Open access and open science

Journée de la recherche HEP-VS

Marc Robinson-Rechavi

@marc_rr

@marcrr@ecoevo.social

UNIL | Université de Lausanne
Faculté de biologie et de médecine

SIB Swiss Institute of Bioinformatics

A note on references in this talk

To avoid highlighting journal titles, each reference will be

First author – year – keyword

with a unique result in Google Scholar

e.g. " Liu 2020 positive selection"

The moral case for Open Access

Winners of Open Access

researchers
text mining
start-ups & SMEs
medical doctors
patients
journalists
teachers
amateur scientists
the public (GMOs, vaccines, climate...)

Losers of Open Access

Commercial publishers

Medium rich labs if APC Gold OA

- too rich to waive publication costs
- too poor to pay for all papers

Researchers in low-income countries if no waivers

Some scientific societies

- share profits of publishers

From talk to action

The start: the Public Library of Science

Open Letter

In 2000 Harold Varmus, Patrick Brown, and Michael Eisen circulated an open letter that would eventually be signed by 34,000 scientists from 180 countries and spark the foundation for PLOS

"

We support the establishment of an online public library that would provide the full contents of the published record of research and scholarly discourse in medicine and the life sciences in a freely accessible, fully searchable, interlinked form. Establishment of this public library would vastly increase the accessibility and utility of the scientific literature, enhance scientific productivity, and catalyze integration of the disparate communities of knowledge and ideas in biomedical sciences.

We recognize that the publishers of our scientific journals have a legitimate right to a fair financial return for their role in scientific communication. We believe, however, that the permanent, archival record of scientific research and ideas should neither be owned nor controlled by publishers, but should belong to the public and should be freely available through an international online public library.

To encourage the publishers of our journals to support this endeavor, we pledge that, beginning in September 2001, we will publish in, edit or review for, and personally subscribe to only those scholarly and scientific journals that have agreed to grant unrestricted free distribution rights to any and all original research reports that they have published, through PubMed Central and similar online public resources, within 6 months of their initial publication date.

Harold Varmus, Patrick Brown, and Michael Eisen
PLOS co-founders

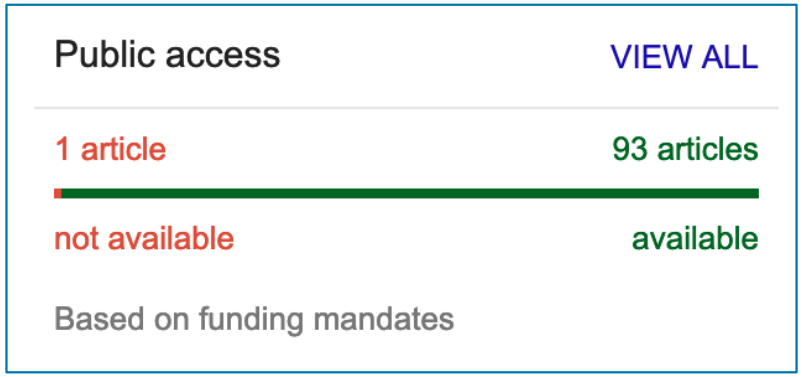
Led to PLOS

I signed on 5 Jan 2001

https://plos.org/open-letter/

Personal commitment to open access

- All papers open access since 2010
- Preprinting since 2014
- Editorial boards *PLOS One* then *PLOS Computational Biology*
- 2018: resigned from all editorial roles at for-profit publishers
- 2020: *Review Commons* advisory board
- 2021: *bioRxiv* affiliate



https://tinyurl.com/mrrxiv

Big Deals Open Access – Swissuniversities

1st round of Big Deal negotiations 2018-2021

2nd round of Big Deal negotiations 2022-2025

https://www.swissuniversities.ch/en/themen/digitalisierung/open-access/publisher-negotiations

Read & Publish pricing

Publishing fee
Based on the publishing output of an institution's corresponding authors during the last full year.

+

Reading fee
Covers the cost of giving an institution perpetual access rights to all content behind the paywall (the articles that aren't published OA).

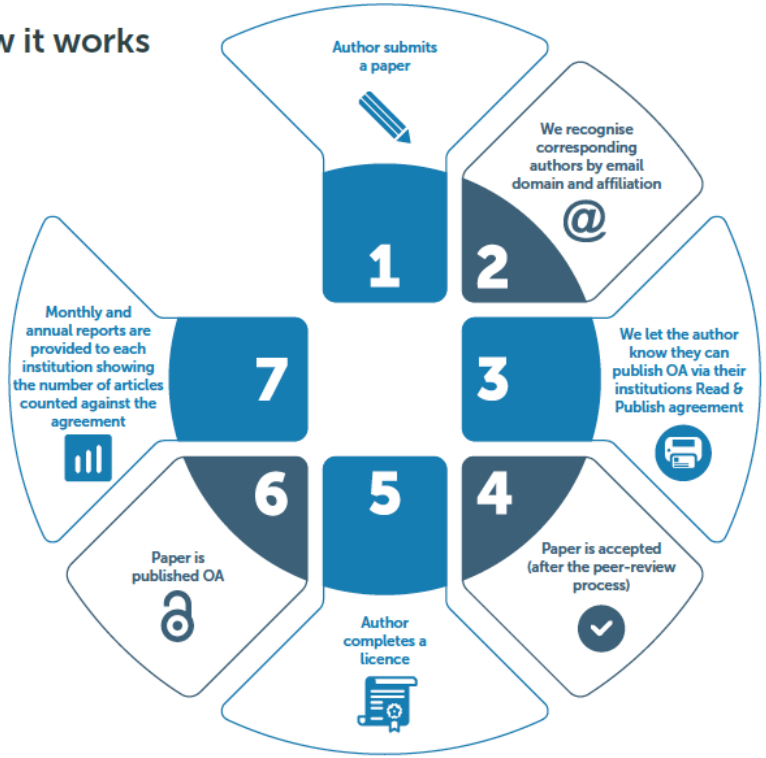
=

Total price
The combined publishing and reading fee is the price an institution will pay. Please note this will vary between institutions as it is based on publishing output.

−

Transition discount
We have built in a discount variable to support the transition from a subscription model to a publishing fee based model. This discount will be applied for a set period of time, which will be outlined in the agreement.

How it works



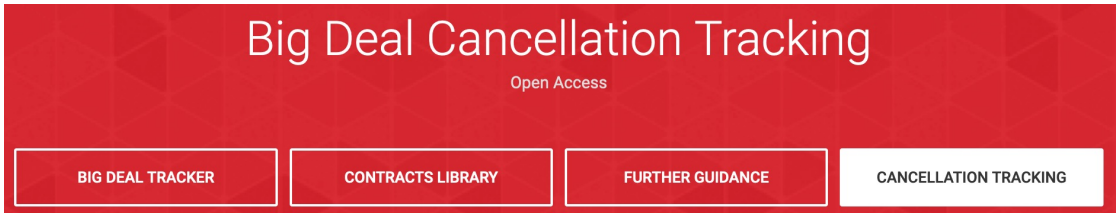
Negotiation aims

Core provision	• Read access rights to journal titles requested by mandating parties Continuing read access to licensed titles after termination of the agreement (post cancellation rights).
	• Open Access publishing rights for all journal publications, i.e. full publisher portfolio[2] including prestigious high impact titles (e.g. Nature, Cell, Lancet, etc.) and Gold OA titles and brands (e.g. BioMed Central).
Pricing	• Cost neutrality on national level for entire publisher journal portfolio, based on existing spend for transformative agreements, additional licences (Nature journals) and Gold OA. Inflation may have to be accounted for. • Cost control mechanism for Gold Open Access, mandating institutions define their level of central investment.
	• Price Model for transformative part (Hybrid Open Access) which includes a price point(s) for reading and publishing (Read fee, Publishing fee, or Publish and Read (PAR) fee). • Price Model for publication in Gold Open Access Journals which allows for central and decentral payment of Gold Open Access Article Processing Charges (APCs).
Legal	• CC BY licence required as default solution for Open Access publishing, other CC licence types upon request from the author.
	• Transformative agreements to be published on conclusion with pricing information on national level only.
Workflow	• Institutional and author workflows to follow ESAC-recommendations. If technically feasible for publisher, access via application programming interfaces (API) to resulting publications and publication metadata.

No deal is a possibility

January-June 2020 no deal with Springer.

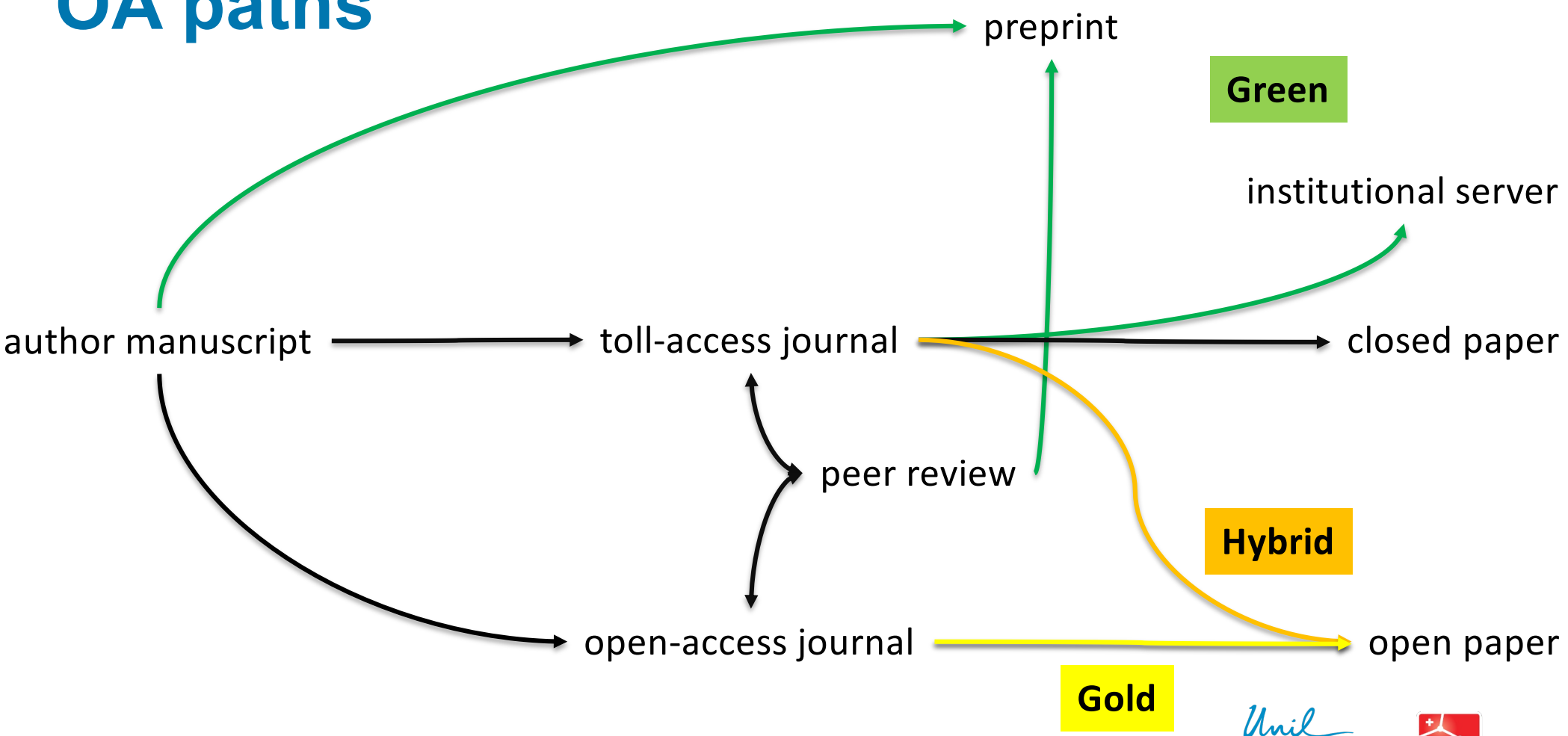
Since January 2022 no deal with OUP.



https://sparcopen.org/our-work/big-deal-cancellation-tracking/

Paths to open access

OA paths


preprint
Green
institutional server
author manuscript
toll-access journal
closed paper
peer review
Hybrid
open-access journal
open paper
Gold

Preprints

Principle of preprints

Manuscripts available as early as possible, before journal publication

DOI, publication date

- stable, citable

Dedicated servers:

- arXiv.org in physics, maths, CS... **since 1991**
- biorXiv.org in biology in 2013
- **EdArXiv, PsAarXiv**, MedArXiv, ChemrXiv, paleorXiv, engrXiv, SocArXiv, AgriXiv, EarthArXiv, PhilArchive, ESSOAr, AfricArxiv...
- Mixed model preprint + OA journal: F1000, eLife

Advantages of preprints

You the researcher chose when to publish

Free (as in beer) for authors and readers

Guillaume Bourque @guilbourque 2d

Can I just say that I think @biorxivpreprint is the greatest thing since sliced bread? Within a week, lots of feedback and even a new collaboration! So much better than waiting for months for 2-3 reviews that are sometimes uneven in terms of quality...

> **Guillaume Bourque** @guilbourque
> Linear genomes are so 2000s... Say hello to graph genomes for epigenomic data! Check out this ChIP-seq peak that would have been missed otherwise...
>
> Very excited about our new paper on this:
> biorxiv.org/content/10.110...
>
> 

Green Open Access with preprints

Preprint then publication in toll-access journal

But final version might differ

But copyright to editor

Not convinced?

Some practical points

Updates possible with versioning

Supplementary materials can be included

and probably should

At publication, link to journal version

Direct submission preprint to journal (sometimes)

New Results

1 comment

Adaptive evolution of animal proteins over development: support for the Darwin selection opportunity hypothesis of Evo-Devo

Jialin Liu, Marc Robinson-Rechavi

doi: https://doi.org/10.1101/161711

Now published in *Molecular Biology and Evolution* doi: 10.1093/molbev/msy175

Actually a bit worried?

But scooping?

Results public with official date stamp

Yes ideas can be used without citation

- Like for papers
- Not legally forbidden, but poor practice

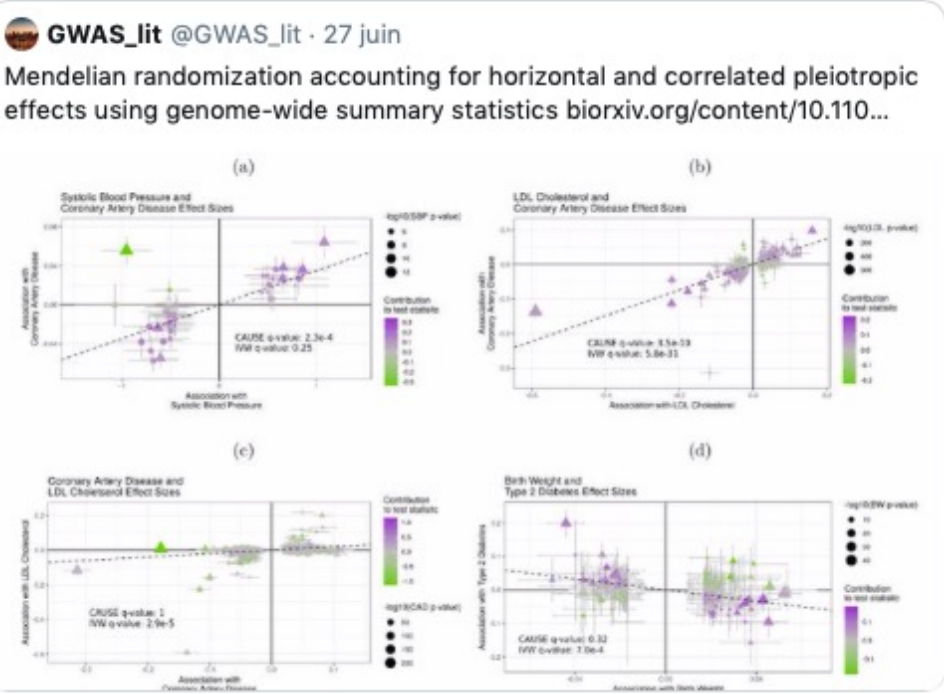
Risk exists during anonymous peer review

You are in control

Zoltan Kutalik
@zkutalik

...and we have just been scooped! Needless to say, it's a really great idea. :)

Traduire le Tweet



GWAS_lit @GWAS_lit · 27 juin

Mendelian randomization accounting for horizontal and correlated pleiotropic effects using genome-wide summary statistics biorxiv.org/content/10.110...

Highly competitive fields use preprints

- Human genetics GTEx consortium: 32 in biorXiv
- 22'028 "Covid19" in medRxiv
- Pharmaceutical industry uses preprints
  - Roche + Sanofi + Novartis = 56% (Subramanian et al 2021 industry preprints)

Other concerns

Will journals reject because of preprint?

- Most accept
- Others can change policy when demands

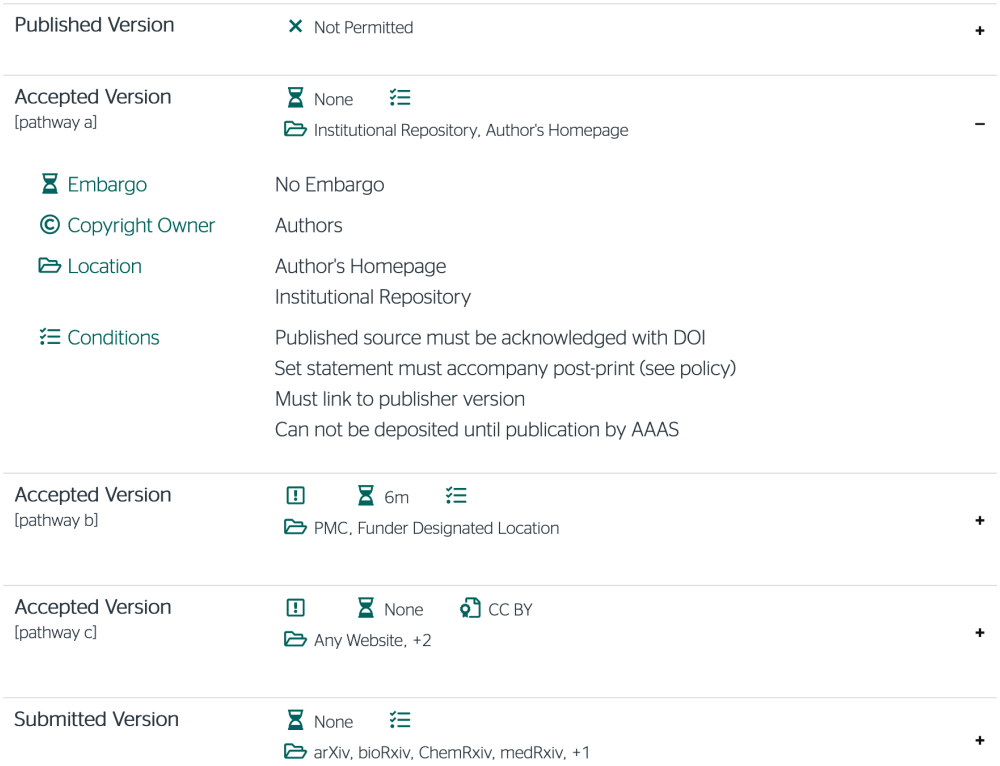
Less quality?

- Do you want to attach your name publicly to poor work?

Makes coordinated submissions easier

Sherpa Romeo publisher policies

e.g. Science



Published Version	✕ Not Permitted	+
Accepted Version [pathway a]	None Institutional Repository, Author's Homepage	−
Embargo	No Embargo	
Copyright Owner	Authors	
Location	Author's Homepage Institutional Repository	
Conditions	Published source must be acknowledged with DOI Set statement must accompany post-print (see policy) Must link to publisher version Can not be deposited until publication by AAAS	
Accepted Version [pathway b]	6m PMC, Funder Designated Location	+
Accepted Version [pathway c]	None CC BY Any Website, +2	+
Submitted Version	None arXiv, bioRxiv, ChemRxiv, medRxiv, +1	+

https://v2.sherpa.ac.uk/id/publication/11114?template=romeo

The preprint, the oak tree, and the blue bird

1

New Results

Low Rate of Somatic Mutations in a Long-Lived Oak Tree

Namrata Sarkar, Emanuel Schmid-Siegert, Christian Iseli, Sandra Calderon, Caroline Gouhier-Darimont, Jacqueline Chrast, Pietro Cattaneo, Frederic Schutz, Laurent Farinelli, Marco Pagni, Michel Schneider, Jeremie Voumard, Michel Jaboyedoff, Christian Fankhauser, Christian S. Hardtke, Laurent Keller, John R. Pannell, Alexandre Reymond, Marc Robinson-Rechavi, Ioannis Xenarios, Philippe Reymond

doi: https://doi.org/10.1101/149203

Abstract

Because plants do not possess a proper germline, deleterious somatic mutations can be passed to gametes and a large number of cell divisions separating zygote from gamete formation in long-lived plants may lead to many mutations. We sequenced the genome of two terminal branches of a 234-year-old oak tree and found few fixed somatic single-nucleotide variants (SNVs), whose sequential appearance in the tree could be traced along nested sectors of younger branches. Our data suggest that stem cells of shoot meristems are robustly protected from accumulation of mutations in trees.

1

2

Cold Spring Harbor Laboratory

bioRxiv beta

THE PREPRINT SERVER FOR BIOLOGY

HOME | A

Search

New Results

Low Rate of Somatic Mutations in a Long-Lived Oak Tree

Namrata Sarkar, Emanuel Schmid-Siegert, Christian Iseli, Sandra Calderon, Caroline Gouhier-Darimont, Jacqueline Chrast, Pietro Cattaneo, Frederic Schutz, Laurent Farinelli, Marco Pagni, Michel Schneider, Jeremie Voumard, Michel Jaboyedoff, Christian Fankhauser, Christian S. Hardtke, Laurent Keller, John R. Pannell, Alexandre Re

doi: https://do

This article is a p

Article usage: June 2017 to November 2017

Show by month	Abstract	Pdf
otal	7,340	2,164

Abstract

Abstract

Because
be passe
gamete f
genome
somatic
could be
stem cell
in trees.

255

See more details

Picked up by **2** news outlets
Blogged by **2**
Tweeted by **352**
On **5** Facebook pages
Mentioned in **1** Wikipedia entries

14 readers on Mendeley

Blog posts linking to this article:

the Node, 05 Jul 2017

Our latest monthly trawl for developmental biology (and other cool) preprints. See last year's introductory post for background…

The Daily Scan from GenomeWeb, 21 Jun 2017

Tweets referencing this article:

Casey Bergman
@caseybergman

@mike_schatz @notSoJunkDNA @ewanbirney @embl @wolfgangkhuber @Eileen_Furlong Indeed, something like this? https://t.co/InppB7cyNp

22 Sep 2017

Richard Cronn
@rcronn1

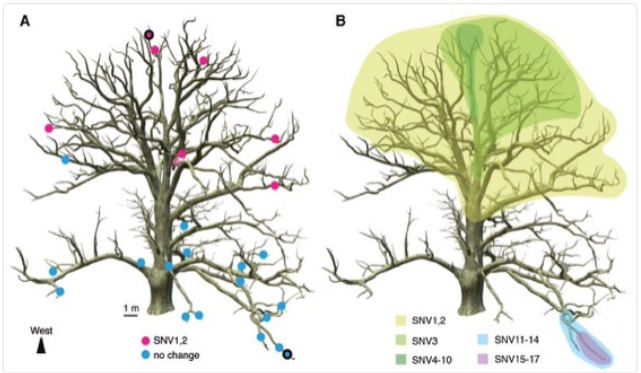
RT @marc_rr: Fun cool science: a 234 year old oak tree has few somatic mutations, and those we find perfectly follow tree shape. https://t.…

21 Aug 2017

Marc RobinsonRechavi
@marc_rr

Fun cool science: a 234 year old oak tree has few somatic mutations, and those we find perfectly follow tree shape. twitter.com/c_s_hardtke/st…

À l'origine en anglais



17:11 - 13 juin 2017

208 Retweets **290** J'aime

6 208 290

1

3

2

Cold Spring Harbor Laboratory

bioRxiv beta

THE PREPRINT SERVER FOR BIOLOGY

New Results

Low Rate of Somatic Mutations in a Long-Lived Oak Tree

Namrata Sarkar, Emanuel Schmid-Siegert, Christian Iseli, Sandra Calderon, Caroline Gouhier Jacqueline Chrast, Pietro Cattaneo, Frederic Schutz, Laurent Farinelli, Marco Pagni, Michel Sc Jeremie Volmard, Michel Jaboyedoff, Christian Fankhauser, Christian S. Hardtke, Laurent Kel Alexandre R

doi: https://do

This article is a p

Article usage: June 201 to November 2017

Show by month | Abstract

Total | 7,340

Abstract

Abstract

Because
be passe
gamete f
genome
somatic
could be
stem cell
in trees.

255

See more details

Picked up by **2** news outlets
Blogged by **2**
Tweeted by **352**
On **5** Facebook pages
Mentioned in **1** Wikipedia entries

14 readers on Mendeley

Blog posts linking to this article:

the Node, 05 Jul 2017

Our latest monthly trawl for developmental biology (and other cool) preprints. S
post for background…

The Daily Scan from GenomeWeb, 21 Jun 2017

Tweets referencing this article:

Casey Bergman
@caseybergman

@mike_schatz @notSoJunkDNA @ewanbirney @embl @wolfgangkhub
Indeed, something like this? https://t.co/InppB7cyNp

22 Sep 2017

Richard Cronn
@rcronn1

RT @marc_rr: Fun cool science: a 234 year old oak tree has few somatic
find perfectly follow tree shape. https://t.…

21 Aug 2017

HOME | /

Search

nature International weekly journal of science

Home | News & Comment | Research | Careers & Jobs | Current Issue | Archive | Audio & Video | For Au

Archive > Volume 546 > Issue 7659 > News > Article

NATURE | NEWS

Ancient oak's youthful genome surprises biologists

DNA of 234-year-old tree has few mutations, giving weight to idea that plants protect their stem cells.

Heidi Ledford

19 June 2017 (preprint 13 June)

PDF | Rights & Permissions

Abaddon1337/CC BY-SA 4.0

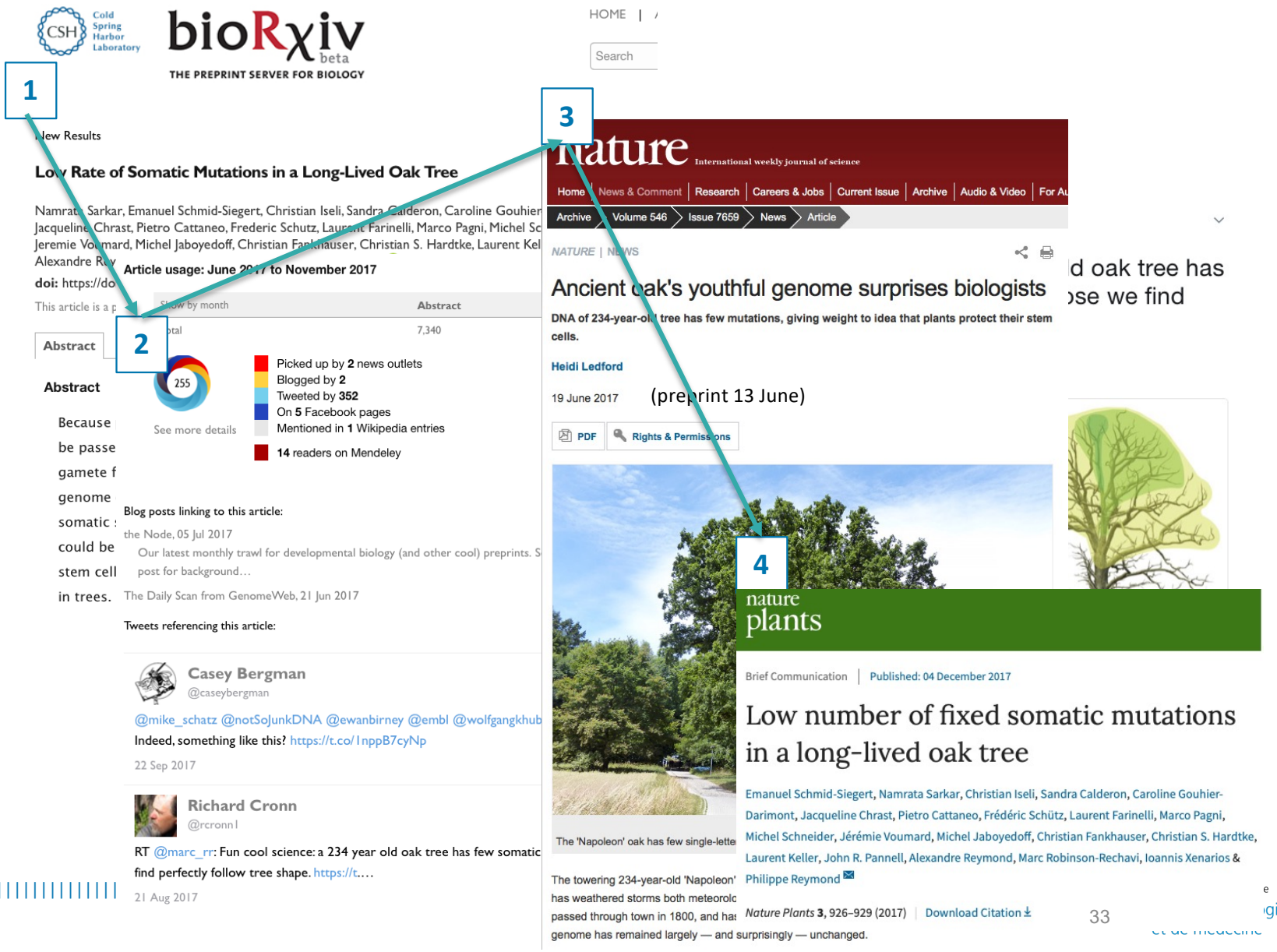
The 'Napoleon' oak has few single-letter mutations in its genome.

The towering 234-year-old 'Napoleon' oak on the campus of the University of Lausanne in Switzerland has weathered storms both meteorological and political. The tree was young when Napoleon's troops passed through town in 1800, and has grown into a majestic city landmark. But through it all, its genome has remained largely — and surprisingly — unchanged.

d oak tree has
ose we find

UNIL | Université de Lausanne
Faculté de biologie et de médecine

SIB Swiss Institute of Bioinformatics



Swiss Institute of Bioinformatics

Make your life simpler

More open, less stress

Easy to provide reference for a talk / poster

Lab members don't worry about sharing

OK to share manuscript you're reviewing

SNSF, EU, and other funders accept preprints

Preprints used in "Current state of own research" in October 2021 SNSF application:

- Djordjevic et al. *Dynamics of sex-biased gene expression over development in the stick insect Timema californicum*. bioRxiv. 2021; 2021.01.23.427895
- Jaron et al. *Convergent consequences of parthenogenesis on stick insect genomes*. bioRxiv. 2020; 2020.11.20.391540
- Laloum & Robinson-Rechavi. *Why is the expression of so many genes rhythmic? Energetic cost explains protein rhythmicity and expression noise control explains mRNA rhythmicity*. bioRxiv. 2021; 2021.04.15.439944

Open science, beyond OA

Different open for different stuff

- Open access
- Open source
- Open data

Open: **free** as in beer and **free** as in freedom

Creative Commons Licenses

License name	Abbreviation	Icon	Attribution required	Allows remix culture	Allows commercial use	Allows Free Cultural Works	Meets the OKF 'Open Definition'
Attribution	BY		Yes	Yes	Yes	Yes	Yes
Attribution-ShareAlike	BY-SA		Yes	Yes	Yes	Yes	Yes
Attribution-NonCommercial	BY-NC		Yes	Yes	No	No	No
Attribution-NonCommercial-ShareAlike	BY-NC-SA		Yes	Yes	No	No	No
Attribution-NoDerivatives	BY-ND		Yes	No	Yes	No	No
Attribution-NonCommercial-NoDerivatives	BY-NC-ND		Yes	No	No	No	No
"No Rights Reserved"	CC0		No	Yes	Yes	Yes	Yes

https://en.wikipedia.org/wiki/Creative_Commons_license#Four_rights

FAIR

To be Findable:
F1. (meta)data are assigned a globally unique and persistent identifier
F2. data are described with rich metadata (defined by R1 below)
F3. metadata clearly and explicitly include the identifier of the data it describes
F4. (meta)data are registered or indexed in a searchable resource

To be Accessible:
A1. (meta)data are retrievable by their identifier using a standardized communications protocol
A1.1 the protocol is open, free, and universally implementable
A1.2 the protocol allows for an authentication and authorization procedure, where necessary
A2. metadata are accessible, even when the data are no longer available

To be Interoperable:
I1. (meta)data use a formal, accessible, shared, and broadly applicable language for knowledge representation.
I2. (meta)data use vocabularies that follow FAIR principles
I3. (meta)data include qualified references to other (meta)data

To be Reusable:
R1. meta(data) are richly described with a plurality of accurate and relevant attributes
R1.1. (meta)data are released with a clear and accessible data usage license
R1.2. (meta)data are associated with detailed provenance
R1.3. (meta)data meet domain-relevant community standards

"as open as possible and as closed as necessary"
H2020 guidelines

Garcia et al 2020 FAIR training

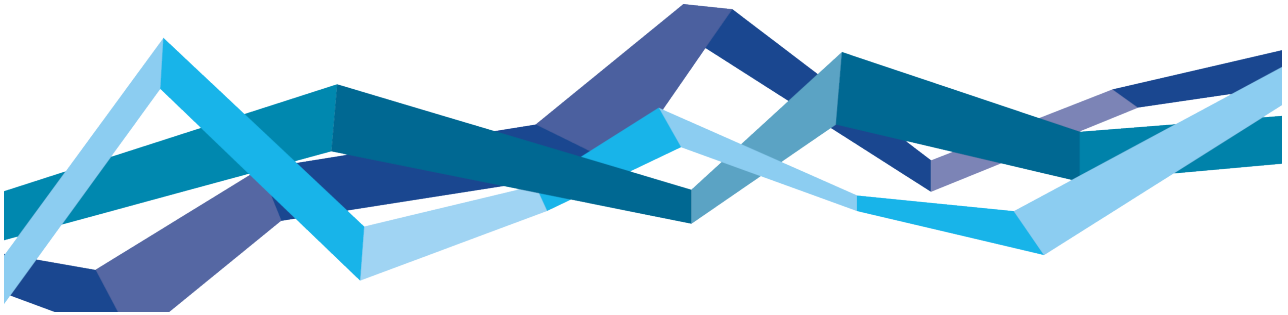
Wilkinson et al 2016 stewardship

Research evaluation is adapting

Agreement signed by Swissuniversities and SNSF

AGREEMENT ON REFORMING RESEARCH ASSESSMENT

20 July 2022



UNIL | Université de Lausanne
Faculté de biologie et de médecine

SIB Swiss Institute of Bioinformatics

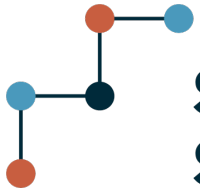
Evaluation criteria

- Focus research assessment criteria on quality.
  - Reward the originality of ideas, the professional research conduct, and results beyond the state-of-the-art.
- Consider also the full range of research outputs
  - such as scientific publications, data, software, models, methods, theories, algorithms, protocols, workflows, exhibitions, strategies, policy contributions, etc.
- Abandon inappropriate uses in research assessment of journal- and publication-based metrics, in particular inappropriate uses of Journal Impact Factor (JIF) and h-index

SNSF: Major scientific achievements

Most important scientific achievements.

In addition to scientific publications, any other relevant information, such as a knowledge transfer event, a software, database, prototype, etc. may be provided here. Describe for each achievement the applicant's specific contribution and the overall impact of the work.



Swiss National Science Foundation

"When will ‘open science’ become simply ‘science’?"

Watson 2015 simply