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# You are Crossref

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[crossref.org](https://crossref.org)

A decorative pattern of white dots of varying sizes arranged in vertical columns of varying heights, located in the bottom right corner of the page.

This is the story of our origins, of how and why we have grown and evolved over twenty years into an indispensable, community-governed infrastructure for research.

Most of the advances we have made are geared towards greater metadata connectedness, through the provision of a number of tools and services — all of which provide benefit to our members, other metadata users, and the scholarly communications community as a whole.

So, read on to discover why we exist and persist, who we fundamentally are, what we believe in, what we do, and how — with the help of our extended community — we do it.

# WE LCO ME



# Why we exist and persist

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With the emergence of the internet, articles became clickable as URLs were used to link and cite work. But there were two problems. First, publishers had to sign hundreds of individual linking agreements with each other—which would have become overwhelming. Second, some URLs began to fail, mainly due to content being moved or URL schemes changing, and could no longer be relied upon.

Enter the Digital Object Identifier (DOI). Unlike a URL, a DOI is a persistent identifier—a life-long reference—that specifies the content of an online object, not the location. This means it remains associated with the object, irrespective of changes to the object’s web address. The DOI is associated with a URL, and can be updated centrally so the DOI also goes to the current location of the content. That central updating happens through Crossref.

In the year 2000, Crossref was founded by a group of forward-thinking scholarly publishers who understood the need to provide a collaborative, central Reference Linking service—using DOIs—which would be accessible to, and governed by, the global scholarly communications community.

Over the years Crossref has evolved and [our mission](#) is now broader than just DOIs and [Reference Linking](#). Today, we are a self-sustaining not-for-profit member organization that aims to make all research outputs easy not just to find, cite, and link, but also to assess and reuse.

As publishing evolves, so has our member base. It’s now 11,000+ strong and includes libraries, scholars, funders, and more. These organizations continue to guide us through working groups and committees, together with thousands of metadata users.

We are steered by our ‘truths’, the principles that guide us in everything we do.

- **“Before Crossref, publishers had to sign hundreds of individual linking agreements with each other”**



# What we believe in – our truths

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## **Come one, come all**

We define publishing broadly. If you communicate research and care about preserving the scholarly record, join us. We are a global community of members with content in all disciplines, in many formats, and with all kinds of business models.

## **One member, one vote**

Help us set the agenda. It doesn't matter how big or small you are, every member gets a single vote to create a board that represents all types of organizations.

## **Smart alone, brilliant together**

Collaboration is at the core of everything we do. We involve the community through active working groups and committees. Our focus is on things that are best achieved by working together.

## **Love metadata, love technology**

We do R&D to support and expand the shared infrastructure we run for the scholarly community. We create open tools and APIs to help enrich and exchange metadata with thousands of third parties to drive discoverability of our members' content.

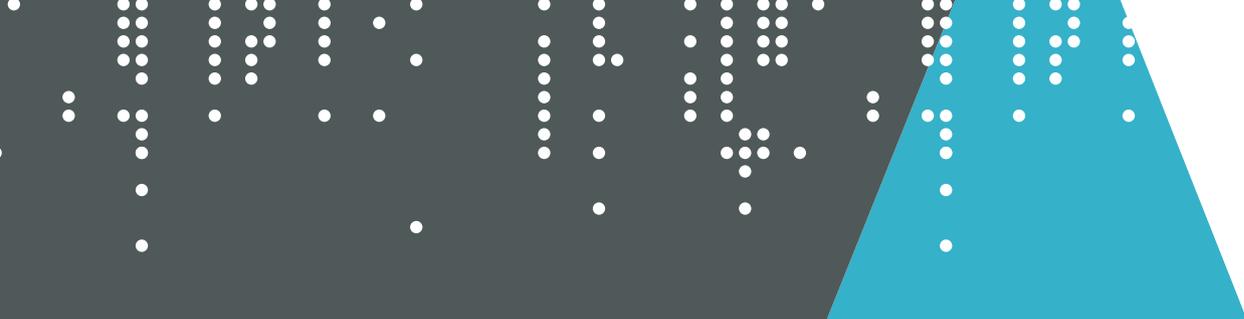
## **What you see, what you get**

Ask us anything. We'll tell you what we know. Openness and transparency are principles that guide everything we do.

## **Here today, here tomorrow**

We're here for the long haul. Our obsession with persistence applies to all things—metadata, links, technology, and the organization. But “persistent” doesn't mean “static”; as research communications continues to evolve, so do we.

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# What we do, how we do it

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Everything we do at Crossref is designed to put research outputs in context, so that the content our members produce can be found, cited, linked, assessed, and reused—and we do this in five ways:

## Rally

**Getting the community working together to make scholarly communications better.** We lead and participate in working groups and committees in order to help everyone involved in research communications work toward the same shared goal.

## Tag

**Structuring, processing, and sharing metadata to reveal relationships between research outputs.** We make our metadata available for reuse without restriction, through search and open APIs, so that it can add value to the numerous tools and services people use for discovery and analysis.

## Run

**Operating a shared, open infrastructure that is community-governed and evolves with changing needs.** Our metadata schemas are regularly updated to address new outputs—such as adding and linking preprints and peer review reports—and help members establish connections and provenance in a transparent way.

## Play

**Engaging in debate and experimenting with technology to solve our members' problems.** We challenge others to help analyze and interpret real needs—sense-checking ideas and proposals to develop solutions that will work both technically and socially.

## Make

**Creating tools and services to enable connections and give context.** Our services help give meaning to the relationships between research outputs so members can, for example, demonstrate editorial rigour or present trust signals to readers.

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## Research travels further if it's linked to the millions of other published outputs in as many ways as possible.

Crossref's original purpose was to provide a central reference linking service. However, as publishing changed there was a need for more ways for people to add to and enrich metadata. So we created a number of tools and services that make it easier for content to be found, cited, linked, assessed, and ultimately used by others.

Anyone can search and use our metadata, but only members deposit metadata and DOIs, and register their content. With membership comes the responsibility to follow best practice and get involved, for example, by volunteering for an advisory group, voting in or even standing as a candidate in our annual Board elections.

Membership at Crossref begins with **Content Registration**, which allows organizations that publish any kind of scholarly materials and content to register and update metadata—through machine or human interfaces—to let the world know it exists. **Reference Linking** is also an obligation of membership. It enables researchers to follow a link from a reference list to other works, helping them to make connections and discover new things.



# DOIs are just the beginning



## Other tools and services we offer:

### For everyone

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The collective power of our members' metadata is available to use through a variety of tools and APIs—allowing anybody to search and reuse the metadata in sophisticated ways. This is **Metadata Search and Delivery**. It's by default Open and there is a paid service-level option too.

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The **Funder Registry** is a unique and open taxonomy of grant-giving organizations. It allows everyone to have transparency into research funding, and its results.

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**Participation Reports** gives—for the first time—a clear picture for anyone to see the metadata Crossref has. This is data that's long been available via our public REST API, now visualized.

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Publisher metadata is one side of the story surrounding research outputs, but conversations around scholarly research take place all over the web; **Event Data** captures these, and provides traceable information about the provenance and context of every Event.

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### For members

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**Content Registration** allows you to register and update metadata through machine or human interfaces. Typical content includes journal articles and preprints, books and book chapters, standards, components such as charts, peer review reports, etc. **Metadata Manager** supports Content Registration for journal and soon book content, offering a way to manually register and update metadata for both single and multiple deposits.

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**Reference Linking** enables researchers to follow a link from the reference list to other full-text documents, helping them to make connections and discover new things.

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Researchers cite other people's work to acknowledge the material they used. **Cited-by** shows how work has been received by others; displaying the number of times it has been cited, and linking to the citing content.

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**Crossmark** reveals the current status of an item of content, and can display any other metadata a member chooses, such as funder names, peer review type and date, or license information.

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A Crossref service powered by iThenticate—**Similarity Check** provides editors with a user-friendly tool to help them detect plagiarism and ensure content originality.

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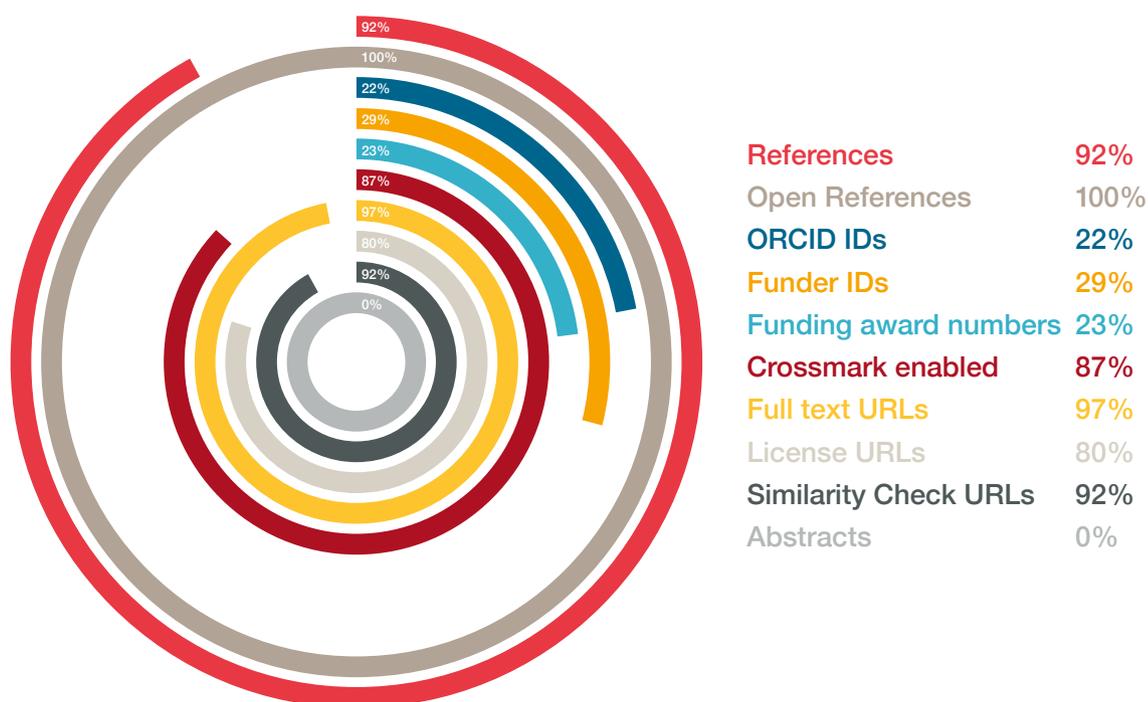
**What  
does good  
metadata  
look like?**

Participation Reports is a new tool that monitors what metadata you are registering, even if this work is done by a third party or another department. It gives—for the first time—a clear picture for anyone to see the metadata Crossref has. This is data that’s long been available via our Public REST API, now visualized. It’s an opportunity to evaluate and educate. See for yourself where the gaps in your metadata are, and what could be improved upon. Understand best practice through seeing what others are doing, and learn how to level-up.

Gaps or errors in metadata are passed on to thousands of other services, which causes problems downstream and means we all suffer. Richer metadata makes content useful, so it makes sense for the metadata you deposit to be as accurate and complete as possible. The more elements there are to the metadata, the higher the chance of others finding and using the content.

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This metadata sample belongs to one of our largest publishers.



Over the years we’ve made great progress in connecting information about researchers, their affiliations, grants, and research outputs. Imagine how much more powerful this information would be if supplemented by comprehensive, accurate, and up-to-date metadata.

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**“Metadata is the liberator of knowledge and everybody in scholarly communications has a responsibility to improve it”**

**Ed Pentz, Crossref Executive Director**

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# Not just for publishers

Over the years we have evolved to work with and for many new and emerging types of organizations. We've also made tools and services that support different parts of the scholarly community. Our work helps research funders, editors, librarians, researchers, developers, research administrators, and (of course) publishers—from all over the world.

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## Research funders

We collect and share metadata about published research—such as Funder IDs, ORCID iDs, licenses, clinical trials, and retractions—all of which help funders connect grants and grantees with their published outputs to measure reach and return.

## Editors

Editorial integrity can be demonstrated with tools that help assess a paper's originality, and properly label and connect updates, corrections, and retractions.

## Librarians

Librarians can enhance metadata and connect discovery and linking services with our millions of metadata records—they're all available in XML and JSON, through our open APIs and search.

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## Researchers

We make it easy for researchers to find other researchers' work and let their own be found by collecting and sharing information such as citations and mentions. Thousands of tools and services harness this information—for search, discovery, and measurement—through our open APIs.

## Developers

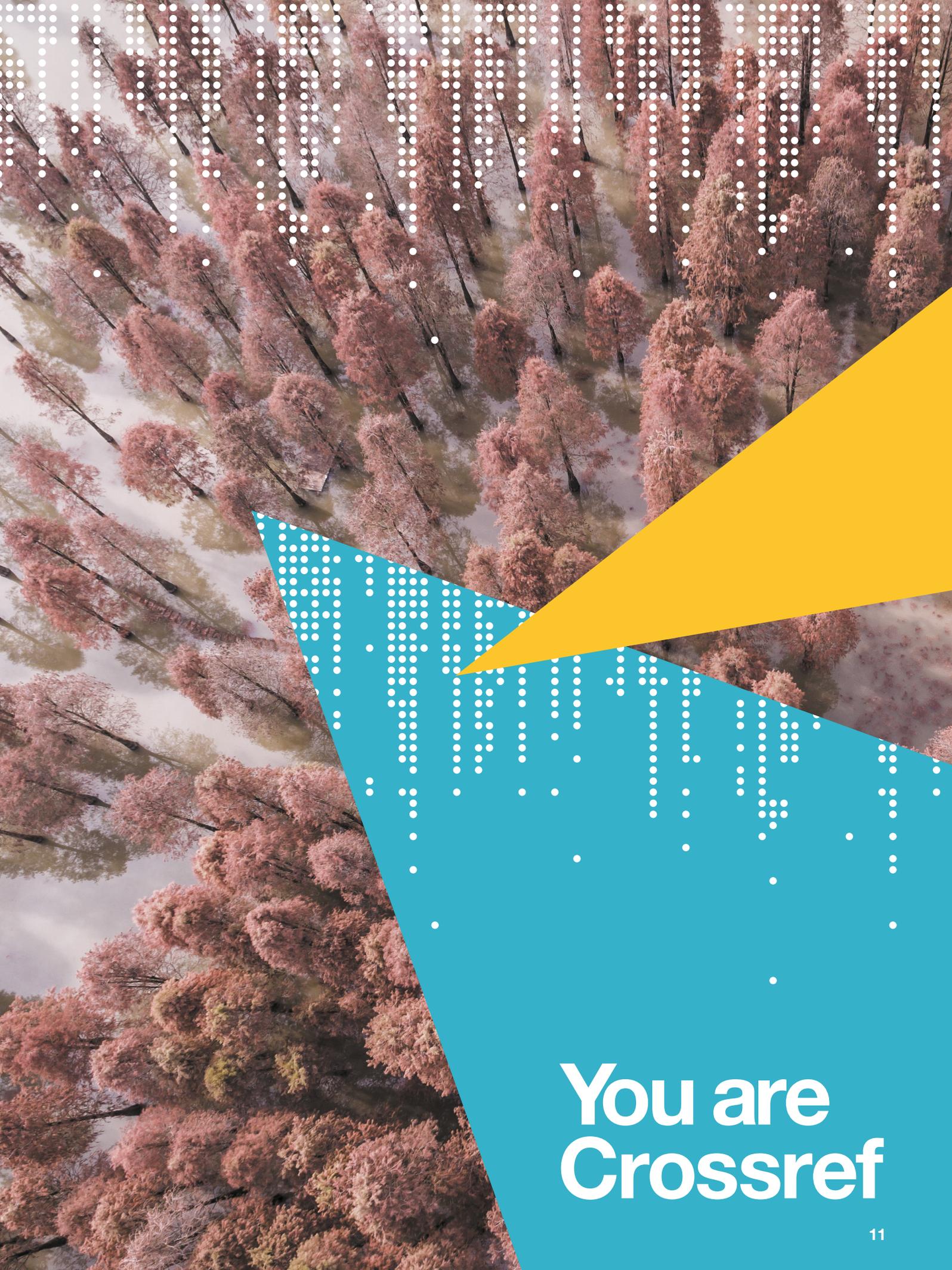
By integrating our metadata about scholarly content into their projects via our open APIs, developers can build tools and software to find, cite, link, and/or assess research outputs.

## Research administrators

Research administrators can analyze published works and enhance research assessment activities using metadata through our open APIs.

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