

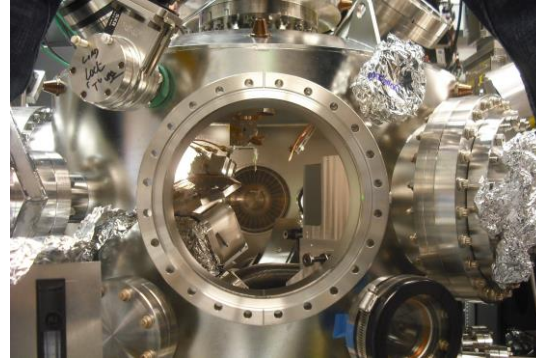
Open scholarly metadata

Dr. Teresa Kubacka

ETH Library

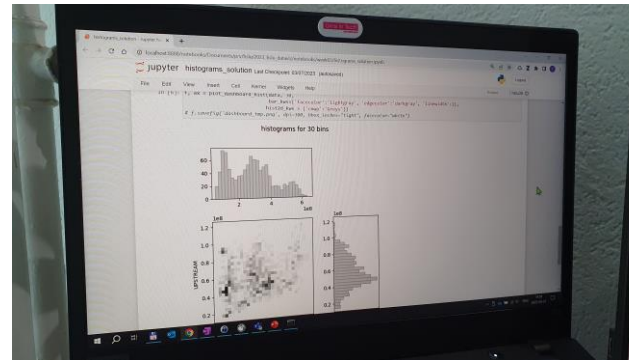
Open Data Forum, 16.06.2023

Data scientist at a library?



I belong to a group of people who studied physics...

...but now do something else.



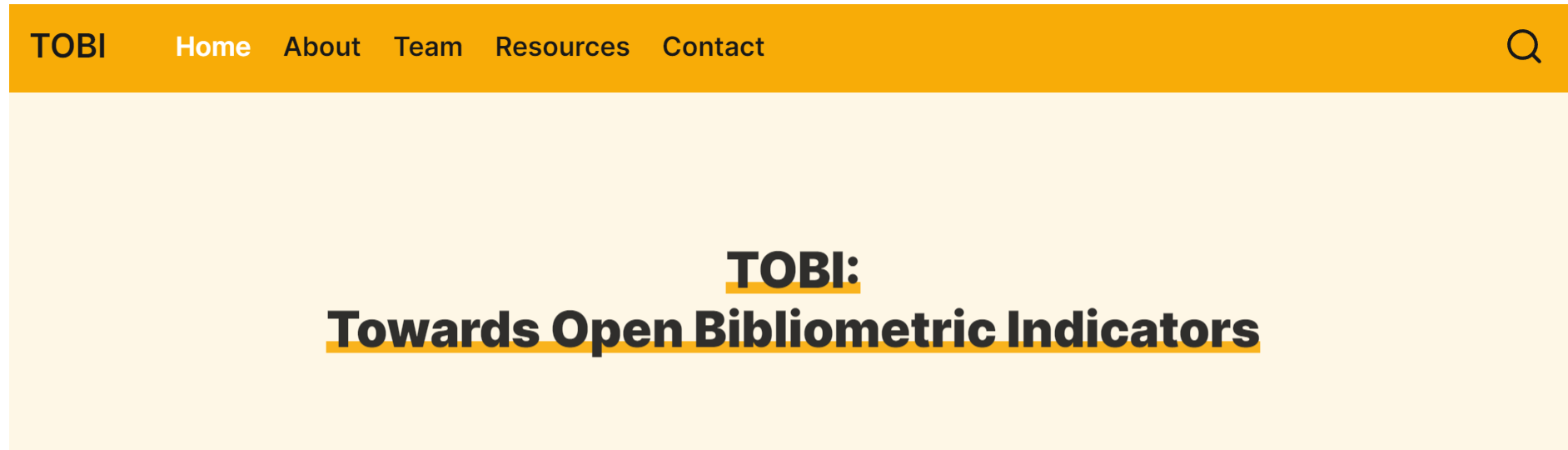
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HSLU Lucerne University
of Applied Sciences
and Arts

Project TOBI

<https://eth-library.github.io/tobi/>



ETH zürich

ETH Library

swissuniversities

TOBI is a project lead by the ETH Library and co-funded by swissuniversities. It aims to evaluate the quality of open bibliometric data sources regarding research affiliated with Swiss Higher Education Institutions. The project has started in Q1 2023 and will wrap up in Q4 2024.

I will glimpse over many topics, so reach out to me afterwards!

ETH zürich

ETH Library

- ETH Zurich: ~11 000 employees, ETH Library: ~300 employees
- ETH Library provides services for the whole ETHZ community
- 3 main areas of competence:

Books, collections and archives

- Books, journals, other media
- Archives (old periodicals, books; historical documents of ETHZ)
- Special collections (e.g. entomological, mycological, materials, history of science, maps, photos, literature...)
- Digitalization
- Libraries as physical places (e.g. place of study)

Research support services

- Scientific communication, contracts with publishers, APCs
- Open Access repository
- Research data management and long-term archiving
- **Scientometrics**
- Academic librarianship, literature search
- Scientific writing and knowledge management

Trainings

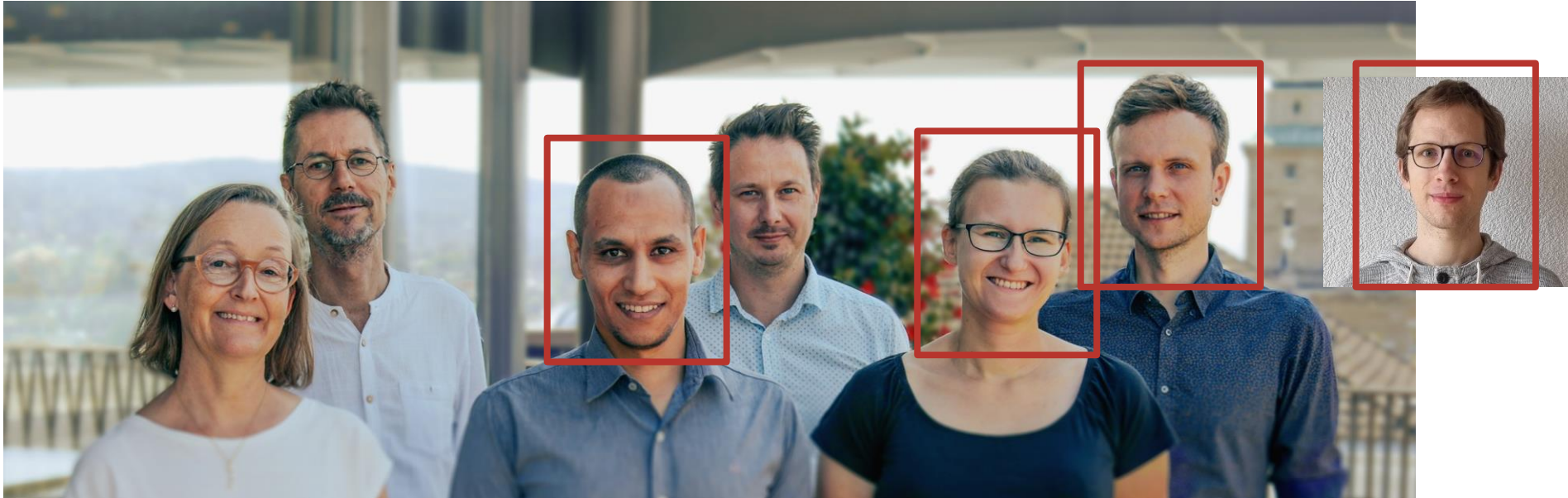
- Trainings and workshops for students and researchers
- Consultations (“Book a librarian”)

Scientometrics team at the ETH Library

ETH Library → Research Support Services → Knowledge Management (KOM)

Left to right:

Annette Guignard
Dr. Roland Suri
Mahmoud Hemila
Dr. David Johann
Dr. Teresa Kubacka
Dr. Julian Dederke
Simon Willemin



- Services in the field of scientometrics (Bibliometrics/Altmetrics)
- Information management / Tools that help you stay up to date

We started in 2020 and officially provide services since July 2021.

What is scholarly metadata?

Journal, publisher



Authors

A novel technique to monitor subsurface movements of landslides
Amin Askarinejad and Sarah M. Springman

Date

Updated online 25 March 2021: The license for this article has been changed to the CC BY 4.0 license. The PDF and HTML versions of the article have been modified accordingly.

Keywords
(given or
extracted)

Abstract: Slope deformation sensors (SDSs) were developed to monitor profiles of soil deformation at a high frequency during slope-monitoring and landslide-triggering experiments. It was hypothesized that the surface and subsurface movements could be combined to integrate the temporal development of the movements and help monitor the initiation and propagation of the shear bands indirectly, as well as predict the volume of the eventual landslide. Four SDSs were installed in a 38° slope in Northern Switzerland and slope movements due to two artificial rainfall sprinkling experiments in October 2008 and March 2009 were monitored. This paper describes the design, numerical validation, installation details, and performance of the SDSs during the first rainfall event. The data acquired from SDSs in terms of bending strain, deformation profiles, and an indication of the mechanical energy transmitted from the surrounding soil are analysed and compared with the patterns of surface movements of the slope and changes in the horizontal earth pressure. The findings are interpreted based on the applied rainfall, hydrological properties of the slope, bedrock shape, and specifications of the observed failure surface in the subsequent landslide triggering experiment. Details of the data acquired from SDSs during the second experiment in March 2009 are reported and analysed in a forthcoming paper.

Key words: landslide monitoring, natural hazards, subsurface movements, slope deformation sensors, rainfall-induced landslides.

Résumé : Les capteurs de déformation de pente (SDSs) ont été développés pour surveiller les profils de déformation du sol à une fréquence élevée lors de la surveillance de la pente et des expériences de déclenchement des glissements de terrain. On a émis l'hypothèse que les mouvements de la surface et du sous-sol pourraient être combinés pour intégrer le développement temporel des mouvements et aider à surveiller indirectement l'initiation et la propagation des bandes de cisaillement, ainsi que pour prédire le volume du glissement de terrain éventuel. Quatre SDSs ont été installés dans une pente de 38° dans le nord de la Suisse et des mouvements de pente due à deux expériences artificielles d'arrosage des précipitations en octobre 2008 et en mars 2009 ont été surveillés. Cet article décrit la conception, la validation numérique, les détails d'installation et les performances des SDSs lors du premier événement pluviométrique. Les données obtenues à partir des SDSs en termes de contrainte de flexion, de profils de déformation et d'indication de l'énergie mécanique transmise par le sol environnant sont analysées et comparées aux modèles de mouvements de surface de la pente et aux variations de la pression horizontale des terres. Les résultats sont interprétés en fonction de la pluviométrie appliquée, des propriétés hydrologiques de la pente, de la forme du substrat rocheux et des spécifications de la surface d'échec observée dans l'essai de déclenchement des glissements de terrain suivant. Les détails des données acquises auprès des SDSs lors de la deuxième expérience en mars 2009 sont rapportés et analysés dans un deuxième article. [Traduit par la Rédaction]

Mots-clés : surveillance des glissements de terrain, risques naturels, mouvements souterrains, capteurs de déformation de pente, glissements de terrain induits par les précipitations.

Introduction

Combining information about the direction, magnitude, and rates of surface movements with the subsurface deformations of unstable slopes provide valuable data that can be used to estimate the possible volume of a moving landslide, and to understand the triggering mechanisms of instabilities (Green 1973; Buchli et al. 2013, 2016).

The instrument used most commonly to monitor the onset and continuation of deformation in slow moving slides is the slope inclinometer. The deformations are measured normal to the axes of a borehole by passing a probe inside a specially formed plastic

casing (Dunnicliff 1988). However, the soil deformation profile measured using a slope inclinometer system in a zone of extreme shear may not represent the actual soil deformations. The PVC casing has a specific stiffness, which means it may not follow the soil deformation exactly and there could be differential lateral movement between the casing and soil. Moreover, significant deformation at the shear zone may distort the casing and prevent the probe from travelling easily along the tube (e.g., Arenson et al. 2002). Furthermore, data are only obtained when the probe is lowered and raised manually.

However, monitoring results of several landslides in sandy slopes reveal that the precursors take place within a short time

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A. Askarinejad. Faculty of Civil Engineering and Geosciences, TU Delft, 2628 CN Delft, P.O. Box 5048, 2600 GA Delft, the Netherlands.

S.M. Springman. IGT, ETH Zürich, Stefano-Franscini-Platz 5, 8093 Zurich, Switzerland.

Corresponding author: Amin Askarinejad (email: A.Askarinejad@tudelft.nl).

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Published at www.nrcresearchpress.com/cgj on 8 September 2017.

Full-text search (incl. title, abstract)

Askarinejad and Springman

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These graphs illustrate higher amounts of applied mechanical work from the surrounding soil to the SDSs in the upper part of the slope, where higher values of surface movements were observed and also the eventual failure occurred in the landslide triggering experiment in March 2009 (Askarinejad et al. 2012).

The changes in the ground water level measured by a piezometer installed at a depth of 3 m in the middle part of the slope location (shown in Fig. 13) are also reported in Fig. 16a. A similar trend is seen in the measurements of the bending strains (Fig. 15a), external bending work, and the water table fluctuations (Fig. 16a) in the upper and middle sections of the slope. The absolute value of these measurements are either constant or increase very gently until approximately 5 h after the sudden increase in the rain intensity about 61 h after the start of rainfall. All of these parameters increase for approximately 24 h (shown by vertical dashed line 3 in Figs. 15a and 16). The decreasing trend of the absolute bending strains and external bending work measured by the SDSs indicate a decrease in the downslope velocity of the soil mantle. This observation confirms the coupling of the hydromechanical responses of the slope.

Summary and conclusions

Simple and low cost SDSs were developed to monitor surface and subsurface movements of a steep forested slope in Northern Switzerland that was subjected to artificial intense rainfall events. The data from these sensors can be sampled remotely at high frequency. The performance of SDSs in detecting the failure surface depth was validated by laboratory experiments and numerical modelling. Thereafter, four of them were installed in loose silt sand at different locations in the slope.

The general trend of movements, based on analysis of the measurements from the SDSs during the course of the 4.5 day rainfall experiment, indicated that the slope had experienced a down-slope surface movement of a magnitude of 0.5 to 2.5 mm, with more pronounced deformations in the upper part of the slope. Comparing these results to the surface deformation measured by a four camera photogrammetry method confirmed that the measured surface deformations are similar, although the values are not exactly the same.

The results of the movement measurements were analysed together with the external bending work per unit volume of each SDS, which was determined as an indication of the mechanical energy transmitted from the surrounding soil to the sensor. Hence, the locations with more transmitted mechanical energy are identified in less stable areas. The results are in agreement with the measured surface displacements, and eventual failure area of the landslide that occurred 5 months later, due to artificial rainfall applied on the same slope.

It can be concluded that the SDSs are able to detect the depth of the failure surface, based on the results of extensive laboratory physical modelling and numerical simulations. They are very responsive to fine soil movements because their bending stiffness is lower by a factor of 300, compared to the conventional slope inclinometers. Enhanced sensitivity, high frequency of remote sampling, and relatively simple installation procedure make them suitable for the early warning systems of shallow (less than 2.5 m depth) landslides triggered by rainfall.

Calculation of the deformation profile using the measurements of SDSs is based on the assumption of an elastic bending along the main body of the sensor. This criterion limits the maximum reliably measurable deformation profile of the slope and is governed by the thickness of the shear band. However, the measured bending strains along the sensor are not limited by this criterion and therefore can be used as indications of the state of the slope at large deformations prior to the onset of failure.

The limit states and levels of bending strains and external bending work measured by these sensors need to be set for different

alarm statuses based on the tolerable risk, as well as the geotechnical and hydrogeological properties of each individual site. Moreover, the data from these sensors need to be combined with measurements of pore-water pressure and, ideally, with the horizontal earth pressure in an effective early warning system as the safety of a slopes subjected to pore-water pressure increase is significantly influenced by the stresses parallel to the slope measurements (Picarelli 2000; Leroueil et al. 2009).

Acknowledgements

This research was funded by the Competence Centre for Environment and Sustainability (CCES) within the framework of the TRAMM – Project and included other resources provided by the ETH Research Fund and EU project of SafeLand (EU FP7 grant agreement No. 226479). We are grateful to the Ruedlingen Council (especially C. Leutenegger, President, and her deputy, M. Kern) as well as the fire station, farmers, foresters, and communities of Ruedlingen and Buchberg. D. Akca, E. Bleiker, C. Brönnimann, F. Casini, L. Colombo, M. Denk, S. Durot, A. Ehrbar, F. Gambazzi, R. Herzog, M. Iten, P. Kienzler, J. Laue, G. Michlmayr, F. Morales, C. Rickli, R. Rohr, A. Schmid, M. Schwarz, M. Sperl, M. Staehli, K. Steiner, B. Suski, A. Volkwein, A. von Bötticher, C. Wendeler, F. Wietlisbach, and the late A. Zweidler are thanked for their contributions to this project.

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Published by NRC Research Press

Metadata:
Research field,
topic ...

Affiliations

DOI and reference

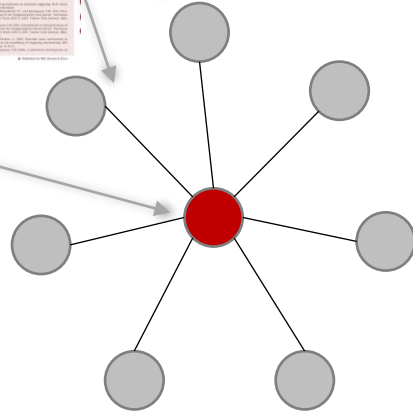
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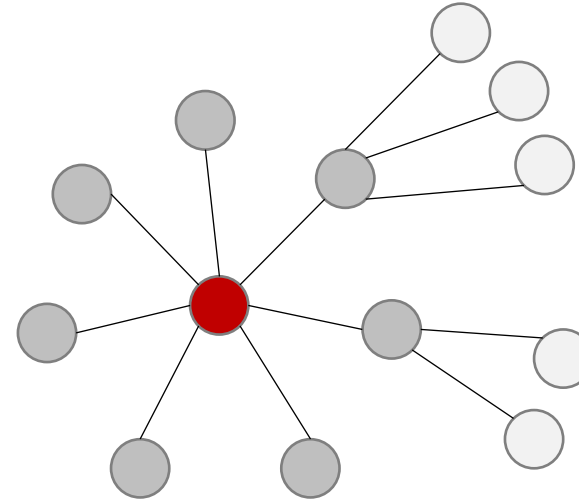
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- Source paper
- Reference (1st degree)



- Source paper
- Reference (1st degree)
- Reference (2nd degree)

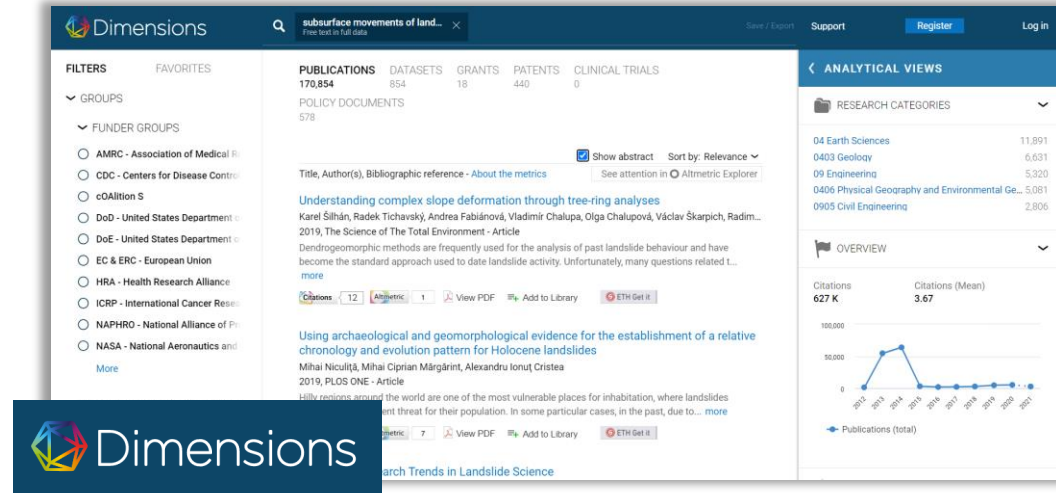
Because the scientists cite each other's work, we can build a **network of references and citations**

What do we need the metadata for?

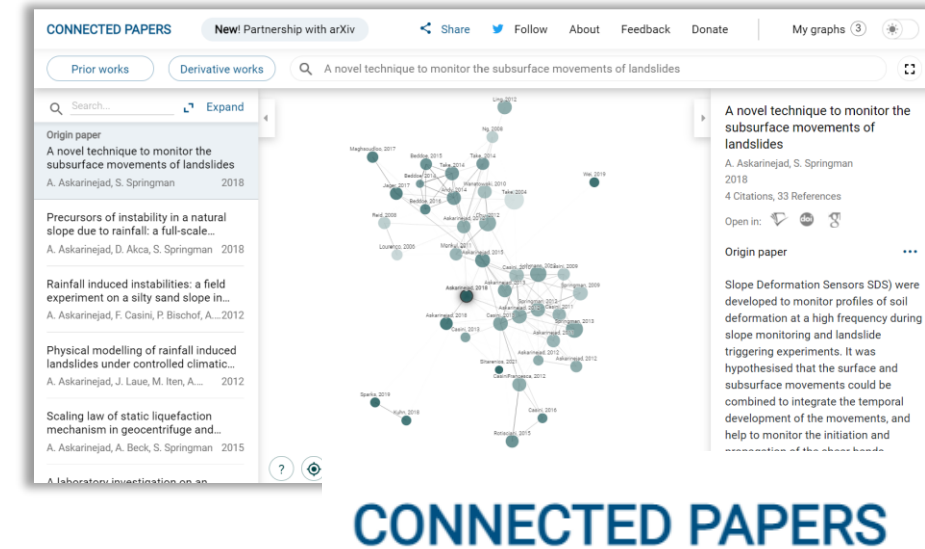
- Knowledge discovery and literature search
- Research assessment, strategic research management
- Science on science, digital humanities

Knowledge discovery

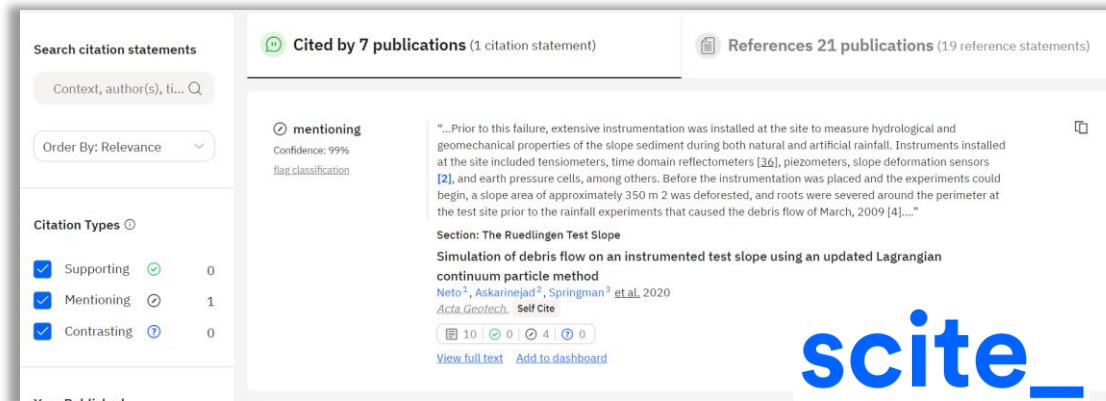
Combine keywords with analytics to drill down



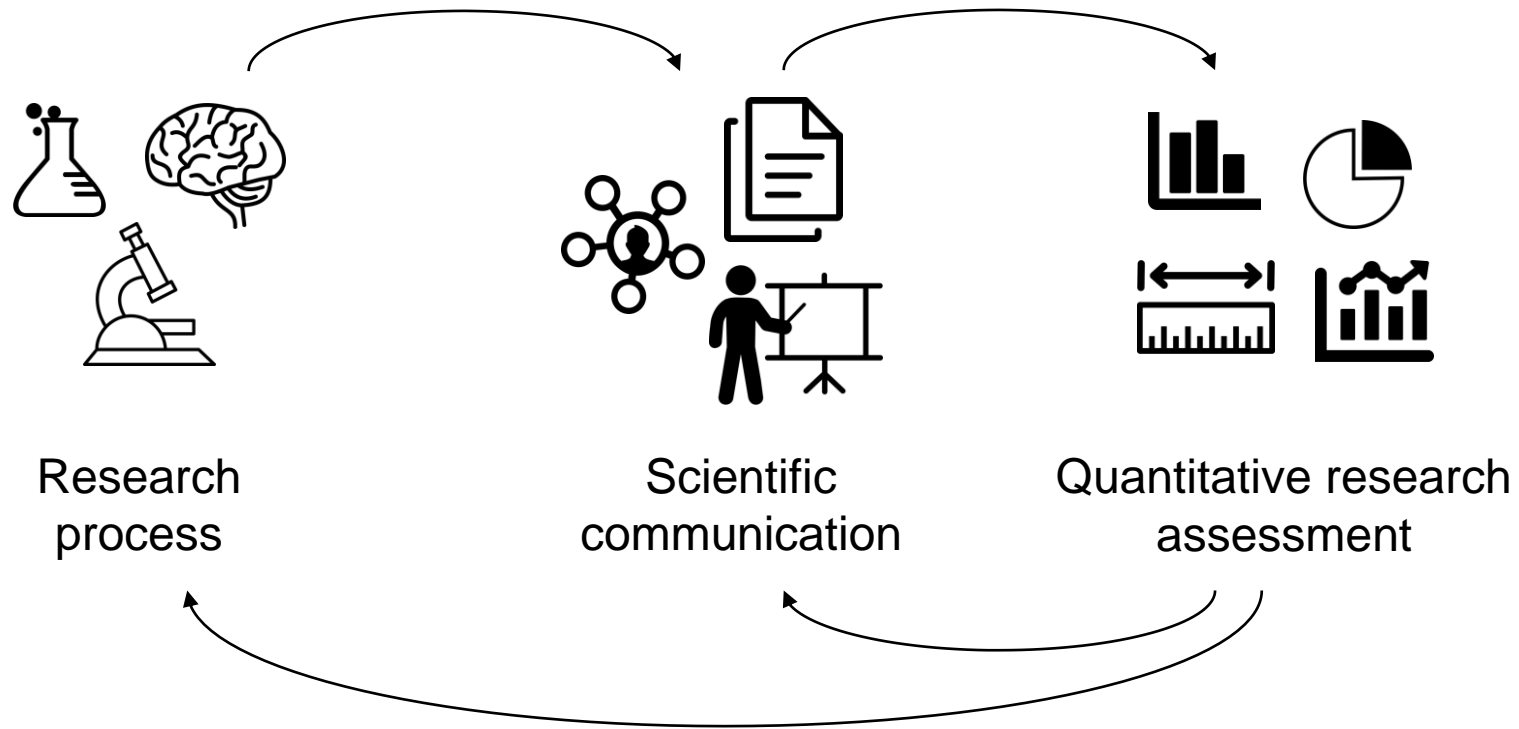
Networks based on text similarity



Which citations confirm given study or provide contrasting evidence



Scientometrics for research assessment



Funders



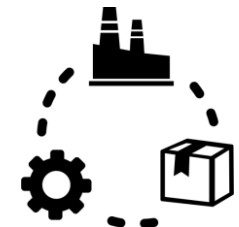
Publishers



Government

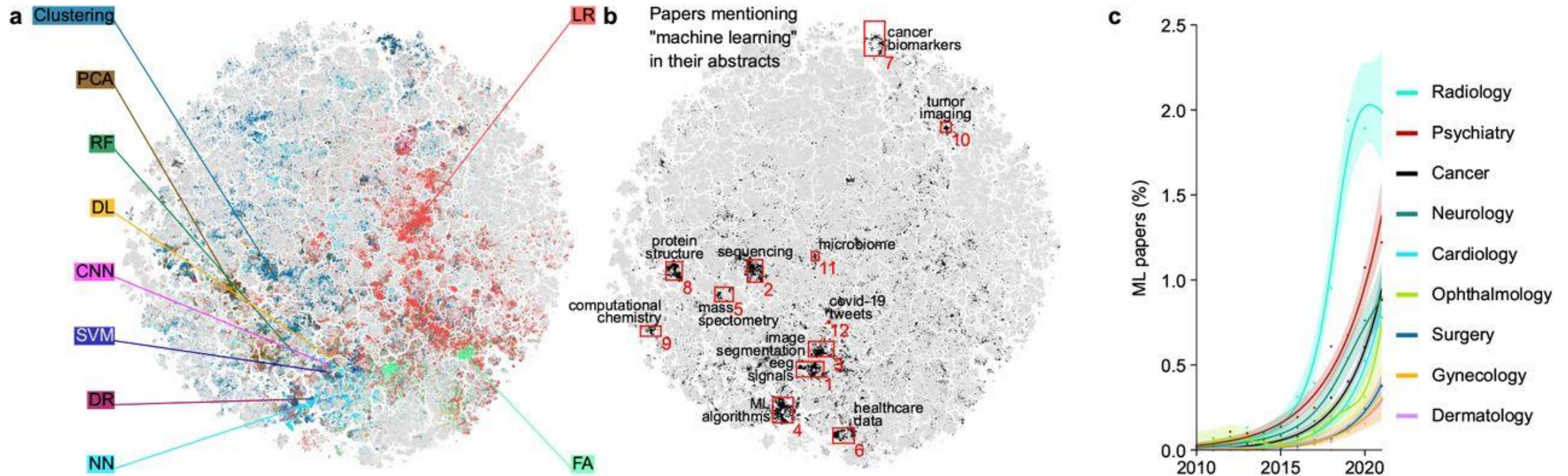


Industry



Science on science and digital humanities

The landscape of biomedical research
Rita González-Márquez, Luca Schmidt, Benjamin M. Schmidt, Philipp Berens, Dmitry Kobak. bioRxiv 2023.04.10.536208; doi:
<https://doi.org/10.1101/2023.04.10.536208>



Problem: Scientific research is paywalled!

Paywalled science: single articles

Article | Published: 14 June 2023

General cross-coupling reactions with adaptive dynamic homogeneous catalysis

Indrajit Ghosh , Nikita Shlapakov, Tobias A. Karl, Jonas Düker, Maksim Nikitin, Julia V. Burykina, Valentine P. Ananikov & Burkhard König 

Nature (2023) | [Cite this article](#)


66 Altmetric | [Metrics](#)

Abstract

Cross-coupling reactions are among the most important transformations in modern organic synthesis^{1,2,3}. Although the range of reported (het)aryl halides and nucleophile coupling partners is very large considering various protocols, the reaction conditions vary considerably between compound classes, necessitating renewed case-by-case optimization of the reaction conditions⁴. Here we introduce adaptive dynamic homogeneous catalysis (AD-HoC) with nickel under visible-light-driven redox reaction conditions for general C(*sp*²)–(hetero)atom coupling reactions. The self-adjustive nature of the catalytic system allowed the simple classification of dozens of various classes of nucleophiles in cross-coupling reactions. This is synthetically demonstrated in nine different bond-forming reactions (in this case, C(*sp*²)–S, Se, N, P, B, O, C(*sp*³), *sp*², *sp*), Si, Cl) with hundreds of synthetic examples under predictable reaction conditions. The catalytic reaction centre(s) and conditions differ from one another by the added nucleophile, or if required, a commercially available inexpensive amine base.

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Paywalled science: price we pay for monopoly

- Scientists need to read other people's work to do their job
- Scientists need to publish their work so that others can re-use them
- Gold standard is the peer-review ("fact-checking", integrity check)
- Peer-review process has been captured by the journal publishers

Scientist

Paid by the taxpayer

- Produce the content
- Typeset the manuscript
- Review work of others
- Pay the "processing fee"
- Pay the Open Access fee
- Pay to read the article

Editor \$\$\$

Paid by the publisher

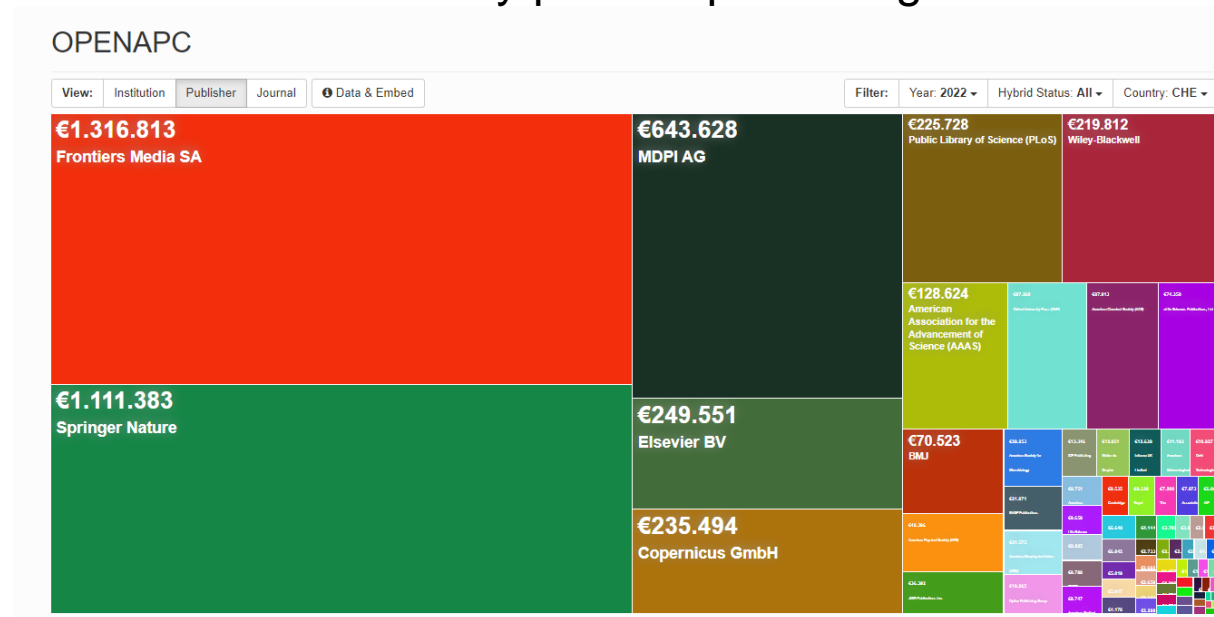
- Get rid of obvious fakes
- Language check
- Find the reviewer
- Put the text online / in print

Robert Maxwell: *"I set up a perpetual financing machine through advance subscriptions as well as the profits on the sales themselves. It is a cash generator twice over"*

OpenAPC: how much does it cost to publish?

<https://treemaps.openapc.net/apcdata/openapc/#publisher/country=CHE&period=2022>

OpenAPC: Crowdsourced data from the libraries
on the fees they paid for publishing articles



Publishers (78 entries)	Sum	Number of Articles	Mean Value	Standard Deviation
Total	€4.874.932	2122	€2.297	€1.030

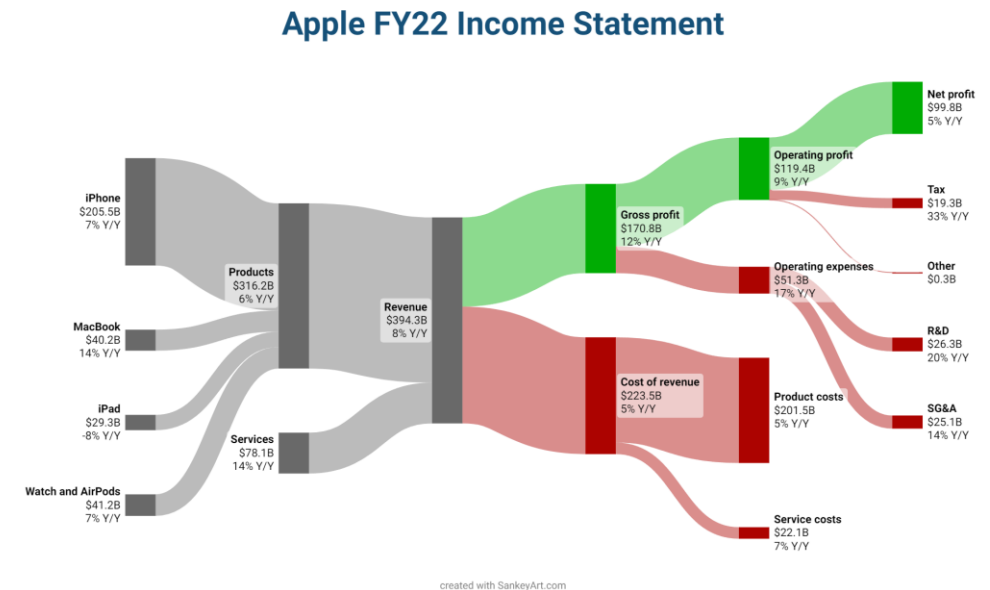
Total CH: ca. 50 000 publications in 2022

The big business of academic publishing

Big publishers have profit margins higher than big tech!

The core of Elsevier's operation is in scientific journals, the weekly or monthly publications in which scientists share their results. Despite the narrow audience, scientific publishing is a remarkably big business. With total global revenues of more than £19bn, it weighs in somewhere between the recording and the film industries in size, but it is far more profitable. In 2010, Elsevier's scientific publishing arm reported profits of £724m on just over £2bn in revenue. It was a 36% margin - higher than Apple, Google, or Amazon posted that year.

<https://www.theguardian.com/science/2017/jun/27/profitable-business-scientific-publishing-bad-for-science>



<https://www.sankeyart.com/sankeys/public/all/81/>

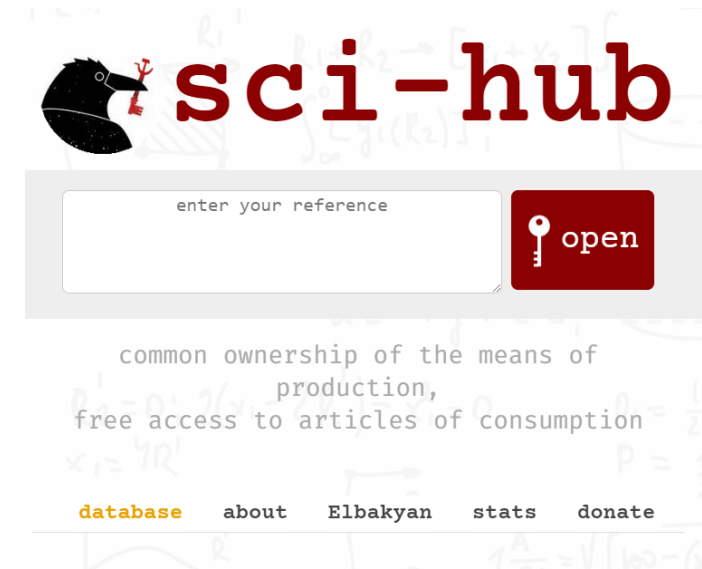
They try to secure additional income sources: selling usage data, licenses for metadata databases...

Scrape and pirate is not an option

One of the world's largest science publishers, Elsevier, won a default legal judgement on 21 June against websites that provide illicit access to tens of millions of research papers and books. A New York district court awarded Elsevier US\$15 million in damages for copyright infringement by Sci-Hub, the Library of Genesis (LibGen) project and related sites.

“The Court has not mistaken illegal activity for a public good,” said Maria A. Pallante, president and CEO of the Association of American Publishers – a trade group that Elsevier belongs to – in a statement released on 22 June. “On the contrary, it has recognized the defendants’ operation for the flagrant and sweeping infringement that it really is and affirmed the critical role of copyright law in furthering scientific research and the public interest.”

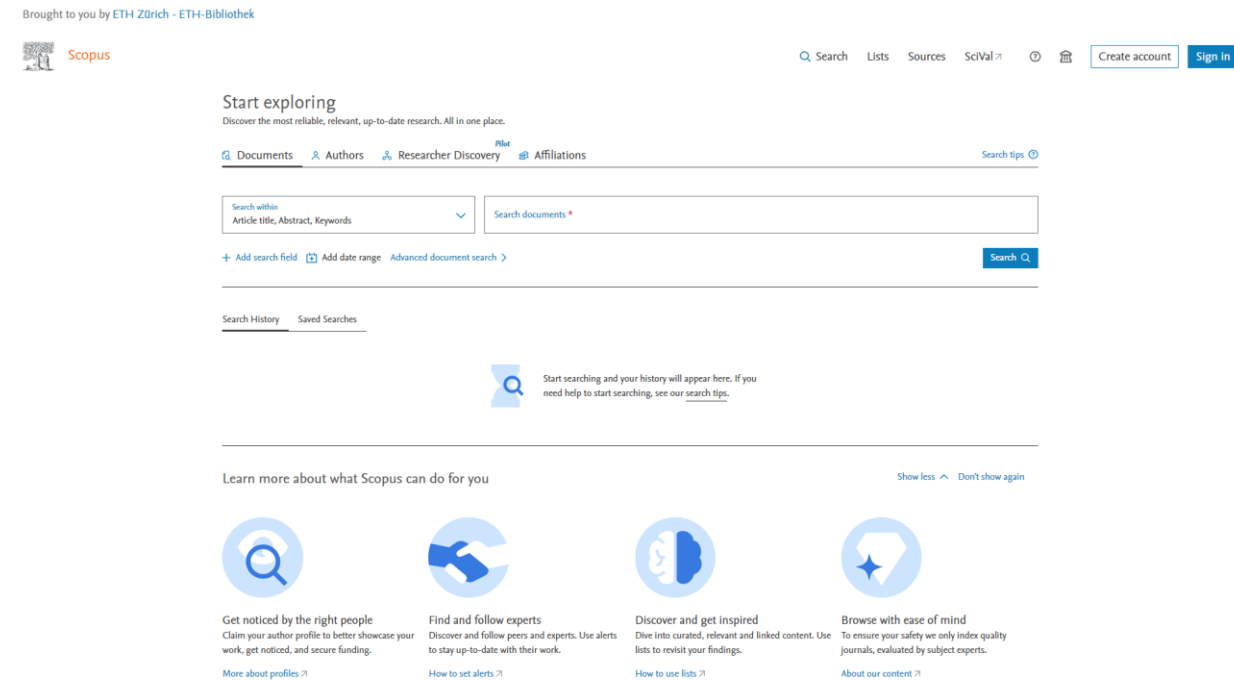
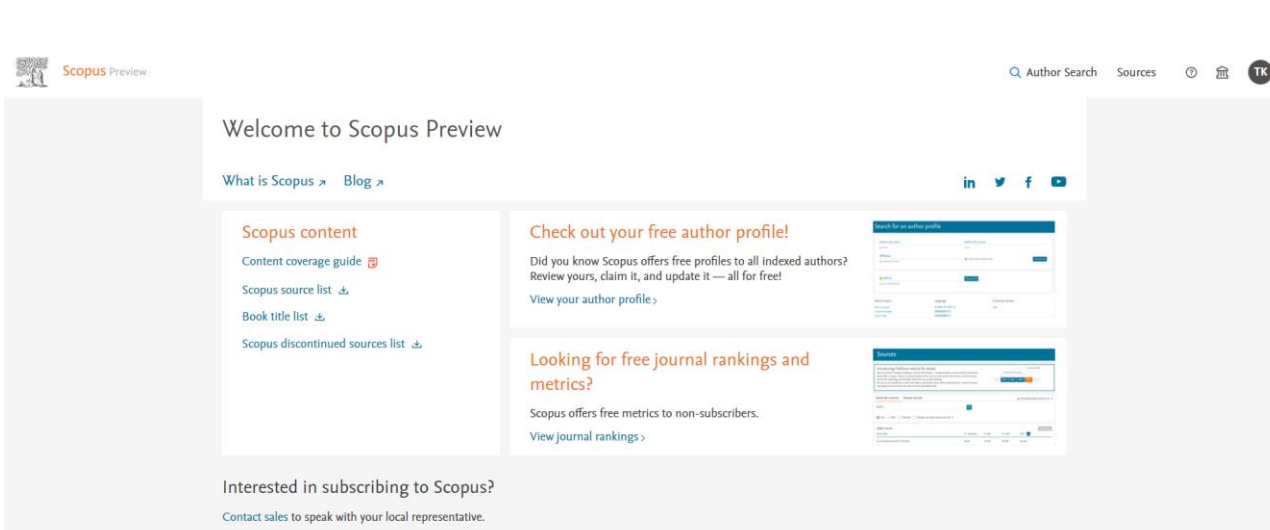
<https://www.nature.com/articles/nature.2017.22196>



Courts on the side of publishers!
You can get in big trouble

Paywalled science: databases

Metadata databases are crucial for research assessment and literature search – they got paywalled too!



<https://www.scopus.com/home.uri>

The biggest database providers

 Clarivate

Web of Science™



Scopus



Dimensions

} Publisher
owned

(**Google Scholar**)

no API, no raw data

How expensive are the metadata databases?

Confidential, but if you google it...

COST

The exact pricing is confidential, but **the annual cost of USU's subscription to Web of Science is enough to purchase a very comfortable home in Logan.**

<https://libguides.usu.edu/scopus/rationale>

Web of Science has an annual subscription cost equal to the 2012 median price of a single-family home in the United States. Web of Science isn't an aggregator of content, like JSTOR. It's primarily an index: it aggregates citations, but not the full text of the publications themselves. It does some other important things, too, like providing cited reference searching and article-level metrics

<https://libguides.library.arizona.edu/wos/rationale>

There used to be an open alternative...

Microsoft Academic

[Article](#) [Talk](#)

From Wikipedia, the free encyclopedia

Microsoft Academic was a free internet-based [academic search engines](#) for [academic publications](#) and literature, developed by [Microsoft Research](#), shut down in 2022. At the same time, [OpenAlex](#) launched and claimed to be a successor to Microsoft Academic.^{[1][2]}

https://en.wikipedia.org/wiki/Microsoft_Academic

So what to do now?

TOBI: Towards Open Bibliometric Indicators

Project TOBI

- Rising body of open bibliometric databases
- It would be great to use them instead of the commercial ones, but are they any good?
 - Missing affiliations and author attributions
 - Kinds of available metadata
 - Systematic biases (language, discipline etc.)
 - Scraped “fake” articles?
 - ...
- Important because they will be used for strategic decision making!
- Scattered coverage: how to merge them sustainably?



...



San Francisco Declaration on Research Assessment



- Response to relying on proxy indicators in research assessment and to overrelying on metrics

For organizations that supply metrics

11. Be open and transparent by providing data and methods used to calculate all metrics.

12. Provide the data under a licence that allows unrestricted reuse, and provide computational access to data, where possible.

13. Be clear that inappropriate manipulation of metrics will not be tolerated; be explicit about what constitutes inappropriate manipulation and what measures will be taken to combat this.

14. Account for the variation in article types (e.g., reviews versus research articles), and in different subject areas when metrics are used, aggregated, or compared.

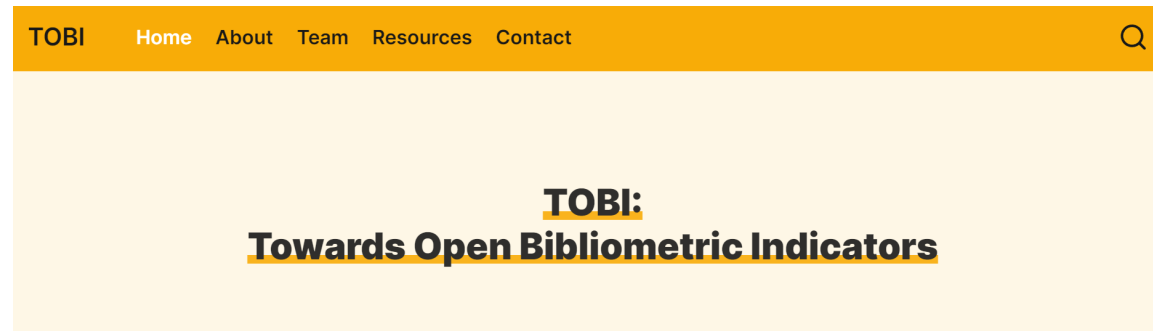
To be fully open and transparent, we cannot use paywalled data which is curated as a black box!

<https://sfdora.org/read/>

Project TOBI

- Not quite research, not quite service – external funding from Swissuniversities
- Started in March 2023: 3 months old!

<https://eth-library.github.io/tobi/>



ETH zürich

ETH Library

swissuniversities

TOBI is a project lead by the ETH Library and co-funded by swissuniversities. It aims to evaluate the quality of open bibliometric data sources regarding research affiliated with Swiss Higher Education Institutions. The project has started in Q1 2023 and will wrap up in Q4 2024.

TOBI: results as of now

- Identified ~100 datasets
 - Categorized and annotated them
 - Compiled a db of metadata of datasets for easy comparison
 - Writing a report / whitepaper
- Literature review
- Investigated APIs
- Setting up infrastructure to analyze the raw data – database dumps (**we are looking for advice!**)
- Metadata tracking app

TOBI: impact and synergies

- Swiss landscape
 - Big initial investment into using such data – not very common in CH
 - Provide starter code and data for an evidence-based decision making
 - Prime new users to use open data as the first priority
 - Open question: infrastructure with a live database for Swiss HEIs? **Looking for partners!**
- How to measure impact of science?
 - What data may be missing from our «academic view»?
 - Potential of merging with OGD! **Looking for ideas!**
- Non-academic impact and applications
 - **Looking for your input!**

Thank you for the attention!

teresa.kubacka@library.ethz.ch
@paniterka_ch
www.linkedin.com/in/tkubacka
www.teresa-kubacka.com

Dr. Teresa Kubacka
Senior Data Scientist
teresa.kubacka@library.ethz.ch

ETH Library
Research Support Services
Knowledge Management

HG H 11.1
Rämistrasse 101
8092 Zürich

www.library.ethz.ch