

Strategic Plan for Green Open Access, FY 25-28  
A Supplement to the Open Access Collection Development Strategies  
University of Colorado Boulder Libraries

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Melissa H. Cantrell  
Scholarly Communication Librarian, Co-Chair, Open Access Guild

Ryan Caillet  
Institutional Repository Program Manager, Member, Open Access Guild

Andrew Johnson  
Head, Data and Scholarly Communication Services Section

## I. Purpose and Scope

In summer of 2023, the Open Access (OA) Guild submitted the “[Open Access Collection Development Strategies, FY 24-28](#)” to the Deans of the CU Boulder Libraries. Within this plan, the OA Guild indicates “this report does not include recommendations related to CU Scholar, Green OA infrastructure, or other open infrastructural efforts, which are being addressed separately by various groups in the Libraries,” and that the Head of Data and Scholarly Communication Services would lead a separate effort to provide recommendations for Green OA infrastructure. The following supplemental document represents an effort to close these gaps as well as to emphasize the importance of Green OA to the Libraries’ overall OA strategy.

Recent studies scrutinizing the consolidation of commercial publishers and their adoption of OA publishing - along with the article processing charges (APCs) often associated with it - underline the importance of diversified and equity-minded approaches to OA. As outlined by Butler et. al<sup>1</sup>, the top four academic publishers (Elsevier, Wiley-Blackwell, Springer-Nature, and Taylor & Francis) publish over half of scholarly journal articles indexed in Web of Science. This consolidation leads to reduced competition and influences price-setting, as there is little market pressure to keep APCs at or below current inflation rates. As a result, from 2015 to 2018 five publishers generated \$1.06 billion in revenue from APCs for Gold and Hybrid OA, in addition to their revenue streams from subscription publishing. While it is a goal of the Libraries to advance the accessibility of university research outputs, these findings indicate that “[i]nstead of making scholarly publishing sustainable and accessible for all, high APCs and transformative agreements aim to preserve the status quo, where academic publishing is a highly profitable business for a few corporations” (Butler et. al, 19).

Green OA, or self-archiving, whereby an author posts a work to a repository so it may be downloaded for free, remains an essential option for authors without the resources to pay an

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<sup>1</sup> [https://doi.org/10.1162/qss\\_a\\_00272](https://doi.org/10.1162/qss_a_00272)

APC and one of the most equitable and sustainable pieces of the OA puzzle for both authors and libraries seeking to support Green OA publishing. For this reason, the following plan is not merely a supplement to the CU Boulder Libraries collection development strategies – it is a fundamental component of our larger goal of transforming the scholarly ecosystem to one that is more open, transparent, and sustainable.

## II. Overview of Green OA

### Definition of Green OA

For the purposes of this plan, we define Green OA as any version of a scholarly article that is made openly available in any repository. Versions of scholarly articles can include the preprint or submitted version (before peer review), the postprint or final accepted version (after peer review but before publisher formatting), and the final published version (as it appears in the journal). Types of repositories include institutional repositories like CU Boulder's [CU Scholar](#) or Harvard's [DASH](#), disciplinary repositories like [arXiv](#) or [Humanities Commons](#), and federal funding agency repositories like [PubMed Central](#) or [NSF PAR](#).

### Barriers to Achieving Green OA

Critically, Green OA is entirely agnostic with regard to the choice of journal in which an article is ultimately published, including whether that journal uses an open or closed model of access. The only impact the choice of publication venue has on Green OA is that some journals restrict which versions of articles they allow to be posted in which repositories and at which times. Such policies vary widely across closed access journals. Notably, the 2022 memo from the White House Office of Science and Technology Policy on “Ensuring Free, Immediate, and Equitable Access to Federally Funded Research” and the subsequent public access plans announced by federal funding agencies in response do not allow for any embargo periods on final accepted versions of articles resulting from federally funded research.<sup>2</sup> More recent developments from at least one major private research funder go even further by mandating that all funded research must be made available before peer review (i.e., posted as preprints) and that APCs will no longer be allowable costs for grant recipients.<sup>3</sup> It remains to be seen what impact all of these funder requirements will have on publisher policies for Green OA.

In addition to embargo periods and other restrictions placed on Green OA by publishers, a major barrier to achieving widespread Green OA is that it requires action by authors to navigate journal policies and understand the process of depositing articles to various repositories. Federal funding agency policies as well as institution-based OA policies, like CU Boulder's OA policy,<sup>4</sup> attempt to simplify the need to navigate journal policies by establishing blanket rights for authors to deposit a specific article version (typically the postprint) in designated repositories

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<sup>2</sup> <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-access-Memo.pdf>

<sup>3</sup> <https://www.science.org/doi/epdf/10.1126/science.adp6029>

<sup>4</sup> <https://www.colorado.edu/policies/campus-open-access-policy>

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like NIH's PubMed Central or CU Boulder's CU Scholar. There are also numerous efforts underway to streamline the process of depositing versions of articles in Green OA repositories. The NIH, for instance, works with publishers to allow journals to deposit versions of published articles directly into PubMed Central.<sup>5</sup> At institutions like CU Boulder, libraries and other units involved with institutional repositories often create automated workflows for identifying publications eligible for deposit and requesting the appropriate version of the article from the author for upload to the repository.<sup>6</sup> Typically, these workflows still require some involvement by the author, and authors often have difficulty locating or properly identifying the appropriate version of the article needed for deposit in the repository. As a result, the issue of acquiring the correct versions of articles from authors remains a significant barrier to achieving the full potential of Green OA.

## Challenges with Tracking and Measuring Green OA

Tracking and measuring the number of Green OA articles produced at an individual institution like CU Boulder presents several challenges given the characteristics of Green OA. First, multiple Green OA versions and/or copies of the same article can appear in one or more repositories. Unlike Gold OA (articles published in open access journals) where tracking published versions of articles is relatively straightforward, total counts of Green OA articles need to account for duplication when attempting to determine the number of unique articles available as Green OA. Duplication between Gold OA and Green OA is also possible, since versions of Gold OA articles (including the published version) may also be deposited in Green OA repositories. This duplication can complicate efforts to determine which articles are publicly available solely as Green OA. In addition, a journal article can become Green OA at any point, rather than just at the time of publication as with Gold OA articles. This creates a challenge for efforts to track growth in Green OA over time, since counts for any given year can change whenever an article is deposited into a repository (regardless of when the article was actually published). This is most evident and somewhat predictable for recently published articles, since many closed access journals still require an embargo period before articles can be deposited in Green OA repositories. This "embargo lag" typically disappears after one or two years, so it should always be taken into account when looking at the most recent years of data on Green OA. Finally, even identifying and locating all Green OA articles across a landscape of hundreds if not thousands of repositories presents a fundamental challenge for tracking Green OA.

In response to these challenges, tools are being developed to help measure the impact of Green OA. At CU Boulder, [Unpaywall](#) is used as a data source for identifying OA versions of all articles published by CU Boulder faculty to include in [CU Experts](#) profiles so that visitors to the latter site can read CU Boulder research, regardless of whether they have access to paywalled versions of articles. On the backend of this Unpaywall/CU Experts integration, Libraries personnel see a more detailed picture of Green OA practices on campus, including total number of unique articles in at least one repository, total number of articles across all repositories, and total number of articles in any individual repository (e.g., CU Scholar). These categories of

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<sup>5</sup> <https://www.ncbi.nlm.nih.gov/pmc/pub/pubinfo/>

<sup>6</sup> <https://digitalcommons.du.edu/collaborativelibrarianship/vol11/iss3/7/>

Green OA activity can all be filtered by publication year and campus department/unit as well. While this doesn't solve all of the challenges with tracking and measuring Green OA at CU Boulder (e.g., constantly changing data), it does provide a detailed snapshot of the Green OA landscape at any given time.

### III. State of Green OA at CU Boulder

This plan provides recommendations, strategies, and goals to inform the direction of activities related to Green OA at CU Boulder to complement the "[Open Access Collection Development Strategies, FY 24-28](#)" plan. To develop these recommendations, the authors utilized multiple data sources to provide a nuanced picture of the current state of Green OA at CU Boulder. These data sources revealed key findings about the amount of current Green OA activity by CU Boulder authors by campus unit, publisher, and repository (including CU Scholar). Given the aforementioned challenges with tracking Green OA over time, the authors chose to analyze currently available data from 2021 as a representative year for what Green OA practices look like at CU Boulder presently. Data from 2021 are recent enough to reflect current trends in the amount of articles available via Green OA while being far enough in the past to be relatively stable (i.e., not expected to change significantly due to embargoes lifting). Other efforts, including the annual [State of Open at CU Boulder](#) reports, have used different high-level methodologies to show general trends of increasing amounts of Green OA articles over time, so this deep dive into data from 2021 provides the opportunity to analyze a more complete picture of Green OA practices. In addition, the authors used internal University Libraries data to estimate total current personnel and other expenditures that support Green OA activities. The majority of this support differs significantly from the expenditures related to Gold OA detailed in the "[Open Access Collection Development Strategies, FY 24-28](#)" plan, since most Green OA investments relate to personnel and infrastructure costs. This is typical of Green OA costs in general, since this type of OA is achieved through investments in infrastructure, and Green OA is nearly always free from the author's perspective. The following sections detail the key findings from the analyses of all of these data sources.

## Key Findings

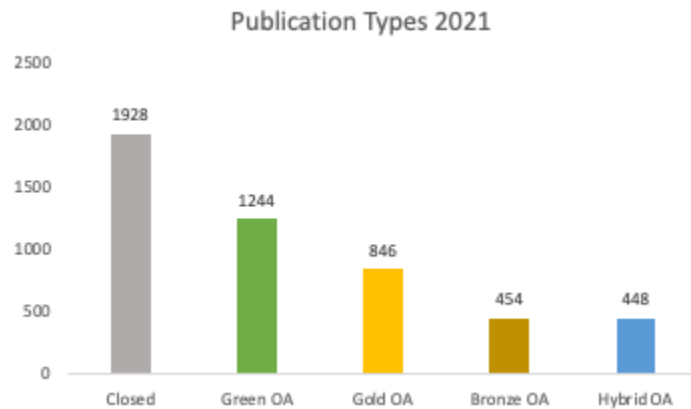
### Total CU Boulder Green OA Articles

Based on Dimensions data for 2021, Green OA was the second most common "best" type of access, as well as the most common OA type (Figure 1).<sup>7</sup> In other words, for about one third (34%) of publication outputs in 2021, the best version of a publication was in a repository. This finding reinforces the importance of considering Green OA in an overarching campus OA strategy.

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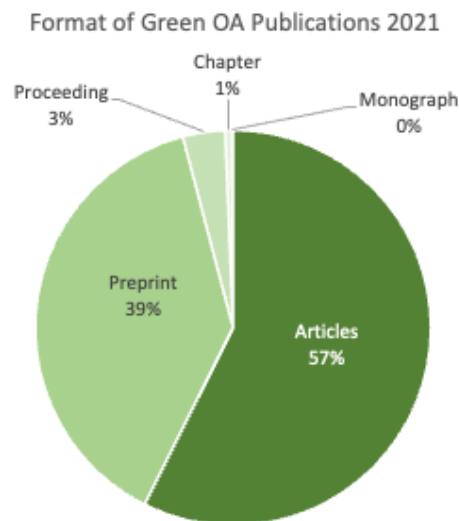
<sup>7</sup> Best OA version is determined by Unpaywall plugin as "the most current, authoritative version": <https://support.unpaywall.org/support/solutions/articles/44001943223-how-is-the-best-oa-location-determined->

Figure 1



The overwhelming majority of Green OA content in 2021 was either an article or preprint (96%) according to data from Dimensions (Figure 2). While a Green OA article is identified as a published article with its best OA location in a repository (which may be a preprint or postprint), Dimensions also identifies the content type “preprint”, which is a manuscript in a preprint repository that may not yet have a published counterpart. CU Scholar primarily archives articles rather than preprints. Green OA has at times been dismissed as consisting predominantly of content prior to or without peer review. However, well over half (57%) of Green OA content in any repository from 2021 were articles with a published and peer-reviewed counterpart, demonstrating Green OA as a well-established route to open access for peer-reviewed content as well as preprints.

Figure 2

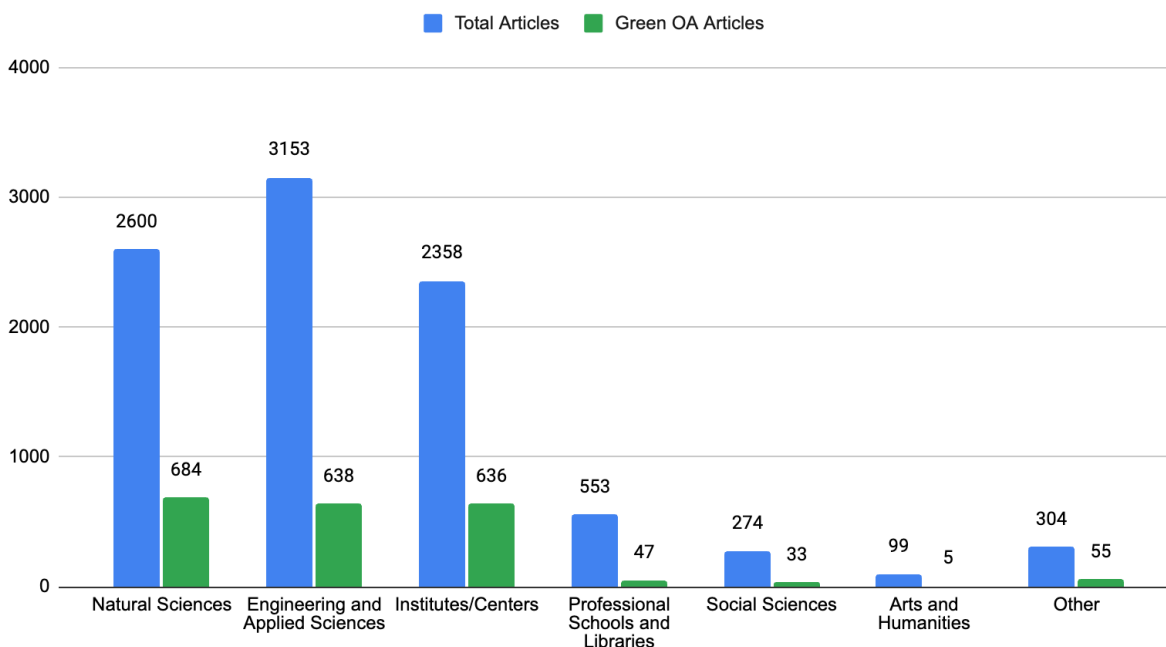


### Green OA by CU Boulder Discipline

Using data from Unpaywall on Green OA status combined with data from CUBE on publications by CU Boulder authors from 2021, broad disciplinary trends emerge with regard to the amount of Green OA articles available. For the purposes of this analysis, the authors began with affiliations from all CU Boulder colleges and schools and then split out affiliations from the College of Arts and Sciences into its three divisions (Arts and Humanities, Natural Sciences, and Social Sciences) to draw out key disciplinary distinctions. The authors also combined all of the professional schools (Business, CMCI, Education, Law, and Music) and the Libraries into a single category given the relatively low amounts of articles produced by those individual colleges and schools. Finally, the authors included articles with primary affiliations from CU Boulder research institutes and centers in a single category. Figure 3 shows the amount of Green OA articles relative to the total articles produced by CU Boulder authors from the major disciplinary categories analyzed.

Figure 3

2021 Green OA Relative to Total Articles by CU Boulder Discipline



Authors from the Natural Sciences produced the most Green OA articles in 2021 (684), followed by slightly lower amounts from authors in Engineering and Applied Sciences (638) and Institutes/Centers (636). Notably, 74.7% of the 2021 Green OA articles from the Institutes/Centers category came from just four institutes and centers primarily aligned with Natural Sciences and Engineering disciplines. Thus, it is likely that over 90% of the total Green OA articles at CU Boulder come from authors in the natural sciences and engineering disciplines. These disciplines also produce far more articles overall (as Figure 3 shows) due to possible factors such as larger numbers of faculty, higher rates of publishing, and greater

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emphasis on journal articles over other types of research outputs (e.g., monographs). All other broad disciplinary categories not only produce far fewer Green OA articles (Professional Schools and Libraries had the most in 2021 with 47 total) but also have a smaller percentage of Green OA articles relative to total publishing output (Social Sciences had the highest Green OA percentage in 2021 with 12.0% not including “Other”). These disciplinary gaps could provide targeted outreach opportunities to units with low Green OA activity that might not be aware of Green OA as an option for making articles openly available. These gaps also could be indicative of wider cultural barriers to Green OA in some disciplines, including publishers and funders lacking policies favorable to Green OA practices. With regard to funders, this could be evolving as the 2022 White House OSTP memo is implemented, since it applies to all federal agencies across all disciplines. That said, some disciplines with lower Green OA output may receive lower levels of federal funding as well, so it remains to be seen how much of an impact these new federal policies will have on such disciplines. For further exploration of disciplinary differences, Appendix A provides Green OA article totals at the individual CU Boulder department/unit level.

### CU Boulder Articles Available via Green OA by Top Publishers

Dimensions data was used to analyze Green OA totals by the top publishers for CU Boulder in 2021. Table 1 shows both the top ten publishers in 2021 overall - based on total publication outputs by CU Boulder authors - and the top ten publishers based on Green OA outputs in 2021. Unsurprisingly, a few publishers appear in both lists, with a significant number of total publication outputs as well as Green OA outputs (e.g. Elsevier, Wiley, Springer Nature, ACS, AGU, and IEEE). However, relative positions within these rankings differ to varying degrees, suggesting discrepancies in self-archiving policies, author practices in exercising rights under these policies, or both.<sup>8</sup>

Table 1

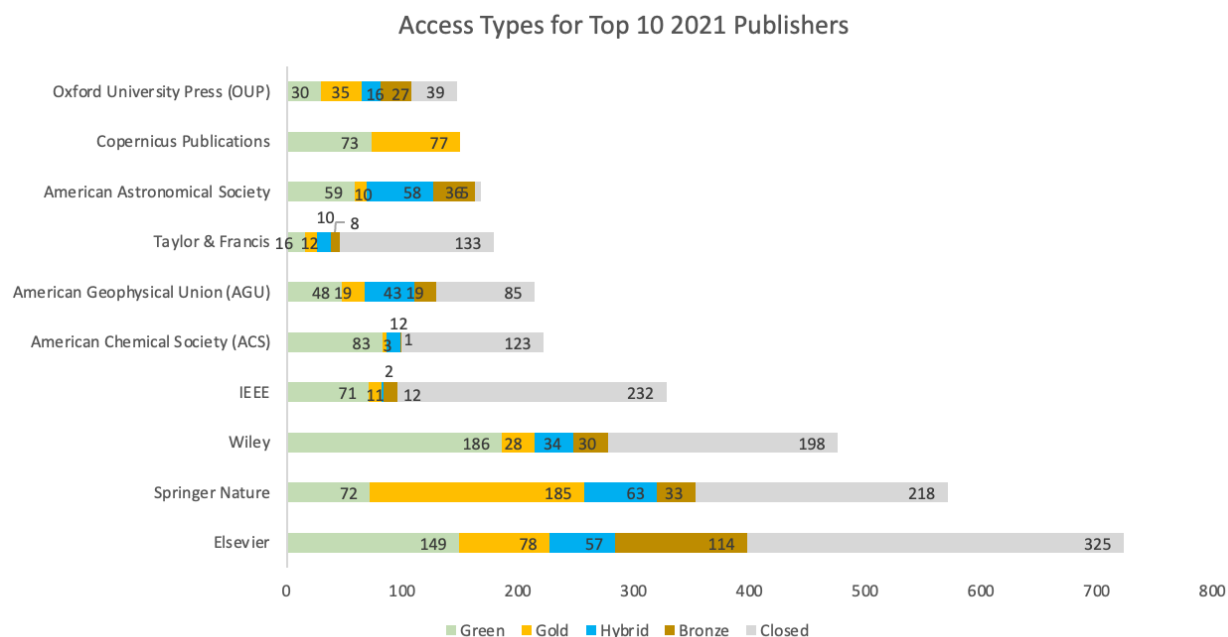
Top 10 Publishers Overall 2021	#	Top 10 Publishers (Green OA) 2021	#
Elsevier	723	Wiley	186
Springer Nature	571	Elsevier	149
Wiley	476	Cold Spring Harbor Laboratory	137
IEEE	328	American Chemical Society (ACS)	83
American Chemical Society (ACS)	222	American Physical Society (APS)	75
American Geophysical Union (AGU)	214	Copernicus Publications	73
Taylor & Francis	179	Springer Nature	72
American Astronomical Society	168	IEEE	71
Copernicus Publications	150	American Astronomical Society	59
Oxford University Press (OUP)	147	American Geophysical Union (AGU)	48

<sup>8</sup> While Cold Springs Harbor Laboratory is listed as a publisher in Dimensions, it is rather the host of major repositories such as medRxiv and bioRxiv, and thus we do not consider it a publisher for the purpose of this analysis, though this role does explain its prominence in Green OA.

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Figure 4 takes a closer look at the proportion of Green OA outputs compared to other access types for CU Boulder publications within the top ten publishers overall for 2021. It is apparent that self-archiving of manuscripts is supported by publishers and/or practiced by authors to varying degrees. Based on a proportion of total 2021 CU Boulder outputs, Wiley and Copernicus have the highest Green OA outputs (39% and 48%, respectively), and Taylor & Francis and Springer Nature had the lowest Green OA outputs (9% and 12%, respectively).

Figure 4



Solely looking at the proportion of Green OA for a publisher can be misleading with regard to their overall open access strategy, as also demonstrated in Figure 4. For example, while Taylor & Francis and Springer Nature both have very low rates of Green OA, Taylor & Francis has poor support for OA across the board, while Springer Nature's Gold and Hybrid OA programs make its overall OA portfolio much more robust.

On the other hand, Wiley and Copernicus had the highest rates of Green OA in 2021. That outlook for Wiley is somewhat dampened by its lackluster support for other OA types, though their overall OA outputs still represent well over half of total Wiley outputs for the year. Copernicus, meanwhile, is fully OA either through Green or Gold routes, as is the American Astronomical Society through a mix of OA routes, a fact that could be lost if only looking at Green OA outputs.

In other words, it is difficult to look *only* at Green OA when evaluating a publisher's Green OA strategy and support, since any holistic assessment of their commitment to OA is dependent on the full mix of its OA portfolio.

## Green OA Repositories Containing CU Boulder Articles

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Using data from Unpaywall on Green OA status and repository location combined with data from CU Experts on publications by CU Boulder authors from 2021, Table 2 shows the top ten repositories that house Green OA versions of CU Boulder-authored articles (see Appendix B for the full totals for all repositories).

Table 2

Repository Name	# Green OA Articles from 2021
Cornell University - arXiv	248
Le Centre pour la Communication Scientifique Directe - HAL	165
U.S. Department of Energy Office of Scientific and Technical Information - OSTI OAI	157
University of Colorado Boulder - CU Scholar	104
National Oceanic & Atmospheric Administration - NOAA Institutional Repository	103
University of California - eScholarship University of California	54
PubMed Central - Europe PMC	22
California Institute of Technology - CaltechAUTHORS	18
DANS - Data Archiving and Networked Services - NARCIS - National Academic Research and Collaborations Information System	18
OSF Preprints - PsyArXiv	18

This data includes all versions of Green OA articles available in all repositories, so the same article could have multiple Green OA versions in multiple repositories. It is also important to note that there is variation between the coverage of CU Experts and the coverage of Dimensions, so these numbers are not directly comparable across data sources used in other sections of this report. That said, Table 2 provides a picture of where the vast majority of Green OA articles published by CU Boulder authors are located. This includes major disciplinary repositories (arXiv, PsyArxiv), U.S. funding agency repositories (OSTI OAI, NOAA Institutional Repository, PubMed Central), international repositories (HAL, DANS), and U.S. institutional repositories (CU Scholar, eScholarship, CaltechAUTHORS). CU Scholar ranks fourth among all repositories with 104 Green OA articles from 2021, which represents 7.6% of the total Green OA articles available. The top five repositories on this list account for 56.6% of all Green OA articles in

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repositories from 2021 (a total of 1,373 articles across 173 different repositories). The diversity of repositories in which CU Boulder articles reside demonstrates the need for efforts like the [U.S. Repository Network \(USRN\)](#) that seek to provide easier ways to connect and search across repositories for Green OA articles. The Libraries are currently part of a [multi-institution discovery pilot project](#) aimed at advancing these USRN goals. In addition, the prominence of CU Scholar on the list of repositories with the most Green OA articles by CU Boulder authors demonstrates the value of investments in institutional repositories in addition to domain and funder repositories.

### CU Boulder Libraries Current Investment in Green OA

Unlike Gold/Hybrid OA and closed access publishing models, Green OA typically provides access to articles at no cost to authors or readers, so funding mechanisms like subscription costs, APCs, and transformative agreements do not apply to Green OA. Instead, costs for providing Green OA fall entirely in the realm of sociotechnical infrastructure, which includes technology-related costs (e.g., storage, software) as well as salary for positions related to repository development, maintenance, administration, and user support. Table 3 shows the total estimated personnel contributions for supporting the CU Scholar repository, which is the primary CU Boulder Libraries investment in Green OA. Importantly, CU Scholar provides public access to a variety of research outputs beyond versions of journal articles (e.g., theses and dissertations, data sets, reports, etc.), so the percentages of all positions involved in supporting the repository provided in Table 3 include work that enables access to all types of research, not just Green OA articles. In addition, the remaining percentages of all of these positions support other efforts in the Libraries, including other initiatives related to public access to articles and research data, which demonstrates the flexibility in infrastructure-based investments in OA.

Table 3

Position Title	Estimated FTE Contributed to CU Scholar
Software Developers	1.2 FTE
Institutional Repository Program Manager	0.75 FTE
Data Librarians	0.3 FTE
Head, Data and Scholarly Communication Services	0.15 FTE
Scholarly Communication Librarian	0.1 FTE
	<b>Total 2.5 FTE</b>

In addition to personnel contributions to CU Scholar, there are also annual costs related to the technical infrastructure for the repository (Table 4). While CU Scholar is built on free and open source software (Samvera), there are costs related to the infrastructure needed to run the

software and for storage of the items in the repository, which must be kept permanently and thus continually grow from year to year. The current estimate for these annual infrastructure costs is \$7,875 per year. Growth of most repository content types remains steady, but there is no current indication that these costs will increase significantly in the near future. That said, there are external factors that could change this scenario if they were to come to pass (e.g., changes to funder or publisher policies). In addition to CU Scholar infrastructure costs, the only other annual investment the Libraries make to Green OA is support for the arXiv disciplinary repository. This annual membership costs \$5,000 per year and supports the community-driven effort to maintain arXiv as a resource to researchers worldwide. Since arXiv contains the most articles authored by CU Boulder researchers of any repository (see Table 2), it seems valuable to continue to provide this support.

Table 4

Description	Annual Cost (\$)
CU Scholar technical infrastructure	\$7,875
arXiv membership	\$5,000
	<b>Total \$12,875</b>

## IV. Goals, Strategies, and Recommendations

Based on the data sources evaluated and the analysis of the existing Green OA landscape, the following goals, strategies, and recommendations for Green OA will help advance the Libraries overall OA strategy:

1. **Goal #1: By the end of FY28, Green OA is recognized across campus as a means of providing OA that is viable for authors and sustainable for institutions.**
  - a. Strategies:
    - i. Reframe how we message OA across campus to always include Green OA, using language that emphasizes the distinction between Green OA and Gold OA and in ways that resonate with authors.
    - ii. Identify opportunities to expand and clarify outreach to campus constituents about the advantages of Green OA over Gold OA in terms of sustainability for the institution.
  - b. Recommendations:
    - i. Consistently message our Green OA initiatives (e.g., OA policy, CU Scholar) in discussions with faculty and administration about OA.
    - ii. Emphasize in OA-related communications with campus constituents that Green OA is already the most common form of OA utilized at CU Boulder,

that it avoids controversial aspects of APC-based models, and that it is the preferred method of OA for federal funders.

- iii. Consider targeted outreach about Green OA to departments in the Arts & Humanities, Social Sciences, and Professional Schools that publish significant amounts of articles, especially in light of the potential impacts that implementation of the White House OSTP memo may have on funded research in these departments.

**2. Goal #2: By the end of FY28, Green OA policies and guidelines are prioritized as part of a holistic strategy for vendor negotiations and transformative agreements.**

a. Strategies:

- i. Leverage Green OA data (e.g. from Dimensions, Unpaywall/CU Experts integration) and publisher policies on self-archiving in assessing transformative agreements.
- ii. Monitor OSTP-related developments (e.g., significant increases in the percentage of Green OA articles available).

b. Recommendations:

- i. Ensure Green OA is a recognized and supported route to OA in publisher agreements, especially for publishers within disciplinary areas where Green OA is common practice.
- ii. Over time, assess what impact (if any) increased support for Gold and Hybrid OA through transformative agreements has on Green OA practices.
- iii. Advocate in negotiations for publishers to present Green OA options to authors and make this OA route more visible.

**3. Goal #3: By the end of FY28, CU Scholar development and related collaborations are supported at a level that enables full participation in key Green OA initiatives.**

a. Strategies:

- i. Leverage collaborations both internal and external to CU Boulder to expand existing partnerships and identify new opportunities to enhance the value CU Scholar provides for Green OA.
- ii. Strategically prioritize developer resources to ensure repository infrastructure continues to meet user needs and enables engagement with national initiatives.

b. Recommendations:

- i. Prioritize implementation of improvements to CU Scholar identified in the USRN discovery pilot project, and continue to engage with the USRN and other national initiatives related to Green OA and institutional repositories in order to identify future development priorities.
- ii. Optimize existing developer resources to maintain and enhance the CU Scholar technology stack and features in order to improve user experience and promote higher deposit rates of Green OA articles among CU Boulder researchers; however, if the goals laid out in this plan are

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successful in increasing awareness of and demand for CU Scholar, the budget for developer support for Green OA may need to increase to maintain reasonable standards of quality for infrastructure and services.

- iii. Support continued collaboration with OIT to maintain and enhance the Libraries ability to monitor and track Green OA activity in CU Scholar and across campus through efforts like the CU Experts/Unpaywall integration.

Appendix A. 2021 Green OA Articles by CU Boulder Unit

CU Boulder Unit	Green OA Articles	Total Articles	Green OA % of Unit Total Articles	Unit % of Total Green OA Articles at CU
Cooperative Institute for Research in Environmental Sciences	270	893	30.24%	12.87%
Physics	167	601	27.79%	7.96%
College of Engineering and Applied Science	154	813	18.94%	7.34%
Chemical and Biological Engineering	99	261	37.93%	4.72%
Laboratory for Atmospheric and Space Physics	96	396	24.24%	4.58%
Computer Science	89	407	21.87%	4.24%
Electrical, Computer and Energy Engineering	80	489	16.36%	3.81%
Psychology and Neuroscience	76	255	29.80%	3.62%
Aerospace Engineering Sciences	71	443	16.03%	3.38%
Institute of Arctic & Alpine Research	68	246	27.64%	3.24%
Atmospheric and Oceanic Sciences	66	180	36.67%	3.15%
Astrophysical and Planetary Sciences	63	308	20.45%	3.00%
Chemistry	63	220	28.64%	3.00%
Mechanical Engineering	57	313	18.21%	2.72%
Geological Sciences	45	159	28.30%	2.14%
Molecular, Cellular & Developmental Biology	44	127	34.65%	2.10%
Civil, Environmental and Architectural Engineering	41	303	13.53%	1.95%
Renewable & Sustainable Energy Institute	41	114	35.96%	1.95%
Applied Mathematics	38	93	40.86%	1.81%
Ecology and Evolutionary Biology	37	229	16.16%	1.76%
Integrative Physiology	35	163	21.47%	1.67%
Biochemistry	30	82	36.59%	1.43%
Institute for Behavioral Genetics	29	72	40.28%	1.38%
Geography	27	138	19.57%	1.29%
Biofrontiers Institute	26	68	38.24%	1.24%
Institute of Behavioral Science	24	117	20.51%	1.14%
Research & Innovation Office	24	132	18.18%	1.14%
Institute of Cognitive Science	19	102	18.63%	0.91%
Mathematics	17	49	34.69%	0.81%

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Leeds School of Business	16	99	16.16%	0.76%
Department of Environmental Studies	13	84	15.48%	0.62%
JILA	13	22	59.09%	0.62%
ATLAS Institute	12	47	25.53%	0.57%
Economics	10	35	28.57%	0.48%
Renée Crown Wellness Institute	10	65	15.38%	0.48%
Sociology	10	50	20.00%	0.48%
University of Colorado Museum of Natural History	9	67	13.43%	0.43%
Anthropology	8	70	11.43%	0.38%
Leeds-Budget & Administration	7	37	18.92%	0.33%
IRISS Grand Challenge	6	73	8.22%	0.29%
Information Science	6	16	37.50%	0.29%
School of Education	5	133	3.76%	0.24%
Center for Integrated Plasma Studies	4	13	30.77%	0.19%
Engineering Connections	4	20	20.00%	0.19%
Materials Engineering	4	8	50.00%	0.19%
National Security Working Group	4	28	14.29%	0.19%
Office of the Chancellor	4	20	20.00%	0.19%
CU Grand Challenge SWx Center	3	8	37.50%	0.14%
Center for Advanced Decision Support for Water and Environmental Systems	3	42	7.14%	0.14%
College of Arts and Sciences	3	8	37.50%	0.14%
Graduate School	3	12	25.00%	0.14%
Institutes - Administration	3	15	20.00%	0.14%
A&S UG Ed Administration	2	3	66.67%	0.10%
Academic Affairs	2	3	66.67%	0.10%
Bruce D. Benson Center for the Study of Western Civilization	2	17	11.76%	0.10%
College of Music	2	38	5.26%	0.10%
Honors Program	2	6	33.33%	0.10%
Linguistics	2	40	5.00%	0.10%
Media Studies	2	42	4.76%	0.10%
Philosophy	2	15	13.33%	0.10%
Speech, Language, and Hearing Sciences	2	29	6.90%	0.10%
University Libraries	2	31	6.45%	0.10%

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A&S Nat Sci Administration	1	5	20.00%	0.05%
A&S Research Administration	1	6	16.67%	0.05%
A&S Residential Acad Programs	1	6	16.67%	0.05%
Advertising, Public Relations and Media Design	1	35	2.86%	0.05%
Center for Astrophysics & Space Astronomy	1	26	3.85%	0.05%
Center to Advance Research and Teaching in the Social Sciences	1	16	6.25%	0.05%
Communication	1	17	5.88%	0.05%
Communication & Society RAP	1	3	33.33%	0.05%
Engineering Honors Program	1	3	33.33%	0.05%
English	1	36	2.78%	0.05%
Environmental Design	1	26	3.85%	0.05%
Faculty Affairs	1	3	33.33%	0.05%
French & Italian	1	31	3.23%	0.05%
International Education	1	31	3.23%	0.05%
Journalism	1	13	7.69%	0.05%
OIT-Administration	1	1	100.00%	0.05%
Political Science	1	50	2.00%	0.05%
Rec Ctr-Special Ops	1	6	16.67%	0.05%
Research & Engineering Ctr for Unmanned Vehicles	1	6	16.67%	0.05%
School of Law	1	32	3.13%	0.05%
Sewall RAP	1	3	33.33%	0.05%
Spanish and Portuguese	1	17	5.88%	0.05%

## Appendix B. 2021 CU Boulder Green OA Articles by Repository

<b>Repository Name</b>	<b>CU Green OA Articles</b>
Cornell University - arXiv	248
Le Centre pour la Communication Scientifique Directe - HAL	165
U.S. Department of Energy Office of Scientific and Technical Information - OSTI OAI	157
University of Colorado Boulder - CU Scholar	104
National Oceanic & Atmospheric Administration - NOAA Institutional Repository	103
University of California - eScholarship University of California	54
PubMed Central - Europe PMC	22
California Institute of Technology - CaltechAUTHORS	18
DANS - Data Archiving and Networked Services - NARCIS - National Academic Research and Collaborations Information System	18
OSF Preprints - PsyArXiv	18
Cold Spring Harbor Laboratory - bioRxiv	17
University of Michigan - Deep Blue	16
Spanish National Research Council	14
University of Oslo - Duo Research Archive	14
CERN European Organization for Nuclear Research - Zenodo	11
Cold Spring Harbor Laboratory - medRxiv	11
La Trobe University - OPAL	11
Massachusetts Institute of Technology - DSpace@MIT	10
University College London - UCL Discovery	10
Authorea - Authorea	7
GFZ German Research Centre for Geosciences - Publication Database GFZ	7
RePEc: Research Papers in Economics - RePEc	7
Technical University of Denmark, DTU - Technical University of Denmark, DTU Orbit	7
USMAI Consortium - Maryland Shared Open Access Repository	7
University of Illinois at Chicago - INDIGO	7
University of Leeds, The University of Sheffield, University of York - White Rose Research Online	7
Woods Hole Scientific Community - Open Access Server of the Woods Hole Scientific Community	7
Ecole Polytechnique Fédérale de Lausanne - Infoscience	6
University of Edinburgh - Edinburgh Research Explorer	6

## Public Version

University of Groningen / Centre for Information Technology - University of Groningen research database	6
University of Liège - Open Repository and Bibliography	6
University of Warwick - Warwick Research Archive Portal	6
Alma Mater Studiorum Università di Bologna - Archivio istituzionale della ricerca - Alma Mater Studiorum Università di Bologna	5
Natural Environment Research Council - NERC Open Research Archive	5
Paul Scherrer Institute - DORA PSI	5
Research Square - Research Square	5
University of Cambridge - Apollo	5
University of Oxford - Oxford University Research Archive	5
University of Reading - CentAUR	5
University of Southampton - ePrints Soton	5
Delft University of Technology - Research Repository	4
Elsevier - VU Research Portal	4
Karlsruhe Institute of Technology - Repository KITopen	4
Swiss Federal Institute for Forest, Snow and Landscape Research - DORA WSL	4
University College Cork, Ireland - Cork Open Research Archive	4
University of Bristol - Bristol Research	4
Vrije Universiteit Amsterdam - VU Research Portal	4
Durham University	4
University Library Bern - BORIS - Bern Open Repository and Information System	4
Australian National University - ANU Open Research	3
CONICET - CONICET Digital	3
Cardiff University - ORCA Online Research @Cardiff	3
ETH Zurich - Repository for Publications and Research Data	3
Econstor - Econstor	3
Edinburgh Napier University - Edinburgh Napier Research Repository	3
Eindhoven University of Technology - Eindhoven University of Technology Research Portal	3
Hong Kong Polytechnic University - PolyU Institutional Research Archive	3
King Abdullah University of Science and Technology - King Abdullah University of Science and Technology Repository	3
Leiden University - Leiden Repository	3
Queensland University of Technology - QUT ePrints	3
State University of New York - SUNY Open Access Repository	3

## Public Version

The University of Glasgow - Enlighten: Publications	3
The University of Manchester - Research Explorer	3
University of Bath - University of Bath Research Portal	3
University of Castilla La Mancha - Virtual Community of Pathological Anatomy	3
University of Liège - ORBi - Open Repository and Bibliography of the University of Liège	3
University of Pretoria - UpSpace Institutional Repository	3
University of Twente - University of Twente Research Information	3
no - no	3
California Digital Library - EarthArXiv	2
Columbia University - Columbia Academic Commons	2
Elsevier - Scopus	2
Erasmus University Rotterdam - EUR Research Repository	2
GEOMAR - Helmholtz Centre for Ocean Research Kiel - OceanRep	2
Ifremer - Archimer	2
Imperial College London - Spiral	2
Indiana University - Purdue University Indianapolis - IUPUI ScholarWorks	2
Max Planck Society - MPG.PuRe	2
North American Electric Reliability Corporation - North American Electric Reliability Corporation Open Archive	2
Penn State Libraries - ScholarSphere	2
PhilPapers Foundation - PhilPapers	2
Polytechnic University of Catalonia - UPCCommons	2
Potsdam Institute for Climate Impact Research	2
Radboud University - Radboud Repository	2
St Andrews Research Repository - St Andrews Research Repository	2
State Meteorological Agency - Arcimis	2
Universitat Jaume I - Repositori UJI	2
University of East Anglia - UEA Digital Repository	2
University of Greenwich - Greenwich Academic Literature Archive	2
University of South Queensland - USQ EPrints	2
University of Strathclyde - Strathprints: The University of Strathclyde institutional repository	2
University of Victoria - UVic's Research and Learning Repository	2
Universitätsbibliothek der Freien Universität Berlin - Refubium	2
Virginia Tech - Virginia Tech Works	2

## Public Version

Kooperativer Bibliotheksverbund Berlin-Brandenburg	2
AMOLF - AMOLF Institutional Repository	1
Aberdeen University - Aberdeen University Research Archive	1
Alfred-Wegener-Institut - Helmholtz-Zentrum für Polar-und Meeresforschung	1
Augsburg University - OPUS - Augsburg University Publication Server	1
Bryn Mawr College - Scholarship, Research, and Creative Work at Bryn Mawr College	1
CCSD	1
Carlos III University of Madrid - e-Archivo	1
Conicet	1
East Carolina University - The Scholarship East Carolina University's Institutional Repository	1
European Commission - Joint Research Centre	1
Florida International University - Florida International University Digital Commons	1
Georg-August-Universität Göttingen - GoeScholar The Publication Server of the Georg-August-Universität Göttingen	1
Georgia State University - Counseling And Psychological Services Dissertations	1
Ghent University - Ghent University Academic Bibliography	1
Griffith University, Queensland, Australia - Griffith Research Online	1
Humboldt University of Berlin - edoc Publication server	1
Indiana University - IUScholarWorks	1
International Institute of Applied Systems Analysis - IIASA PURE	1
Kansas State University - K-State Research Exchange	1
King's College London - Research Portal	1
Lancaster University - Lancaster EPrints	1
Library of the Hungarian Academy of Sciences - Repository of the Academy's Library	1
Liverpool John Moores University	1
Louisiana State University - LSU Digital Commons	1
Ludwig Maximilian University of Munich - Munich Personal RePEc Archive	1
Monash University - Monash University Research Portal	1
National Institute of Polar Research	1
National University of La Plata - El Servicio de Difusión de la Creación Intelectual	1
Newcastle University - Newcastle University ePrints	1
OSF Preprints - OSF Preprints	1
OSF Preprints - SocArXiv	1
OSF Preprints - SportRxiv	1

## Public Version

Queen Mary University of London - Queen Mary Research Online	1
Queen's University Belfast - Research Portal	1
RCAAP Project by FCT - Portuguese National Funding Agency for Science, Research and Technology - RCAAP Search Portal	1
Red Federada de Repositorios Institucionales de Publicaciones Científicas - LA Referencia	1
Rothamsted Repository - Rothamsted Repository	1
Singapore Management University - Singapore Management University Institutional Knowledge	1
Swansea University - Cronfa	1
Swiss Federal Institute of Aquatic Science and Technology	1
Temple University - TUScholarShare	1
Texas Tech University - ThinkTech	1
The Arctic University of Norway - Munin Open Research Archive	1
The Marine Biological Association	1
The Open University - Open Research Online	1
Trinity College Dublin - Trinity's Access to Research Output	1
Trinity University - Digital Commons@Trinity	1
Ulsan National Institute of Science and Technology - Scholarworks@UNIST	1
Universidad del Pais Vasco - Communities in ADDI	1
Universidade do Minho - RepositóriUM	1
Universita Degli Studi Di Milano - Archivio Istituzionale della Ricerca	1
Universitat Autònoma de Barcelona - Dipòsit Digital de Documents de la UAB	1
Universitat de Barcelona - Dipòsit Digital de la Universitat de Barcelona	1
University of Birmingham - University of Birmingham Research Portal	1
University of Exeter - Open Research Exeter	1
University of Ferrara - Institutional Research Information System University of Ferrara	1
University of Geneva - Archive ouverte UNIGE	1
University of Jyväskylä - Jyväskylä University Digital Archive	1
University of Konstanz - KOPS - The Institutional Repository of the University of Konstanz	1
University of Lapland - LaCRIS - University of Lapland Current Research System	1
University of Minnesota, USA - AgEcon Search	1
University of North Carolina at Chapel Hill - Carolina Digital Repository	1
University of Oulu - University of Oulu Repository - Jultika	1
University of Plymouth - PEARL	1
University of Southern Denmark - University of Southern Denmark Research Portal	1

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University of Stirling - Stirling Online Research Repository	1
University of Trieste <a href="https://www.units.it/">https://www.units.it/</a> - ArTS Archivio della ricerca di Trieste	1
University of Waikato - Research Commons	1
University of Western Australia - UWA Profiles and Research Repository	1
University of Zaragoza Repository - Zagan	1
University of Zurich - Zurich Open Repository and Archive	1
Université Libre de Bruxelles - Dépôt institutionnel de l'Université libre de Bruxelles	1
Université de Lausanne - SERVAL	1
Université de Lille	1
West Virginia University - The Research Repository @ WVU	1
Yokohama National University - Yokohama National University Repository	1
ZB MED - Informationszentrum Lebenswissenschaften - PUBLISSO-Fachrepositorium Lebenswissenschaften	1
Åbo Akademi University - AboCRIS	1