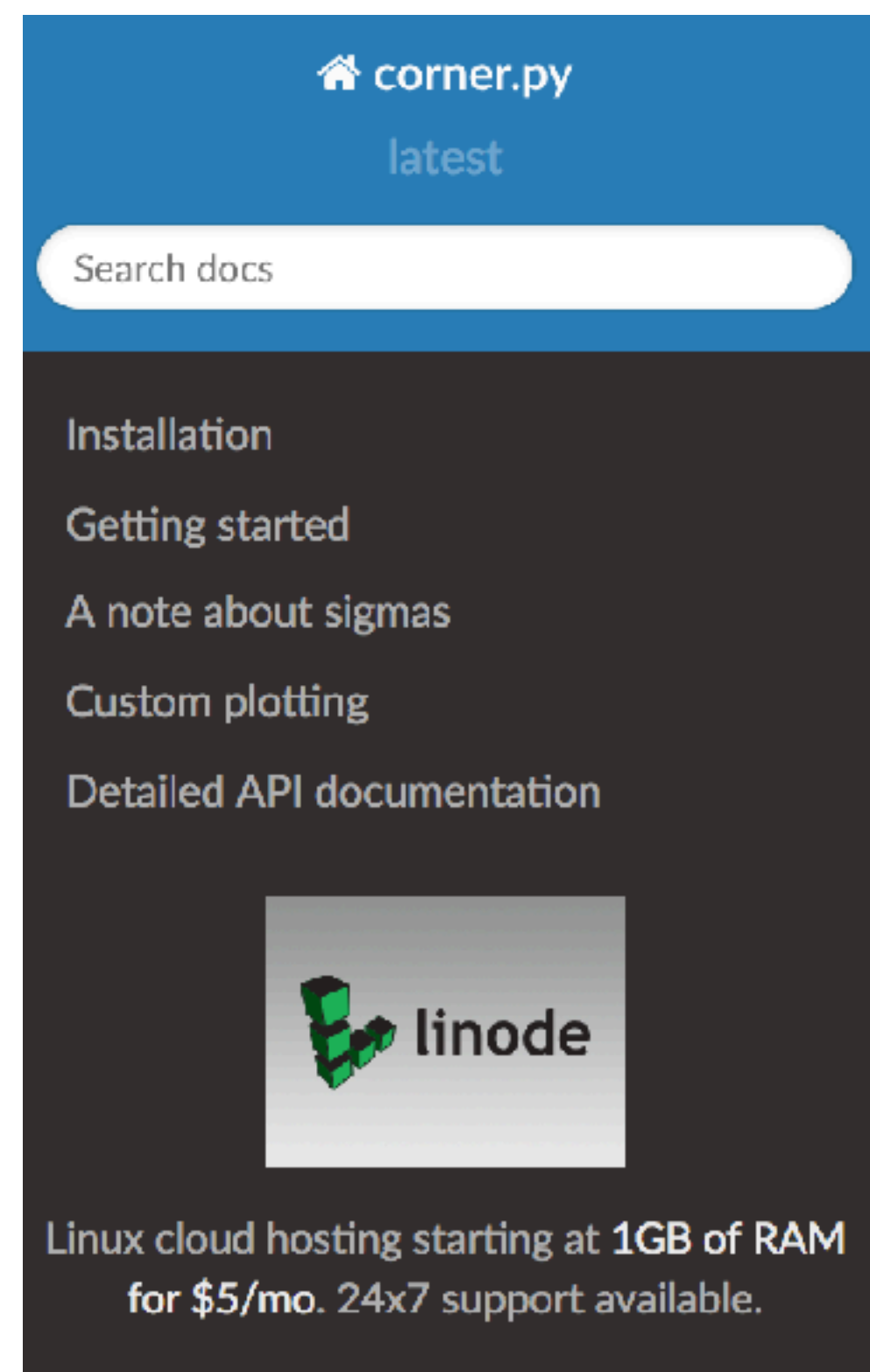
Ivan Milic @Whisperin... · 7/29/17

Very sorry for not doing it. Will definitely do every time from now on!

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- Get a DOI
- Give users instructions on how to cite your software



## Attribution

If you make use of this code, please cite [the JOSS paper](#):

```
@article{corner,  
  Author = {Daniel Foreman-Mackey},  
  Doi = {10.21105/joss.00024},  
  Title = {corner.py: Scatterplot matrices in Python},  
  Journal = {The Journal of Open Source Software},  
  Year = 2016,  
  Volume = 24,  
  Url = {http://dx.doi.org/10.5281/zenodo.45906}  
}
```

## Authors & License

Copyright 2013-2016 Dan Foreman-Mackey & contributors

Built by [Dan Foreman-Mackey](#) and contributors (see `corner.__contributors__` for the most up to date list). Licensed under the 2-clause BSD license (see `LICENSE`).



help your users help you

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- Get a DOI
- Give users instructions on how to cite your software
  - more data driven approaches

## Citation File Format (CFF)

CFF is a human- and machine-readable file format in YAML 1.2 which provides citation metadata for software. It is maintained openly on GitHub:

<https://github.com/citation-file-format>.

The current version is [1.0.3](#).

About

Resources

Services

Branch: master dataset / codemeta.json Find file Copy path

rsdoiel prep for testing fixes for issue 44 and 45 a397f9d 6 days ago

2 contributors

41 lines (41 sloc) 1.36 KB Raw Blame History

```
1 {
2   "@context": "https://doi.org/10.5063/schema/codemeta-2.0",
3   "@type": "SoftwareSourceCode",
4   "description": "A command line tool for working with JSON documents on local disc",
5   "name": "dataset",
6   "codeRepository": "https://github.com/caltechlibrary/dataset",
7   "issueTracker": "https://github.com/caltechlibrary/dataset/issues",
8   "license": "https://data.caltech.edu/license",
9   "version": "0.0.38",
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13      "givenName": "Robert",
14      "familyName": "Doiel",
15      "affiliation": "Caltech Library",
16      "email": "rsdoiel@caltech.edu",
17      "@id": "https://orcid.org/0000-0003-0900-6903"
18    },
19    {
20      "@type": "Person",
21      "givenName": "Thomas E",
22      "familyName": "Morrell",
23      "affiliation": "Caltech Library",
24      "email": "tmorrell@caltech.edu",
25      "@id": "https://orcid.org/0000-0001-9266-5146"
26    }
27  ],
28  "developmentStatus": "active",
29  "downloadUrl": "https://github.com/caltechlibrary/dataset/archive/v0.0.38.zip",
30  "keywords": [
31    "GitHub",
32    "metadata",
33    "data",
34    "software"
35  ],
36  "maintainer": "https://orcid.org/0000-0003-0900-6903",
37  "programmingLanguage": [
38    "Go",
39    "Python"
40  ]
41 }
```

Caltech Library

Enhanced software preservation now available in CaltechDATA!

Friday, March 09, 2018

CaltechDATA has supported automatic preservation of GitHub software repositories since launch, so anyone at Caltech can get a DOI (permanent identifier) for their software project and have Caltech Library handle long term preservation. However, most GitHub repositories do not include clear metadata such as authors, affiliations, or ORCID identifiers. CaltechDATA now supports **CodeMeta**, a new standard format for software metadata. By including a **codemeta.json** file in your GitHub repo, your full author list, keywords, and license will be listed in CaltechDATA and registered with your DOI.



**<http://citeas.org/>**

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**CiteAs**<sup>[1]</sup>  
alpha

AboutAPI

pyqz  
view website

**Cite this project as:**

American Psychological Association 6th edition ▼

Vogt, F.. (2015). pyqz. GitHub repository. Retrieved from <https://github.com/fpavogt/pyqz>

COPY

DOWNLOAD

Modify view in API

help your users help you

---

maybe the solution is in your own hands instead:

how can you foster good citation practices for your software?

- **Get a DOI**
- **Give users instructions on how to cite your software**
- **Use tools on your software development platform to measure impact (won't higher your H-index but can go on your CV!)**

The image shows two GitHub repository headers. The top header is for the repository `gboeing / osmnx`. It features buttons for 'Unwatch' (76), 'Unstar' (933), and 'Fork' (158). Below these are tabs for 'Code', 'Issues' (3), 'Pull requests' (1), 'Projects' (0), 'Wiki', and 'Insights' (which is highlighted with an orange bar). The bottom header is for the repository `dfm / emcee`. It features buttons for 'Watch' (98), 'Star' (798), and 'Fork' (306). Below these are tabs for 'Code' (which is highlighted with an orange bar), 'Issues' (6), 'Pull requests' (0), 'Projects' (0), 'Wiki', and 'Insights'.

**Research  
Software  
Citation**  
**I'm citable! [1]**  
**Software is an important  
research product. Cite it and  
make it citable!**  
**[1] cite.research-software.org**

Arguably, the scholarly ecosystem as such, or at least its processes for acknowledging and crediting research efforts in any form, would have to be transformed into a more ideal state for software to assume its proper place. But until this can be achieved - if it is possible at all - **the current system should be leveraged** in order to create a level(er) playing field for software in science.

<https://research-software.org/citation/introduction>

federica bianco NYU