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Author

Vollmer, Timothy

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Timothy Vollmer

16 Creative Commons and Open Access in an Academic Library: Implementation, Tools, Policy and Education

Abstract: An important task for libraries today is to support scholars in the creation, sharing, and preservation of knowledge. Libraries and librarians ensure the application of appropriate practices in copyright in their institutions and help faculty, students and researchers to navigate the research lifecycle, providing education and outreach to diverse university audiences, including faculty, students, post-doctoral students, visiting researchers, and staff, answering questions about copyright, offering information about open access publishing options, developing and maintaining open access repositories and policies, and providing information on grant requirements that may govern how published research is disseminated. The focus of this chapter is Creative Commons (CC) and open access (OA) to research in the context of the academic library. The knowledge required by librarians in their roles as guides and supporters of scholarly authors is described. The chapter outlines details of the publishing process, the importance of sharing knowledge, the significance of rights retention for researchers, and shows how CC works alongside limitations and exceptions to copyright. Various aspects of CC licensing, including the types available, and categories of OA are explored. Aspects of the operation of CC in relation to flourishing research practices such as text and data mining are discussed and contemporary challenges of using CC-licensed databases of images in facial recognition research highlighted. The chapter describes how CC licenses and tools are leveraged within the academic library. While the chapter emphasizes the roles of academic librarians and provides examples within academic libraries, the knowledge presented, and approaches given can be applied in other types of libraries.

Keywords: Open access publishing; Academic libraries; Science publishing; Library copyright policies

Introduction

An important task of academic librarians is to support scholarly authors on their paths to create, share, and preserve knowledge. Academic librarians engage in this work in a variety of ways: helping faculty navigate the research lifecycle;

answering questions about copyright; offering information about open access publishing options; developing and maintaining open access repositories and policies; and providing information on grant requirements that may govern how published research is disseminated. Academic librarians provide education and outreach to diverse university audiences, including faculty, students, post-doctoral students, visiting researchers, and library and professional staff.

The focus of this chapter is [Creative Commons](#) (CC) and [open access](#) (OA) as they impact on research in an academic context. How do librarians provide effective support to their clients to ensure they optimize use of CC and OA in their research? What knowledge is required by librarians and what are the key competencies required to guide and support scholarly authors? How do Creative Commons licenses work alongside limitations and exceptions to copyright? How CC licensing operates in relation to flourishing research practices such as text and data mining is explored. It is vital that researchers retain their rights during the publishing process to be able to share their work. The primary paths for making scholarship open access, green and gold, are discussed, along with the opportunities and challenges encountered leveraging CC within both the research activity and publishing. The use of CC licenses and tools in relation to collections metadata, repositories, preprint servers, and open access journals is outlined. Institutional, public, and philanthropic open access policies are described and the importance of the role of the academic librarian in providing guidance, education, and support in relation to OA policy compliance highlighted. Details of appropriate educational resources, communities of interest, and training for academic librarians are provided.

Key Knowledge Areas

Academic librarians helping researchers publish their research results and scholarship require knowledge of core issues related to Creative Commons and open access. Substantive areas include understanding how CC licenses operate, the publishing lifecycle, the importance of retaining rights, and how researchers may use CC-licensed works within their own scholarship, along with the applications in libraries of CC, particularly in areas of collection management within a framework of effective institutional policies supporting good practice. There is a significant body of knowledge on copyright law for librarians (for example Crews 2020; Russell 2004; Benson 2019). This chapter draws on existing work and writing but constrains its scope to the intersection of CC and OA in the academic library and its audiences.

Open Access

Open access is a much larger topic than Creative Commons (Suber 2012). This chapter contextualizes open access through the lens of Creative Commons tools, policy, and education efforts within the academic library and institutions of higher education, as opposed to public libraries, special libraries, and other institutions in the galleries, libraries, archives, and museums (GLAM) sector, although approaches may well be applicable elsewhere.

Within OA is the growing global movement encouraging the use of Open Educational Resources (OERs) (Smith and Casserly 2006). [OERs](#) are “teaching, learning or research materials that are in the public domain or released with intellectual property licenses that facilitate the free use, adaptation and distribution of resources”. OERs include “full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge”. But OERs are not the focus of this chapter, even though an increasing number of librarians are supporting instructors and students in creating and adapting OERs, including openly licensed textbooks for use in the university setting. This chapter concentrates on CC and OA in sharing research outputs and scholarly journal articles.

How Creative Commons Works

Creative Commons is a broad topic with a history reaching back two decades (Bollier 2008) and the duties of a librarian include many areas intersecting with CC. CC licenses apply to works within the framework of copyright laws around the world. In general, copyright law grants a bundle of exclusive rights to the copyright holder. In most cases, the original author of a work is the initial copyright holder, since copyright law grants automatic protection to creative works the moment they are captured in a tangible medium of expression. The author may later transfer or assign the copyright to another entity, such as a publisher. For example, in the US, copyright law grants to copyright holders the exclusive rights of reproduction, the preparation of derivative works, distribution, public performance, and public display (US Copyright Office 2021).

Some creators, including academic authors, do not wish to exercise all their exclusive rights under copyright, and instead prefer to share their creativity under more open conditions. [Creative Commons](#) is a non-profit organization whose mission is to “[help overcome legal obstacles to the sharing of knowledge and creativity to address the world’s pressing challenges](#)”. Creative Commons was founded in 2001 and hosts a suite of copyright licenses that permit creators

to share their creativity on more generous terms with the public than does copyright whereby default all rights are reserved. CC licenses and various legal tools provide a standardized way for creators to grant particular permissions to use of works while at the same time ensuring that credit for work is appropriately acknowledged.

The rightsholder is the only person [who may attach](#) a Creative Commons license to a work. A particular benefit of Creative Commons is that, in contrast to traditional types of licenses, once an author has marked a work with a CC license, there is no need to negotiate any rights with a potential user. The work is simply offered under the terms of the license, and anyone who views the work may use the work under those terms.

Creative Commons offers [six copyright licenses](#), as well as a public dedication tool to permit an author to dedicate a work to the [public domain](#), [CC0](#). The six licenses are:



CC BY: This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use



CC BY-SA: This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format, so long as attribution is given to the creator. The license allows for commercial use. If you remix, adapt, or build upon the material, you must license the modified material under identical terms.



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CC BY-NC-SA: This license allows reusers to distribute, remix, adapt, and build upon the material in any medium or format for noncommercial purposes only, and only so long as attribution is given to the creator. If you remix, adapt, or build upon the material, you must license the modified material under identical terms.



CC BY-ND: This license allows reusers to copy and distribute the material in any medium or format in unadapted form only, and only so long as attribution is given to the creator. The license allows for commercial use.



CC BY-NC-ND: This license allows reusers to copy and distribute the material in any medium or format in unadapted form only, for noncommercial purposes only, and only so long as attribution is given to the creator.

All the CC licenses share common features, such as:

- Sharing: the licensee may copy and redistribute the licensed material in any medium or format, at least for noncommercial purposes
- [Attribution](#): acknowledgment must be provided to the author when a work is shared
- [Non-exclusivity](#): the licensor may enter into different licensing arrangements at any time, and
- [Irrevocability](#): once a licensee receives a work under a CC license, the licensee always has the right to use it under those terms.

Creative Commons licenses last for the [duration of copyright](#) and are presented as [three layers](#). They include: the Legal Code, which is the license text that has been vetted by a group of international intellectual property experts and lawyers; the Commons Deed or human-readable version of the legal code which presents the key permissions and conditions of the license in an easy to understand summary; and a machine-readable code, which makes it possible for [software applications](#) and web searchers to find CC-licensed materials shared under a particular license (Abelson, Adida, Linksvayer, and Yergler 2008), for example a Google search for [images](#).

Authors can pick the CC license relevant to their needs by visiting the CC license chooser website (<https://creativecommons.org/choose/>; <https://chooser-beta.creativecommons.org/>). Alternatively, some content sharing websites, including open access scholarly journals and repositories, integrate CC licensing into their [platforms](#), allowing creators to choose the appropriate license at the time they are uploading their work to the site. CC licenses are used to share a variety of materials such as photography, music, video, educational resources, scientific research, and other creative works.

In 2019, there were nearly two billion CC-licensed works shared online (Creative Commons 2019, 6). Creative Commons licensing has become the most used open content license suite, with significant adoption of the licenses by projects including [Wikipedia](#) and [Flickr](#). The licenses have been used by intergovernmental organizations such as [UNESCO](#), the group of research funding agencies [cOAlition S](#) with its [Plan S](#), and OA publishers such as [eLife](#). While earlier iterations of the CC license suite were matched to an individual country's copyright law with [separate license texts](#) drafted to correspond to variations in a country's copyright rules, the most recent version, version 4.0, has been released as a single international version applicable across all jurisdictions. CC 4.0 licenses available in English have been translated into [26 non-English languages](#).

Limitations and Exceptions to Copyright

Limitations and exceptions are crucial checks to the authors' otherwise exclusive rights under copyright, and it is important that librarians and scholarly authors understand how the limits intersect with CC licensing. Limitations and exceptions are implemented differently globally. In some countries, a statute may provide specific use of copyrighted works without infringing the rights of the copyright holder. For example, a jurisdiction may include a statutory provision in its copyright law that permits a library to make a copy of a copyrighted work for the purpose of preservation under certain conditions, without first getting permission from the copyright holder. Other copyright laws include a more general limitation or exception, such as the US Copyright Law's Section 107 fair use provision which states: "...the fair use of a copyrighted work, including such use by reproduction in copies or phonorecords or by any other means specified by that section, for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research, is not an infringement of copyright" (US Copyright Office 2021, 19). Fair use is a powerful and flexible exception to copyright often exercised in the educational context. For example, a researcher wishing to incorporate copyrighted content into a scholarly article can review the potential use against the four factors of fair use and make a determination whether, on balance, the use is fair. The four factors include:

1. the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes
2. the nature of the copyrighted work
3. the amount and substantiality of the portion used in relation to the copyrighted work as a whole, and
4. the effect of the use upon the potential market for, or value of, the copyrighted work (US Copyright Office 2021, 20).

CC licenses do not constrain a user's ability to leverage the rights under a limitation or exception to copyright. The [CC FAQ states](#), "if your use of CC-licensed material would otherwise be allowed because of an applicable exception or limitation, you do not need to rely on the CC license or comply with its terms and conditions". This means that if a user is incorporating part of a [CC-BY-NC-ND](#)-licensed article into a work and is doing so under a limitation or exception, such as fair use, there is no requirement to adhere to the terms of the license. Essentially, the CC license never trumps the underlying rights of a user to leverage limitations and exceptions to copyright.

There may be situations where an author wishes to include third party works used under a limitation or exception to copyright but wants to apply a CC license

to the work as a whole, openly licensing personal contributions. A practical way to address the issue is to include a disclaimer at the beginning of the work that identifies any third-party copyrights not covered by the CC license.

Publishing Lifecycle

Both limitations and exceptions to copyright and CC licenses might come into play at different times during the research and publication lifecycle. A scholarly author might leverage fair use when drafting a scientific paper by including acceptable portions of the scholarly works of others and release the article under a CC license by publishing the completed manuscript in an open access journal.

In their role as guides for scholarly authors, librarians are already familiar with the research and publication lifecycle. The cycle continues to evolve with new research and publication practices, but the standard workflow as described in the Association of College and Research Libraries (ACRL) [scholarly communication toolkit](#) contains common features: creation, evaluation, publication, description, dissemination and access, preservation and reuse. Academic authors read the works of others and develop their own lines of inquiry. They conduct research and synthesize findings into a written article. Depending on the discipline and type of research, findings might be presented at a conference, issued as a preprint, or produced in a blog. Fully-fledged articles are submitted to a relevant journal or publisher, who typically coordinates the peer review process. Following peer review and revision, the article is published either in open access or for subscription with access frequently available through library subscriptions to individual titles, aggregated collections, publisher, or subject groupings. Many academic writers place a version of work undertaken in an institutional repository. Finally, content is digitally preserved, ensuring that users downstream can access and use the works to create new scholarship. Content previously available in print versions stored in libraries in digital formats is available remotely. The cycle begins again.

Scholarly authors do not generally create copyrighted works for direct financial remuneration, but write to be read, create impact, advance careers, and support knowledge growth and scientific endeavor in their particular fields of study. Peter Suber explains:

...authors of research articles are not paid. When money is even part of an author's incentive, copyright fortifies the incentive by giving authors a temporary monopoly on their work and the revenue stream arising from it. Without copyright, unauthorized copies might kill the market for authorized copies and reduce sales. But all this is irrelevant to authors who

write for impact, not for money, and who voluntarily forgo royalties... scholars have always had independent incentives to write journal articles, such as knowledge sharing, reputation building, and creating a portfolio for promotion and tenure (Suber 2019).

If scholarly authors are writing for impact, they can consider making research publications OA which is [defined](#) as “digital, online, free of charge, and free of most copyright and licensing restrictions”. [Open access](#) can be implemented in various ways, with two primary designations. The self-archiving of a version of a research article under specific conditions into a repository is called green, while immediate publication under open licenses in journals for free access is called gold. With the green open access route, scholarly authors publish through the typical subscription journal publishing channels. Sometimes an author is required to transfer the copyright or grant an exclusive right to the journal. Green OA usually permits scholarly authors to deposit a version of the article in an institutional or subject-specific repository, sometimes after an embargo. Green OA is strengthened through institutional open access policies, funding agency requirements or by individual authors retaining some rights under copyright to deposit research articles into repositories.

Through the gold OA route, authors publish in OA journals. The research is made immediately available, typically under a CC license. Sometimes an upfront publication fee is paid by the author or the author’s institution or funder. The fee is known as an article processing charge, or [APC](#). One study estimates that 27.9% of the scholarly literature is in OA, representing 18.6 million articles (Piwowar et al 2018). By 2025, it is predicted that 44% of all journal articles will be available as OA (Piwowar, Priem and Orr 2019).

Rights Retention

Many subscription-based journal publishers require that authors transfer or assign copyright to the publisher. If an author transfers copyright, the author will often give the publisher full exclusive rights of reproduction, adaptation, distribution, public display, and public performance. Essentially, an author who transfers copyright without retaining rights is put in a position where permission must be sought from the publisher for the author to use personally created work, unless the use falls under a limitation or exception to copyright, such as fair use. Another consequence of transferring the copyright to the publisher is the loss of the ability to share the work under a CC license. The copyright holder is the only person who can attach a CC license to a work.

Librarians can explain to authors the implications of transferring copyright and provide advice on rights retention options. Authors can retain rights through various mechanisms. They can negotiate the details of the publishing contract. The [Scholarly Publishing and Academic Resources Coalition \(SPARC\)](#) is a global advocacy organization working to make research and education open and equitable for everyone. Together with the [Science Commons](#), a CC project that operated from 2005–2009 with the aim: “to identify unnecessary barriers to research, craft policy guidelines and legal agreements to lower those barriers, and develop technology to make research data and materials easier to find and use”, SPARC created an [author addendum](#) to effectively manage rights and ensure broad access. Most academic libraries provide guidance to their students, faculty, and researchers on how authors can negotiate with publishers to retain the rights required for OA. The [Office of Scholarly Communication Services](#) at the University of California Berkeley Library is an example of a library providing such services. Rights retention is important not only for authors submitting research papers to scholarly journals, but also for authors for which the monograph is the primary vehicle for publication. [Authors Alliance](#) is one of many non-profit organizations providing support and advice to authors who wish to share their creativity broadly to support the public good, and has published a guide to negotiating book contracts, including rights issues and CC options (Schofield et al 2018).

Authors in institutions of higher education can sometimes rely on open access policies adopted by their universities. The policies typically reserve rights for sharing articles authored by faculty or other university affiliates by retaining nonexclusive rights to posting a version of scholarly articles to an institutional repository. Many librarians assist faculty in understanding and complying with university open access policies. Some funding agencies who require open access to the outputs of their research grants provide information and assistance to potential grantees on retaining rights and complying with grant requirements. The previously mentioned cOAlition S initiative involving many research funding agencies provides advice on [rights retention](#). Institutional and funder OA policies are discussed in greater detail later in the chapter.

Authors in some jurisdictions can reacquire rights through statute. For example, US copyright law provides for a mechanism called termination of transfer, which permits authors to recapture previously transferred copyrights 35 years after publication (US Copyright Office 2021, 167). The Authors Alliance published a guidebook to help authors reclaim rights if a publisher is no longer supporting the dissemination of their works (Cabrera, Ostroff and Schofield 2015). Creative Commons and the Authors Alliance together developed a termination of transfer or [rights reversion tool](#) that can assist authors in reacquiring rights.

Using CC-Licensed Works in Research

Because CC licenses grant copyright permissions in advance, authors can use CC works in their own research without contacting the copyright owner. [Attribution](#) may be satisfied “in any reasonable manner based on the medium, means, and context” ([Section 3a.1.A.i](#)). Creative Commons provides guidance on [attribution practices](#) across a variety of media. As discussed above, the legal construction of the CC licenses does not hinder an author from using a licensed work under a relevant limitation or exception to copyright. For example, part of a CC BY licensed image can be incorporated into research under a limitation or exception even where this action would not comply with the terms of the license. However, even if the researcher is not required via the license to provide attribution to the author of the image, the work should be cited appropriately in accordance with academic norms.

Text and Data Mining

Authors may consult with librarians about incorporating new research methods and outputs into their work. One area of increasing interest is [text and data mining \(TDM\)](#), “the discovery by computer of new, previously unknown information, by automatically extracting information from different written resources” (Hearst 2003). TDM methods are being used to analyze large swathes of the scholarly record and enable connections across disparate fields of inquiry that otherwise would be impossible to discover by a single reader.

Researchers who wish to perform TDM can face a variety of legal hurdles, including copyright. While there are many types of TDM, one approach involves the downloading of large sets of text on which to perform TDM. A researcher implicates copyright because, as discussed earlier in the chapter, the right of reproduction is one of the exclusive rights granted to the copyright holder. The researcher would be required to obtain permission from the copyright holder to engage in TDM or would need to rely on limitations and exceptions to copyright. Overall, the use of copyright-protected texts can be an impediment to some researchers who wish to conduct TDM (Green et al 2016). Text and data mining has been found to be fair use under US copyright law in a case involving the [Authors Guild and HathiTrust](#).¹ The laws of various countries permit TDM under specific statutory limitations and exceptions to copyright. For example, the copy-

¹ Authors Guild v. HathiTrust, 755 F.3d 87 (2d Cir. 2014), Authors Guild v. Google, Inc., 804 F.3d 202 (2d Cir. 2015).

right law of the United Kingdom permits text and data mining, but only for non-commercial purposes (UK Intellectual Property Office 2014). The [European Union Directive on Copyright in the Digital Single Market](#) came into force in 2019. [Article 3](#) provides for rules to adapt certain exceptions and limitations to copyright and once implemented in Member State copyright legislation, will permit research organizations and cultural heritage institutions to conduct TDM for purposes of scientific research. And [Article 4](#) permits those outside specific research organizations to engage in TDM, but the scope of the provision is narrower.

Researchers who wish to conduct TDM within jurisdictions without a copyright exception that expressly permits it could look at using bodies of texts with few rights issues, for example public domain or openly licensed works. However, researchers should realize there are drawbacks to limiting themselves to TDM material only in the public domain, or available under an open license. If a researcher were to conduct TDM on works only in the public domain, which mostly consists of older works whose copyright has expired, the research could produce skewed results. And even though there are millions of texts available under CC licenses, they present only a fraction of the scholarship published each year. Restricting TDM input to works unencumbered by legal restrictions could “risk bias in the scholarly record” (Courtney, Samberg, and Vollmer 2020). Levensdowski shows how race, gender, and other biases found in openly available texts have contributed to and exacerbated bias in developing artificial intelligence tools (2018).

Researchers may conduct TDM on CC-licensed works, but they should be aware of the requirements in doing so. Librarians can help researchers understand that if there is a limitation or exception that permits TDM in the jurisdiction in which they are conducting their research, then the researcher can rely on it for TDM activity. If there is no copyright exception, then the researcher could consider CC-licensed works, but would need to answer [additional questions](#) based on the type of license applied to the target corpus, and the type and purpose of activity being conducted. If the researcher is undertaking the TDM primarily for commercial purposes, material licensed under a CC license which contains the NonCommercial condition, including BY-NC, BY-NC-SA, and BY-NC-ND, is excluded. If the TDM activity is being undertaken for noncommercial purposes, then a researcher can freely mine under any of the CC licenses.

Two of the CC licenses contain a NoDerivatives clause, which means that a user cannot share derivative works created using the content offered under those licenses. Any TDM adaptations made can be shared only if the license permits it. Licenses permitting adaptations are BY, BY-SA, BY-NC, and BY-NC-SA. If the researcher is not making any adaptations based on the underlying materials, TDM outputs can be shared, regardless of which CC license is attached.

Even if a researcher is able to leverage fair use rights to conduct TDM on copyrighted works, the law, at least in the US, does not necessarily permit the researcher to share or republish the full corpus of underlying works, or adaptations created during the TDM conduct. The researcher may be able to share annotations or snippets of the underlying work if doing so would be considered transformative, thus supporting their fair use evaluation. Researchers may want to be able to share small portions of the underlying content to show their work, thus enabling downstream researchers to be able to verify or replicate research results.

Facial Recognition Research

Researchers might be interested in using CC-licensed works in artificial intelligence algorithm training. CC-licensed content is relatively unencumbered by rights issues, at least from a copyright perspective. But there are other legal, policy, and ethical considerations that CC licenses are not able to address. Users of the licenses, as well as the librarians that teach the legal literacies of copyright and open access, should be aware of the limitations.

For example, CC licenses do not purport to [license publicity, personality, or privacy rights of third parties](#). Photographs depicting people are particularly relevant in privacy regulations. Scholars who wish to include CC-licensed images and photographs of persons should know that while the license grants copyright permissions to use the works, it does not simultaneously give permission to use the image of a person depicted in a photograph.

The issue of privacy of persons appearing in CC-licensed works has recently come to the fore in the case of research on facial recognition. In 2019, NBC News published a story about how IBM was using up to one million CC-licensed photographs from the photo-sharing website Flickr to train data sets to improve facial recognition algorithms (Solon 2019). The images at issue contained depictions of people, and the photographers who had taken the photos and published them on Flickr under CC licenses found them in the IBM dataset. IBM claimed that the purpose of collecting and conducting research on the CC-licensed Flickr photos was to “create AI systems that are more fair and accurate”, especially considering how poorly many facial recognition systems operate today (Smith 2019). While IBM’s use of the CC-licensed photographs technically would be permitted from a copyright perspective, some photographers objected to their works being included in the dataset without their permission because they did not want their photography to potentially be used to power facial recognition algorithms that could be used for surveillance. Creative Commons responded that while the IBM approach might have been legal from a copyright perspective, the research should

also have taken privacy issues into consideration, which are not addressed by CC licenses. And the CC response pointed to the larger issue. Community and authors must grapple with how they feel about unexpected and potentially nefarious uses of creativity that is created and shared in good faith (Merkley 2019). While in theory the entirety of the CC-licensed Flickr corpus could be viewed as a gigantic open data set, there are non-copyright law and policy concerns, and ethical conundrums, that require researchers to navigate the issues with care.

Tools and Platforms

Librarians should be aware of the various ways that CC licenses and other legal tools are integrated within library practices, collections, institutional repositories, preprint servers, and open access journals. The knowledge of applications and uses will help librarians support scholarly researchers and others on campus interested in open access publishing and assist in knowledge growth.

Collection Management

Academic libraries collect mostly by purchase physical copies of monographs and license electronic access to ebooks and ejournals but do not hold the copyright and cannot apply CC licenses to their collections. Academic libraries continue to develop legal and policy workflows to manage their collections and help audiences understand copyright and other relevant considerations concerning use of library materials, including compliance with contracts and donor agreements, respect for the privacy of subjects of the materials, and ethical concerns with sensitive collections where digitizing and sharing them could put a particular community at risk. The GLAM sector in the US is developing guidelines in relation to [open access](#) in digital collections management with guidelines on [contracts](#) and [copyright](#) (Wallace 2020).

CC licenses and legal tools are useful for sharing data about library collections. There is a growing practice to share metadata about collections as open data, for example through [Wikidata](#). Wikidata is a free, collaborative, multilingual and open secondary knowledge base that can be read and edited by both humans and machines. Wikidata is the central storage for the structured data of its Wikimedia related projects including Wikipedia, Wikivoyage, Wiktionary, Wikisource, and others. It is free for use by anyone. Contributions are published in the public domain using the [CC0 Public Domain Dedication](#). Some academic

libraries are participating in the [Wikidata](#) project to improve the discoverability and accessibility of their collections outside traditional discoverability platforms, while others are exploring the sharing of bibliographic information related to the research created by scholarly authors (Association of Research Libraries 2019).

Rights Statements

Libraries hosting digitized [special collections](#) frequently provide rights information on how digitized materials can be used. Various types of rights can be adopted by cultural heritage institutions. [Rightsstatements.org](#) is one approach to standardizing rights statements. It is an international member-based consortium supported by public funding with members including the [Digital Public Library of America](#) and [Europeana](#) as well as national libraries of various countries. It offers “[12 different rights statements](#) that can be used by cultural heritage institutions to communicate the copyright and re-use status of digital objects to the public”. The rights statements are offered in machine-readable fashion, like the Creative Commons licenses. [The link to the desired rights statement must be associated with the digital object.](#) The GLAM sector has conducted conversations about rights statements (scann 2020).

For works available under a CC license, the stable URL to the specific license under which the material is available could be inserted into the appropriate bibliographic record field within the library catalogue or other resource repository. Likewise, the [URI](#) of rights statements can be inserted in a metadata element, including [dc:rights](#) or [edm:rights](#) or property associated with the cultural heritage object to which the rights statement applies. Not only is it useful for searchers to comprehend whether a work is under copyright, or whether there are contractual restrictions that limit use, but they could also filter a search of the entire collection to return only works marked with a particular statement.

Repositories

Scholars rely on general, institutional, or subject repositories to share and preserve their scholarship. Deposit of scientific and scholarly articles into a repository is one of the primary ways authors engage in green open access publishing. Most repositories permit the attachment of a CC license at the time of deposit. Authors choose a license at the time of upload, attach it to their work and thereby make the terms available for search and discovery. Open source publishing platforms such as [Open Journal Systems](#) (OJS) provide the ability for local implemen-

tations to integrate CC licensing in their publishing workflow. Initiatives like the [Public Knowledge Project](#) provide hosting and support services for OJS installations.

General purpose repositories such as [Zenodo](#) permit the free upload of publications, presentations, images, and other types of resources, although users are limited in the types of CC licenses offered. Zenodo is operated by [CERN](#) and [OpenAIRE](#) to ensure [Open Science](#) and uploads are assigned Digital Object Identifiers (DOIs), to make them citable and trackable. Subject-specific repositories such as [Humanities Commons](#), an online humanities network [supported by various scholarly societies and institutions](#), permits members to upload and share research articles and other scholarship under a CC license. As already noted, authors must retain the copyright in their works to upload material under a Creative Commons license. If authors transfer their rights to journal publishers, they might be unable to share their scholarship on general purpose and subject-specific repositories.

Many scholars deposit versions of published research articles in institutional repositories associated with universities or university systems. For example, the University of California's repository, [eScholarship](#), permits university audiences, including faculty and students, to share a variety of scholarly outputs, including author accepted manuscripts, working papers, conference proceedings, electronic theses and dissertations, and educational resources. Another type of repository is the funder repository. For example, articles arising from funding from the [National Institutes of Health](#) (NIH) must be [deposited](#) into [PubMedCentral](#). The NIH public access policy requires submission of final peer-reviewed journal manuscripts [“immediately upon acceptance for publication and be made publicly available on PMC no later than 12 months after the official date of publication”](#).

Preprint Servers

CC licensing is also used for preprints. A [preprint](#) is “a version of a scholarly or scientific paper that precedes formal peer review and publication in a peer-reviewed scholarly or scientific journal”. Some scholars place early versions of their research on preprint websites or servers, to share initial findings of research, invite comments from the academic community, and even connect with other researchers for future collaborations. The practice of releasing preprints is not new. The well-known site [arXiv.org](#) has expanded from its original sharing of preprints in the fields of mathematics and physics since 1991. There has been an explosion of new preprint servers in the last decade, with over 60 platforms representing a wide variety of disciplines (Chiarelli et al).

A preprint is an early version of a scholarly work, and the author still retains the copyright and can share content under a CC license. Most preprint servers permit authors to attach a CC license at the time of upload, permitting readers to use the work under the terms of the CC license. Preprint platforms do not require copyright transfer for a work to be shared on a server and usually stipulate that the author grant a perpetual, non-exclusive license for hosting and distributing the preprint, (either under a CC, or other open license). Like other repositories, the purpose of the non-exclusive grant of rights is to ensure guaranteed availability of content.

[ASAPbio](#) (Accelerating Science and Publication in Biology), a “scientist-driven nonprofit working to address this problem by promoting innovation and transparency in life sciences,” has developed preprint licensing [FAQs](#) to help researchers understand copyright and open licensing in the context of preprints, and explain the implications of choosing a particular license for their preprint. A concern of some scholarly authors is whether a journal in which they intend to publish will object that a pre-peer-reviewed version has been already shared under a Creative Commons license on a preprint server. Some authors fear that sharing a preprint of an article will result in a publisher rejecting a submission, regarding the preprint as a previously published work. However, as [ASAPbio notes](#), “most paywalled/subscription journals in the basic life sciences are willing to consider submissions that have previously circulated as preprints, and policies that refuse to consider submissions based upon the license of the preprint are extremely rare” While ASAPbio’s guidance has been developed in the context of life science preprints, and some [publishers have specific policies](#), the copyright and licensing information is generally applicable to preprints in other disciplines.

Open Access Journals

Green open access is made possible by individual authors self-archiving a version of their scholarly publications in an institutional, disciplinary, funder-based, or general-purpose repository. As noted earlier in this chapter, authors publishing via the gold open access route make research available immediately in an open access journal, and usually under an open license, such as a CC license. Bollier notes, “Creative Commons licenses have been critical tools in the evolution of OA publishing because they enable scientists and scholars to authorize in advance the sharing, copying, and reuse of their work” (Bollier 2008, 243). Sometimes the publication in a gold open access journal requires the payment of an article processing charge (APC). The [Directory of Open Access Journals \(DOAJ\)](#), a frequently

updated list of OA journals, shows that as of 2021, approximately 71% of the open access journals indexed on its site do not charge APCs (11,878 of 16,659).

Publication in an open access journal typically does not require the transfer of copyright. The author retains copyright and is presented with CC license options. Some permit only one CC license option. For example, open access publisher [Public Library of Science \(PLOS\)](#) requires that authors publish their research articles under a Creative Commons Attribution (CC BY) license. Others, such as Elsevier's [Current Research in Microbial Sciences](#), permit authors to choose between publishing under CC BY and CC-BY-NC-ND.

Researchers can learn about gold open access journals through a variety of means. [Sherpa Romeo](#) maintained by [JISC](#) in the UK is an “online resource that aggregates and analyses publisher open access policies from around the world and provides summaries of publisher copyright and open access archiving policies on a journal-by-journal basis”. Another way to discover open access journal publishers and find content is through the previously mentioned [Directory of Open Access Journals](#) (DOAJ). Open access journals indexed in DOAJ must [grant usage rights](#) to others using an open license, CC or equivalent, allowing for immediate free access to the work and permitting any user to read, download, copy, distribute, print, search, or link to the full texts of articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose.

Finally, the Open Access Scholarly Publishing Association (OASPA) tracks open access publishing from member organizations and publishers. OASPA reports that its members published nearly 2.1 million open access articles from 2000–2019, with 425,000, approximately 20% of the total, published in 2019, which represents a growth of around 17% over the previous year (Pollock 2020). Librarians help provide information to authors on article processing charges and help navigate publication agreements and workflows of open access publishers. [APCs](#) vary considerably from under \$100 to over \$5000, and even sometimes as high as €9500 for *Nature*. As discussed above, some OA journal publishers have decided on offering a subset of the Creative Commons licenses, such as CC BY or CC-BY-NC-ND, and charge different amounts based on how open the terms of the specific license. For example, the [Proceedings of the National Academy of the Sciences](#) offers a work to be made open access under the CC-BY-NC-ND license for \$2,000, discounted from \$2,500 if the institution has a site license, but charges an APC of \$2,200 an article to be published under CC BY.

Research Output Policies

Open access policies in place at universities, government agencies, and philanthropic funders aim to increase the reach and impact of scholarly research. Some universities are adopting open access criteria to guide library collection development, or renegotiate access, purchasing and publishing agreements with major journal publishers. The [Registry of Open Access Repository Mandates and Policies \(ROARMAP\)](#) is an international registry of OA policies adopted by universities, research institutions, and research funders. Users can filter the database based on geographic location, policy type, open licensing conditions, and other parameters. Sometimes CC licensing is a central feature to a particular policy, while at other times it remains at the periphery. Regardless, it is important for librarians to understand the policy landscape so they can help authors comply with relevant requirements.

Institutional Policies

University open access policies aim to improve access to the research published by audiences on its campus. The world's first institutional [OA policy was endorsed at QUT](#) in Brisbane, Australia in 2003. Pioneering work was undertaken in the US at Harvard University's Faculty of Arts and Science in 2008. [The OA policy](#) grants Harvard a nonexclusive, irrevocable right to distribute scholarly articles published by faculty for non-commercial purposes. [ROARMAP](#) lists over 800 open access policies adopted by universities or research institutions.

University OA policies contain common features. First, most successful institutional repositories are initiated by faculty instead of administration (Crawford 2011, 44–5). Second, the policy typically contains a section that reserves copyright to the author but provides a grant to the institution of a nonexclusive, irrevocable, royalty-free, worldwide license. Third, the policy is usually constrained to cover work produced by the faculty after the approval of the policy and is forward-looking and not retroactive. Fourth, the policy normally contains instructions for how and when a copy of the work will be made available in an institutional repository. And finally, most times the policy names which unit on campus is responsible for maintaining the policy and answering questions (Folds 2016). The [Berkman Klein Center for Internet & Society](#) at Harvard University maintains an extensive guide which covers good practices in drafting, adoption, implementation, communications, and other tips and examples of open access policy formation at universities (Suber and Schieber 2021).

University open access policies are generally considered green policies because they permit scholarly authors to publish wherever they like, but require a deposit of some version of the published article, typically the [author accepted manuscript](#) (AAM), in the university's institutional repository. The AAM is the completed version of the article that has already gone through peer review but is not yet formatted with the journal publisher's layout and design.

Many university open access policies are silent on CC licensing. If university OA policies permit authors to publish in subscription journals where usually they are obligated to transfer the copyright to the publisher, it means that the author might not be in the position to share the published version in the institutional repository under a CC license. Bosman and Kramer (2020) looked at the policies of 36 large publishers and found that while there are about 2,800 journals that permit immediate deposit under green open access policies, "all disallow or do not explicitly allow CC-BY." The details of an author's publication contract will specify whether an author is able to deposit published scholarship in an institutional repository under a CC license.

Some publishers supply conflicting guidance. For example, while Elsevier requires that author accepted manuscripts are shared under the CC-BY-NC-ND license, it also claims that authors cannot deposit a copy of their AAM into an institutional repository until after an embargo. However, Bolick (2018) points out a workaround to subvert Elsevier's requested embargo. An author posts the publisher-blessed CC-licensed version on a personal website. Since this version is available under a CC license, which grants permission to copyright and redistribute the work, then it would permit the author's host institution to deposit it in an institutional repository "not through the license granted in the publication agreement, but through the CC license on the author's version, which the sharing policy mandates" (Bolick 2018).

Authors publishing via gold open access journals are not usually required to transfer copyright to the journal, and typically choose a CC license for published work. Authors subject to an institutional open access policy who publish in gold open access journals should be able to indicate in the repository metadata the license under which it is being shared. And since open access journals publish their articles under CC licenses, authors should be permitted to deposit the final journal formatted version, not simply the AAM.

Government and Philanthropic Policies

Librarians should be aware of governmental and philanthropic open access policies that require open licensing to the research outputs created through public

and charitable grant funding. The policies vary globally but are relevant to many higher education and academic library audiences because research projects and faculty apply for and receive research grants through grant-issuing institutions, such as the National Science Foundation, the European Research Council, the Ford Foundation, and others.

In the United States, the National Institutes of Health (NIH) Public Access Policy was the precursor to many funders' open access policies. As noted above, the [NIH Public Access Policy](#) requires that research created with NIH funding must be made available for free access by the public within a year of publication in a scholarly journal. Authors are required to deposit a copy of funded research articles in PubMed Central, NIH's public access repository.

The spirit of the NIH Public Access Policy was extended more broadly to other US Federal government research funding agencies. In 2013, a memorandum from the White House's [Office of Science and Technology Policy](#) (OSTP) mandated that recipients of grants from federal agencies who distribute more than \$100 million in research and development funds must make the research articles that arise from that federal funding available to the public within one year of it being published. In 2020 OSTP issued a [request for information](#) to better understand the implications of removing the 12-month access embargo. Neither the NIH Public Access Policy nor OSTP's 2013 directive requires CC licenses for the research funded through these grant funds, although if researchers publish in gold open access journals, they would be able to share the CC-licensed versions of research when making works available on PubMed Central or another public access repository.

Private philanthropies that fund scientific and scholarly research have adopted open access policies for the outputs of their grants. Foundations, including the [William & Flora Hewlett Foundation](#), [Bill & Melinda Gates Foundation](#), [Wellcome Trust](#), and others require permissive open licensing policies on their grant outputs (Kramer 2014; Bill & Melinda Gates Foundation n.d.; Wellcome n.d.; Creative Commons n.d.) The purpose of requiring open licensing such as Creative Commons Attribution (CC BY) is that materials created through philanthropic investments can be freely accessed, reused, remixed, and repurposed broadly by other researchers, and the public.

In Europe, a growing coalition of national and charitable funders organized under [cOAlition S](#) are supporting [Plan S](#), an open access policy beginning in 2021 that will require "all scholarly publications on the results from research funded by public or private grants provided by national, regional and international research councils and funding bodies, must be published in Open Access Journals, on Open Access Platforms, or made immediately available through Open Access Repositories without embargo." Plan S offers a variety of ways for schol-

arly articles arising from funders to comply with the policy. First, authors may publish in an open access journal, with CC BY as the default license, including the use of the CC BY-SA 4.0, CCO Public Domain Dedication. It also permits the use of CC BY-ND, “[provided that this is explicitly requested and justified by the grantee](#)”. Second, authors may publish in a subscription journal, but they must make either the version of record or the author’s accepted manuscript available immediately in a repository. Third, authors may publish open access in a subscription journal if doing so is included under a transformative agreement. cOAlition S offers strategies for funders to educate their audiences around [rights retention](#).

Librarians can work with scholarly authors to understand the requirements of government and philanthropic open access policies, especially in relation to how they intersect with university policies.

Converting Subscriptions and Licenses to Transformative Agreements

Another area where considerations of CC and OA come into play relates to how academic libraries renegotiate access and publishing agreements with scholarly publishers. Many universities have found the subscription costs to commercial journals unsustainable (Cooper and Riger 2021), resulting in [cancellations or renegotiations of big deal agreements](#) with large publishers. For example, in [2019 the University of California system cancelled its subscription with Elsevier](#). The University of California had been proposing a so-called transformative agreement with Elsevier, which would have provided both access to Elsevier journal content, and a mechanism for articles authored by UC community members to be published OA. This type of agreement combines the costs of access and publishing into a single fee. [Transformative publishing agreements](#) are “contracts negotiated between institutions (libraries, national and regional consortia) and publishers that transform the business model underlying scholarly journal publishing, moving from one based on toll access (subscription) to one in which publishers are remunerated a fair price for their open access publishing services.” The University of California in March 2021 negotiated [satisfactory arrangements with Elsevier](#) and has entered into [transformative agreements](#) with other publishers, including Cambridge University Press, Association for Computing Machinery, PLoS, and Springer Nature.

Even though most universities adopt green OA policies, some institutions provide financial assistance to faculty who wish to publish in gold open access journals. For example, at the University of California, Berkeley Library’s [Berke-](#)

[ley Research Impact Initiative](#) (BRII) provides funds for faculty, researchers, students, and staff for the article processing fees of publishing in a fully open access journal when authors do not have grant funds to cover the costs. University-supported gold OA publishing funds are rare. In a survey, while 28% of respondents from doctoral universities said their institution maintains an APC fund, only 4% of respondents from institutions with masters programs said they had such a fund (Rosen and Grogg 2020).

A crucial component to negotiating new agreements with commercial publishers is ensuring that university authors can publish their work on open access terms, and retain other rights normally transferred to publishers as a part of the publication process. The University of California's Committee on Library and Scholarly Communication developed a set of [18 principles](#) as a Declaration of Rights and Principles to Transform Scholarly Communication. Passed in 2018, it was a roadmap for the UC's negotiations with publishers on transformative agreements. Several of the committee's principles are immediately relevant to expanding open access through open licensing. The first principle states:

No copyright transfers. Our authors shall be allowed to retain copyright in their work and grant a Creative Commons Attribution license of their choosing.

Several other principles support scholarly authors in sharing their work in open access, including:

No delays to sharing. Publishers shall make work by our authors immediately available for harvest or via automatic deposit into our Institutional OA repository or another public archive.

No impediments to rights reversion. Publishers shall provide a simple process for our authors to regain copyright in their previously published work.

No curtailment of copyright exceptions. Licenses shall not restrict, and should instead expressly protect, the rights of authors, institutions, and the public to reuse excerpts of published work consistent with legal exceptions and limitations on copyright such as fair use.

Other principles for renegotiating agreements with publishers have been developed and include [LIBER's Five Principles for libraries to use when conducting Open Access negotiations with publishers](#) and the [African Principles for Open Access in Scholarly Communication](#). These and other guiding frameworks set the stage for a fairer relationship with traditional commercial publishers and aim to improve the ability for scholarly authors to publish their work as open access under CC licenses.

CC licensing also comes into play when academic libraries are determining the types of scholarly content and collections in which to invest. The University of California's Scholarly Transformation Advice and Review (STAR) Team imple-

ments [review criteria](#) when reviewing potential system-wide acquisitions. One of the criteria is whether the vendor allows for the sharing of the materials under a Creative Commons license.

Education and Training

Dusty Folds argues that academic librarians should support scholars in understanding and participating in open access, including providing information on OA publications, drafting university open access policies, and training faculty on how to deposit in an institutional repository (Folds 2016). Academic librarians can draw from a variety of educational resources, training programs, and communities to educate themselves about the issues discussed within this chapter and can use the information to provide improved service to their university audiences interested in Creative Commons and open access publishing and policies.

Online Courses and Learning Resources

Online training programs such as [CopyrightX: Libraries](#) and [Copyright for Educators & Librarians](#) provide an introduction to US copyright and case law, and discuss practical considerations for librarians whose job responsibilities include providing information about copyright. The [Creative Commons Certificate for Educators, Academic Librarians and GLAM](#) is an 8-week interactive online course created by Creative Commons with specific chapters on Creative Commons as it relates to open access to research. The courses can equip librarians with knowledge and resources to teach their audiences about copyright and Creative Commons, and the openly licensed curricula can be used and remixed by anyone. Another way that librarians provide information about Creative Commons and open access is by developing and publishing website content such as [LibGuides](#). An example is one prepared by the [University of Colorado](#). Many academic libraries are sharing educational resources and content under CC licenses for reuse and customization by other libraries and educational institutions (Fortney, Hennesy and Murphy 2014).

Workshops and Communities of Practice

Education about Creative Commons is also accomplished through online and in-person workshops which might be provided during [International Open Access Week](#), [Open Education Week](#), and in one-off events that libraries host to educate audiences that include aspects of open licensing and Creative Commons, and related projects such as [Wikipedia Edit-a-Thons](#). Some universities have established ongoing working groups of librarians, faculty, and staff to answer copyright questions from the university community. For example, Harvard Library's [Copyright First Responders](#) helps advance teaching, learning, and scholarship through community engagement with copyright.

Librarians can share information and advice through library or university email lists specifically set up to ask questions and promote discussion around topics such as copyright, scholarly publishing, and open access. These communities of practice can extend beyond the borders of a single university. A group of copyright and information policy professionals in academic and research libraries in the US and Canada established the [University Information Policy Officers \(UIPO\)](#), a community to share information about questions and issues that arise on campuses related to intellectual property and information policy, such as fair use in teaching, copyright legislation, and litigation that affect academic libraries and universities. The group uses an email list and [Slack](#) to communicate and hosts an annual member conference to discuss current issues and build community.

National level professional organizations provide venues for librarians to discuss matters of copyright, open licensing, and open access to research. Professional association committees such as the American Library Association's [Copyright Legislation, Education, and Advocacy Network](#) (CLEAN) advises ALA leadership on copyright policy and legislation, and offers copyright education to librarians. Related groups at the international level include the International Federation of Library Associations and Institutions (IFLA) Advisory Committee on [Copyright and other Legal Matters](#) and the Electronic Information for Libraries' (EIFL) [Copyright and Libraries Programme](#). These member-driven groups provide education and advocacy on topics relevant to open access and copyright within academic libraries.

Conclusion

Academic librarians have long supported university faculty and researchers with information and guidance about scholarly communication and publishing. Increasingly, librarians are expanding their toolkit to provide expertise on copy-

right, open licensing, and open access publishing. Creative Commons licensing is one important piece of the contemporary open access publishing ecosystem. It is important for academic librarians, and the diverse audiences they serve, to understand the nuances, opportunities, and challenges with CC licenses, as well as institutional and funder policies. Luckily, there is a growing body of adaptable educational resources and communities of interest that can help academic libraries fulfil their goals and support OA publishing for the advancement of knowledge.

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