



OpenAlex

An open & complete index of the
global research ecosystem

Today's Agenda

Introducing OpenAlex

Why you should use it

- major features
- how it compares

How you can start using it

- access methods
- form & function of the database

Q&A

Scientific Knowledge Graphs (SKGs) are essential infrastructure.

- research discovery
- scientometrics
- research intelligence and assessment

What are SKGs?

- Web of Science
- Scopus
- Google Scholar?
- Microsoft Academic Graph
- Dimensions
- Crossref, COCI
- OpenAIRE

OpenAlex is an open SKG.
And that's a major feature.

Limitations of Pay-to-view SKGs

Their subscriptions are costly

Their (your) results cannot be shared

You can't build on them

You inherit their exclusiveness

Their subscriptions are costly

- **Pressure on budgets** is intensifying at Universities (esp. library)
- Paywalls **systematically exclude** less wealthy regions
- After paying for subscription, your **access is limited**

OpenAlex is free, enabling equitable access across the globe

Their (your) results cannot be shared

- **transparency** in decision-making
- **reproducibility** of meta-research

Because **OpenAlex is completely open**, anyone can examine and replicate analyses and scenario-play factors influencing decisions

You can't build on them

Possibilities limited by closed databases & their licenses:

- access to full datasets
- commercial uses of data
- integrations with internal or external dashboards
- development of derivative tools

OpenAlex data and codes are under CCO, anyone can examine and use however they wish without lawyers

You inherit their exclusiveness

Exclusiveness criteria that create biases:

- must have an English abstract
- publication status
- theses/dissertations excluded
- type of peer review
- journal has relatively few citations
- geographical diversity of authors

OpenAlex does not apply indexing criteria so **you can pick which data to include** for your purposes

**OpenAlex has broader coverage
than any other SKG.**

SKG content coverage

	Works	Citations	Authors	Venues	Institutions
Web of Science (core)	82M	1.8B	17M	24k	11k
Scopus	82M	1.7B	17M	40k	80k
Google Scholar	390M	?	4M?	?	-
MAG	204M	1.7B	206B	49k	27k
Dimensions	148M	1.6B	28k	74k	100k
Crossref/COCI	135M	1.3B	4.5M	104k	1k
OpenAlex	236M	1.8B	243M	124k	 108k

OpenAlex indexes works & associated metadata

- Sources [232k] ←
- Concepts [65k] ←
- Publishers [10k] ←
- Institutions [102k] ←
- Works [243M] ←
- Funders [32k] ←
- Authors [91M] ←

Sudden collapse of a mesopredator reveals its complementary role in mediating rocky reef regime shifts

Work (Article)

[HTML](#)

Published: 2018
Source: Proceedings of The Royal Society B: Biological Sciences
Authors: Jenn M. Burt (Simon Fraser University); M. Tim Tinker (University of California, Santa Cruz); Daniel K. Okamoto (Florida State University, Simon Fraser University); Kyle W. Demes (University of British Columbia, Simon Fraser University); Keith Holmes (Tula Foundation); Anne K. Salomon (Simon Fraser University)
Concepts: Trophic cascade, Mesopredator release hypothesis, Reef

Cited by: 76
Cites: 55
Related: 10

Abstract

While changes in the abundance of keystone predators can have cascading effects resulting in regime shifts, the role of mesopredators in these processes remains underexplored. We conducted annual surveys of rocky reef communities that varied in the recovery of a keystone predator (sea otter, *Enhydra lutris*) and the mass mortality of a mesopredator (sunflower sea star, *Pycnopodia helianthoides*) due to an infectious wasting disease. By fitting a population model to empirical data, we show that sea otters had the greatest impact on the mortality of large sea urchins, but that *Pycnopodia* decline corresponded to a 311% increase in medium urchins and a 30% decline in kelp densities. Our results reveal that predator complementarity in size-selective prey consumption strengthens top-down control on urchins, affecting the resilience of alternative reef states by reinforcing the resilience of kelp forests and eroding the resilience of urchin barrens. We reveal previously underappreciated species interactions within a 'classic' trophic cascade and regime shift, highlighting the critical role of middle-level predators in mediating rocky reef state transitions.

Funders (4) ↓

Locations (3) ↓

Identifiers (4) ↓

Some of the metadata available (docs.openalex.org/)

Work

Bibliographical [title, publication date/year]
Related PIDs [ID, DOI, PMID, PMCID, MAG,]
Access [License, OA Color, OA version, OA Link],
Authors & Institutions [#, Names, IDs, Corresponding]
APC [List price, Paid, Paid: provenance]
Repository locations [Name, Availability, Distinct #]
Funder [Name, Grant ID]
Citations [Refenced, Citing, Cited by count]
Related works, Concepts, SDGs, MeSH, ngrams
Type, Paratext, Retraction status, Language,
Source [Name, Type, Publisher, OA, DOAJ]

Institution

Name [Display, Acronyms, Alternatives], ID, Type
Location [City, Country, Region, Lat/Lon]
Repositories, Associated institutions
Roles (institution, publisher, funder)
Works [Counts, Citations, Concepts]

Author

Name (display, alternatives), ID, ORCID,
Works [Counts, Citations, H'index, i10_index, Concepts]
Last known institution

Source

Name
ID, ISSN, MAG, Wikidata,
Hosting organizations, Societies
OA? In DOAJ?
APC price & currency
Works [Counts, Citations, Concepts]

Concepts

Name
ID, Wikidata,
Concept level, Ancestor concepts
Description (multiple languages), Related concepts
Works count, Cited by count

**OpenAlex can be open because
it's super cheap to make.**

Why is OpenAlex so cheap?

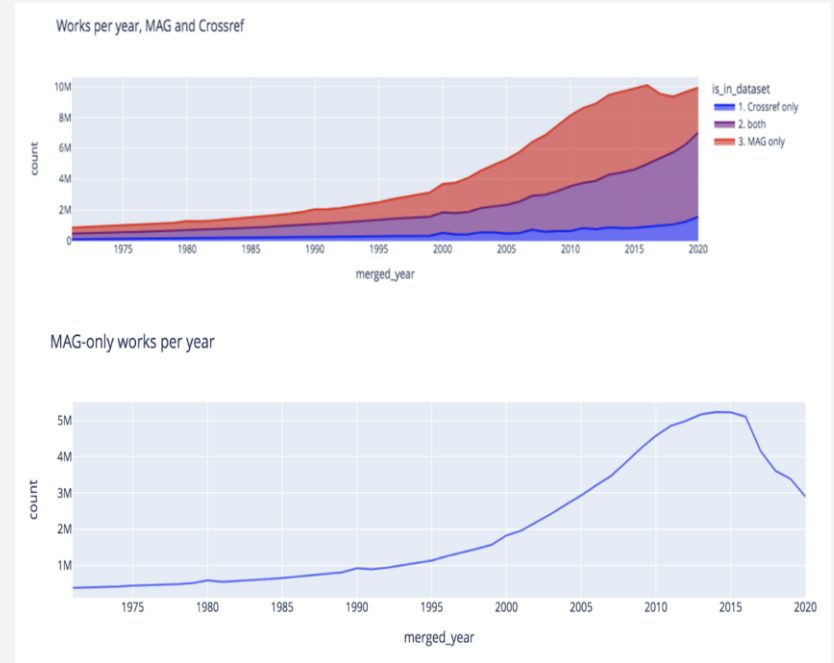
Open MAG data

Open Source ML

Open Access literature

Open PID graphs

- Works: DOI
- Citations: Crossref
- Authors: ORCID
- Journals: ISSN
- Institutions: ROR
- Concepts: Wikidata



**Surprised it's free and better?
See what others have to say.**

Testimonials

“I am the main developer of VOSviewer, one of the most popular software tools worldwide for visualizing scientific literature based on bibliographic data. VOSviewer supports a large number of bibliographic databases. However, most of these databases have important limitations:

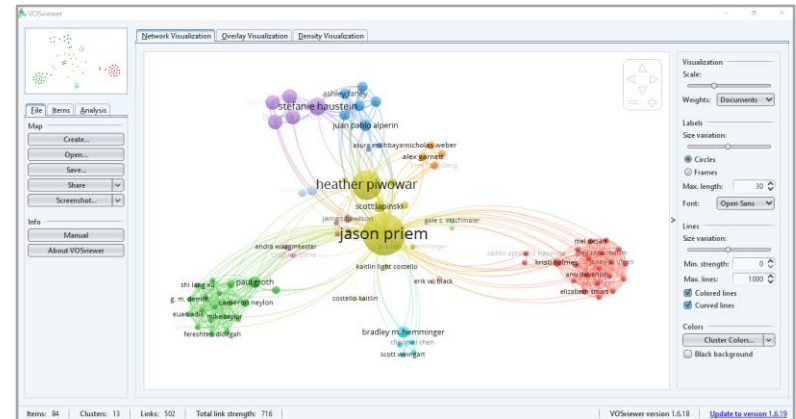
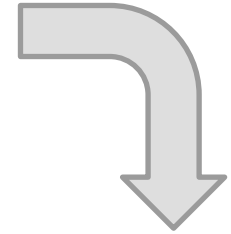
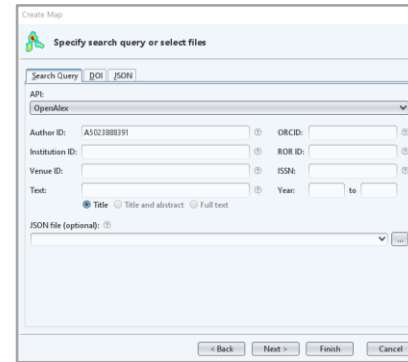
They require an expensive subscription (Web of Science, Scopus),

- their coverage of the scientific literature is limited (Web of Science, Scopus),
- they allow only small amounts of data to be exported (Web of Science, Scopus, Dimensions),
- they are restricted to specific disciplines (PubMed, Europe PMC),
- there are major gaps in their data (PubMed, Europe PMC, Crossref, OpenCitations), and/or
- downloading data is very slow (Crossref, OpenCitations).

OpenAlex is of crucial importance for VOSviewer users because it offers a better performance than other databases on all the above-mentioned criteria.

VOSviewer users regularly run into problems because of the limitations of bibliographic databases. When they ask me for help, I often refer them to OpenAlex as an alternative database that is likely to offer a solution to their problem. I consider OpenAlex to be a fundamental building block for an ecosystem of open infrastructures for high-quality research analytics.”

— Nees Jan van Eck, Centre for Science and Technology Studies (CWTS), Leiden University



Testimonials

“OpenAlex helps **significantly optimize the performance of our literature search**, and thus shorten our overall R&D time.”

– Trang Le, Bristol Myers Squibb

MORE

enterprise

“The OpenAlex API helps us to **consolidate and accelerate** our data collection.”

– Michaela Voigt, Technische Universität Berlin (University library)

MORE

analytics

“[We] have now **moved 100% to OpenAlex**...data and metadata are very complete.”

– André Vermeij, Kenedict

MORE

analytics

“OpenAlex is **CC0 and we can share everything** without worrying or talking to lawyers! It is really great.”

– Tom Theile, Max-Planck-Institute for demographic research

MORE

research

“OpenAlex is highly recommended for its **fast, open, and high-quality** scholarly data”

– Tim Wölfle, Local Citation Network

MORE

enterprise

“OpenAlex gives me an open-source alternative that's **large, free, and has an easy-to-use API**.”

– Chris B., PhD student at US research university

MORE

research

“**The best solution** for academic use cases like ours that are working to further diversity and equity in research.”

– Chinar Dankhara, Georgia Institute of Technology

MORE

analytics

“This is a powerful tool that has already cemented itself as an **integral and vital** part of bibliographic studies.”

– Eric Schares, Iowa State University Library

MORE

analytics

“OpenAlex is the best in terms of completeness, data quality, and ease of use....OpenAlex is **better than the paid data sources**”

– Adam Day, Clear Skies Library

MORE

enterprise

More online at:
openalex.org/testimonials

OpenAlex does have limitations.

OpenAlex limitations

- **Bias:** Inherits from sources, esp Crossref and MAG
- **Research base:** Not much, but rapidly growing
- **Coverage:** No patents. Limited software, datasets
- **Stability:** Data changing (improving) monthly

OpenAlex History

May 2021- Microsoft announced MAG sunsetting

Dec 2021- MAG discontinued

Jan 2022- OpenAlex beta launched

May 2022- User Group launched

August 2022- Full text search

December 2022- Customer support ticket system

March 2023- Premium offering launched

July 2023- Improved author disambiguation launched

How you can access OpenAlex.

OpenAlex snapshot

The screenshot shows the AWS S3 Explorer interface for the bucket named 'openalex'. The breadcrumb path is 'AWS S3 Explorer > openalex'. The interface includes a search bar, a 'Show 50 entries' dropdown, and a table of objects. The table columns are Object, Last Modified, Timestamp, and Size. The objects listed are 'data/' (a folder), 'browse.html' (32 KB, modified a year ago), 'LICENSE.txt' (7 KB, modified 7 months ago), 'README.txt' (129 Bytes, modified 2 months ago), and 'RELEASE_NOTES.txt' (5 KB, modified a month ago). At the bottom, there is a pagination control showing 'Showing 1 to 5 of 5 entries' and buttons for 'Previous', '1', and 'Next'.

AWS S3 Explorer **openalex** Hide folders? Folder Bucket Settings 5

Show entries Search:

Object	Last Modified	Timestamp	Size
data/			
browse.html	a year ago	2022-05-18 10:09:34	32 KB
LICENSE.txt	7 months ago	2022-12-30 11:04:09	7 KB
README.txt	2 months ago	2023-06-06 06:11:51	129 Bytes
RELEASE_NOTES.txt	a month ago	2023-07-11 19:14:20	5 KB

Showing 1 to 5 of 5 entries Previous **1** Next

OpenAlex API

← → ↻ <https://api.openalex.org/works> 🔍 📄 ☆ 🔧 🖨️ 📱 🗑️ 🌐 🗨️ 📄 🗨️ 👤 ⋮
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```
{
- meta: {
  count: 236814898,
  db_response_time_ms: 13,
  page: 1,
  per_page: 25
},
- results: [
  - {
    id: "https://openalex.org/W4221153462",
    doi: null,
    title: "L'essai Trinity (1945) et les risques d'embrassement de l'atmosphère : entre spéculation SF, modélisation",
    display_name: "L'essai Trinity (1945) et les risques d'embrassement de l'atmosphère : entre spéculation SF, modélisation",
    publication_year: 2029,
    publication_date: "2029-11-01",
    - ids: {
      openalex: "https://openalex.org/W4221153462"
    },
    - host_venue: {
      id: null,
      issn_l: null,
      issn: null,
      display_name: null,
      publisher: null,
      type: null,
      url: "https://hal.archives-ouvertes.fr/hal-03567541",
      is_oa: null,
      version: null,
      license: null
    }
  }
]
```

OpenAlex web interface- in Beta!

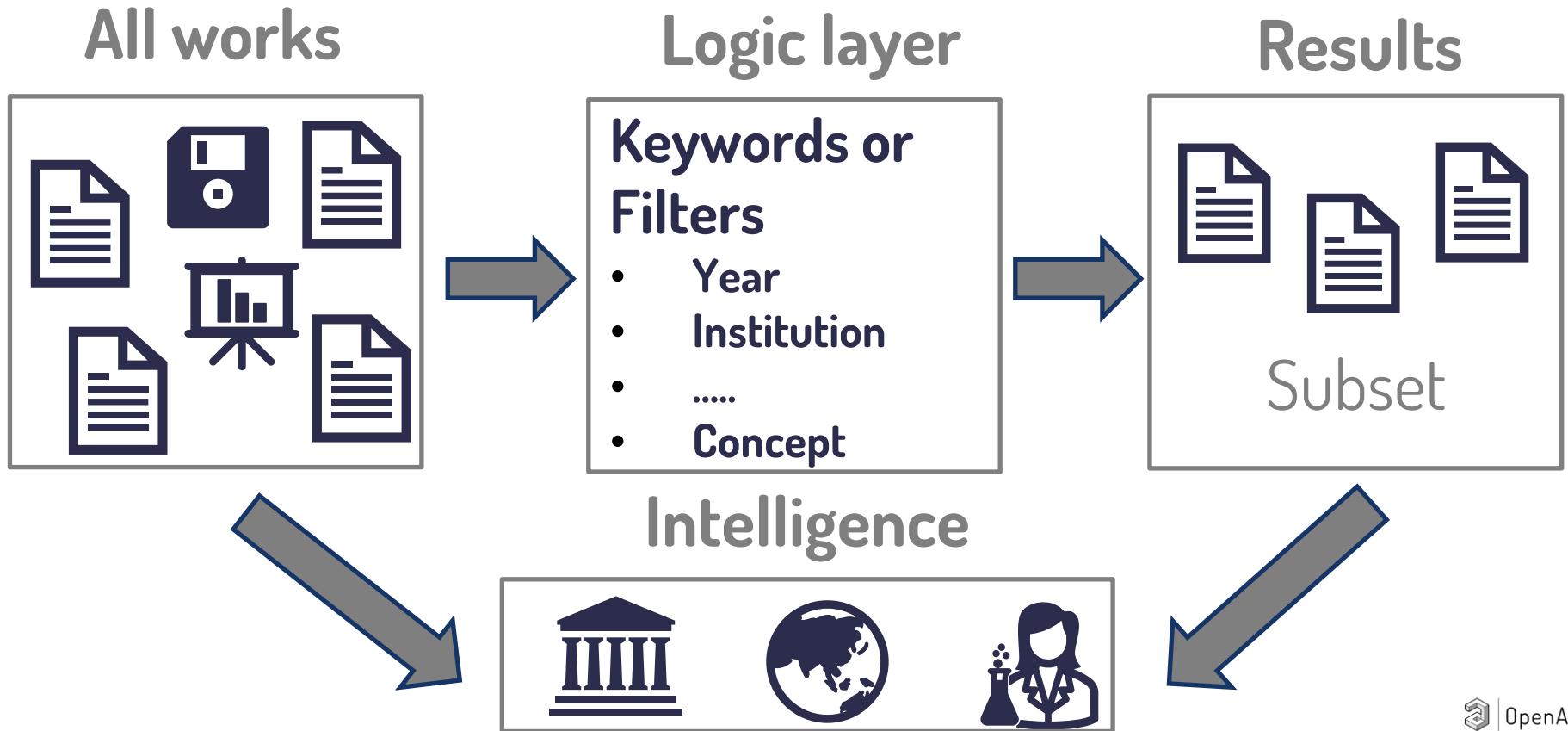
The screenshot displays the OpenAlex web interface. At the top left is the OpenAlex logo. A search bar contains the text 'frogs'. Below the search bar, there are 20 results listed. The first result is 'Effects of extracts of seed and leaf of Piper guineense on skeletal muscle activity in rat and frog.' by F. V. Udoh, T. Y. Lot, et al. - *Phytotherapy Research*, 1999. The second result is 'Frog Consumption Pattern in Ibadan, Nigeria' by F. A. Akinyemi, Efenakpo Dean Ogaga - *Journal for Studies in Management and Planning*, 2015. The third result is 'Mycoflora, Mycotoxin Contamination and Proximate Mineral Composition of Smoke-Dried Frog (Aubria sp.) (Konko) Sold in Ibadan, Oyo State, Nigeria' by Bukola Christianah Adebayo-Tayo, Folahanmi Adeyemi, et al. - *Turkish Journal of Agriculture: Food Science...*, 2015. The fourth result is 'Cryptosporidium in Wild Frogs (Rana spp) Consumed by humans in Kaduna State Nigeria' by G.S.N. Kia, Blessing Iveren Ukuma, et al. - *Online Journal of Public Health Informatics*, 2017. The fifth result is 'Anurans as Intermediate and Paratenic Hosts of Helminth Infections in the Rainforest and Derived Savanna Biotopes of Southern Nigeria' by A.A. Imasuen, Habibat J. Ozemoka, et al. - *International Journal of Zoology*, 2012. On the left side, there are filters for Concepts, Venues, Institution, Author, Fulltext Available (checked), Publisher, Country (checked), and Type. On the right side, there are options for Home, About, and a 'FULLTEXT VIA PUBLISHER' button.

GUI for accessing specific subsets of data, building API calls, and exporting data

Walk-through coming soon!

**Functions enabled by the content
and metadata structure.**

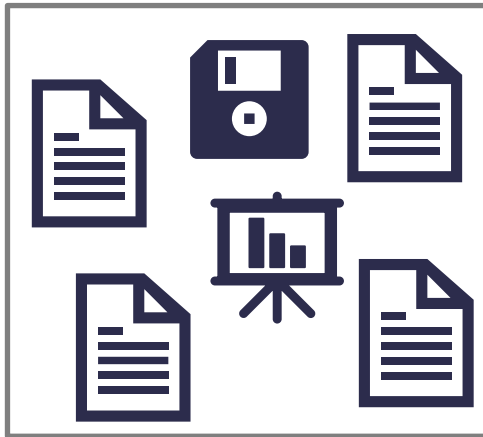
Subsetting & Analysing the Data



Find specific works

e.g., Open access journal publications mentioning kelp with an author from Canada that was funded by NSERC

All works



Logic layer

Keywords or Filters

- "kelp"
- OA
- Canada
- journal
- Funded by NSERC

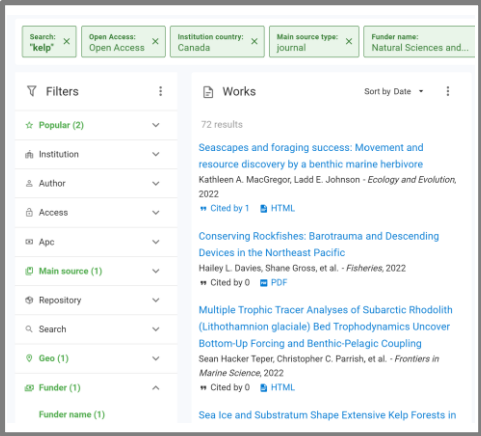
Results

A screenshot of a search results interface. At the top, there are search filters: "Search: 'kelp'", "Open Access: Open Access", "Institution country: Canada", "Main source type: Journal", and "Funder name: Natural Sciences and...". Below this is a "Filters" sidebar on the left with expandable sections for "Popular (2)", "Institution", "Author", "Access", "Apc", "Main source (1)", "Repository", "Search", "Geo (1)", "Funder (1)", and "Funder name (1)". The main area shows "72 results" and a list of three works. The first work is "Seascapes and foraging success: Movement and resource discovery by a benthic marine herbivore" by Kathleen A. MacGregor, Ladd E. Johnson, published in "Ecology and Evolution, 2022". The second is "Conserving Rockfishes: Barotrauma and Descending Devices in the Northeast Pacific" by Halley L. Davies, Shane Gross, et al., published in "Fisheries, 2022". The third is "Multiple Trophic Tracer Analyses of Subarctic Rhodolith (Lithothamnion glaciale) Bed Trophodynamics Uncover Bottom-Up Forcing and Benthic-Pelagic Coupling" by Sean Hacker Teper, Christopher C. Parrish, et al., published in "Frontiers in Marine Science, 2022".

Common intelligence use cases

e.g., Open access journal publications mentioning kelp with an author from Canada that was funded by NSERC

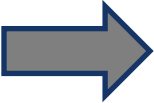
Results



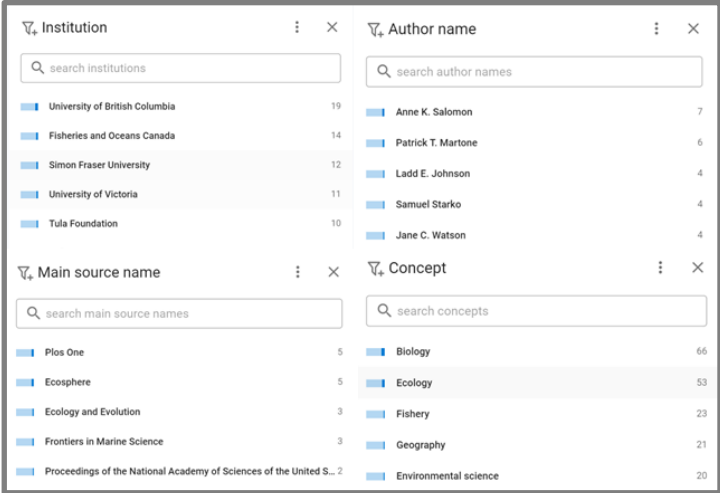
Search: "kelp" x Open Access: Open Access x Institution country: Canada x Main source type: journal x Funder name: Natural Sciences and...

Filters: Popular (2), Institution, Author, Access, Apc, Main source (1), Repository, Search, Geo (1), Funder (1), Funder name (1)

Works: 72 results. Sort by Date. Includes titles like "Seascapes and foraging success: Movement and resource discovery by a benthic marine herbivore" and "Conserving Rockfishes: Barotrauma and Descending Devices in the Northeast Pacific".



Intelligence



Intelligence filters:

- Institution:** University of British Columbia (19), Fisheries and Oceans Canada (14), Simon Fraser University (12), University of Victoria (11), Tula Foundation (10)
- Author name:** Anne K. Salomon (7), Patrick T. Martone (6), Ladd E. Johnson (4), Samuel Starke (4), Jane C. Watson (4)
- Main source name:** Plos One (5), Ecosphere (5), Ecology and Evolution (3), Frontiers in Marine Science (3), Proceedings of the National Academy of Sciences of the United S... (2)
- Concept:** Biology (66), Ecology (53), Fishery (23), Geography (21), Environmental science (20)

OpenAlex API: filter

< → ↺ <https://api.openalex.org/works?filter=institutions.ror:https://ror.org/01cwqze88> 🔍 📄 ☆ 🖨️ 📱 🗄️ 🌐 🎧 🗂️ 👤 ⋮

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```
{
- meta: {
  count: 320955,
  db_response_time_ms: 70,
  page: 1,
  per_page: 25
},
- results: [
  - {
    id: "https://openalex.org/W3175558339",
    doi: "https://doi.org/10.1080/21645515.2021.1908030",
    title: "Prediction of serum HIV-1 neutralization titers of VRC01 in HIV-uninfected Antibody Mediated Prevention",
    display_name: "Prediction of serum HIV-1 neutralization titers of VRC01 in HIV-uninfected Antibody Mediated Pre",
    publication_year: 2022,
    publication_date: "2022-12-31",
    - ids: {
      openalex: "https://openalex.org/W3175558339",
      doi: "https://doi.org/10.1080/21645515.2021.1908030",
      mag: "3175558339",
      pmid: "https://pubmed.ncbi.nlm.nih.gov/34213402"
    },
    - host_venue: {
      id: "https://openalex.org/V2483136528",
      issn_l: "2164-5515",
      - issn: [
        "2164-5515",
        "2164-554X"
      ],
      display_name: "Human Vaccines & Immunotherapeutics",
```

OpenAlex API: group

← → ↻ https://api.openalex.org/works?filter=institutions.ror:https://ror.org/01cwqze88&group_by=oa_status 🔍 📄 ☆ 🗑️ 📧 📺 📻 📡 📶 📷 📸 📹 📺 📻 📡 📶 📷 📸 📹

+ view source -

```
- group_by: [  
  - {  
    key: "closed",  
    key_display_name: "closed",  
    count: 136100  
  },  
  - {  
    key: "bronze",  
    key_display_name: "bronze",  
    count: 62526  
  },  
  - {  
    key: "green",  
    key_display_name: "green",  
    count: 49484  
  },  
  - {  
    key: "gold",  
    key_display_name: "gold",  
    count: 33073  
  },  
  - {  
    key: "unknown",  
    key_display_name: "unknown",  
    count: 21913  
  },  
  - {  
    key: "hybrid",  
    key_display_name: "hybrid",  
    count: 11000  
  }  
]
```


Additional Resources

OpenAlex Resources

documentation: <https://docs.openalex.org/>

tutorial: <https://docs.openalex.org/quickstart-tutorial>

google user group: <https://groups.google.com/g/openalex-users>

help tickets: <https://openalex.org/help>

upcoming webinars: <https://openalex.org/webinars>

Other Resources

R Library to interface with OpenAlex APIs: <https://docs.ropensci.org/openalexR/>

**OpenAlex is open and ready for use.
Go play with it!**

<https://openalex.org/feedback>

SKG content coverage sources

- * <https://link.springer.com/article/10.1007/s11192-018-2958-5>
- * <https://link.springer.com/article/10.1007/s11192-021-03948-5>
- * <https://www.crossref.org/06members/53status.html>
- * <https://api.openalex.org>
- * <https://api.crossref.org/works>
- * <https://app.dimensions.ai/discover/publication>
- * <https://clarivate.libguides.com/librarianresources/coverage>
- * https://api.crossref.org/works?facet=ror-id:*
- * queries on closed-source WoS database
- * <https://www.mdpi.com/2304-6775/9/1/12>
- * <https://twitter.com/albertomartin/status/1534088434427604992>
- * <https://twitter.com/digitalsci/status/1534182383066525696>

OpenAlex coverage of the Global South

22k institutions

21M authors

22M works

1/3 of works are in non-English language

[source: our API!](#)

```
...
188
189 def institutions_in_global_south():
190     total = 0
191     for country in GLOBAL_SOUTH_COUNTRIES:
192         country_code = countries.get(country).alpha2
193         r = requests.get(
194             f"https://api.openalex.org/institutions?filter=country_code:{country_code}&mailto:jason@ourresearch.org"
195         )
196         institution_count = r.json()["meta"]["count"]
197         print(
198             f"{institution_count} institutions in {countries.get(country).name} ({country_code})"
199         )
200         total = total + institution_count
201     return total
202
203 def works_from_global_south():
204     total = 0
205     for country in GLOBAL_SOUTH_COUNTRIES:
206         country_code = countries.get(country).alpha2
207         r = requests.get(
208             f"https://api.openalex.org/works?filter=authorships.institutions.country_code:{country_code}&mailto:jason@ourresearch.org"
209         )
210         works_count = r.json()["meta"]["count"]
211         print(
212             f"{works_count} works from {countries.get(country).name} ({country_code})"
213         )
214         total = total + works_count
215     return total
216
217 def authors_from_global_south():
218     total = 0
219     for country in GLOBAL_SOUTH_COUNTRIES:
220         country_code = countries.get(country).alpha2
221         r = requests.get(
222             f"https://api.openalex.org/authors?filter=last_known_institution.country_code:{country_code}&mailto:jason@ourresearch.org"
223         )
224         authors_count = r.json()["meta"]["count"]
225         print(
226             f"{authors_count} authors from {countries.get(country).name} ({country_code})"
227         )
228         total = total + authors_count
229     return total
230
231
232
233 if __name__ == "__main__":
234     institutions_count = institutions_in_global_south()
235     print(f"{institutions_count:,} institutions in the Global South")
236     # 22,073 institutions in the Global South
237
238     works_count = works_from_global_south()
239     print(f"{works_count:,} works from the Global South")
240     # 22,978,988 works from the Global South
241
242     authors_count = authors_from_global_south()
243     print(f"{authors_count:,} authors with last known affiliation in Global South")
```