

Codefair: Your Personal Assistant for Developing FAIR Software

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CALIFORNIA MEDICAL
INNOVATIONS INSTITUTE



FAIR DATA
INNOVATIONS HUB

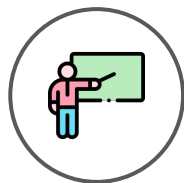
About This Presentation



12 min + 3 min Q&A



Anyone developing, managing,
funding research software



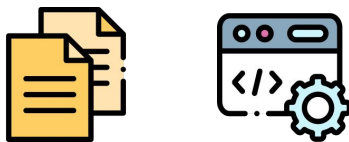
Learn how to make research
software FAIR with Codefair



FAIR

Background

FAIR (Findable, Accessible, Interoperable, Reusable) Principles (2016):
High-level instructions to make research outcomes reusable



Established for of all digital research objects including **software**

<https://doi.org/10.1038/sdata.2016.18>

FAIR

Software

FAIR Principles for Research Software (FAIR4RS Principles, 2022): 17 principles tailored for research software

F1. Software is assigned a globally unique and persistent identifier.
F1.1. Components of the software representing levels of granularity are assigned distinct identifiers.
F1.2. Different versions of the software are assigned distinct identifiers.
F2. Software is described with rich metadata.
F3. Metadata clearly and explicitly include the identifier of the software they describe.

(and more)

<https://doi.org/10.1038/s41597-022-01710-x>

FAIR

How to practically make software FAIR?

FAIR Biomedical Research Software (FAIR-BioRS) Guidelines (2023):
Minimal, actionable guidelines for making software FAIR

- ❑ Include a LICENSE file
- ❑ Include codemeta.json and CITATION.cff metadata files
- ❑ Archive each version of your software, e.g. on Zenodo
- ❑ Etc.

<https://doi.org/10.1038/s41597-023-02463-x>

FAIR

Challenges for making software FAIR



Lack of awareness/training

What is FAIR? What is a codemeta.json file? What is Zenodo?



Time consuming

For each release, DOI, update release date, version number, and authors in codemeta.json, CITATION.cff, CHANGELOG, archival repository metadata



Codefair

Codefair

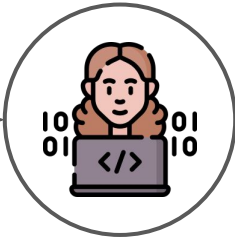
Overview



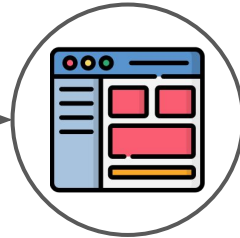
Codefair is a free and open source GitHub app that acts as
your personal assistant for making software FAIR



Install codefair on your
GitHub repository
(codefair.io)



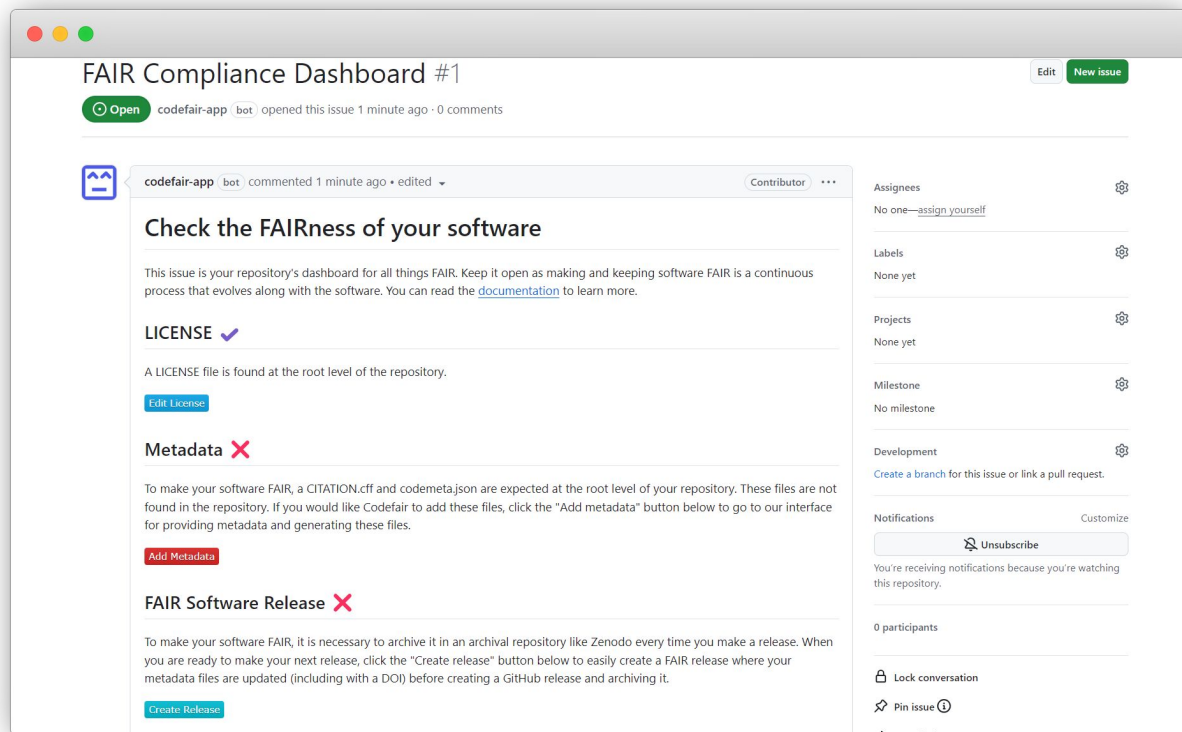
Develop your software
as usual from GitHub



Track and address FAIR
compliance issues
through the GitHub issue

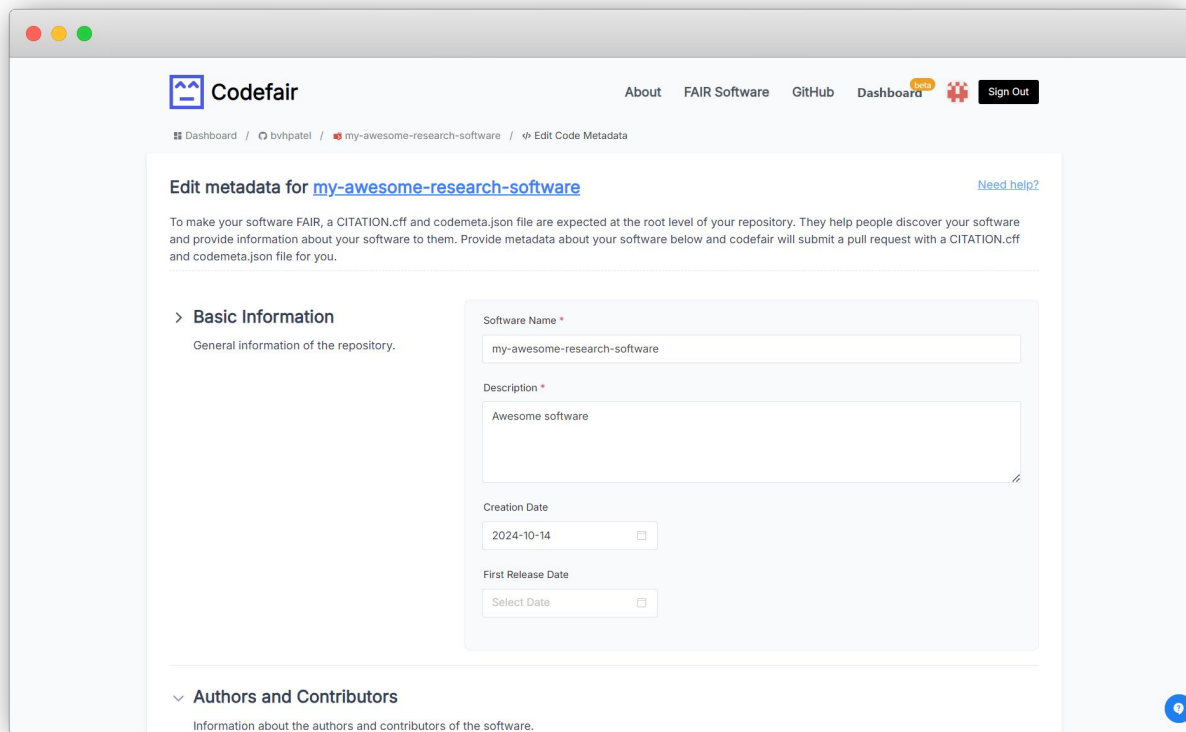
Codefair

GitHub issue dashboard



Codefair

Codefair UI



The screenshot shows a web browser window with the Codefair logo and navigation links (About, FAIR Software, GitHub, Dashboard, Sign Out) at the top. The breadcrumb trail indicates the user is in the 'Edit Code Metadata' section for the repository 'my-awesome-research-software'. The main heading is 'Edit metadata for my-awesome-research-software', with a 'Need help?' link. A paragraph explains that CITATION.cff and codemeta.json files are expected at the root level of the repository. Below this, the 'Basic Information' section is expanded, showing a form with the following fields: 'Software Name' (filled with 'my-awesome-research-software'), 'Description' (filled with 'Awesome software'), 'Creation Date' (filled with '2024-10-14'), and 'First Release Date' (set to 'Select Date'). The 'Authors and Contributors' section is partially visible at the bottom.

Codefair About FAIR Software GitHub Dashboard Sign Out

Dashboard / bvhpatel / my-awesome-research-software / Edit Code Metadata

Edit metadata for my-awesome-research-software

[Need help?](#)

To make your software FAIR, a CITATION.cff and codemeta.json file are expected at the root level of your repository. They help people discover your software and provide information about your software to them. Provide metadata about your software below and codefair will submit a pull request with a CITATION.cff and codemeta.json file for you.

> **Basic Information**
General information of the repository.

Software Name *
my-awesome-research-software

Description *
Awesome software

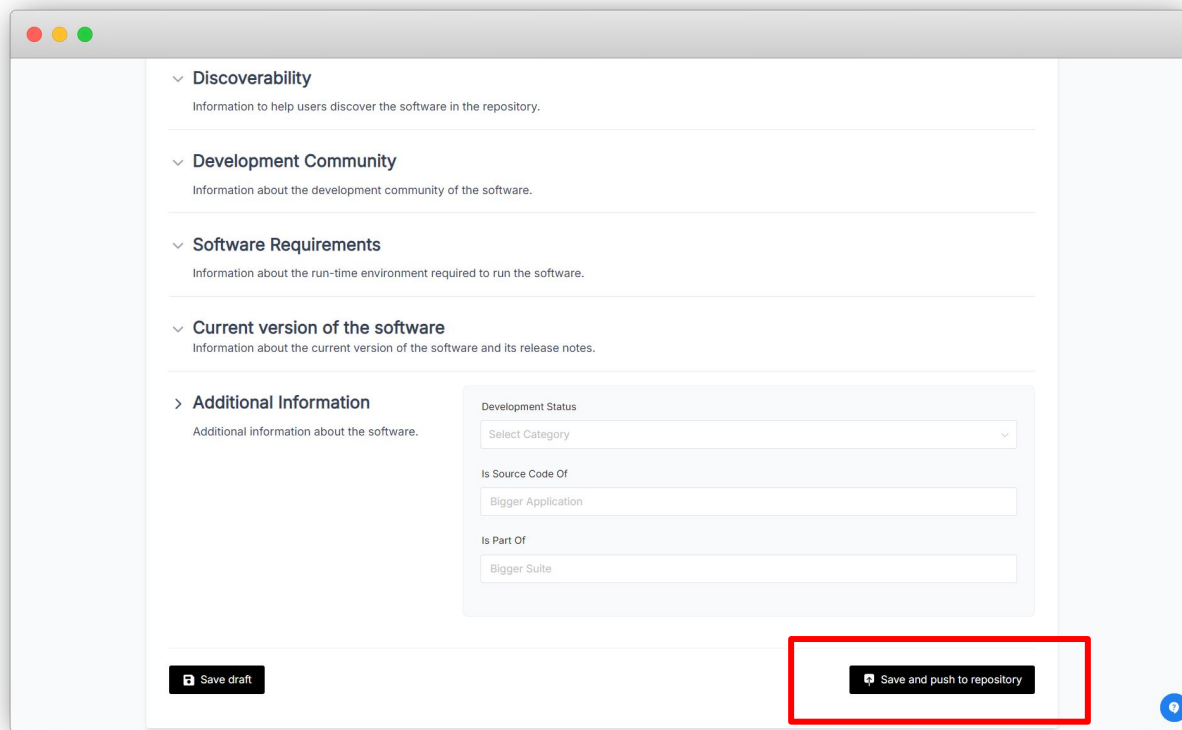
Creation Date
2024-10-14

First Release Date
Select Date

< **Authors and Contributors**
Information about the authors and contributors of the software.

Codefair

Codefair UI



The screenshot displays a web form with a light gray background and a white content area. The form is organized into several sections, each with a dropdown arrow icon to its left. The sections are: 'Discoverability' (Information to help users discover the software in the repository.), 'Development Community' (Information about the development community of the software.), 'Software Requirements' (Information about the run-time environment required to run the software.), and 'Current version of the software' (Information about the current version of the software and its release notes.). Below these is an 'Additional Information' section (Additional information about the software.). This section contains a 'Development Status' dropdown menu with 'Select Category' as the current selection. Below this are two text input fields: 'Is Source Code Of' with the value 'Bigger Application' and 'Is Part Of' with the value 'Bigger Suite'. At the bottom of the form, there are two buttons: 'Save draft' and 'Save and push to repository'. The 'Save and push to repository' button is highlighted with a red rectangular border. A blue circular icon with a question mark is located in the bottom right corner of the form.

Discoverability
Information to help users discover the software in the repository.

Development Community
Information about the development community of the software.

Software Requirements
Information about the run-time environment required to run the software.

Current version of the software
Information about the current version of the software and its release notes.

Additional Information
Additional information about the software.

Development Status
Select Category

Is Source Code Of
Bigger Application

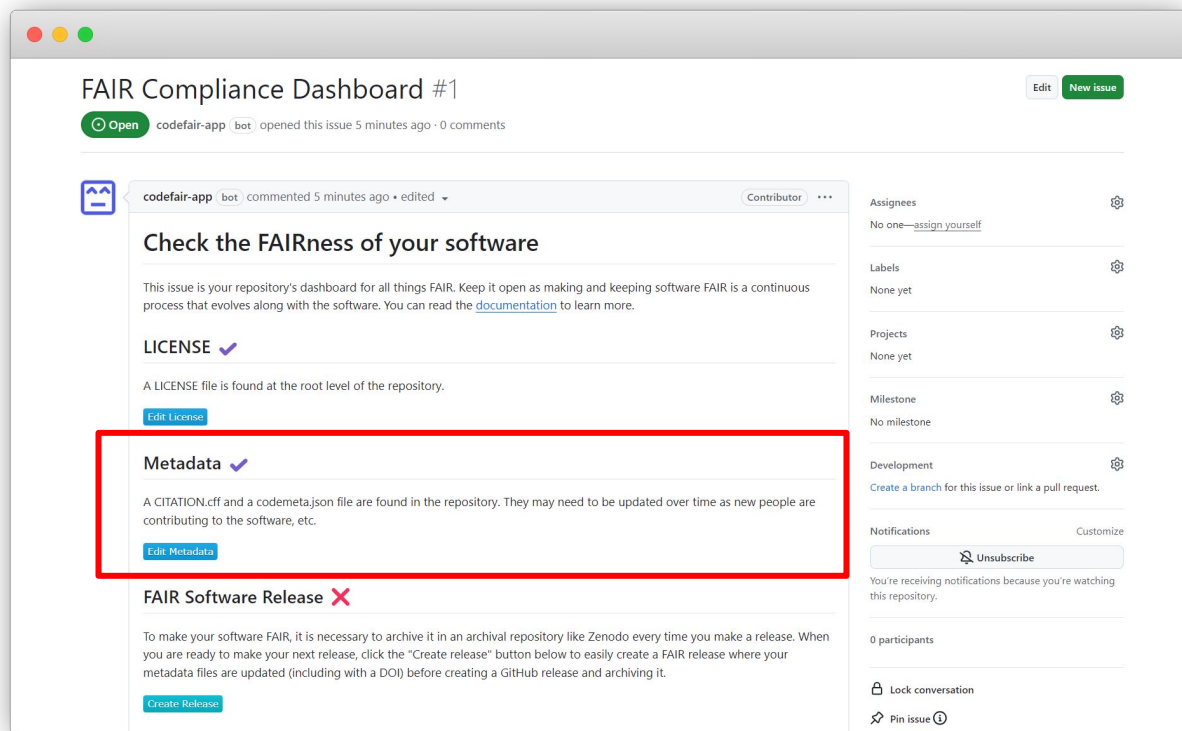
Is Part Of
Bigger Suite

Save draft

Save and push to repository

Codefair

GitHub issue dashboard



Codefair

FAIR Software Release

FAIR Compliance Dashboard #1

[Open](#) codefair-app [bot] opened this issue 5 minutes ago · 0 comments

[Contributor](#) · ...

Check the FAIRness of your software

This issue is your repository's dashboard for all things FAIR. Keep it open as making and keeping software FAIR is a continuous process that evolves along with the software. You can read the [documentation](#) to learn more.

LICENSE ✓

A LICENSE file is found at the root level of the repository.

[Edit License](#)

Metadata ✓

A CITATION.cff and a codemeta.json file are found in the repository. They may need to be updated over time as new people are contributing to the software, etc.

[Edit Metadata](#)

FAIR Software Release ✗

To make your software FAIR, it is necessary to archive it in an archival repository like Zenodo every time you make a release. When you are ready to make your next release, click the "Create release" button below to easily create a FAIR release where your metadata files are updated (including with a DOI) before creating a GitHub release and archiving it.

[Create Release](#)

Assignees No one—[assign yourself](#)

Labels None yet

Projects None yet

Milestone No milestone

Development [Create a branch](#) for this issue or link a pull request.

Notifications [Unsubscribe](#) Customize

You're receiving notifications because you're watching this repository.

0 participants

[Lock conversation](#)

[Pin issue](#) ⓘ

Codefair

Features



Add/edit LICENSE file



Add/edit codemeta.json and CITATION.CFF metadata files



Creating FAIR release via Zenodo



Validating CWL files



Codefair dashboard



Archiving on Figshare, Software Heritage



Integration with linting and other code improvement tools



LLM-integration (improve README, metadata, and more)

Codefair

Who should use it?



Anyone developing
research software
(any field of research)



No knowledge of FAIR
software required



No coding required
(code-free tool)



Supporting Codefair

Supporting Codefair

Many ways!

Use it

Go to codefair.io

Provide feedback

Suggest features

Contribute

Developer
documentation:

[https://docs.codefair.io
/dev/intro.html](https://docs.codefair.io/dev/intro.html)

Fund it

Any funding
opportunities?



Future Work

Future Work



Add **more features** to make software FAIR



Include features to support researchers **beyond just FAIR**
(software quality, security, etc.)



Lead the **FAIR Research Software Guidelines** task force:
<https://www.researchsoft.org/taskforces>

Thank You!



codefair.io



bpatel@calmi2.org



fairdataihub.org

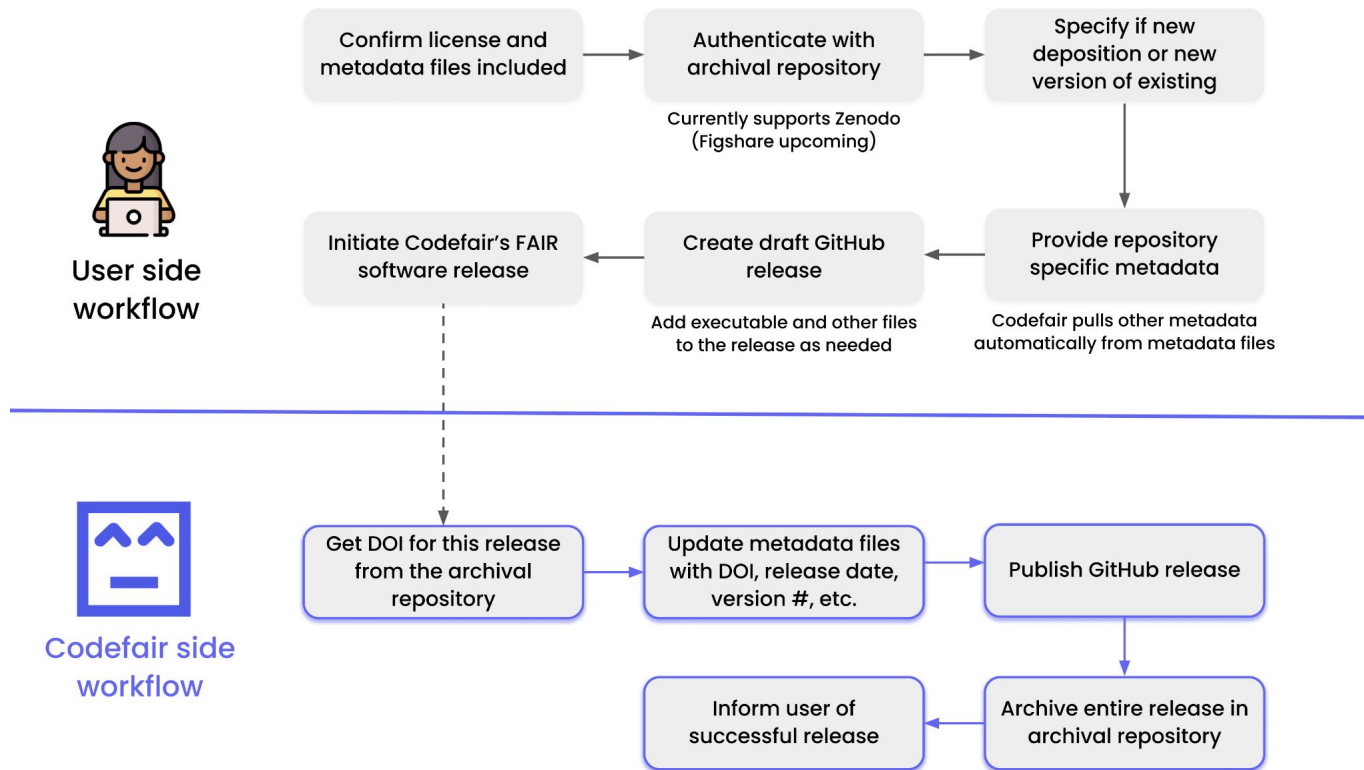
*Find these slides and
all resources here*



bit.ly/codefairUSRSE2024

Codefair

FAIR Software Release



Codefair

Workflow

