

Is 'Open Science' a solution or a threat?

Open science, transparence et evaluation. Perspectives et enjeux pour les chercheurs.

<https://sygefor.reseau-urfist.fr/#!/training/6701/7159/?from=true>

Urfist de Bordeaux, France

4 April 2017

Dr Danny Kingsley

Head of Scholarly Communication

University of Cambridge

@dannykay68

Slides -XXXXXX

Today's talk

- The problem
 - The problems caused by the way research is measured
- The solution?
 - How Open Science can address these
- The reality
 - Why it is difficult to implement Open Science ideas
- I will be live tweeting – so all links to papers will be tweeted as we go #XXXX

The coin in the realm of academia

Anubis3 Medal: Gustav Vigeland (Self-photographed)
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The only thing that counts in academia is publication of novel results in high impact journals

Steele, C., Butler, L. and Kingsley, D. "The Publishing Imperative: the pervasive influence of publication metrics" *Learned Publishing*, October 2006 Vol 19, Issue 4, pp. 277-290. [10.1087/095315106778690751/epdf](https://doi.org/10.1087/095315106778690751/epdf)

We are stuck



The insistence on the need to publish novel results in high impact journals is creating a multitude of problems with the scientific endeavour

The problems

- Problem 1: Reluctance to share data
 - (all disciplines)
- Problem 2: Hyperauthorship
 - (Physics)
- Problem 3: Reproducibility
 - (Psychology, Neuroscience, Pharmacology)
- Problem 4: Retraction
 - (Biological and Medical Sciences)
- Problem 5: Poor Science
 - (Sociology, economics, climate science also vulnerable)
- Problem 6: Attrition
 - (all disciplines)

Focus today

- Problem 1: Reluctance to share data
 - (all disciplines)
- Problem 2: Hyperauthorship
 - (Physics)
- Problem 3: Reproducibility
 - (Psychology, Neuroscience, Pharmacology)
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 - (all disciplines)

Problem 1: Data Excuse Bingo

My data contains personal/sensitive information	My data is too complicated	People may misinterpret my data	My data is not very interesting
Commercial funder doesn't want to share it	We might want to use it in another paper	People will contact me to ask about stuff	Data Protection/ National Security
It's too big	People will see that my data is bad	I want to patent my discovery	It's not a priority and I'm busy
I don't know how	I'm not sure I own the data	Someone might steal/ plagiarise it	My funder doesn't require it

Incompatible!

My data contains personal/sensitive information	My data is too complicated	Permission is	My data is not very interesting
Commercial funder doesn't want to share it	We might want to use it in another paper	Permission to ask about stuff	on/National Security
It's too big	People see the data is	Someone might steal/plagiarise it	It's not a priority and I'm busy
I don't know how	I'm not the data	might steal/plagiarise it	My funder doesn't require it

‘Someone might steal/plagiarise it’

‘A second concern held by some is that a new class of research person will emerge — **people who had nothing to do with the design and execution of the study but use another group’s data for their own ends**, possibly stealing from the research productivity planned by the data gatherers, or even use the data to try to disprove what the original investigators had posited. There is concern among some front-line researchers that the system will be taken over by what some researchers have characterized as “**research parasites.**”’

Solution – reward data sharing

- REgistry of REsearch Data REpositories

<http://www.re3data.org/>



- Joint Declaration of Data Citation Principles

<https://www.force11.org/group/joint-declaration-data-citation-principles-final>



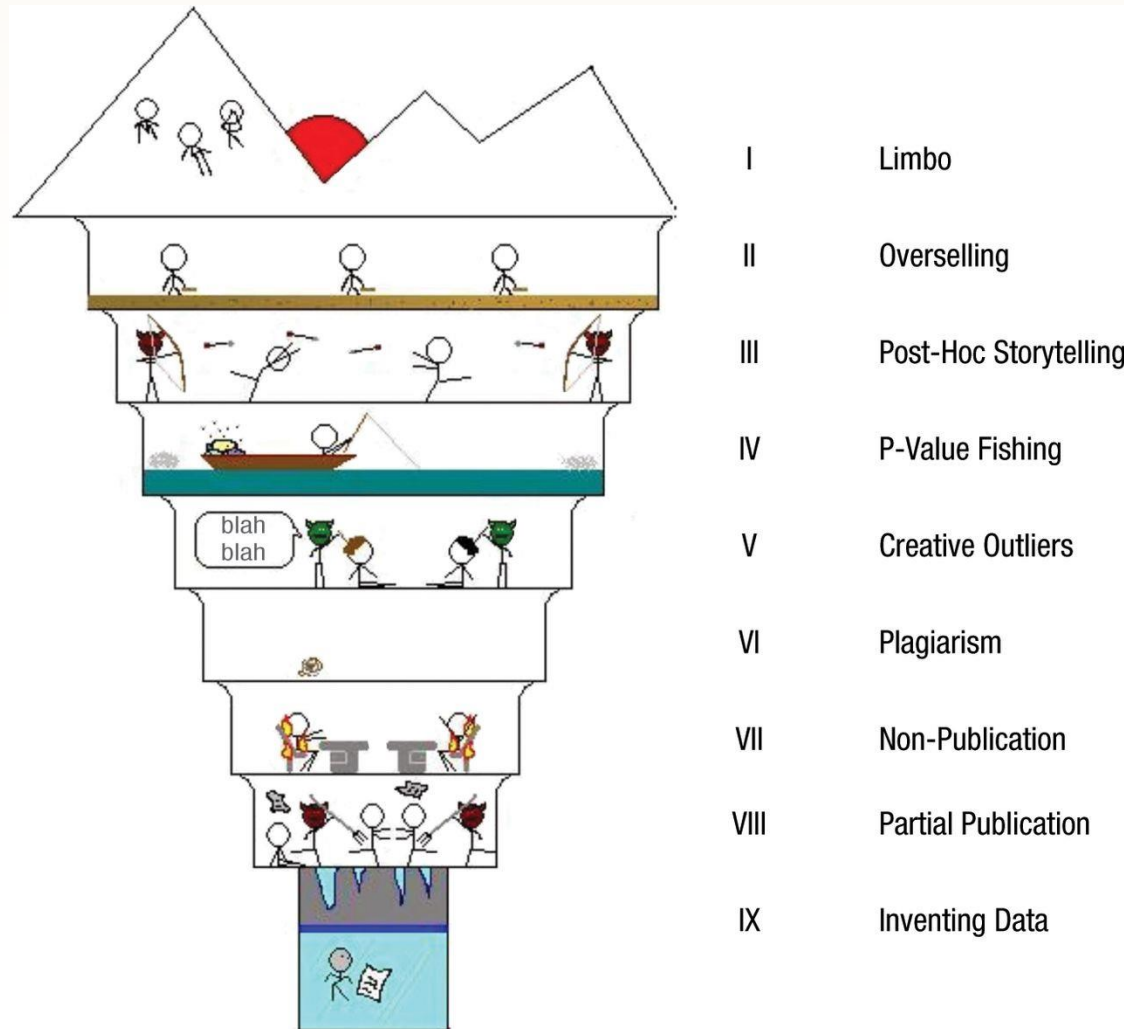
Problem 3: Reproducibility



Scientists are very rarely rewarded for being right, they are rewarded for publishing in certain journals and for getting grants.

The nine circles of scientific hell

(with apologies to Dante and xkcd)



Neuroskeptic Perspectives on Psychological Science
2012;7:643-644

Perspectives on
Psychological
SCIENCE

Oh dear

plos.org create account sign in

PLOS MEDICINE Browse Publish About Search Q advanced search

OPEN ACCESS

ESSAY

Why Most Published Research Findings Are False

John P. A. Ioannidis

Published: August 30, 2005 • <http://dx.doi.org/10.1371/journal.pmed.0020124>

Article	Authors	Metrics	Comments	Related Content
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64,355 Save 2,253 Citation

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Abstract

Modeling the Framework for False Positive

Abstract

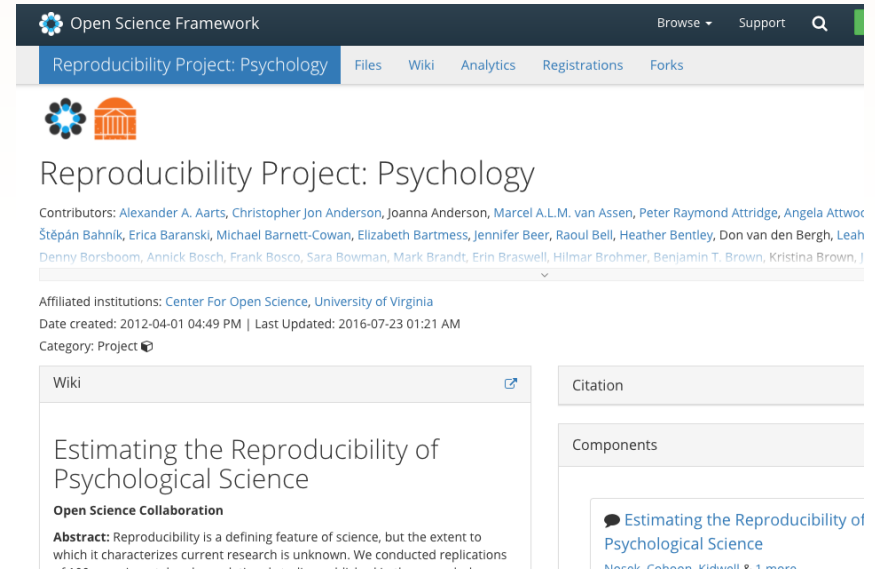
“Simulations show that for most study designs and settings, it is more likely for a research claim to be false than true.”

<http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0020124>

Reproducibility project

Conducted replications of 100 experimental and correlational studies published in three psychology journals using high-powered designs and original materials when available.

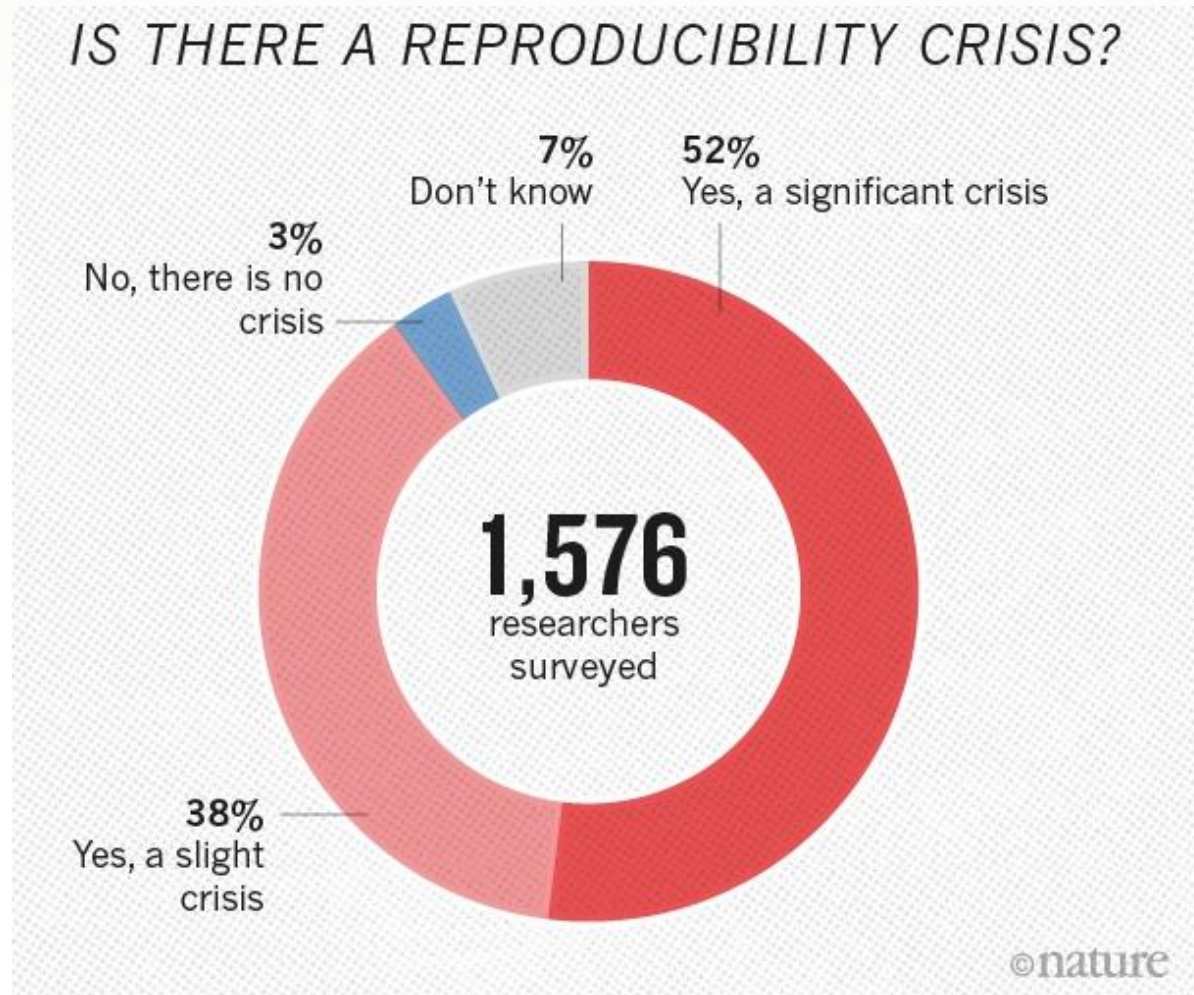
- Replication effects = half the magnitude of original effects (substantial decline)
- 97% of original studies had significant results
- 36% of replications had significant results



The screenshot shows the OSF project page for 'Reproducibility Project: Psychology'. The header includes the OSF logo and navigation links: Browse, Support, and a search icon. Below the header, the project title 'Reproducibility Project: Psychology' is displayed with a sub-header 'Reproducibility Project: Psychology'. A list of contributors is provided, including Alexander A. Aarts, Christopher Jon Anderson, Joanna Anderson, Marcel A.L.M. van Assen, Peter Raymond Attridge, Angela Attwool, Štěpán Bahník, Erica Baranski, Michael Barnett-Cowan, Elizabeth Bartmess, Jennifer Beer, Raoul Bell, Heather Bentley, Don van den Bergh, Leah Denny Borsboom, Annick Bosch, Frank Bosco, Sara Bowman, Mark Brandt, Erin Braswell, Hilmar Brohmer, Benjamin T. Brown, Kristina Brown, and others. The page also shows the affiliated institutions (Center For Open Science, University of Virginia), the date created (2012-04-01 04:49 PM), the last updated date (2016-07-23 01:21 AM), and the category (Project). A 'Wiki' tab is active, showing the title 'Estimating the Reproducibility of Psychological Science' and an abstract: 'Reproducibility is a defining feature of science, but the extent to which it characterizes current research is unknown. We conducted replications...'. A 'Citation' tab is also visible, showing the citation information for the project.

<https://osf.io/ezcuuj/>

Crisis?



Nature, **533**, 452–454 (26 May 2016) doi:10.1038/533452a
<http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970>

Interest at highest level

CC credit Jim Trodel



- Research Integrity Enquiry
 - UK Government Science and Technology Committee - Submissions closed 10 March 2017
 - <https://www.parliament.uk/business/committees/committees-a-z/commons-select/science-and-technology-committee/inquiries/parliament-2015/inquiry6/>

Time for a change



The whole outdated enterprise is kept alive for one main reason: the fact that employers and funders of researchers assess researchers primarily by where they publish. It's extraordinary to me and many others that the employers, mainly universities, outsource such an important function to an arbitrary and corrupt system.

‘Richard Smith: Another step towards the post-journal world’ BMJ blog, 12 Jul, 16

<http://blogs.bmj.com/bmj/2016/07/12/richard-smith-another-step-towards-the-post-journal-world/>

Solution – Open Science

- We need to change the way we reward researchers by distributing the dissemination of outputs across the research lifecycle
- We will hear more about reproducibility and open science later today
- I will be talking now about the challenges of implementing Open Science in institutions

Resources if you want to know more

- *The Case for Open Research* – series of blogs July & August 2016
 - https://unlockingresearch.blog.lib.cam.ac.uk/?page_id=2#OpenResearch
- My talk about the open argument
 - “Reward, reproducibility and recognition in research - the case for going Open” Eleventh Annual Munin Conference on Scholarly Publishing, 21 November 2016
 - Slides: <http://www.slideshare.net/DannyKingsley/reward-reproducibility-and-recognition-in-research-the-case-forgoing-open>
 - Video: <http://septentrio.uit.no/index.php/SCS/article/view/4036>
- Useful slides and list of references
 - "Fake Results": The Reproducibility Crisis in Research and Open Science Solutions
http://digitalcommons.uri.edu/lib_ts_presentations/48/

The challenges of implementing Open Science



It is difficult to get ANY change in research institutions

We need institutions to play along

- “Improving the quality of research requires change at the institutional level”
 - Smaldino PE, McElreath R. 2016 The natural selection of bad science. R. Soc. open sci.3: 160384.
<http://dx.doi.org/10.1098/rsos.160384>
- “Universities and research institutes should play a major role in supporting an open data culture”
 - Science as an open enterprise The Royal Society Science Policy Centre report 02/12 Issued: June 2012
DES24782<https://royalsociety.org/~media/policy/projects/sape/2012-06-20-saoe.pdf>

Resistance

- Generally institutions are reluctant to step up, partly because of the governance structure.
- **The nature of research itself is changing profoundly.** This includes extraordinary dependence on data, and complexity requiring intermediate steps of data visualisation. **These eResearch techniques have been growing rapidly, and in a way that may not be understood or well led by senior administrators.**
 - “Openness, integrity & supporting researchers”
Emeritus Professor Tom Cochrane
<https://unlockingresearch.blog.lib.cam.ac.uk/?p=307>

Governance

- These are big changes that need to be pushed through the system.
- This is particularly complicated at Cambridge



The Regent House and the Senate



The Regent House is the governing body of the University, made up of around 5,500 University academics, officers and senior College members. *The Senate*, comprising holders of a University MA degree or higher and members of the Regent House, is principally tasked with electing the Chancellor.

[Read More >](#)

Change is S-L-O-W

Academics at the 800-year-old institution have a unique role in the running of their university and, along with owning their own intellectual property rights, members of the university's Regent House can lobby for a vote on all amendments and additions to the university's governing rules.

The ancient system of governance has come under attack in the past for being too cumbersome, and ill-designed for the 21st century. The university has come under pressure from government to reform its system of governance and intellectual property rights.

“Dons clash with Cambridge over intellectual rights”, The Guardian, 2005

<https://www.theguardian.com/education/2005/nov/22/highereducation.businessofresearch>

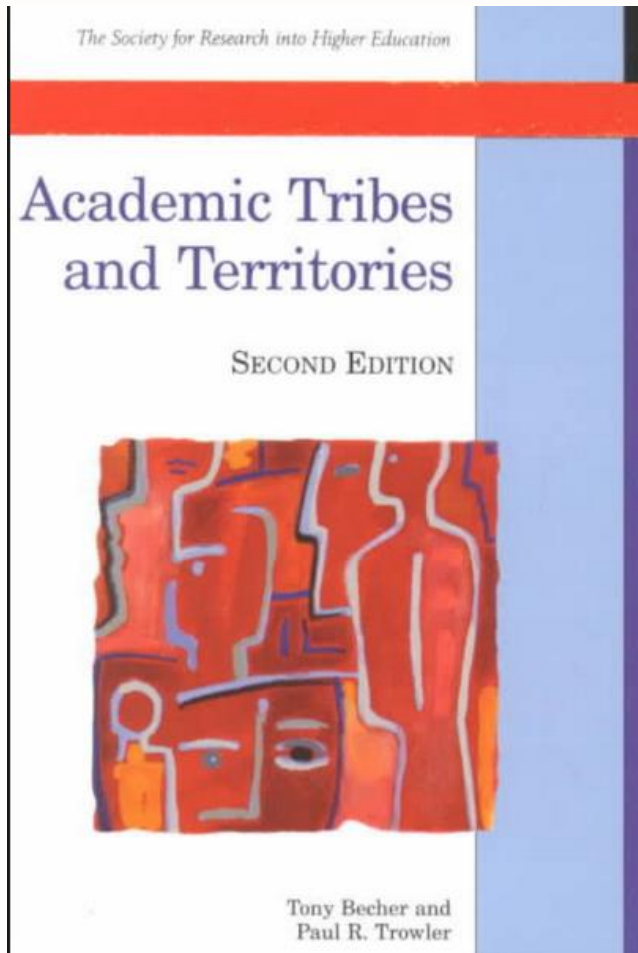
Esteem economy

Chris Potter / CC BY



- Academia is an unusual economy – no payment for publishing, instead esteem
- The people and institutions who have succeeded have done so within the current ‘economy’
- If the way research is rewarded changes, then the winners might not be winners any more

Academia is tribal



- 'Invisible colleges' relate to the community people have with their discipline.
- This stuff sounds scary! If people have not experienced things themselves they don't believe it

A whole other tribal system

<http://www.cam.ac.uk/for-staff/features/colleges-and-university-a-complex-relationship>

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For staff

Features

Colleges and University: a complex relationship

Colleges and University: a complex relationship



Published

31 Jan 2013

While many of us realise there is a complex relationship between the Colleges and the wider University, the precise nature of the connection is not always understood, even by staff or current students. Here, we offer staff a primer.

Cambridge is a multifaceted, multi-layered structure that has developed organically over eight centuries. Perhaps the easiest way of understanding it is to look at the functions of the College and University, how they differ and how they overlap. Let's start at the beginning of the process, with admissions.

Admissions

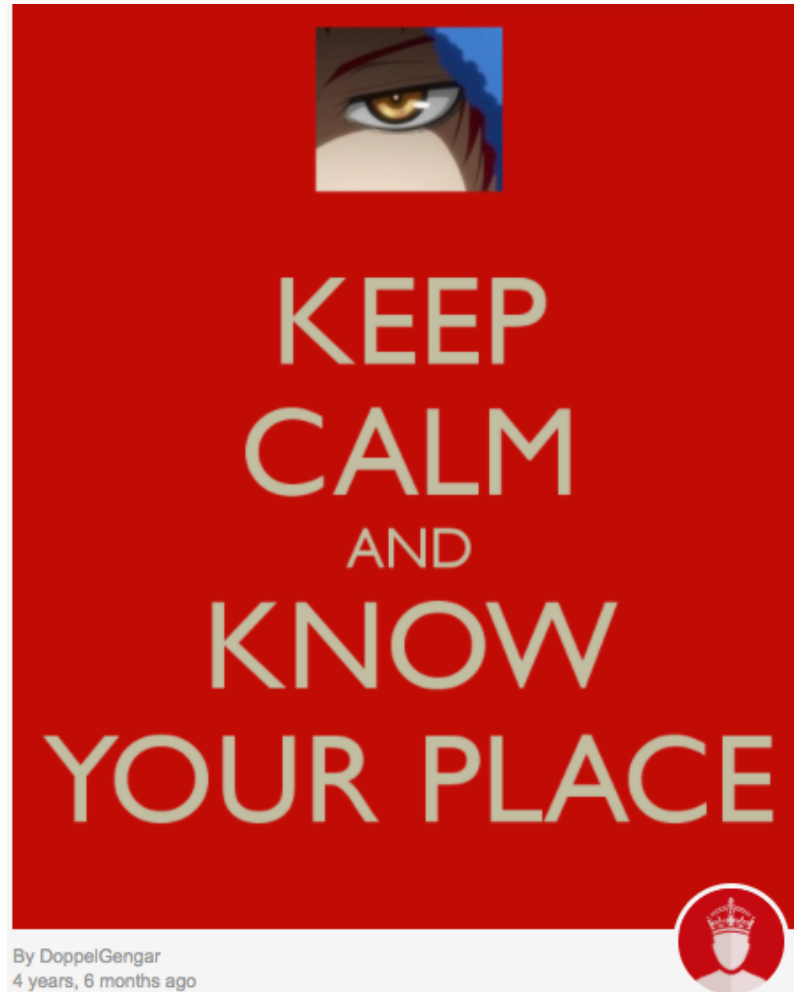
Cambridge Colleges are free to select their own undergraduates for admission, subject to some minimum educational requirements set by the University. Unlike other universities, where Faculties and Departments select undergraduates for admission, in Cambridge this responsibility is held within the Colleges – a recognition of their distinctive combination of

“The collegiate structure is central to Cambridge's success.”

The people who sit on all the committees and make decisions are academics. While they hold these posts, they are still individuals whose research is based in a particular discipline.

Is it our 'place'?

<http://www.keepcalm-o-matic.co.uk/p/keep-calm-and-know-your-place-3/>



What is Scholarly Communication?

- Association of College and Research Libraries (ACRL) 2003 definition:
 - *"the system through which research and other scholarly writings are created, evaluated for quality, disseminated to the scholarly community, and preserved for future use. The system includes both formal means of communication, such as publication in peer-reviewed journals, and informal channels, such as electronic listservs."*
 - <http://acrl.libguides.com/scholcomm/toolkit/>
- Often Scholarly Communication services are run out of libraries

What is the role of the library?

- Discussion at RLUK2017 conference.
 - Are librarians *support staff* or *research partners*?
 - Should we be collaborating and partnering with the research community?
 - Should we be leading the University over these issues?
- See: “Become part of the research process – observations from RLUK2017”
 - <https://unlockingresearch.blog.lib.cam.ac.uk/>

Yes we should be driving this agenda

- Scholarly Communication takes a 'meta' view of the research ecosystem
- Disciplinary differences mean individual researchers come to the table with very specific perspectives
- They all think they are right
- Very few understand that things are different in other disciplines – and that these are as valid as their own
- Scholarly Communication is a research discipline of its own. This is not recognised by most academics!

And then there is the administration



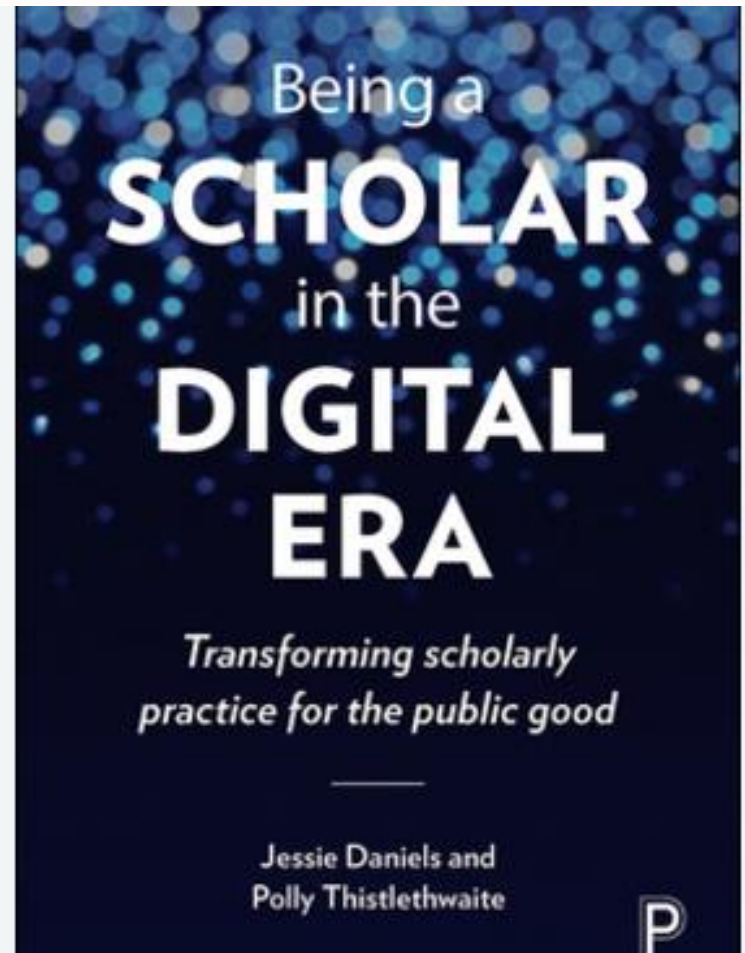
You Tube Cambridge in Numbers

[https://www.youtube.com/watch?v=FwZsb2Ck](https://www.youtube.com/watch?v=FwZsb2CkMsM)

[MsM](https://www.youtube.com/watch?v=FwZsb2CkMsM)

This is not easy

- “Academic administrators that I’ve talked to are genuinely confused about how to update legacy tenure and promotion systems for the digital era. This book is an attempt to help make sense of all this.”
 - <https://www.insidehighered.com/news/2016/10/06/qa-authors-book-scholarship-digital-era>



So what are the problems?

- Lack of perceived need from the academic community for scholarly communication support and advice
- Questions about whether it is appropriate for libraries to be driving this agenda through the institution
- Institutions are set up to maintain the status quo
- Researchers think they know all about how the research ecosystem works. (They mostly don't.)
 - See: “The value of embracing unknown unknowns”
<https://unlockingresearch.blog.lib.cam.ac.uk/?p=594>

Start at the beginning not the end

080409 revolving door-1 by
Dan4th Nicholas CC-BY 2.0



- Making data and other non traditional research outputs available is difficult
- We need to train our research community in how to research openly
 - “Is Democracy the Right System? Collaborative Approaches to Building an Engaged RDM Community” (2017)
<http://biorxiv.org/content/early/2017/01/28/103895>

A lot of persuading!!

- Academics
 - don't believe you
 - don't necessarily think they need you
- Institutions
 - not always supportive
 - designed not to change
- Libraries
 - don't think this is their role
 - having something of a crisis of purpose as we move to an open world

Some institutions are standing up

Stand out from the crowd by Steven
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Leading the way

- Indiana University-Purdue University Indianapolis (IUPUI) –
 - Have included open access as a value in promotion and tenure guidelines
(2016)<http://crln.acrl.org/content/77/7/322.full>
- University of Liege
 - “[The university] linked internal assessment to the scientific output stored in {repository} ORBi. Those applying for promotion have no choice but to file all their publications in full text.” (2011)
<http://openaccess.eprints.org/index.php?/archives/853-The-Liege-ORBi-model-Mandatory-policy-without-rights-retention-but-linked-to-assessment-procedures.html>

Research underway

- OOO Canada Research Network “Motivating Open Practices Through Faculty Review and Promotion - 25 October 2016
 - http://www.oocanada.ca/motivating_open_practices_rpt
- NIH “Including Preprints and Interim Research Products in NIH Applications and Reports” – 6 October 2016
 - <https://grants.nih.gov/grants/guide/notice-files/NOT-OD-17-006.html>
- Report: *Next-generation metrics: Responsible metrics and evaluation for open science.*
 - <https://ec.europa.eu/research/openscience/pdf/report.pdf>

Open can mean success

- McGill University's Montreal Neurological Institute and Hospital, Canada
 - First academic institution to adopt an open science approach
 - Institute has received considerable donations in the wake of this decision
 - **\$20 million in January 2017** to establish the Tanenbaum Open Science Institute
<https://www.mcgill.ca/newsroom/channels/news/mcgill-university-announces-transformative-20-million-donation-montreal-neurological-institute-and-264838>

Lots of work to be done



Image by Danny Kingsley

Questions/Discussion

Thanks!

Dr Danny Kingsley

Head of Scholarly Communication

University of Cambridge

@dannykay68