

Welcome to the
Pinnacle Seminar
of the
Data Sharing Seminar Series for Societies



Science
JOURNALS MAAS



ACS
Chemistry for Life®

AGU
ADVANCING EARTH
AND SPACE SCIENCE

AMS 
American Meteorological Society
Board on Data Stewardship

E **BRITISH
ECOLOGICAL
SOCIETY**

CSSP 
council of scientific society
presidents

ECOLOGICAL SOCIETY OF AMERICA
esa


FASEB
Federation of American Societies
for Experimental Biology

FABBS 
Federation of Associations in
Behavioral & Brain Sciences

I U P A C

INTERNATIONAL UNION OF
PURE AND APPLIED CHEMISTRY

Bring awareness of the aspirations of open and FAIR digital research products and encourage the culture of sharing.

Moderator

Yvette Seger, Federation of American Societies For Experimental Biology

Panelists

Ian Bruno, International Union of Pure and Applied Chemistry

August Muench, American Astronomical Society

Emilie Aime, British Ecological Society

Doug Schuster, American Meteorological Society (AMS), Board on Data Stewardship

What is IUPAC?

International Union of Pure and Applied Chemistry

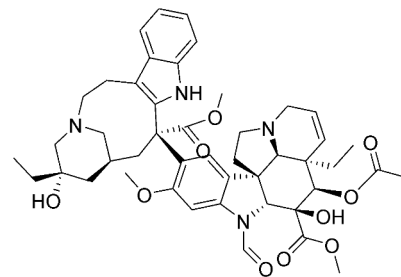
100 years of global consensus to define & develop a common and systematic language for chemistry:

- 4,000 scientific experts worldwide, many drawn from scientific societies
- Pure and applied – research, industry, policy, education



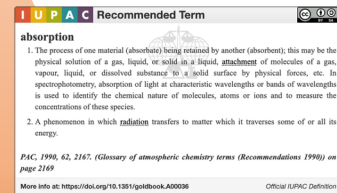
Periodic Table of Elements

Chemical
representation



Chemical Nomenclature,
Representation Formats and
Standard Identifiers (InChI)

Common
language



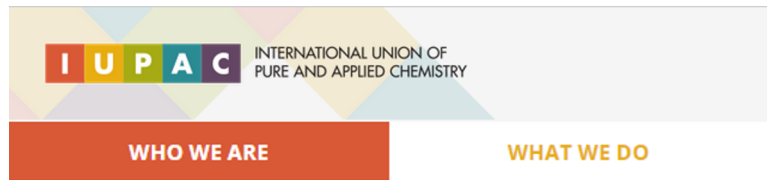
Terminologies,
units and
symbols

Chemical
properties

Chemical
concepts

Critically evaluated data sets

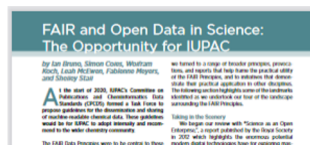
Raising Awareness within IUPAC and Beyond



DIGITAL STANDARDS

- Established Standards (e.g. InChI, ThermoML, JCAMP-DX)
- Available Resources (e.g. Gold Book for digital terminology)
- Current Projects aimed at further enabling FAIR (e.g. metadata schema, digital units, molecular representation)

<https://iupac.org/what-we-do/digital-standards/>



FAIR and Open Data in Science: The Opportunity for IUPAC

Ian Bruno, Simon Coles, Wolfram Koch, Leah McEwen, Fabienne Meyers, Shelley Stall

Chemistry International, vol. 43, no. 3, 2021, pp. 12-16. <https://doi.org/10.1515/ci-2021-0304>

51st IUPAC General Assembly

Solving Global Challenges with Chemistry

▲ IUPAC Digital (workshop lead by CPCDS)

Friday, August 13, 2021

Case studies from relevant data resources, domain data initiatives, industry and other domains. Making the strategic case for investment of resources in digital chemistry activities.

Raising Awareness within IUPAC and Beyond

Symposia, workshops and other activities relating to FAIR in conjunction with other societies and organisations



Participation in EU-funded RDA/CODATA WorldFAIR Project: Global Cooperation on FAIR Data Policy and Practice

IUPAC deliverables

- Digital Recommendations for Chemistry FAIR data policy and practice
- How-to demonstrations and templates on how to prepare and deposit chemical data
- Utility services for Chemistry Standards – confirming chemical identity and digital representation of substances





AAS Journals have adopted a policy that reflects the importance of software to the astronomical community, and the need for clear communication about such software which ensures that credit is appropriately given to its authors. The policy provides clear guidelines for citing software in all manuscripts, and supports the publication of descriptive articles about software relevant to research in astronomy and astrophysics.

Bringing awareness through

- Data Editors engaging Authors (2000-)
- Policy Statement on Software (2016-)
- Developing new Data Policies (2022-)

Data/Software Keywords:	Data/software review
<p>This manuscript contained the following Data/Software keywords that may require review:</p> <p>github.com, sourceforge.net</p>	<p>1) We recommend that living code on github repositories (e.g. Be-synthesis-with-moog) place a "frozen" version on Zenodo (or other 3rd party repositories that issue DOIs) and then cite them in the article. A tutorial on how to do this is available here:</p> <p>https://github.com/AASJournals/Tutorials/tree/master/Repositories</p> <p>[Edit]</p>

Bringing awareness through Data Editors

- run scripts to identify linked code repositories;
- review URLs for remote, unarchived data/code/figures;
- request data be included or archived & linked to final article;
- review tables, figures & animations for size or accessibility;
- submit data/code recommendations to the author.



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Bringing awareness through Policy

- 2016 Software policy focused on attribution and increasing recognition of software developers;
- Provided tools for preserving and citing software in manuscripts (“Software Availability Statements”);
- In 2022 respond to Community (NASA) open-science initiatives; develop a formal “Data” policy.

Open data at the British Ecological Society



Our current policy

- From 1 January 2014 authors have been required to archive their data and must meet the following conditions:
 - Data must be freely, and permanently available
 - Results must be reproducible
 - Code must be archived for theoretical papers

https://besjournals.onlinelibrary.wiley.com/hub/data_archiving_policy

How is the policy working

- Compliance is excellent
- Archived data quality is very variable
- Interoperability of datasets is often poor
- Archiving data in association with articles leads to fragmentation

Policy changes in the pipeline

- Cross discipline collaboration to improve data standards
- Emphasise FAIR plus the importance of how to use the data
- Require data earlier in the process
- Emphasise the importance of data as an important research output in it's own right – credit for data collectors
- Clarity on exceptions

AMS Board on Data Stewardship



- **Advocate** for the application of Open Science Principles in the AMS community
 - Inform goals/policies/standard practices in academia, government, non-profit, and private sectors in pursuit of open science
- Assist in drafting/updating AMS policy and professional guidance statements
 - **Full, Open, and Timely Access to Data -Adopted in 2013, updated 2019**
 - **Software Preservation, Stewardship and Reuse -Adopted in 2021**

Community Engagement



American Meteorological Society

BOARD ON DATA STEWARDSHIP

- Policy statements published in flagship journal
- Annual meeting activities
 - Data Help Desk
 - bit.ly/DataHelpAMS22
 - Open Science Town Halls
 - Open Science sessions
- Webinars

Data Help Desk at AMS 2022

JANUARY 23-27, ONLINE

The Data Help Desk, which is being held in conjunction with the [American Meteorological Society \(AMS\) Annual Meeting](#), connects researchers with data and software experts to enhance research and make data and software more open and FAIR. [Follow the action on Twitter](#). The Data Help Desk at #AMS2022 is hosted by the AMS Board on Data Stewardship with additional support from ESIP.

[Ask a Question via Twitter](#)

[Ask a Question via Form](#)

Resource Gallery

[Demos & Tutorials](#)

[One-Pagers & Notebooks](#)

More Details

Do you have earth science data or software-related questions? Are you looking to make your data and/or software open and FAIR? Are you interested in tools and resources for working with your data or for finding data to reuse? The Data Help Desk is here for you!

Community Engagement



- Data driving scientific inquiry
- Data transforming education and training, and bridging disciplines
- Data advancing racial and socioeconomic justice, equity, and visibility
- Data shaping environmental attitude and behavior
- Data integrating public-private-academic partnerships
- Data powering economic growth

Theme of the AMS 103rd Annual Meeting



Data: Driving Science. Informing Decisions. Enriching Humanity.

We observe, create, measure, simulate, collect, and process data at a prodigious rate, propelled by modern digital technology, and use it to create new knowledge and insights; inform and validate models and hypotheses; guide policies and decisions; and advance the scientific, environmental, and societal dimensions of the weather, water, and climate enterprise (WWC).

Our imperative must be to ensure that data in all its forms, and the actions taken based on this data, are free of biases and fully accessible.

Provide incentives for sharing data and software.

Moderator

Juliane Baron, Federation of Associations in Behavioral and Brain Sciences

Panelists

Frank Krause, Federation of American Societies For Experimental Biology

Cindy Paska, Council of Scientific Society Presidents

Leah McEwen, International Union of Pure and Applied Chemistry

Brooks Hanson, American Geophysical Union

Compliance



Culture Change

FASEB DataWorks! is new initiative that brings the biological and biomedical research communities together to advance human health through data sharing and reuse.

DATAWorks! FASEB

Salon

DATAWorks! FASEB

Prize

DATAWorks! FASEB

Community

DATAWorks! FASEB

Help Desk

Opportunities to Engage with DataWorks!

Participate in the Data Management Plan Challenge

- Reward researchers who produce exemplary DMPs in the biology and biomedical fields with up to \$1,000 cash prize
- Next Deadlines for Submission: **June 5** and **October 5**
- Visit www.faseb.org/dataworks for more information

Join future Salons

- May 12, 2 pm ET – “How to Prepare a Data Management Plan”

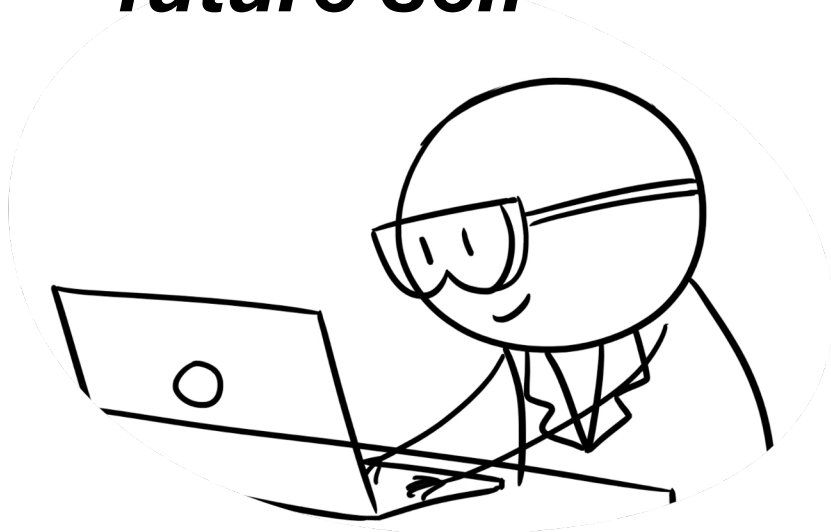
Amplify with your network

- Share opportunities with peers
- Follow twitter.com/faseborg,
#FASEBDataWorks

Value of sharing data

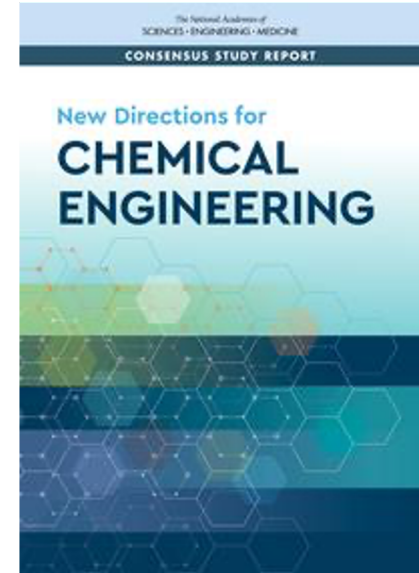
1. Marketable skills – data are highly valued in chemical industries
2. Advance research – enhance collaborations, apply data science
3. Improve workflows – efficiency, documentation, sanity

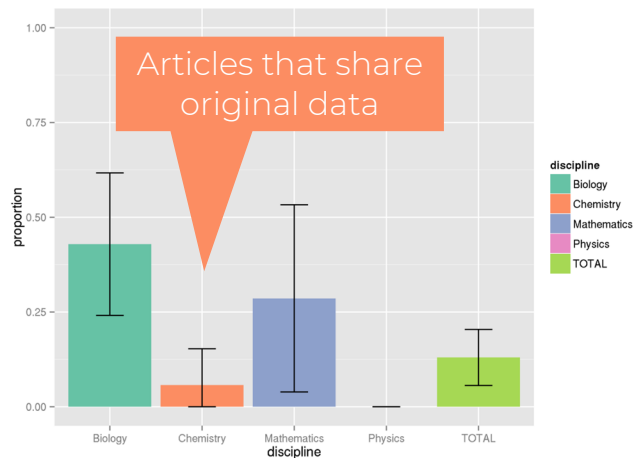
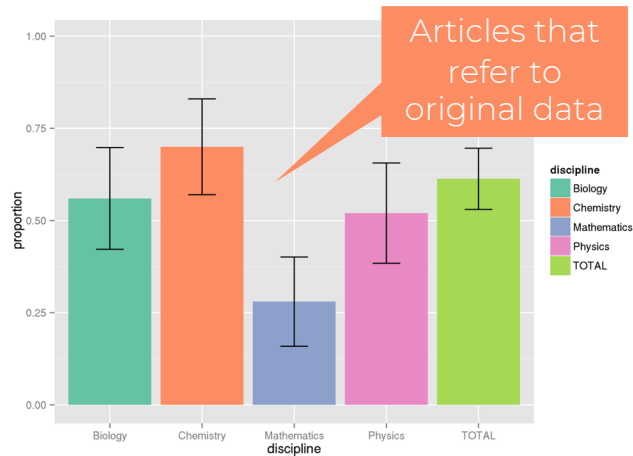
“Don't trust your future self”



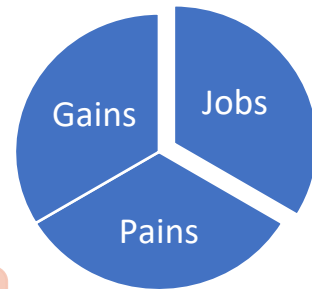
Data are highly valued in chemical industries

- New Directions for Chemical Engineering (US National Academies, 2022)
- **Tools to enable the future of chemical engineering**
- *“Current and future engineers will need to navigate the interface between the natural world and the data that describes it...”*
- *“Developing tools that synthesize data in real time and frameworks or models that transform data into information and actionable knowledge could become one of chemical engineering’s key contribution to society over the next decades.”*



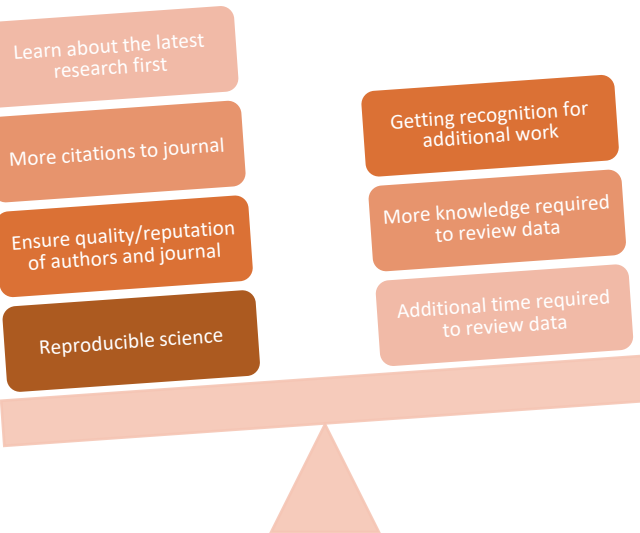


Enhance/Advance Research



Gains

Pains



Update publication policy and author guidelines around availability statements and citations for data and software.

Moderator

Zsolt Silberer, Ecological Society of America

Panelists

Jake Yeston, AAAS/Science

Michael Friedman, American Meteorological Society (AMS), Board on Data
Stewardship

Angie Hunter, American Chemical Society

Heather Carlo, Ecological Society of America

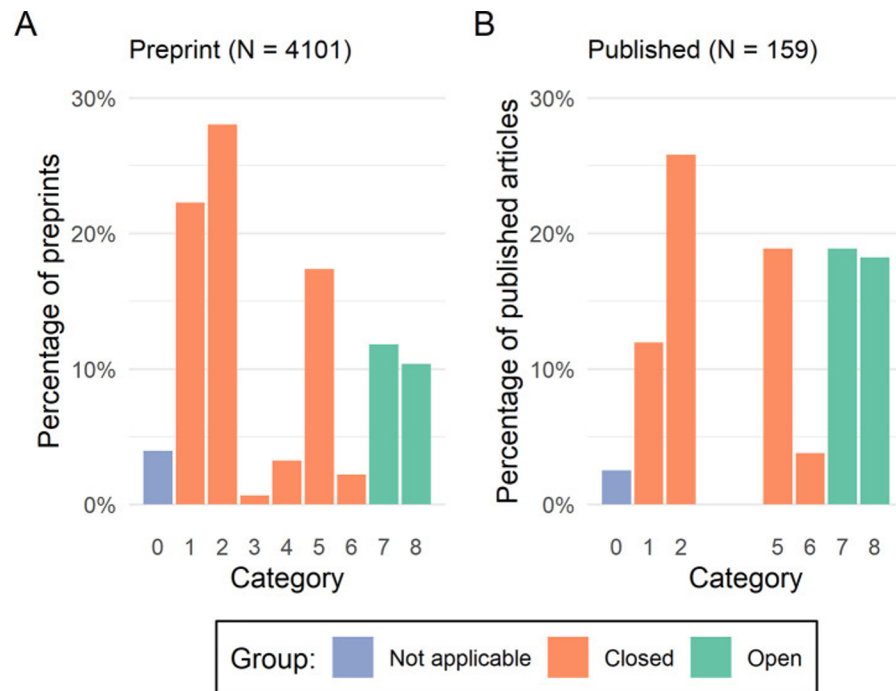
Current state of Policy, Author Compliance and Data Availability

Definitively progress had been made on:

1. Data availability statements are a reality
2. Greater adoption of open data
3. Industry, publisher and societies are taking action on Open Science

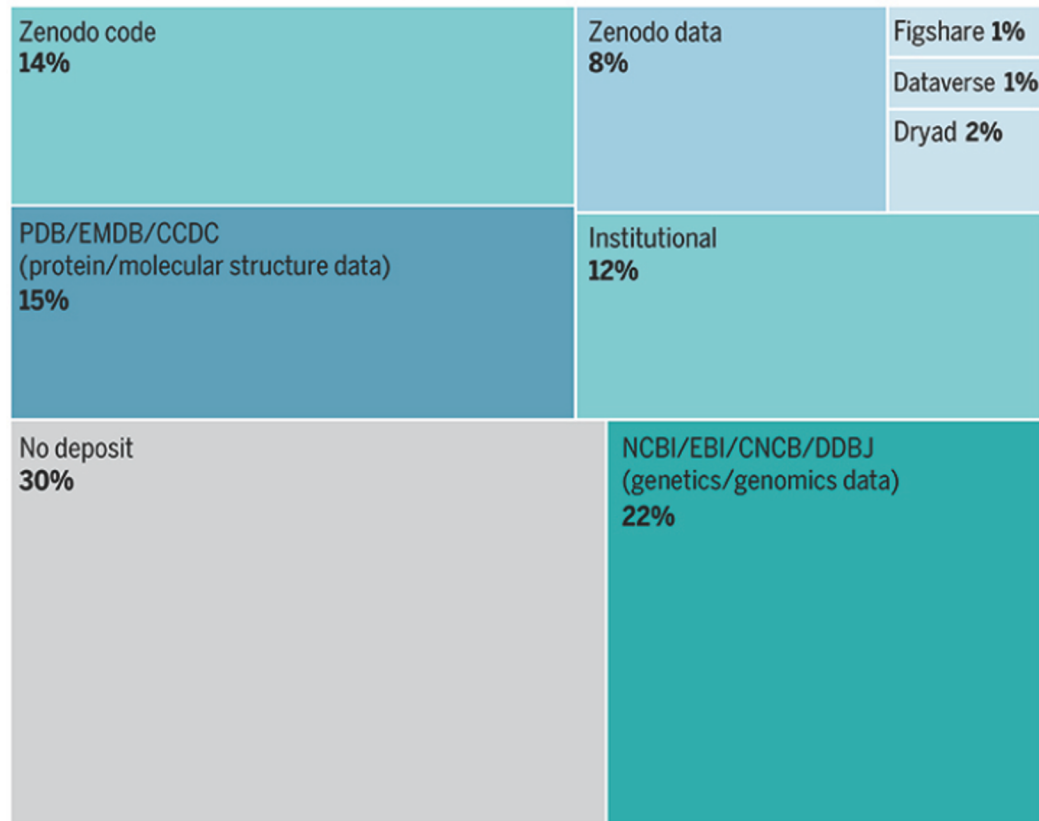
But, the progress is still muted by:

1. Author confusion
2. Lack of use of an author availability statements
3. Openness of the data and its availability
4. Wide variation in adoption and standardization



Distribution of the data availability statements (2019 to 2020) of preprints in medRxiv (Panel A) and published (Panel B) records by category
DOI: 10.1371/journal.pone.0250887

Percentage of papers that used particular repositories



Kelly Franklin/Science

<https://www.science.org/content/blog-post/progress-data-and-code-deposition>

Because some papers used more than one repository, the percentage sum exceeds 100. Subject-specific repositories used three or fewer times included:

[Materials Data Facility](#)
[Materials Cloud](#)

[National Centers for Environmental Information](#)
[National Snow and Ice Data Center](#)
[Sea Scientific Open Data Publication](#)
[ForestPlots.net](#)
[Environmental Information Data Center](#)
[EarthChem](#)

[Biological and Chemical Oceanography Data Management Office](#)
[Neptune Sandbox Berlin](#)
[OneStratigraphy](#)
[Knowledge Network for Biocomplexity](#)
[ESRF heritage database for palaeontology, evolutionary biology and archaeology](#)

Takeaways

- Crystallographic and genomic repositories have been MANDATED for over a decade, so their prevalence is not surprising
- How can authors be persuaded of the value of field-specific over general repositories?
- Our biggest remaining challenge is specifying WHICH TYPE OF DATA must be archived for each field of study
- Our second biggest challenge is dealing with third-party constraints that make readers recontact each source in a collated dataset

RDA Framework Compliance 1

- Embargoes (explicitly prohibited)
- Data Citation (explicitly mandated, though we do not yet mandate DOIs)
- Researcher/Author Support (offered by individual editors responsible for each discipline, plus a dedicated email address for readers to complain if they cannot access data)
- Data Availability Statements (explicitly mandated)
- Mandatory Data Sharing (explicitly mandated)

RDA Framework Compliance 2

- **Definition of Data (work in progress, especially across different disciplines)**
- **Definition of Exceptions (work in progress, as noted above pertaining to third party constraints)**
- **Data Formats and Standards (work in progress, specified in some fields such as crystallography but not others)**
- **Data Repositories (again work in progress: permanence and accessibility are mandated, several general repositories are recommended, and we link to the AGU/Datacite repository finder, but we don't set criteria such as CoreTrustSeal, which is a problem for Institutional repositories in particular)**
- **Supplementary Materials (we nudge authors toward repositories but still allow data files in the supplement if the authors have a strong preference)**

RDA Framework Compliance 3

- **Data and Software Licensing (we do not yet offer guidance, but we should)**
- **Peer Review of Data (we do this on an as-needed basis, but in the medium term we are aiming to partner with one or more repositories to make the process more routine)**
- **Data Management Plans (we do not yet offer guidance, and are open to discussions about the subject with funders)**

AMS Publications

- Take lead in moving AMS policy and professional guidance statements to having associated guidelines and requirements for authors, editors, and reviewers
- Educate and help train staff, update workflows, etc., to implement policy for AMS Publications
 - How deep and to whom does the responsibility go for checking and verifying availability statements?
- Engage with Publications Commission, BDS, other boards
 - Data Policy and Guidelines for AMS Publications, updated 2020
 - New update by summer 2022 incorporating best practices for Software Preservation, Stewardship and Reuse, adopted in 2021

AMS Publications

- **Participation in other efforts** in this area is crucial
 - COPDESS, FORCE11, etc.
- **Increased communication and coordination** across publishers is key to progress in general, and minimizing researcher/author pushback
- **Development of common resources**
 - Clear examples of data and software citations that cover as many scenarios as possible
 - New tools to assist authors in determining the what, where, and how of preserving data and software, and making them readily accessible and usable
 - Extremely large datasets and model data output
 - E.g., Model Data RCN project rubric

ACS Research Data Initiatives



■ ACS Research Data Policy

- Developed in partnership with ACS editors and outside experts
- Provides best practice recommendations for data citation, data availability statements, & repositories
- Organizational member of RDA; endorse TOP Guidelines, FORCE11, STM Brussels Declaration

■ ACS Data Guidelines

- Biological, Computational/Machine Learning/Simulations, Organic (**Oct. '21**)
 - **Coming Soon:** Nanoscience / Materials science / Energy (**in 2022**)
-

ACS Publishing Center: New Pages Launched in 2021



[ACS Publications](#) > [ACS Publishing Center](#) > [ACS Research Data Policy](#)

ACS Research Data Policy

The open exchange of information and ideas is critical to scientific progress and ACS' mission of improving people's lives through the transforming power of chemistry. ACS Publications' portfolio of journals offer the highest levels of rigor in the review and publication of scientific articles and research data. Transparency and the open availability of research data are essential to enhancing both scientific progress and the public trust of those research results.

ACS strongly endorses [The FAIR Data Principles](#) and believes that where ethically and legally feasible, all research data should be findable, accessible, interoperable, and reusable. ACS supports the [Center for Open Science's Transparency and Openness Promotion \(TOP\) Guidelines](#), the [Joint Declaration of Data Citation Principles](#), and the [STM Brussels Declaration](#). ACS is a member of the [Research Data Alliance](#). Through engagement with these community initiatives, we strive to promote best practices in research data availability and to bring those best practices to its community of researchers and journal authors to help improve the execution, communication, and reproducibility of science.

Open availability of research data offers the following benefits:

For authors of ACS journal articles

- Open availability of data makes the related research more trustworthy and enhances scientific reputation.
- Research funders are increasingly recognizing data as a valuable research output.

ACS Publishing Center

- [Data Policy](#)
- [Data Guidelines](#)

[ACS Publications](#) > [ACS Publishing Center](#) > [ACS Research Data Guidelines](#)

ACS Research Data Guidelines

ACS Publications portfolio of journals offer the highest levels of rigor in the review and publication of scientific articles and research data. To assist authors to include data as a prioritized publication component, we have developed ACS Research Data Guidelines.

[ACS Research Data Policy](#)

Browse data guidelines for reporting

- [Biological data](#)
- [Simulations, Machine Learning, Computational Data](#)
- [Organic chemistry data](#)
- [Coming Soon](#) Nanoscience / Materials science / Energy (in 2022)

[+ Biological data](#)

[+ Simulations, Machine Learning, Computational Data](#)

[+ Organic chemistry data](#)

Overview of ACS Research Data Levels



Research Data Policy Levels All policy levels are subject to potential ethical and legal restrictions on the public release of data (see section below on Exceptions). Authors are advised to check the Author Guidelines for the journal to which they plan to submit for journal-specific data guidelines.	
Level 1 Public data availability encouraged	The journal encourages all authors to publicly share all the data underlying the results reported in the paper, preferably via archiving in an appropriate public repository. Authors are encouraged to provide a Data Availability Statement describing the public availability of the data supporting the article's conclusions. Publicly available data sets should be cited appropriately .
Level 2 Public data availability encouraged; Data Availability Statement required	The journal encourages all authors to publicly share all the data underlying the results reported in the paper, preferably via archiving in an appropriate public repository. Authors are required to provide a Data Availability Statement describing the public availability of the data supporting the article's conclusions. Publicly available data sets should be cited appropriately .
Level 3 Public data availability required; Data Availability Statement required	The journal requires , as a condition of publication, all authors to publicly share all the data underlying the results reported in the paper, preferably via archiving in an appropriate public repository. Authors are required to provide a Data Availability Statement describing the public availability of the data supporting the article's conclusions. Publicly available data sets should be cited appropriately .
Level 4 Public data availability required and data will be peer-reviewed; Data Availability Statement required	The journal requires , as a condition of publication, all authors to publicly share all the data underlying the results reported in the paper, preferably via archiving in an appropriate public repository. The data will undergo peer review along with the manuscript. Authors are required to provide a Data Availability Statement describing the public availability of the data supporting the article's conclusions. Publicly available data sets should be cited appropriately .



Level 1: All ACS journals encourage data sharing



Level 2: *Next step for ACS – DAS pilot (2022)*



Level 3: Some journals require certain types of data be shared publicly (i.e. CIF data) but no DAS

Open Research History for ESA Journals

- Prior to 2011 An expectation of availability upon request
- 2011 Data requirement for *Ecological Monographs*
- 2012 Novel code requirement for *Ecology*
- 2014 Data requirement for *Ecological Applications*
- 2021 Unified requirements for the entire ESA family of journals
<https://www.esa.org/publications/data-policy/>

Evolution of ESA's Guidelines for Open Research

2011

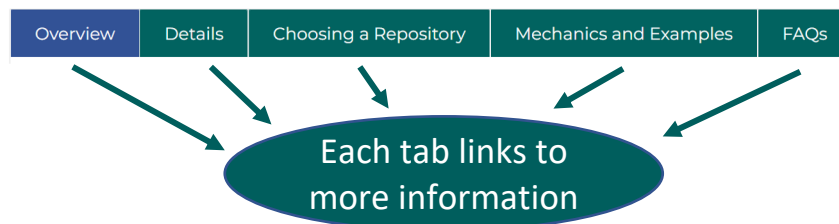
Data Policy. As a condition for publication of a manuscript in Ecological Monographs, all data associated with the results reported in manuscripts submitted after January 1, 2011 must be made available in a permanent, publicly accessible data archive or repository. Examples of permanent data repositories include GenBank for DNA sequences (<http://www.ncbi.nlm.nih.gov/genbank/>), Ecological Archives (<http://esapubs.org/archive/>) for basic ASCII tables, and ORNL-DAAC (<http://daac.ornl.gov/>) for biogeochemical data. Ecological Monographs also is a partner with Dryad (<http://datadryad.org/>), which provides a flexible platform for a wide variety of digital data. Data do not have to be archived at the time of manuscript submission, only following acceptance of the manuscript for publication.

Archived data should be sufficiently complete so that subsequent users can (1) reconstruct tables, graphs, and statistical analyses reported in the original publication, and (2) derive summary statistics necessary for new analyses or meta-analyses. Thus, the normal resolution of the data that are archived will be at the level of individual observations. Truly "raw" data, such as scanned pages from field notebooks, complete video streams, or traces of Markov chain Monte Carlo runs rarely will be required. Sensitive information, such as precise locality data for rare, threatened, or endangered species, or identity of human subjects, should be redacted as required. Sufficient metadata should accompany the data file so that others can readily use files and interpret variables, including their units. Such metadata can usually be provided in a short text file.

2022

Home » Publications » Open Research Policy

Open Research Policy



Current state, future directions at ESA Journals

 **Ecology** @ESAEcology · Jan 3
Cruising into 2022 with our January issue release!

Papers in the issue link to [#opendata](#) from [@uazlibraries](#) [@OSFramework](#) [@figshare](#) [@NCBI](#) [@datadryad](#) [@zenodo_org](#) [@USGS](#) [@EDIdotdata](#)

 **Ecological Monographs** @ESAMonographs · Feb 1
Our February issue is online with a Review, Concepts & Synthesis, and articles on a variety of topics.

With links to [#OpenData](#) from [@datadryad](#) [@zenodo_org](#) [@EDIdotdata](#) [@umnlb](#) [@Concordia](#) [@figshare](#) [@NCBI](#) [#SRA](#) [#GenBank](#) and more!

 **Ecological Applications** @ESAApplications · Mar 1
Our March issue connects to so much [#OpenData](#)!

With thanks to:
[@DataINRAE](#) [@zenodo_org](#) [@datadryad](#) [@figshare](#) [@EDIdotdata](#) [@DigitalUct's](#) [#ZivaHub](#) [@National_Ag_Lib's](#) [#AgDataCommons](#) [@NOAANCEI](#) [@SYKEinfo](#) [@USGS](#) [#ScienceBase](#) [@ForestGEO](#) [@NASAEarthData](#) [@seano_data](#)

Partnerships

Cohesive
Policies

Unified
Instructions

Simplified
Steps

Thank you!

All seminars available at wesharedata.org

Next Seminar Series (starting mid-year): **Open Science for All**



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