

Visualizing Science Using OpenAlex and VOSviewer

Nees Jan van Eck

Centre for Science and Technology Studies (CWTS), Leiden University

OpenAlex how-to webinar

December 14, 2023

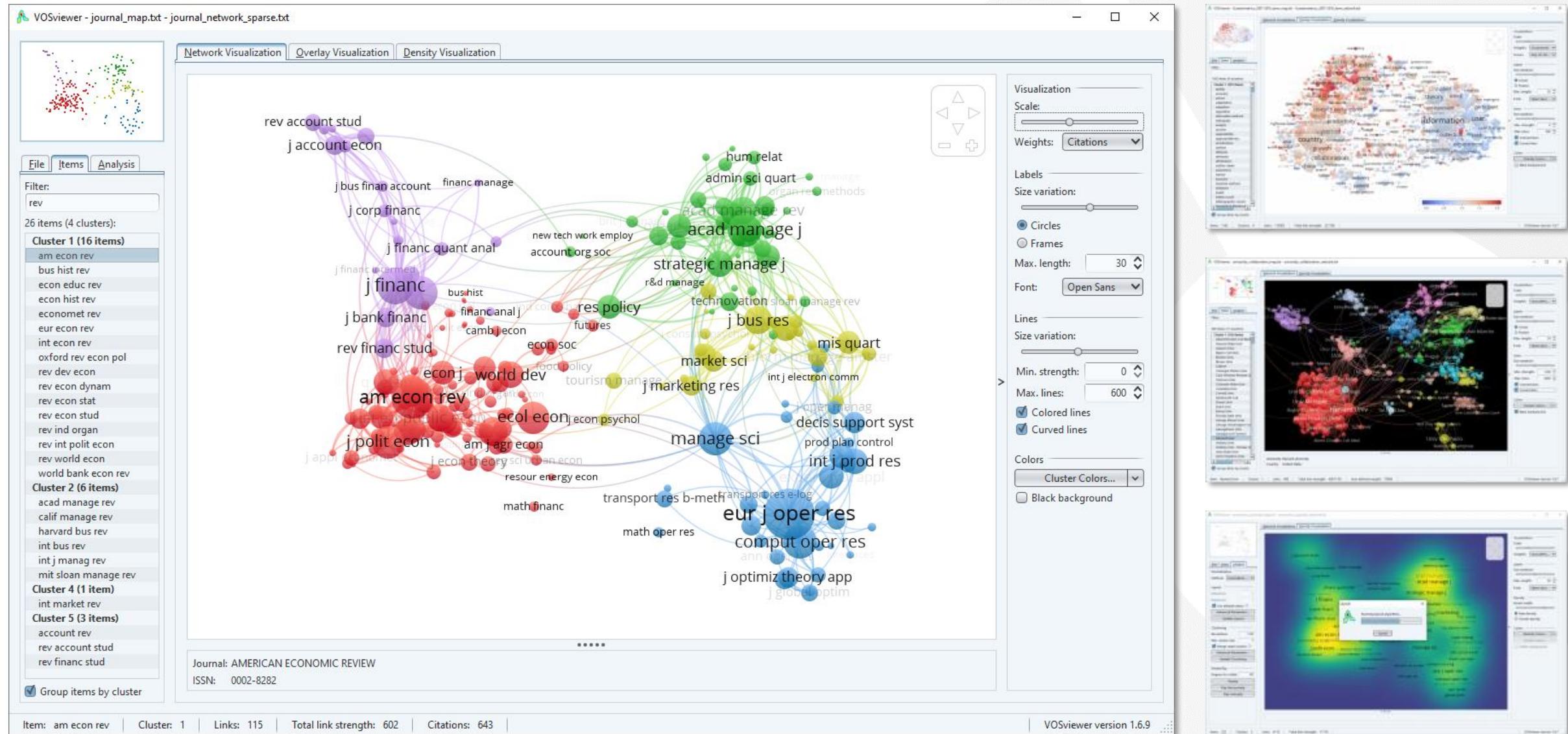


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Outline

- VOSviewer intro
- OpenAlex + VOSviewer demos
- Q&A

VOSviewer

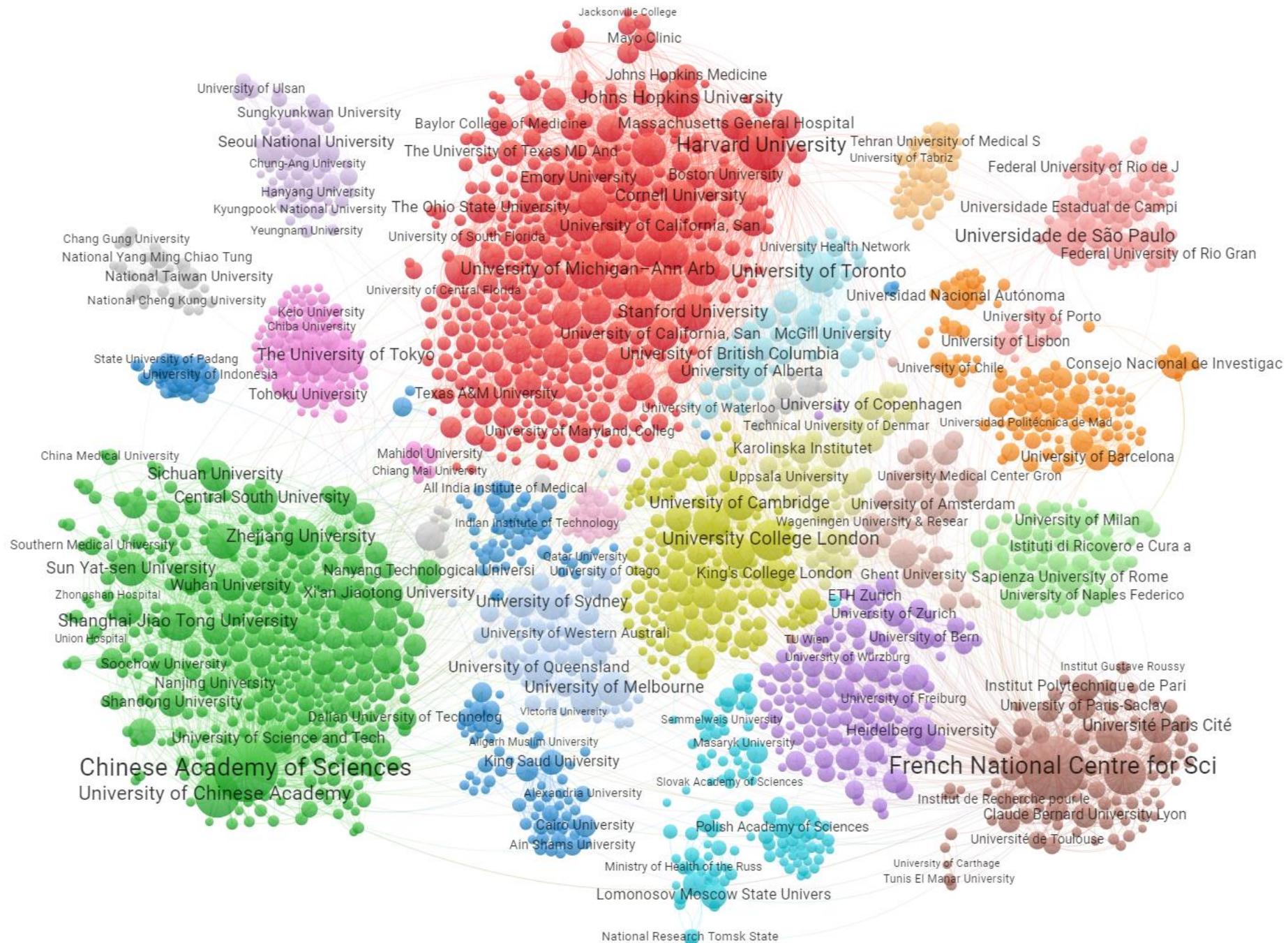


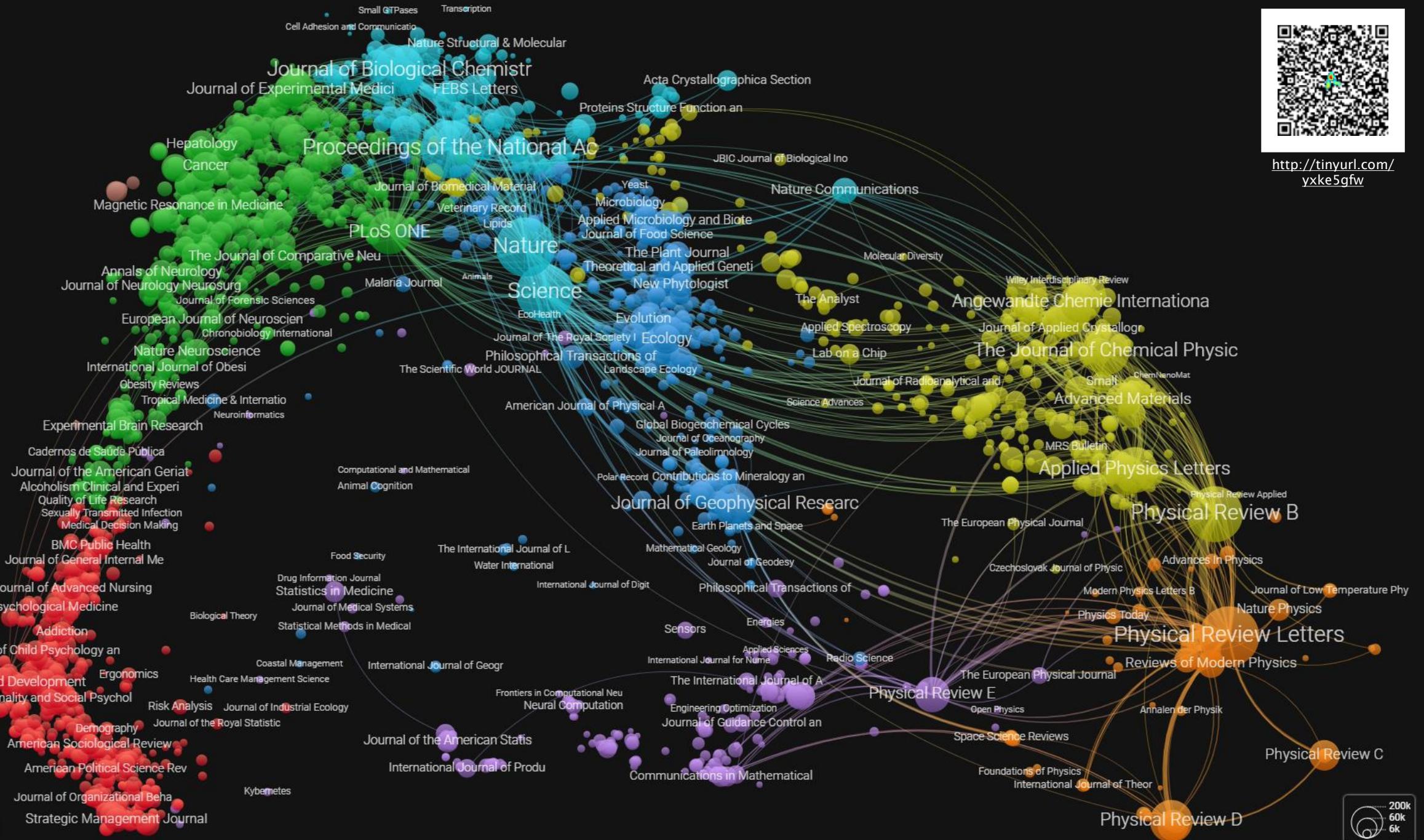
VOSviewer

- Focus on visualization of scientometric networks
- Support for large number of data sources
- Text mining functionality
- Advanced visualization features
- Relatively easy to use
- Limited analysis options
- Developed at CWTS



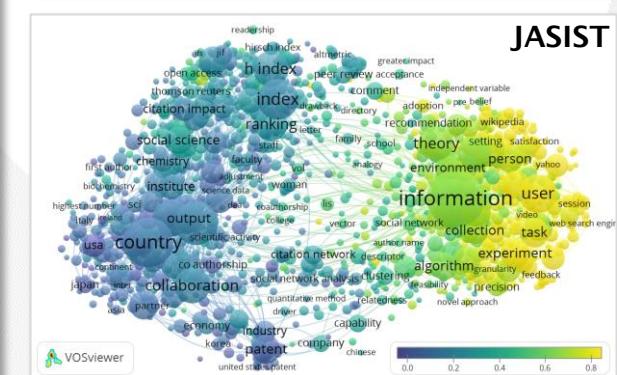
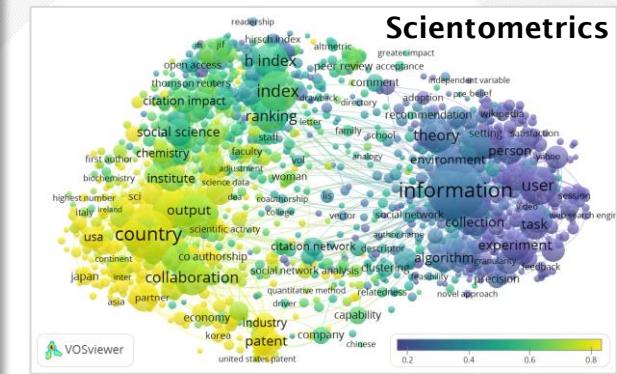
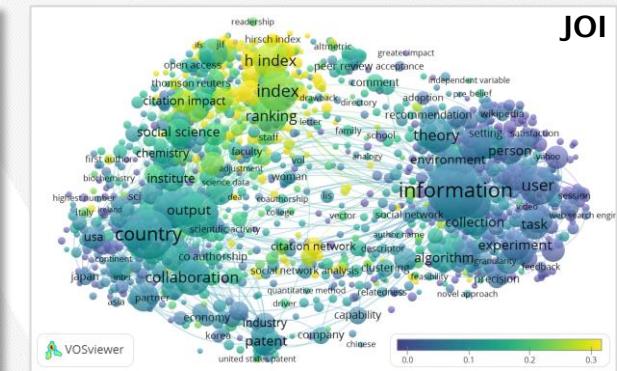
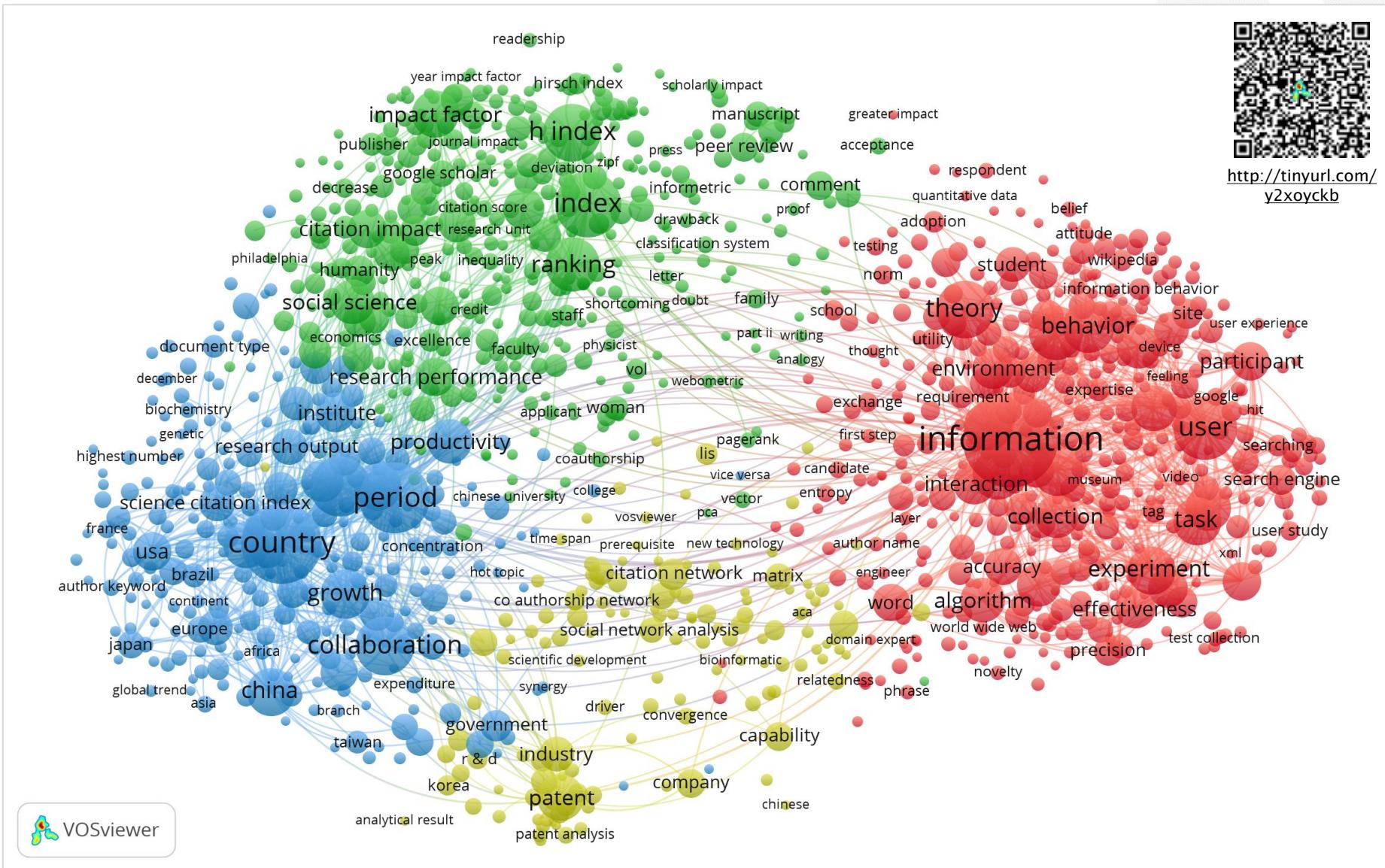
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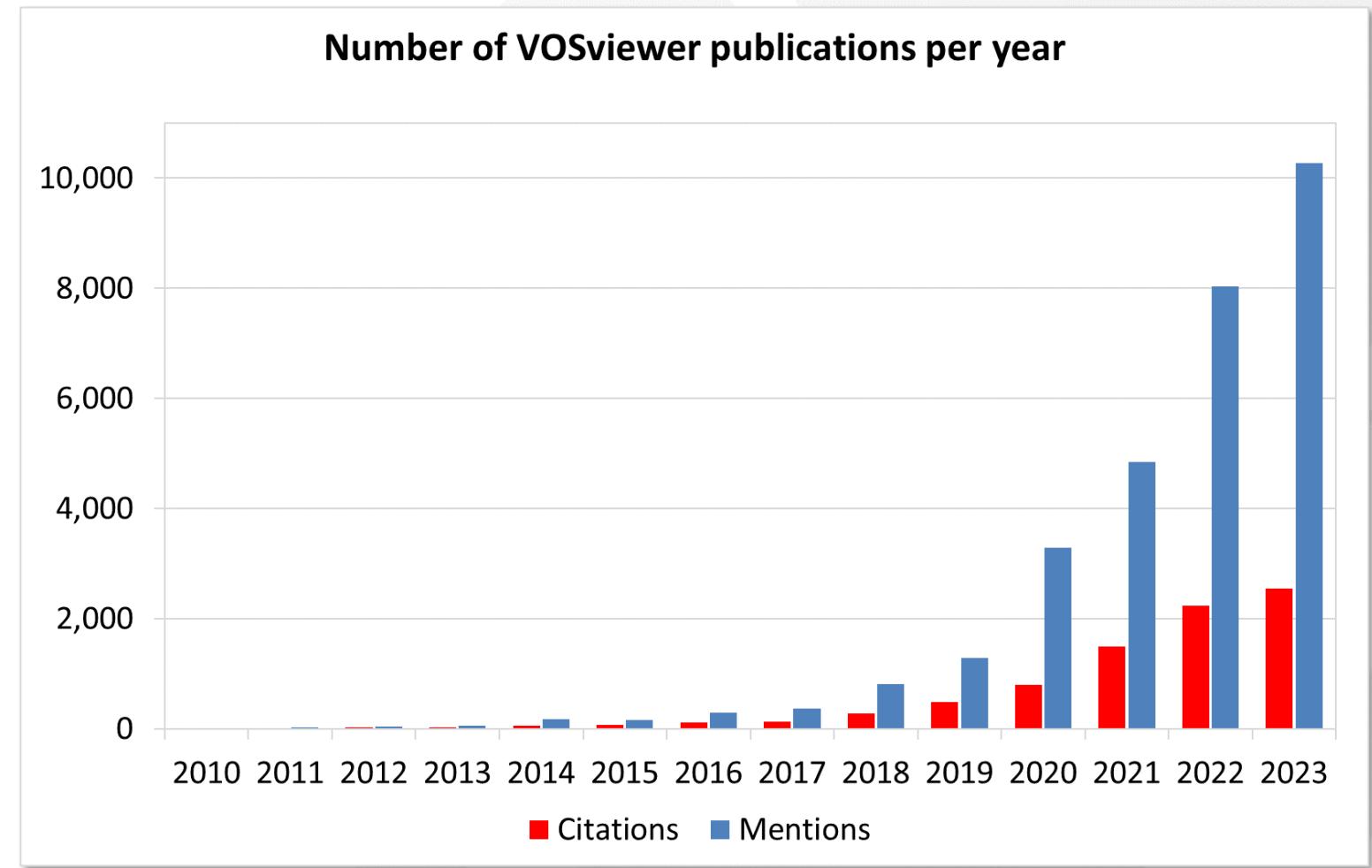
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Text mining

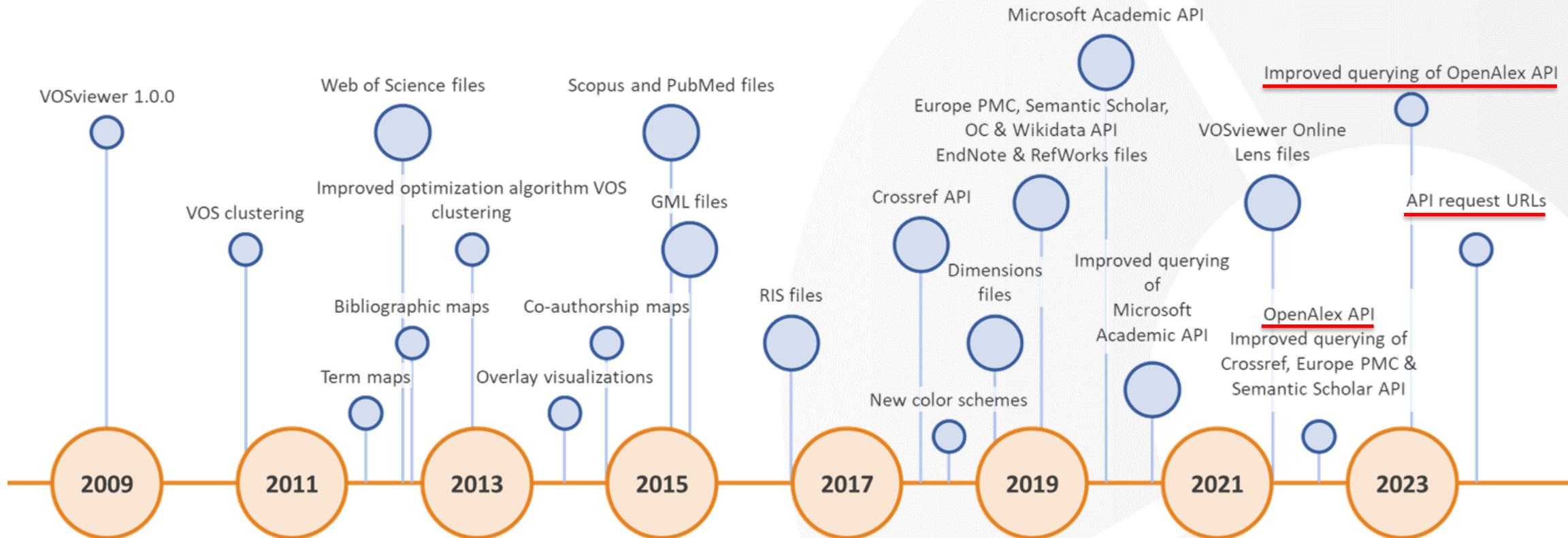


Users of VOSviewer

- Researchers
- Research institutions
- Research funders
- Scientific publishers
- Industry



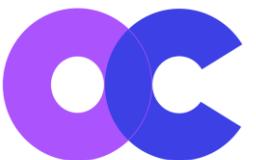
Development



Data sources supported by VOSviewer



OpenAlex



Crossref



Europe PMC



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Dimensions

Web of Science

Scopus

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Citation Analysis May Severely Underestimate the Impact of Clinical Research as Compared to Basic Research

Nees Jan van Eck^{a*}, Ludo Waltman^b, Anthony F. J. van Raan^c, Robert J. M. Kluitz^c, Wilco C. Peerdeman^d

Received: December 10, 2012; **Accepted:** March 20, 2013; **Published:** April 17, 2013

Editor: Christopher J. G. Sturges, University of Cambridge, United Kingdom

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Competing interests: N.J. van Eck, L. Waltman, and A.F.J. van Raan are affiliated with the Centre for Science and Technology Studies of Leiden University and receive grants in the production of bibliometric indicators. This does not alter our authors' adherence to PLOS ONE policies on sharing data and materials.

*** E-mail:** wneesjan.van.eck@luc.edu

Abstract

Background: Citation analysis has become an important tool for research performance assessment in the medical sciences. However, different areas of medical research may have considerably different citation practices, even within the same medical field. Because of this, it is difficult to what extent citation-based bibliometric indicators allow for valid comparisons between research areas and to what extent they are able to reflect the true impact of research.

Methodology: A visualization methodology is introduced that reveals differences in citation practices between medical research areas. The methodology extracts terms from the titles and abstracts of a large collection of publications and uses them to construct a map of a medical field and to indicate how research areas within this field differ from each other in their average citation impact.

Results: Visualizations are provided for 32 medical fields, defined based on journal subject categories in the Web of Science database. The analysis focuses on three fields: Cardiac & cardiovascular systems, Clinical neurology, and Surgery. In each of these fields, the visualization shows that the citation practices of basic research areas are more oriented towards citations than to focus on clinical intervention research, while high-impact research areas are often more oriented on basic and translational research.

Conclusion: Current bibliometric indicators, such as the h-index and the impact factor, do not correct for differences in citation practices between medical fields. These indicators therefore cannot be used to make accurate between-field comparisons. More sophisticated bibliometric indicators do correct for field differences but still fail to take into account underlying differences in citation practices. The lack of awareness of these differences in citation research may be substantially underestimated in comparison with basic and diagnostic research.

Citation: van Eck NJ, Waltman L, van Raan AFJ, Kluitz RJM, Peerdeman WC (2013) Citation Analysis May Severely Underestimate the Impact of Clinical Research as Compared to Basic Research. PLoS ONE 8(4): e62385. doi:10.1371/journal.pone.0062385

Editor: Christopher J. G. Sturges, University of Cambridge, United Kingdom

Received: December 10, 2012; **Accepted:** March 20, 2013; **Published:** April 17, 2013

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*** E-mail:** wneesjan.van.eck@luc.edu

Introduction

Citation analysis is widely used in the assessment of research performance in the medical sciences [1]. Especially the h-index [2] and the impact factor [3] are frequently used to evaluate the scientific output of researchers. However, the use of these indicators for performance analysis has important limitations. In particular, both the h-index and the impact factor fail to take into account differences in citation practices between fields of science [4]. For instance, the citation practices of basic research areas are much larger in molecular biology than in mathematics. As a consequence, publications in molecular biology on average are cited more frequently than publications in mathematics. This difference can be more than an order of magnitude [7].

Most bibliometric indicators are based on the assumption that citation patterns conform to a normal distribution. Current bibliometric systems perform a normalization to correct for differences in citation practices between fields of science [8,9]. These corrections are usually made by applying a field-specific indicator (e.g., the journal subject categories in the Web of Science database). However, the use of these indicators for performance analysis has important limitations. In particular, both the h-index and the impact factor fail to take into account differences in citation practices between fields of science [4]. For instance, the citation practices of basic research areas are much larger in molecular biology than in mathematics. As a consequence, publications in molecular biology on average are cited more frequently than publications in mathematics. This difference can be more than an order of magnitude [7].

This paper presents an empirical analysis of the above problem, with a focus on clinical research. An analysis of visualization

April 2013 | Volume 8 | Issue 4 | e62385

Underestimation of the Impact of Clinical Research

Author Contributions

Generated and analyzed the experiments: NJ LW. Performed the experiments: NJ LW. Analyzed the data: AFJ RJM WCP. Contributed reagents/materials/analysis tools: NJ LW. Wrote the paper: NJ LW AFJ RJM WCP.

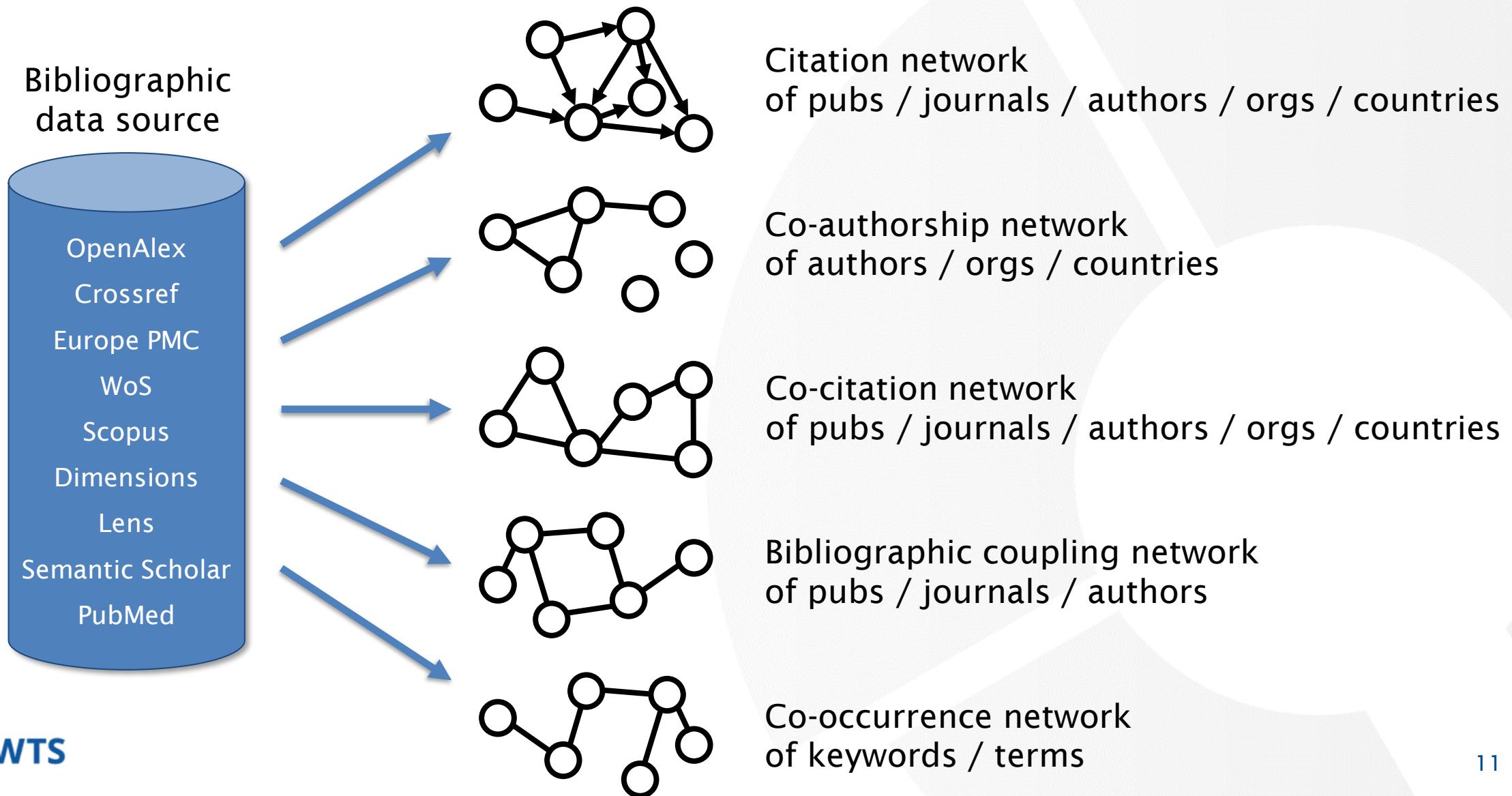
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134. Leydesdorff L, Waltman L (2012) The use of field of study in the citation analysis of scientific journals. *Journal of Informetrics* 6(1): 1–10.
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151. Leydesdorff L, Waltman L (2012) The use of field of study in the citation analysis of scientific journals. *Journal of Informetrics* 6(1): 1–10.
152. Leydesdorff L, Waltman L (2012) The use of field of study in the citation analysis of scientific journals. *Journal of Informetrics* 6

Bibliographic data sources

	OpenAlex	Dimensions	Scopus	Web of Science
Journals	180,000	110,000	40,000	30,000
Publications	150 million	110 million	50 million	80 million
Citations	1.5 billion	1.5 billion	1.7 billion	1.8 billion

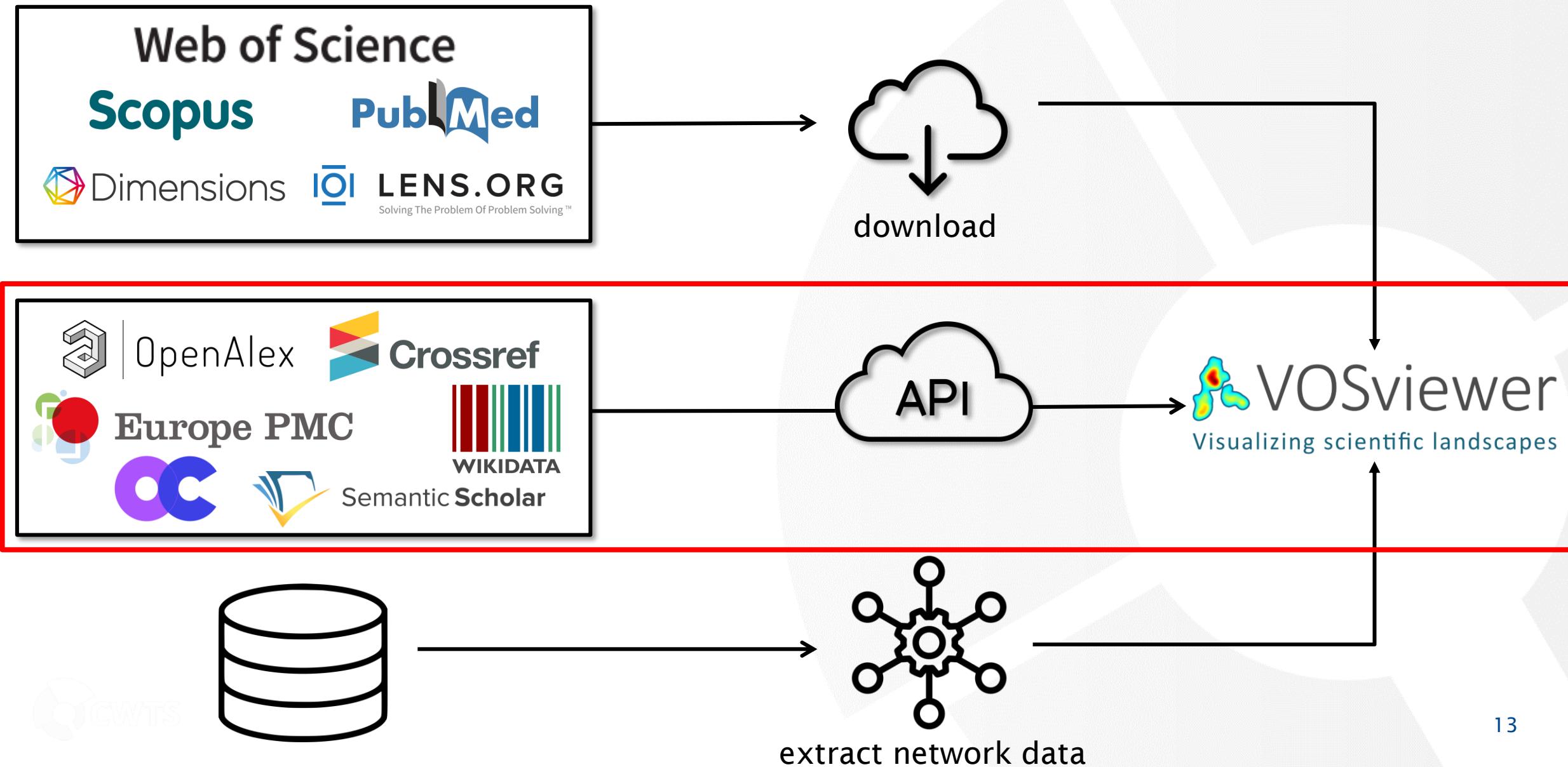
Bibliometric networks in VOSviewer

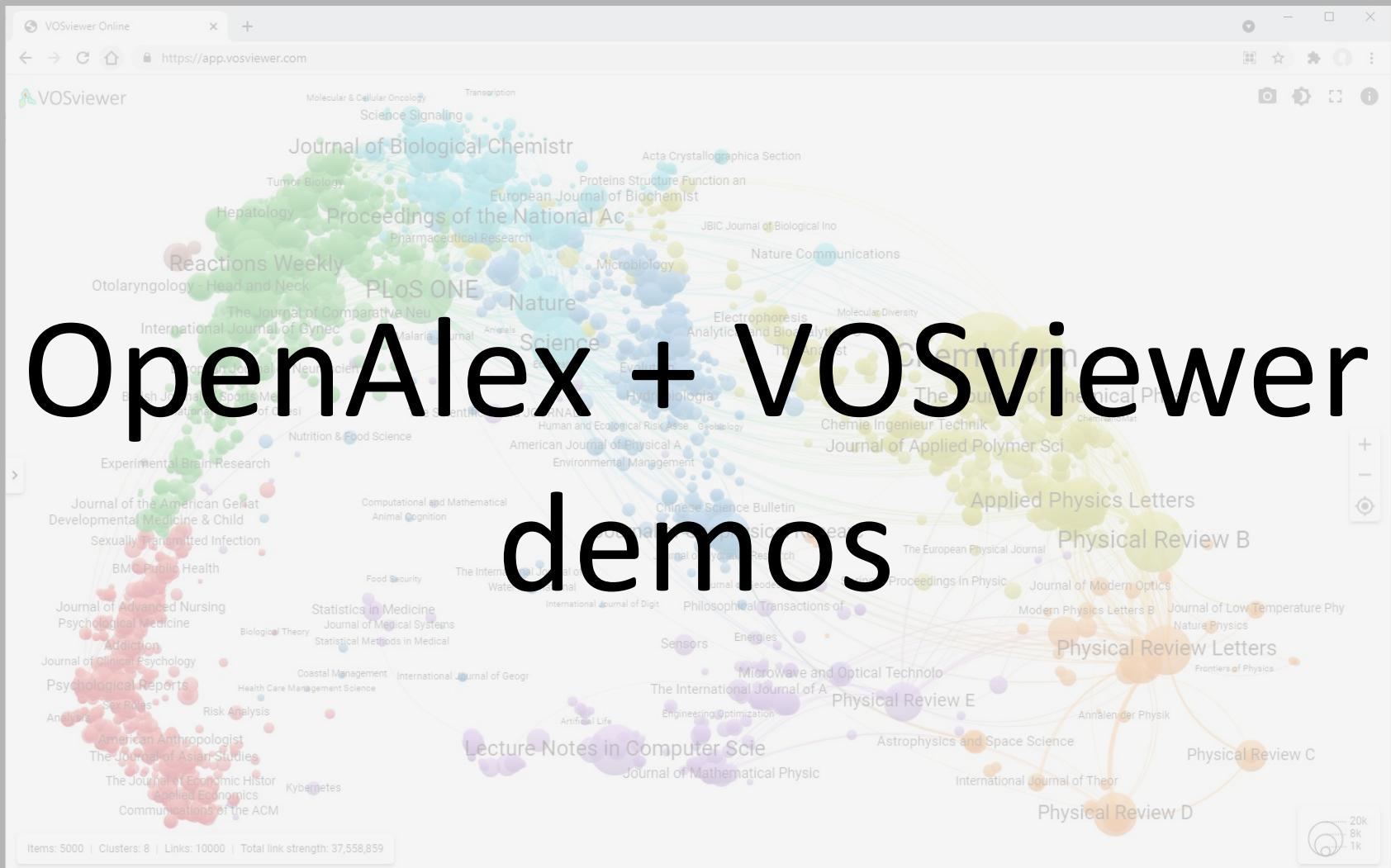


Types of networks supported by each data source

	Co-authorship	Co-occurrence	Citation	Bibliographic coupling	Co-citation
OpenAlex	✓	✓	✓	✓	✗
Crossref	✓	✓	✓	✓	✓
Europe PMC	✓	✓	✓	✓	✓
Web of Science	✓	✓	✓	✓	✓
Scopus	✓	✓	✓	✓	✓
Dimensions	✓	✓	✓	✓	✓
Lens	✓	✓	✓	✓	✗
PubMed	✓	✓	✗	✗	✗
Semantic Scholar	✓	✓	✓	✓	✓
OCC / COCI	✓	✓	✓	✓	✗
Wikidata	✓	✓	✓	✓	✗

Data access





OpenAlex + VOSviewer demos

Demo 1: Co-authorship network of a researcher

- OpenAlex

- Filters:

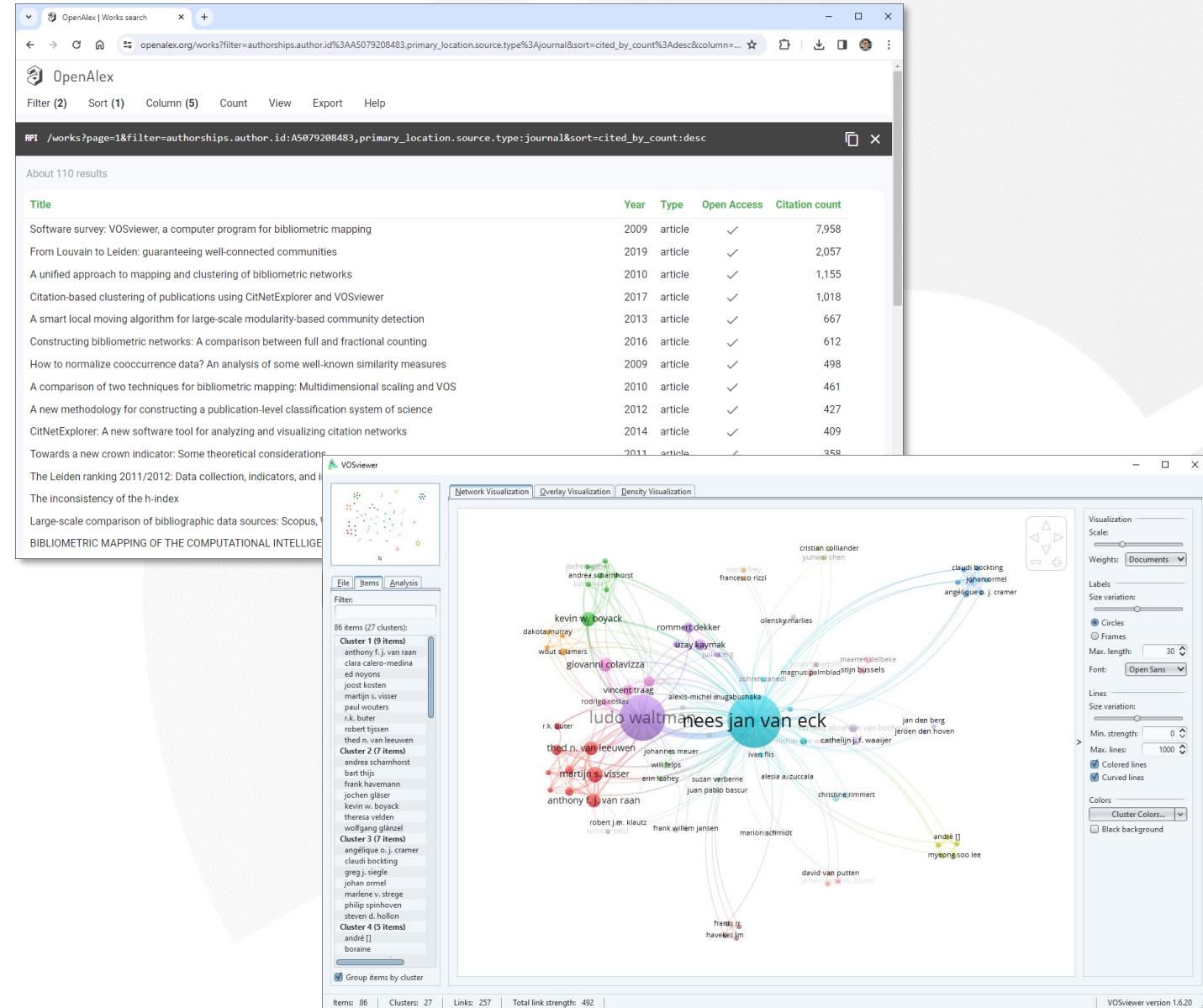
- Author: Nees Jan van Eck
 - Source type: journal

- VOSviewer

- API: OpenAlex

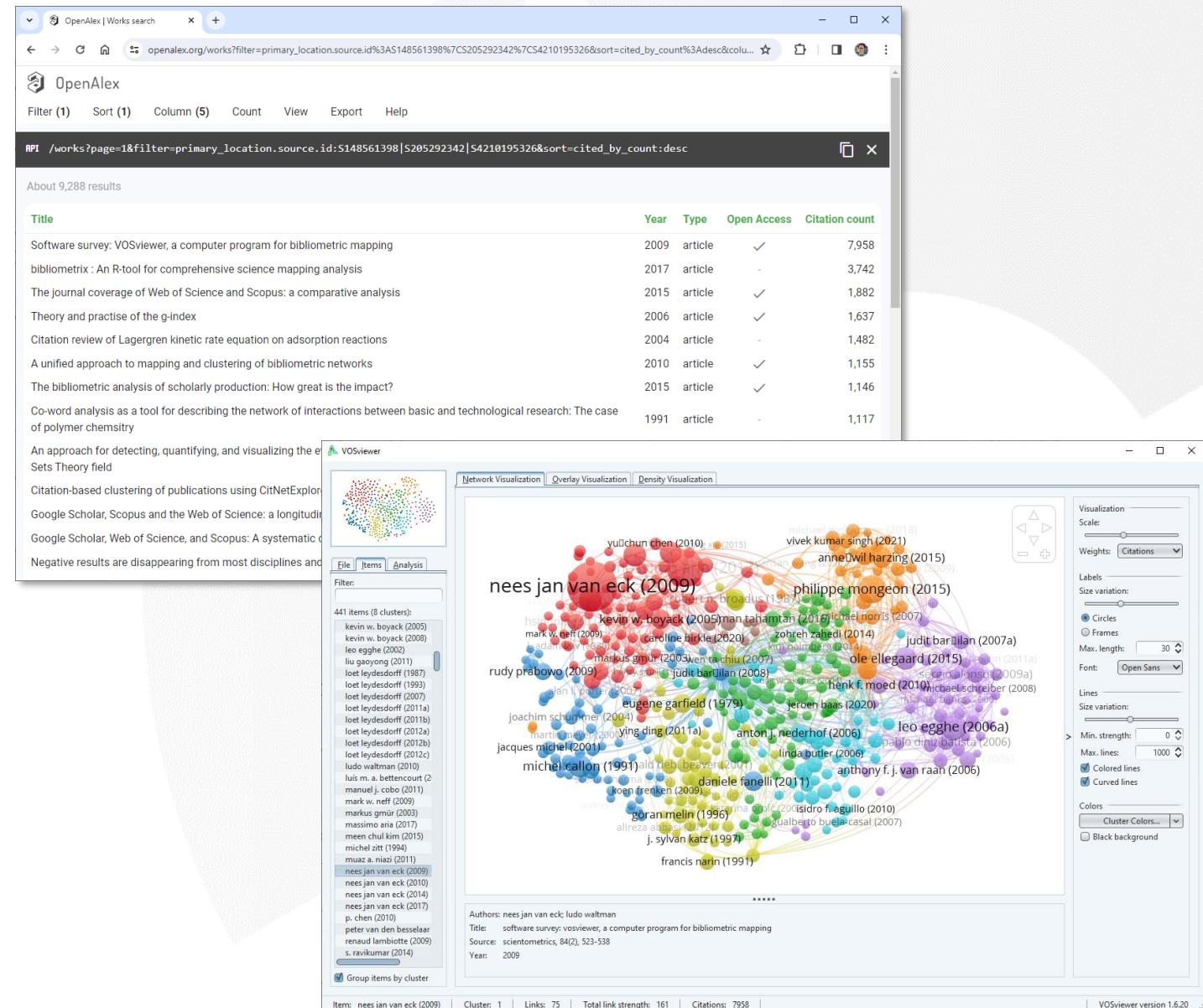
- API request URL:

https://api.openalex.org/works?page=1&filter=authorships.author.id:A5079208483,primary_location.source.type:journal&sort=cited_by_count:desc



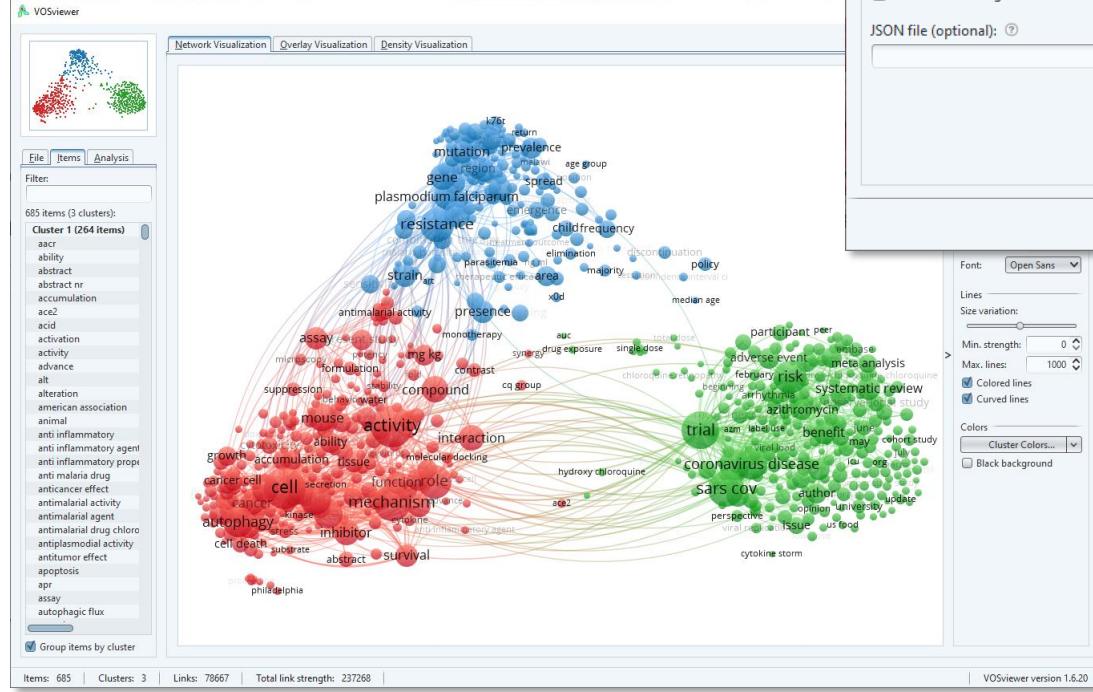
Demo 2: Bibliographic coupling network of highly cited publications

- OpenAlex
 - Filters:
 - Sources: Scientometrics OR Journal of Informetrics OR Quantitative Science Studies
- VOSviewer
 - API: OpenAlex
 - API request URL:
https://api.openalex.org/works?page=1&filter=primary_location.source.id:S148561398|S205292342|S4210195326&sort=cited_by_count:desc



Demo 3: Co-occurrence network of terms extracted from a set of related publications

- VOSviewer
 - API: OpenAlex
 - Search query:
 - Text (title): chloroquine
 - Year: 2016-2022



Create Map

 Specify API request or search query, or select files

API Request | Search Query | DOI | JSON

API:
OpenAlex

Author ID: ORCID:

Affiliation: ROR ID:

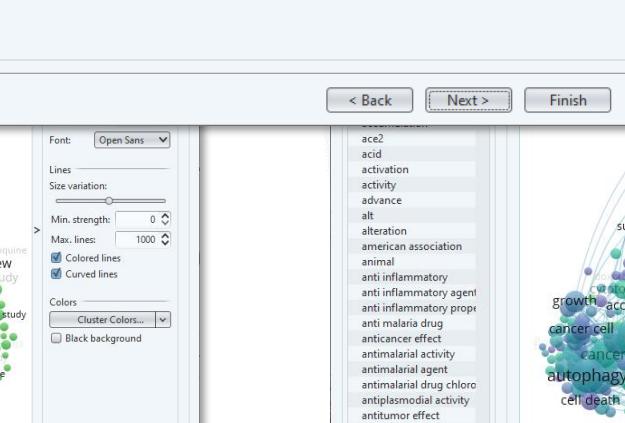
Source ID: ISSN:

Text: chloroquine Abstract Full text
 Exclude non-English documents

Year: to

JSON file (optional):

< Back



Font:

Lines

Size variation:

Min. strength: Max. lines:

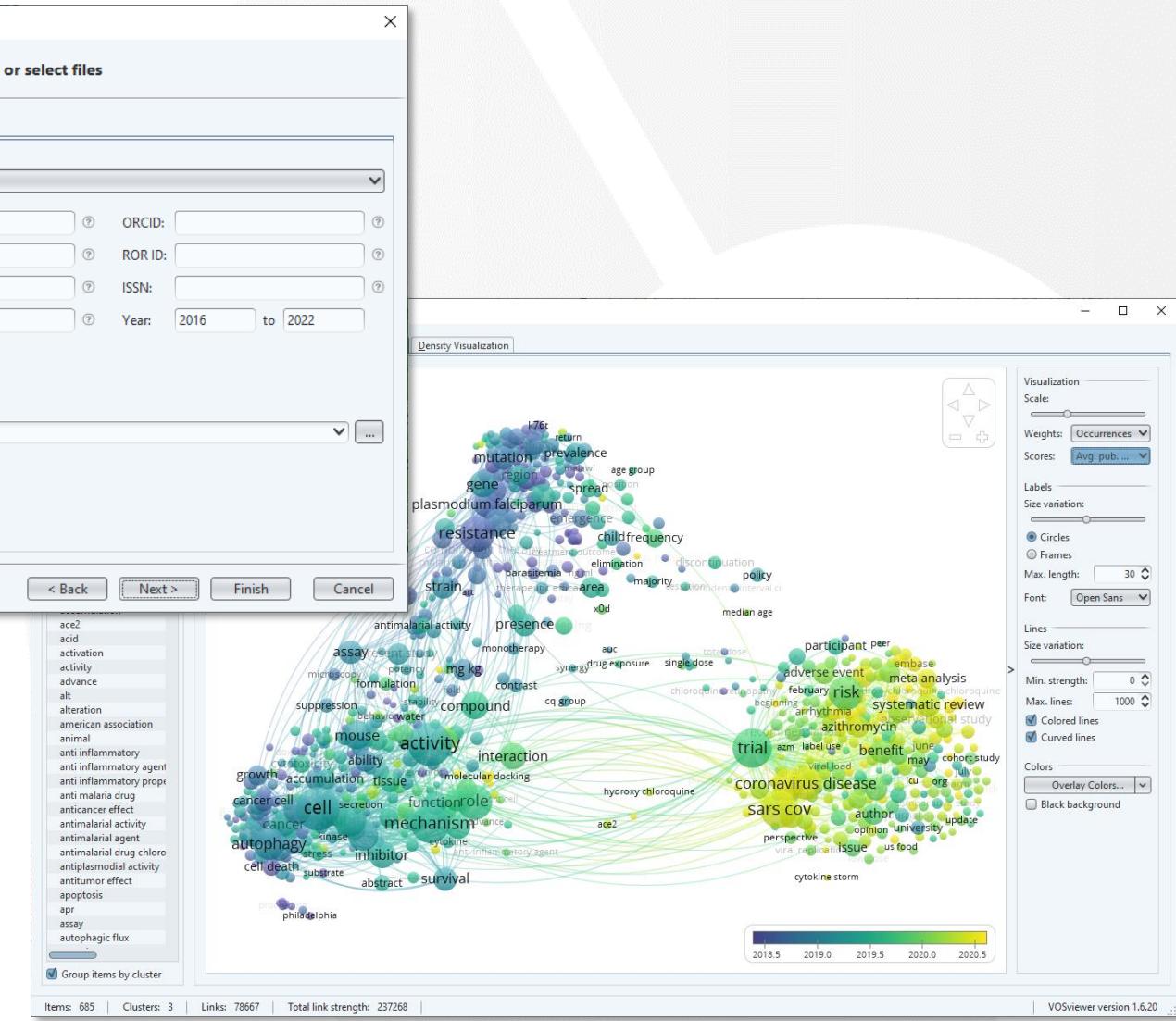
Colored lines Curved lines

Colors

Block background

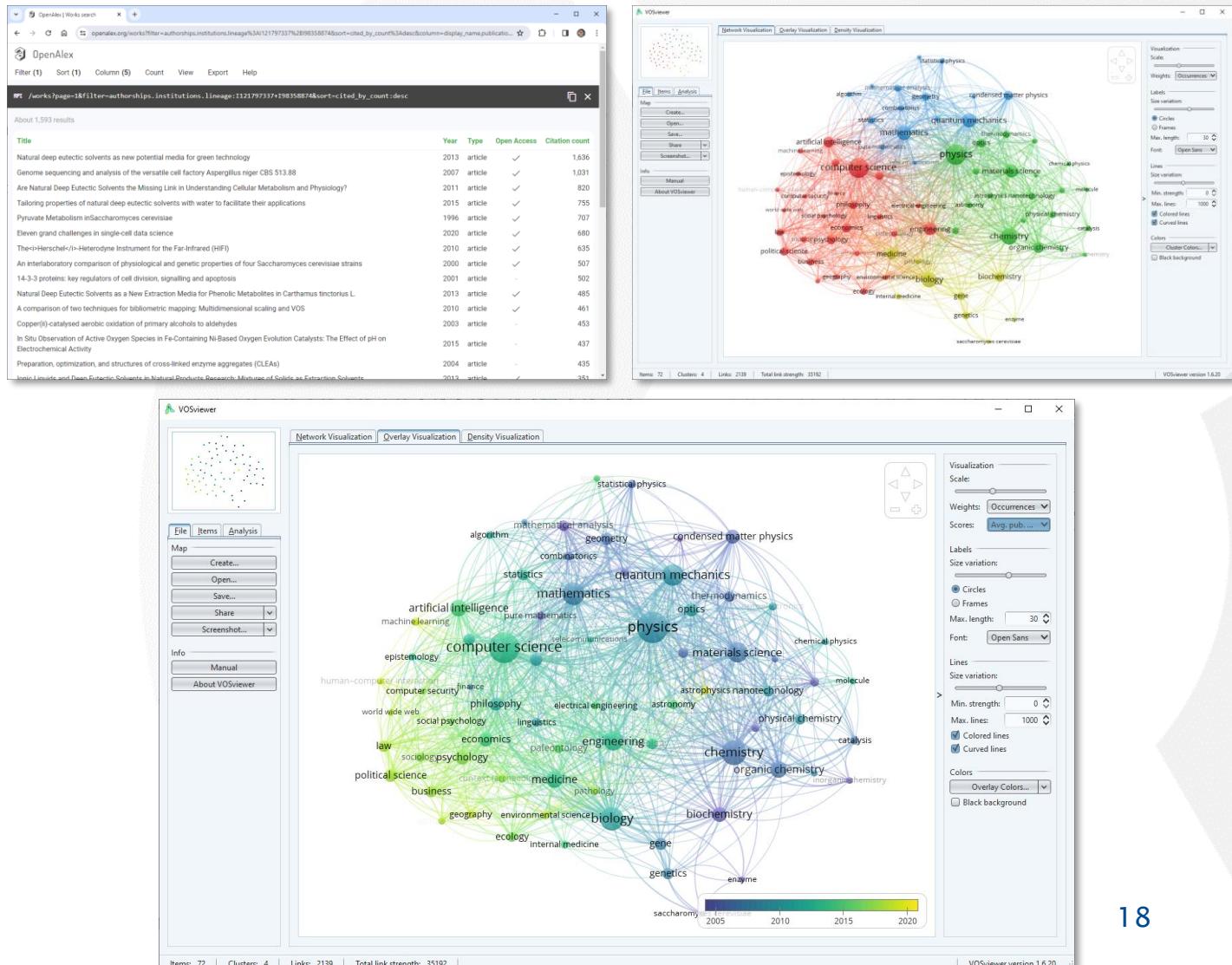
ace2
acid
activation
activity
advance
alt
alteration
american association
animal
anti inflammatory
anti inflammatory agent
anti inflammatory agents
anti malaria drug
anticancer effect
antimalarial activity
antimalarial agent
antimalarial drug chloro
antiplasmodial activity
antitumor effect
apoptosis
apr
assay
autophagic flux

Group items by cluster



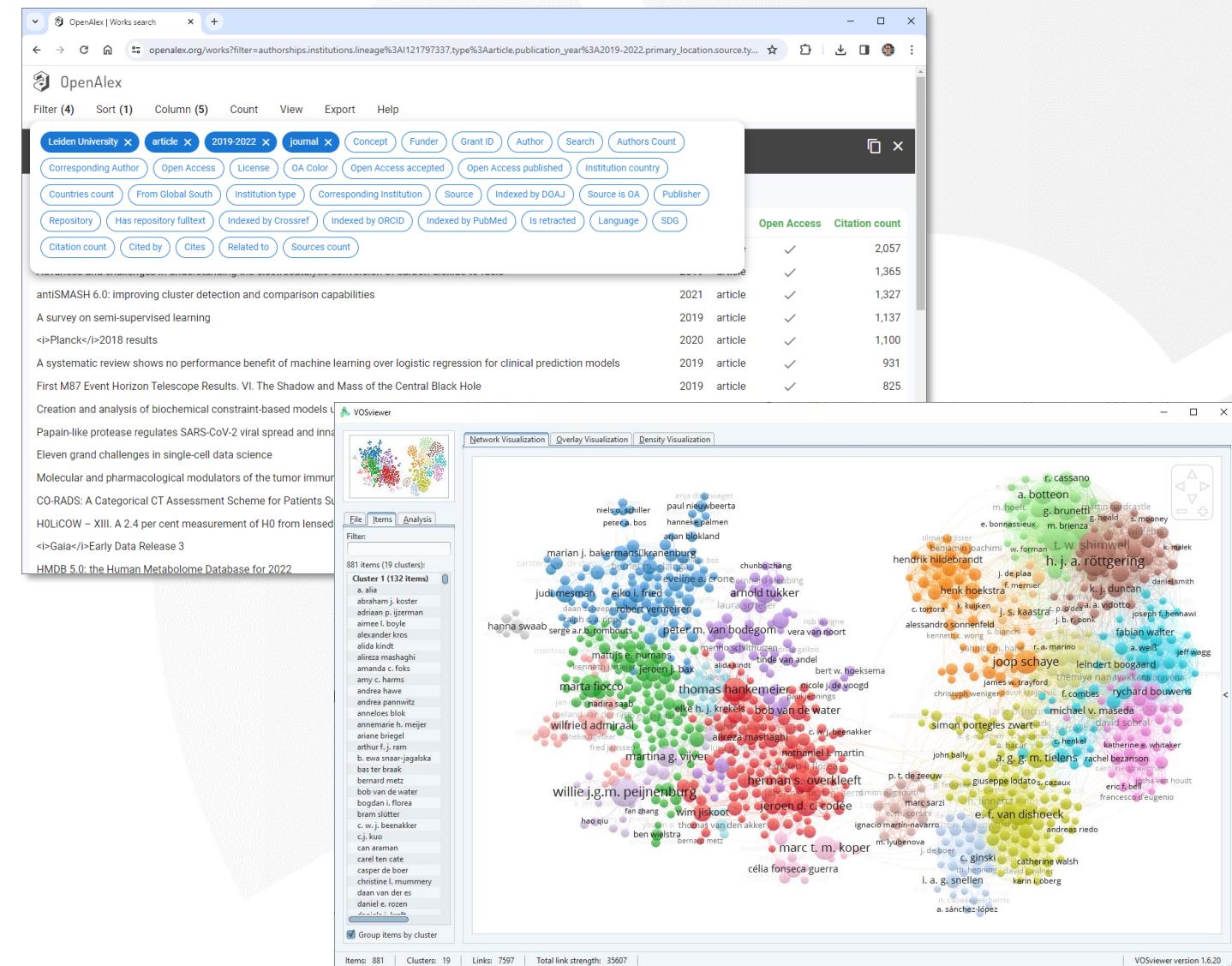
Demo 4: Co-occurrence network of concepts based on a set of collaborative publications

- OpenAlex
 - Filters:
 - Institution: Leiden University AND Delft University of Technology
- VOSviewer
 - API: OpenAlex
 - API request URL:
https://api.openalex.org/works?page=1&filter=authorships.institutions.lineage:l98358874+l121797337&sort=cited_by_count:desc



Demo 5: Co-authorship network of researchers of a university and their collaborators

- OpenAlex
 - Filters:
 - Institution: Leiden University
 - Work type: article
 - Source type: journal
 - Year: 2019-2022
 - VOSviewer
 - API: OpenAlex
 - API request URL:
https://api.openalex.org/works?filter=authorships.institution_id:1121797337,publication_date:2019-2022,type:article,primary_location.type:journal&sort=cited_count:desc



Do it yourself!

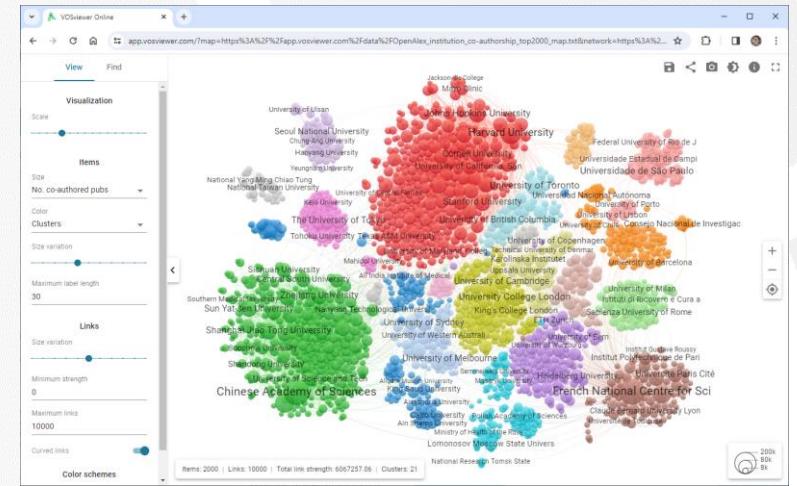
openalex.org

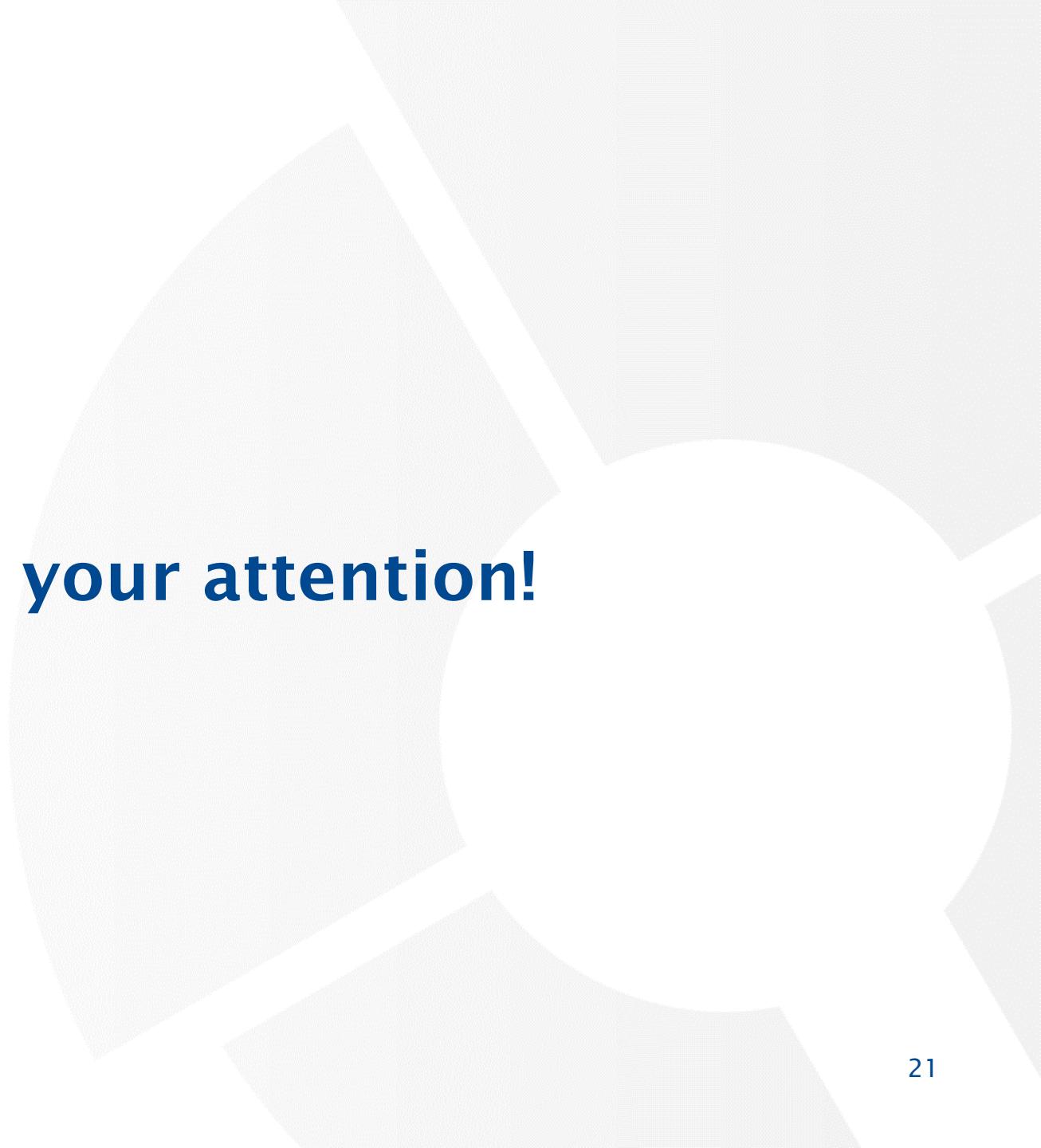
The screenshot shows the OpenAlex search interface with a filter applied for Leiden University. The results list includes various articles from 2019-2022, such as "antISMASH 6.0: improving cluster detection and comparison capabilities" and "A survey on semi-supervised learning". The interface includes a detailed filter sidebar on the left.

www.vosviewer.com



app.vosviewer.com





Thank you for your attention!

Q&A