

# Improving Software Sharing and Impact through Software Registries

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netherlands  
**eScience center**

Code Complete and More Minisymposium & PASC'23  
28/06/2023



# netherlands **eScience** center

National center for the development  
and application of research software

**Founded in 2012 by NWO and SURF**

Science Park Amsterdam



## We provide in-kind funding for collaborative projects

- Projects driven by research challenges faced by project partners
- We provide Research Software Engineers (RSEs) to these projects
- These RSEs create and adapt research software to answer the research questions

**~270 projects**  
(on many different topics)

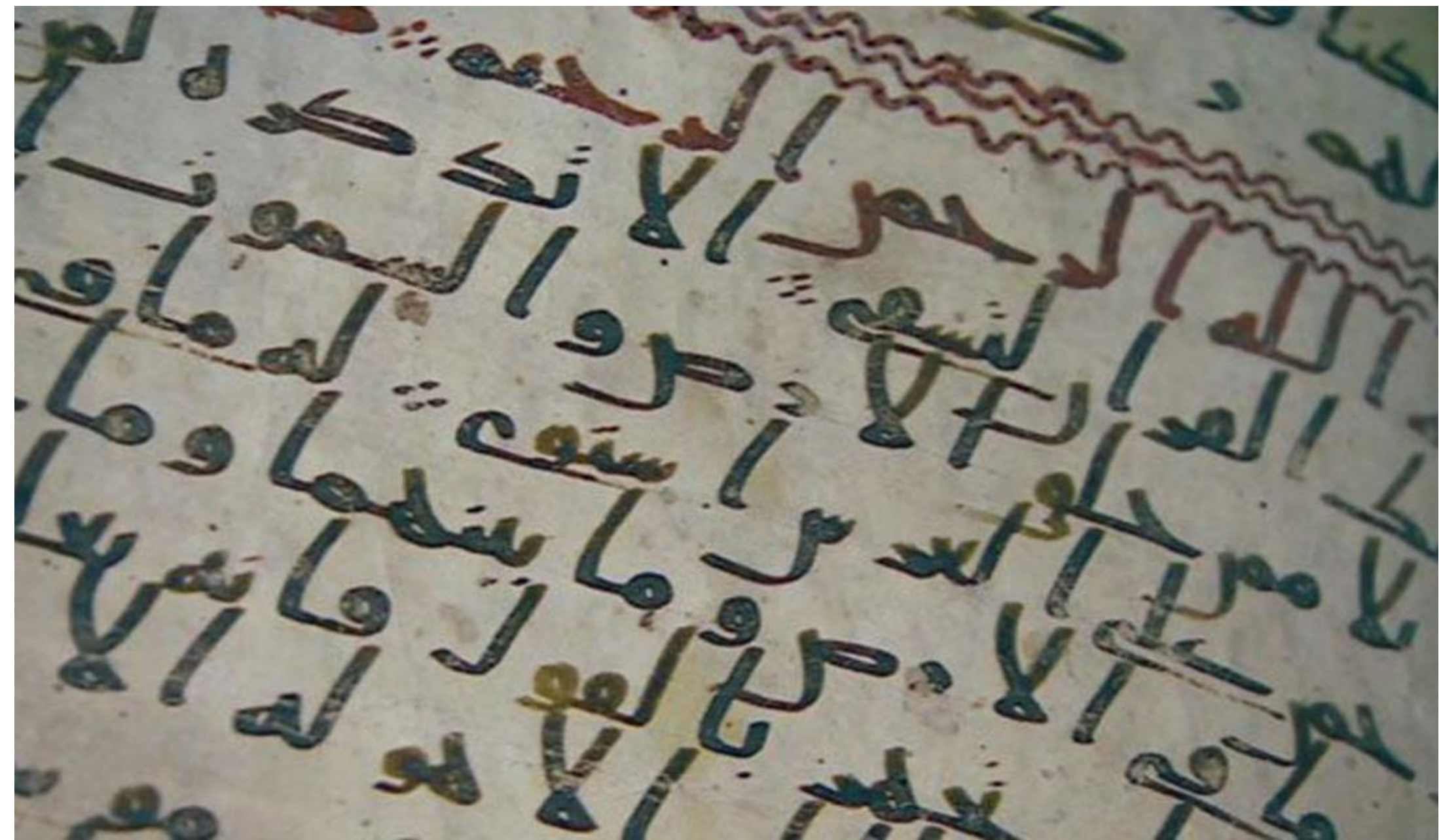
## **Astronomy: fast radio bursts**

In collaboration with ASTRON & UvA



## **Digital Humanities: Arabic-Islamic corpus**

In collaboration with Utrecht University



~270 projects  
(on many different topics)

# Astronomy: fast radio bursts

In collaboration with ASTRON & UvA

**OXFORD ACADEMIC Journals Books**

## Monthly Notices of the Royal Astronomical Society

Volume 499, Issue 4  
December 2020

### JOURNAL ARTICLE

#### A bright, high rotation-measure FRB that skewers the M33 halo

L Connor, J van Leeuwen, L C Oostrum, E Petroff, Y Maan, E A K Adams, J J Attema, J E Bast, O M Boersma, H Dénes ... Show more  
Author Notes

*Monthly Notices of the Royal Astronomical Society*, Volume 499, Issue 4, December 2020, Pages 4716–4724, <https://doi.org/10.1093/mnras/staa3009>  
Published: 30 September 2020 Article history

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**ABSTRACT**

We report the detection of a bright fast radio burst, FRB 191108, with Apertif on the Westerbork Synthesis Radio Telescope. The interferometer allows us to localize the FRB to a narrow 5 arcsec  $\times$  7 arcmin ellipse by employing both multibeam information within the Apertif phased-array feed beam pattern, and across different tied-array beams. The resulting sightline passes close to Local Group galaxy M33, with an impact parameter of only 18 kpc with respect to the core. It also traverses the much larger circumgalactic medium (CGM) of M31, the Andromeda Galaxy. We find that the shared plasma of the Local Group galaxies could contribute  $\sim$ 10 per cent of its dispersion measure of 588 pc cm<sup>-3</sup>. FRB 191108 has a Faraday rotation measure (RM) of  $+474 \pm 3$  rad m<sup>-2</sup>, which is too large to be explained by either the Milky Way or the intergalactic medium. Based on the more moderate RMs of other extragalactic sources that traverse the halo of M33, we conclude that the dense magnetized plasma resides in the host galaxy. The FRB exhibits frequency structure on two scales, one that is consistent with quenched Galactic scintillation and broader spectral structure with  $\Delta\nu \approx 40$  MHz. If the latter is due to scattering in the shared M33/M31 CGM, our results constrain the Local Group plasma environment. We found no accompanying persistent radio sources in the Apertif imaging survey data.

**Keywords:** fast radio bursts  
**Issue Section:** Article

**1 INTRODUCTION**

Fast radio bursts (FRBs) are extragalactic radio pulses, of which approximately 110 have been discovered to date (Lorimer et al. 2007; Petroff et al. 2016). They are short duration ( $\mu$ s–ms), bright ( $0.01$ – $100$  Jy peak flux density), highly dispersed, and relatively common ( $\sim 10^3$  sky<sup>-1</sup> d<sup>-1</sup> above 1 Jy, Cordes & Chatterjee 2019; Petroff, Hessels & Lorimer 2010). The most pressing questions in FRB science fall

Search or jump to... Pull requests Issues Codespaces Marketplace Explore

dianna-ai/dianna Public Watch 4 Fork 7 Star 18

Code Issues 73 Pull requests 6 Actions Projects 1 Security Insights

main 18 branches 7 tags Go to file Add file Code

laurasoots	Merge pull request #387 from dianna-ai/352-imaget-model-loa...	4f2f1bc yesterday	779 commits
.githubhooks	Initialize repo from cookiecutter template	17 months ago	
.github	Run tests also on python 3.10	4 months ago	
dashboard	fix linting	5 days ago	
dianna	remove redundant comment and refactor	14 days ago	
docs	Bump minor version	2 months ago	
paper	fix more commas	14 days ago	
tests	Merge branch 'main' into 380-bug-p_keep	21 days ago	
tutorials	Make torchtext optional by only requiring it when user explicitly im...	last month	
.bumpversion.cfg	Bump minor version	2 months ago	
.gitignore	Ignore file generated by tests	10 months ago	
.prospector.yml	ignore build directory when running prospector	7 days ago	
.readthedocs.yml	Initialize repo from cookiecutter template	17 months ago	
CITATION.cff	Update CITATION.cff	21 days ago	
LICENSE	Initialize repo from cookiecutter template	17 months ago	
MANIFEST.in	remove unused files from cookiecutter template	10 months ago	
README.md	Update README.md	5 days ago	
pyproject.toml	Move testing and coverage to pyproject.toml + add tox config	12 months ago	
setup.cfg	Merge pull request #387 from dianna-ai/352-imaget-model-load-l...	yesterday	
setup.py	attempt to fix linting issue	5 days ago	
sonar-project.properties	Fix URL to sonarcloud organization	17 months ago	

**Releases** 6  
V0.5.0 (Latest) on Sep 27  
+ 5 releases

**Packages**  
No packages published

**Contributors** 11

**Languages**  
Jupyter Notebook 78.2%  
Python 18.6%  
TeX 3.1%  
Shell 0.1%

**DIANNA**

Input data for binary MNIST model Explanation for 'digit 0' with different methods

### Deep Insight And Neural Network Analysis

DIANNA is a Python package that brings explainable AI (XAI) to your research project. It wraps carefully selected XAI methods in a simple, uniform interface. It's built by, with and for (academic) researchers and research software engineers working on machine learning projects.

#### Why DIANNA?

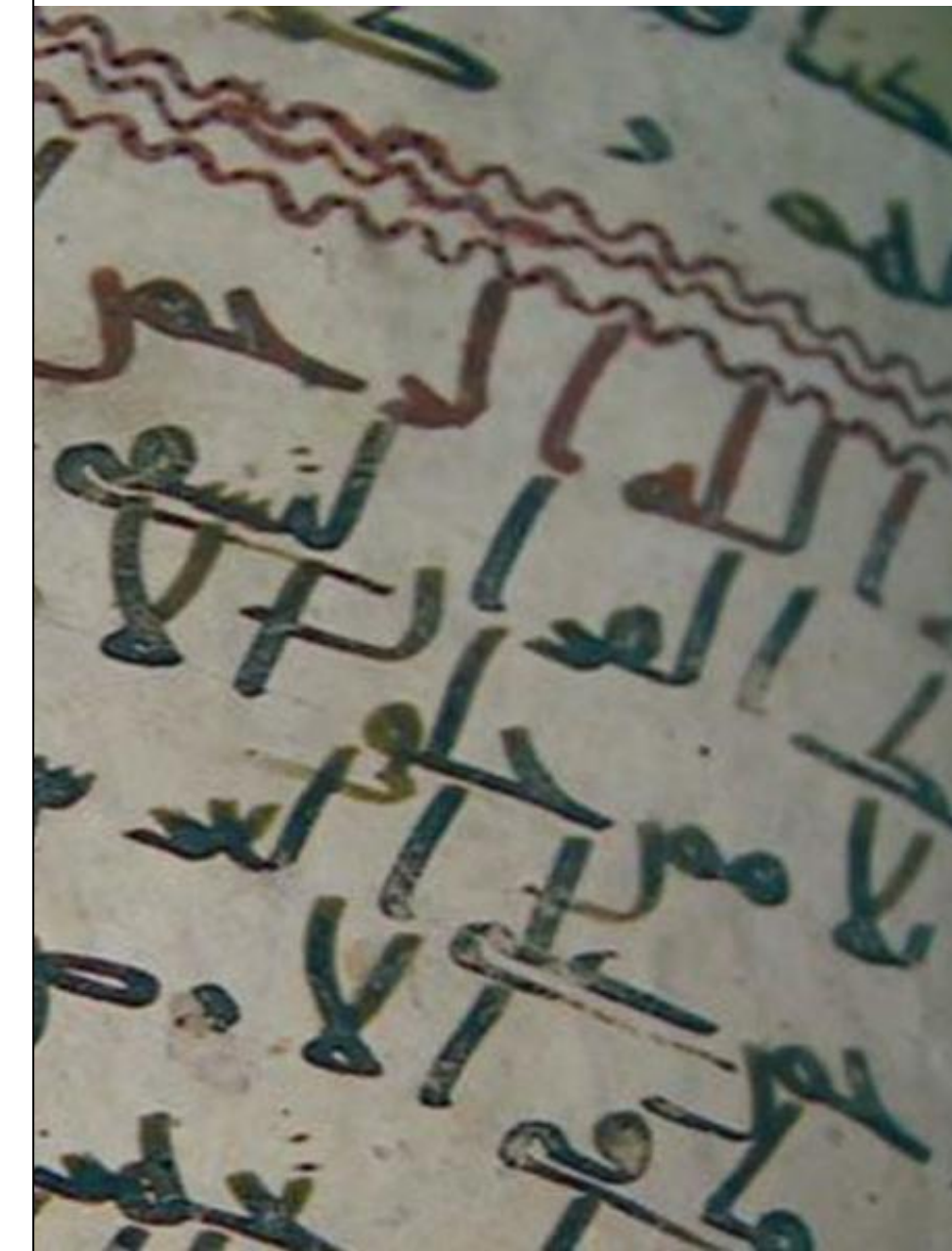
DIANNA software is addressing needs of both (XAI) researchers and mostly the various domains scientists who are using or will use AI models for their research without being experts in (XAI). DIANNA is future-proof: one of the very few XAI library supporting the Open Neural Network Exchange (ONNX) format.

After studying the vast XAI landscape we have made choices in the parts of the XAI Taxonomy on which methods, data modalities and problems types to focus. Our choices, based on the largest usage in scientific literature, are shown graphically in the XAI taxonomy below:

```

    graph TD
      Stage --> Ante-hoc
      Stage --> Post-hoc
      Scope --> Global
      Scope --> Local
      Ante-hoc --> Model-agnostic
      Ante-hoc --> Model-specific
      Post-hoc --> Classification
      Post-hoc --> Regression
  
```

c-Islamic corpus  
recht University



# Our role in the Research Software landscape

matchms / matchms (Public)

Python library for processing (tandem) mass spectrometry data and for computing spectral similarities.

analysis fuzzy-search fuzzy-matching  
python3 similarity-measures  
metabolomics mass-spectrometry

Releases 25  
0.17.0 (Latest)  
on Oct 9  
+ 24 releases

Contributors 19  
+ 8 contributors

Languages  
Python 96.4% TeX 3.3%  
Other 0.3%

**matchms**

Matchms is an open-source Python package to import, process, clean, and compare mass spectrometry data (MS/MS). It allows to implement and run an easy-to-follow, easy-to-reproduce workflow from raw mass spectra to pre- and post-processed spectral data. Spectral data can be imported from common formats such as mzML, mzXML, msp, metabolomics-USI, MGF, or json (e.g. GNPS-style json files). Matchms then provides filters for metadata cleaning and checking, as well as for basic peak filtering. Finally, matchms was built to import and apply different similarity measures to compare large amounts of spectra. This includes common Cosine scores, but can also easily be extended by custom measures. Example for spectrum similarity measures that were designed to work in matchms are [Spec2Vec](#) and [MS2DeepScore](#).

If you use matchms in your research, please cite the following software paper:

F Huber, S. Verhoeven, C. Meijer, H. Spreeuw, E. M. Villanueva Castilla, C. Geng, J.J.J. van der Hooft, S. Rogers, A. Belloum, F. Diblen, J.H. Spaaks, (2020). matchms - processing and similarity evaluation of mass spectrometry data. Journal of Open Source Software, 5(52), 2411, <https://doi.org/10.21105/joss.02411>

Badges	
fair-software.nl recommendations	
1. Code repository	
2. License	
3. Community Registry	
4. Enable Citation	
5. Checklists	

Our main contribution to research and main output as an institute is **research software**.

Quality, sustainability, re-use and broad impact are very important to us!

Open Science, Open Source, Open Data, Open Access, ...

We are actively involved in:

- Best practices guidelines
- Digital skills training
- FAIR software
- Software citation & metadata
- Software Management Plans
- Improving funding of research software
- Research Software Directory

# Examples: Best Practices & Training

The screenshot shows the homepage of 'The Turing Way' handbook. On the left, there is a navigation menu with a search bar and a list of guides: 'Guide for Reproducible Research', 'Guide for Project Design', 'Guide for Communication', 'Guide for Collaboration', 'Guide for Ethical Research', 'Community Handbook', and 'Afterword'. The main content area features a 'Welcome' message, a 'Top Tip' box with a lightbulb icon, and a paragraph explaining the project's goals. Below this is a 'Top Tip' box with a lightbulb icon containing the text: 'The Turing Way is not meant to be read from start to finish. Start with a concept, tool or method that you need now, in your current work. Browse the different guides that make up the book, or use the search box to search for whatever you would like to learn about first.' Further down, there is a paragraph about stakeholders and a link to a Slack workspace. At the bottom, there is a colorful illustration of a person pushing a shopping cart through a maze of boxes labeled 'COLLABORATION', 'PROTECT DESIGN', 'REPRODUCIBILITY', 'COMMUNICATION & OUT REACH', and 'ETHICS'. The text 'TOO EASY NOT TO DO' is written at the bottom of the illustration. A caption below the illustration reads: 'Fig. 1 The Turing Way project illustration by Scriberia. Zenodo. <http://doi.org/10.5281/zenodo.3332807>'.

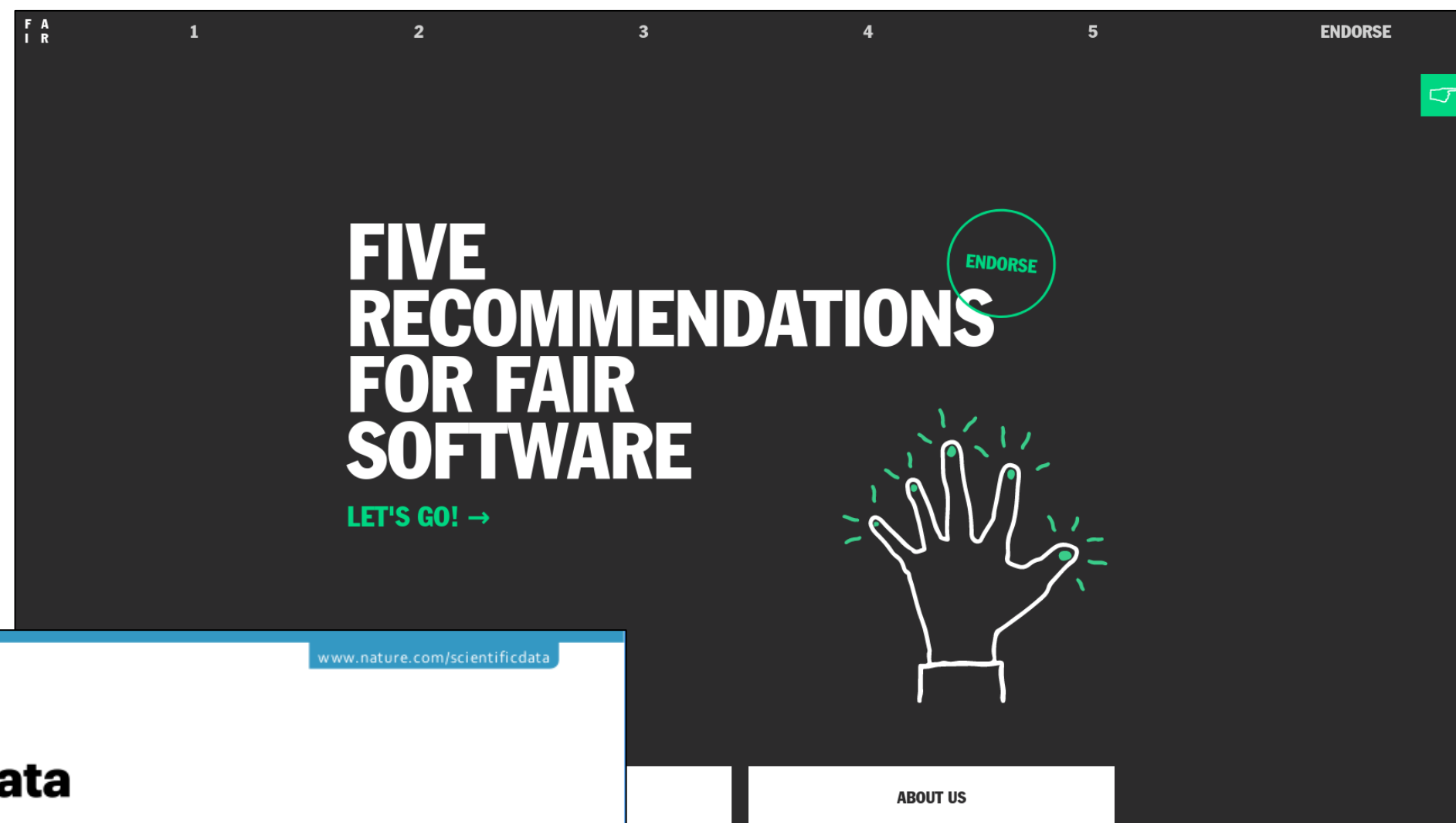
**Best Practices: Turing Way**  
<https://the-turing-way.netlify.app>

The screenshot shows the workshop page for 'Good Practices in Research Software Development (CodeRefinery)'. The page features a blue header with the 'netherlands eScience center' logo and navigation links for 'About', 'What we do', 'Resources', and 'Insights'. The main heading is 'Good Practices in Research Software Development (CodeRefinery)'. Below the heading is a light blue box containing event details: 'Start Date: 12 Dec 2022', 'Start Time: 09:00 Europe/Amsterdam', 'Date End: 15 Dec 2022', and 'End Time: 13:00 Europe/Amsterdam'. A 'Register' button is located below the details. Below the text is a photograph of a person's hands typing on a keyboard in front of a computer monitor displaying code. A caption below the photo reads: '"Good Practices in Research Software Development" workshops introduce practices, tools and skills used in research software development. The key objective of this workshop is to grow researchers' software skills necessary to apply good practices that enable open and reproducible research. The workshop focuses on building modular, reusable, maintainable, sustainable, reproducible, testable, and robust software. The participants should be familiar with programming and regularly write code for their research, but no expertise is required.'

**Digital Skills Training**  
<https://www.esciencecenter.nl/digital-skills>

The screenshot shows the workshop page for 'Reproducible Research with R Packages'. The page features a blue header with the 'netherlands eScience center' logo and navigation links for 'About', 'What we do', 'Resources', and 'Insights'. The main heading is 'Reproducible Research with R Packages'. Below the heading is a light blue box containing event details: 'Start Date: 14 Sep 2022', 'Start Time: 09:00 Europe/Amsterdam', 'Date End: 5 Oct 2022', and 'End Time: 13:00 Europe/Amsterdam'. Below the text is a photograph of a person holding a wrapped gift box. A caption below the photo reads: 'This workshop will provide participants with the basics for writing their own packages in R.' Below the photo is a section titled 'About this event' with the text: 'This workshop takes place online, over four Wednesdays. Participants are required to attend each session. The dates and times for the sessions are:' followed by a list of dates and times: '14 September, 9.00-13.00 CEST', '21 September, 9.00-13.00 CEST', '28 September, 9.00-13.00 CEST', and '5 October, 9.00-13.00 CEST'.

# Examples: FAIR Software & Software Citation



scientific data

OPEN ARTICLE

## Introducing the FAIR Principles for research software

Michelle Barker<sup>1,2</sup>, Neil P. Chue Hong<sup>3</sup>, Daniel S. Katz<sup>4</sup>, Anna-Lena Lamprecht<sup>5</sup>, Carlos Martinez-Ortiz<sup>6</sup>, Fotis Psomopoulos<sup>7</sup>, Jennifer Harrow<sup>7</sup>, Leyla Jael Castro<sup>8</sup>, Morane Gruenpeter<sup>9</sup>, Paula Andrea Martinez<sup>10</sup> & Tom Honeyman<sup>11</sup>

Research software is a fundamental and vital part of research, yet significant challenges to discoverability, productivity, quality, reproducibility, and sustainability exist. Improving the practice of scholarship is a common goal of the open science, open source, and FAIR (Findable, Accessible, Interoperable and Reusable) communities and research software is now being understood as a type of digital object to which FAIR should be applied. This emergence reflects a maturation of the research community to better understand the crucial role of FAIR research software in maximising research value. The FAIR for Research Software (FAIR4RS) Working Group has adapted the FAIR Guiding Principles to create the FAIR Principles for Research Software (FAIR4RS Principles). The contents and context of the FAIR4RS Principles are summarised here to provide the basis for discussion of their adoption. Examples of implementation by organisations are provided to share information on how to maximise the value of research outputs, and to encourage others to amplify the importance and impact of this work.

**Introduction**

In 2016 the publication of "The FAIR Guiding Principles for scientific data management and stewardship"<sup>1</sup> supported a vision where valuable scientific outputs are made FAIR by becoming more Findable, Accessible, Interoperable and Reusable. From the outset, the FAIR Guiding Principles were intended to be applicable to many kinds of digital assets. Increased understanding of the importance of research software in research has catalysed application of the FAIR Guiding Principles to this type of digital asset.

Community-endorsed FAIR principles for research software were released in 2022 by the FAIR for Research Software (FAIR4RS) Working Group (WG), which was jointly convened by the Research Software Alliance (ReSA), Future Of Research Communications and E-Scholarship (FORCE11), and the Research Data Alliance (RDA). This milestone reflects the maturation of the research community in understanding the benefits of having FAIR research software, and coming together as the FAIR4RS WG to achieve this. The FAIR4RS WG is a global and interdisciplinary community whose members share an interest in the application of FAIR principles to research software, such as researchers, software users, developers and maintainers, policy makers, infrastructure support staff, and funders.

The FAIR4RS Principles are relevant to any stakeholder in the research community seeking to increase transparency, reproducibility, and reusability of research. This paper highlights the importance of the FAIR4RS Principles and the positive signals of adoption that demonstrate high levels of community support. It must also be acknowledged that research software and data discoverability is a long-standing challenge and there have

<sup>1</sup>Research Software Alliance, QLD 4780, Cairns, Australia. <sup>2</sup>Software Sustainability Institute & EPCC, University of Edinburgh, 47 Potterrow, Edinburgh, EH8 9BT, UK. <sup>3</sup>NCSA & CS & ECE & School, University of Illinois at Urbana-Champaign, 1205W Clark St., Urbana, IL, 61801, USA. <sup>4</sup>Institute of Computer Science, University of Potsdam, An der Bahn 2, 14476, Potsdam, Germany. <sup>5</sup>Netherlands eScience Center, Science Park 140, 1098 XG, Amsterdam, Netherlands. <sup>6</sup>Institute of Applied Biosciences, Centre for Research and Technology Hellas, Thessaloniki, 57001, Greece. <sup>7</sup>ELIXIR Hub, South Building, Wellcome Genome Campus, Hinxton, Cambridgeshire, CB10 1SD, UK. <sup>8</sup>Semantic Technologies team, ZENODO Information Centre for Life Sciences, Gieveler Strasse 60, 50931, Cologne, Germany. <sup>9</sup>Software Heritage, Inria, 2 rue Simone IFF, Paris, 75012, France. <sup>10</sup>Research Software Alliance/Australian Research Data Commons, Level 6, Duhig Tower, The University of Queensland, Brisbane, QLD 4072, Australia. <sup>11</sup>Australian Research Data Commons, University of Technology Sydney Library, Ultimo, NSW, 2007, Australia. <sup>✉</sup>e-mail: michelle@researchsoft.org

www.nature.com/scientificdata

Check for updates

ABOUT US

## FAIR Principles for Software

## Software Citation Metadata (CITATION.CFF)

### Generate your citation metadata files with ease

CITATION.cff files are plain text files with human- and machine-readable citation information for software and datasets.

Code developers can include such files in their source code repositories to let others know how to correctly cite their software.

You can read more about the Citation File Format in the [official CFF specification website](#).

Generate your CITATION.cff now!

+ Create

### Authors

Who are the author(s) of the work?

Jason Maassen  
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<https://orcid.org/0000-0002-8172-4865>

Author's name, split into four parts

Given names:  Name particle:

Family names:  Name suffix:

E-mail:

Affiliation:  ORCID:

Remove Done

Add author

Previous Finish Next

```
CITATION.cff preview
# This CITATION.cff file was generated with cffinit.
# Visit https://bit.ly/cffinit to generate yours today!

cff-version: 1.2.0
title: Example software
message: >-
If you use this software, please cite it using the
metadata from this file.
type: software
authors:
- given-names: Jason
  family-names: Maassen
  email: j.maassen@esciencecenter.nl
  affiliation: Netherlands eScience Center
  orcid: 'https://orcid.org/0000-0002-8172-4865'
- {}
identifiers:
- type: doi
  value: 10.5281/zenodo.597993
repository-code: 'https://github.com/xenon-middleware/xenon'
keywords:
- GPU
- HPC
license: Apache-2.0
```

✓ Your CITATION.cff is valid

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netherlands **Scienc**e center

Version 2.1.0

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

<https://citation-file-format.github.io/>



## Examples: Policy & Community

The screenshot shows the NL-RSE website homepage. At the top, there is a navigation bar with links for 'Community', 'Blog', 'Join', 'Meetups', and 'Core Team'. The main heading is 'Do you write software for your research?'. Below this, a paragraph describes the community's mission. A prominent purple button says 'JOIN THE COMMUNITY OF 200+ RESEARCH SOFTWARE ENGINEERS'. Below the main content is a 'Blog posts' section with four featured articles, each with a date, title, and a 'Read More' link.

**Do you write software for your research?**

NL-RSE brings together the community of people writing and contributing to research software from Dutch universities, knowledge institutes, companies and other organizations to share knowledge, to organize meetings, and raise awareness for the scientific recognition of research software.

JOIN THE COMMUNITY OF 200+ RESEARCH SOFTWARE ENGINEERS

### Blog posts

- November 22, 2021: **Help us understand the NL-RSE community by completing the survey!** [Read More](#)
- July 7, 2021: **What Open Science can learn from Free Software** [Read More](#)
- June 16, 2021: **A demo in the life of an RSE** [Read More](#)
- April 2, 2021: **What is really needed for software reusability?** [Read More](#)

**Dutch Research Software Engineer Community**  
with RSEs from different organizations

<https://nl-rse.org/>

The cover features a large, colorful geometric pattern of hexagons in shades of purple, blue, orange, yellow, and green. The title 'Practical guide to Software Management Plans' is centered in a clean, sans-serif font. At the bottom right, the logos for NWO and the Netherlands eScience Center are displayed, along with the DOI: 10.5281/zenodo.7038280.

# Practical guide to Software Management Plans

NWO netherlands eScience center  
DOI: 10.5281/zenodo.7038280

**National Guidelines for Software Management Plans**  
with NWO & Dutch Universities

<https://doi.org/10.5281/zenodo.7038280>

The screenshot shows the website for the 'The Future of Research Software' workshop. The header includes the title and navigation links: 'About', 'Programme', 'Draft Declaration', 'Participants', and 'Contact'. The main image is a scenic view of a canal in Amsterdam. Overlaid text includes the workshop title, dates '8 & 9 November 2022 Amsterdam', and a 'See programme' button. Below the image is an 'About the workshop' section with a paragraph of text and a 'Read More' link. A footer note provides contact information for those not invited.

## The Future of Research Software

International Funders Workshop

About Programme Draft Declaration Participants Contact

International funders workshop  
**The Future of Research Software**  
8 & 9 November 2022 Amsterdam

[See programme](#)

### About the workshop

The [Research Software Alliance \(ReSA\)](#) and the [Netherlands eScience Center](#) are hosting a two-day international workshop to set the future agenda for national and international funders to support sustainable research software.

As the importance of software in research has become increasingly apparent, so has the urgent need to sustain it. Funders can play a crucial role in this respect by ensuring structural support. Over the past few years, a variety of methods for sustaining research software have been explored, including improving and extending funding policies and instruments. During the workshop, funding organizations will join forces to explore how they can effectively contribute to making research software sustainable. Our guests will have the opportunity to influence the discussion at this early stage.

*Additional support to increase accessibility will be available on request. Online opportunities will be provided to contribute to discussions around and during the conference, and recordings of the plenary presentations will be made available.*

*Please note this workshop is open to national research funding organizations, by invitation. If you are interested in attending but have not received an invitation, please contact us at [events@esciencecenter.nl](mailto:events@esciencecenter.nl)*

Neve | Powered by WordPress

**International Workshop on Research Software Funding**  
with ReSA

<https://adore.software/>

# Example: Software Registries

The screenshot shows the 'eScience Technology Platform' software registry. It features a navigation menu with 'Software', 'Projects', 'People', and 'Organizations'. The main content area is titled 'Software' and includes a search bar, a list of 45 selected records, and a table with columns for 'Name' and 'Description'. On the left, there are several horizontal bar charts representing different categories: Disciplines, Competence areas, Technical expertises, and Technologies used.

Name	Description
AHN2 pointcloud viewer	WebGL point cloud visualization of AHN2
AMUSE	The Astrophysical Multipurpose Simulation Environment
CClusTera	A 3D web tool for interactive visualization of hierarchically clustered big data
Cesium-ncWMS	3D Globe Visualization of NetCDF data
Common Sense	User-friendly web application for showing (GIS) data on a map
Cross-perspective Topic Modeling	A Gibbs sampler that implements Cross-Perspective Topic Modeling
DataVaults	Technology of Attachment to a DBMS of large file repositories
Differential Evolution	Differential Evolution global optimization algorithm, with Metropolis for uncertainty estimation
eAstroViz	This tool can convert and visualize radio astronomy measurement sets, as well as most LOFAR intermediate data products. It also does RFI mitigation.
eEcology Annotation Tool	Visualize & annotate GPS measurements of bird movements
eEcology Tracker calendar	Calendar overview with daily statistics of GPS-tracker
eWaterLeaf	Web-based visualization for the eWaterCycle project
ExtJS-DateTime	DateTime form input field for ExtJS
FAIR Data Point	FAIR Data Point Metadata Service
GoogleEarth Toolbox for MATLAB	Export data from MATLAB to GoogleEarth's KML format
Historic Embodied Emotions Model (HEEM) dataset	279 17th and 18th century Dutch theater texts with HEEM labels
Kernel Tuner	A simple CUDA/OpenCL kernel tuner in Python

**eSTEP  
2014-2018**

The screenshot shows the 'Research Software Directory' (RSD) prototype interface. It features a search bar, a 'Sort by' dropdown menu, and a grid of software entries. Each entry includes a title, a brief description, and a 'Featured' star. The interface is clean and modern, with a focus on user navigation and search.

mcfly	mc	GGIR	GG
Helps you find a suitable neural network configuration for deep learning on time series.		Converts raw data from wearables into insightful reports for researchers investigating human daily physical activity and sleep.	
1 day ago	★ Featured	2 days ago	★ Featured
SPOT	SP	Xenon	Xe
SPOT is an interactive visualization tool for multi-dimensional data. It allows quick analysis of complex datasets and easy identification of correlations between variables.		If you are using remote machines to do your computations, and don't feel like learning and implementing many different APIs, Xenon is the tool for you.	
28 days ago	★ Featured	47 days ago	★ Featured
Kernel Tuner	Ke	nlppln	nl
Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.		A flexible solution to build text mining workflows that allows you to quickly combine Natural Language Processing tools from different sources.	
52 days ago	★ Featured	55 days ago	★ Featured
MAGMa	MA	Noodles	No

**Research Software Directory  
(prototype)  
2018-2022**

The screenshot shows the 'Research Software Directory' (RSD) production interface. It features a search bar, a 'Sort by' dropdown menu, and a grid of software entries. The interface is clean and modern, with a focus on user navigation and search. The main heading is 'Show your research software to the world'.

**Show your research software to the world**

The Research Software Directory is designed to show the impact research software has on research and society. We stimulate the reuse of research software and encourage proper citation of research software to ensure researchers and RSEs get credit for their work.

248 Software packages registered | 204 Projects registered | 209 Organisations contributed | 576 Contributors to research software | 846 Mentions of research software

**Let's get started!**

Discover research software relevant to your research!  
Get more information on how to add your own software or organization.

Discover Software | Sign up to contribute | Register your organisation

**Research Software Directory  
(production)  
2022-now**

<https://research-software-directory.org>

# Examples of existing registries

**ASCL.net**  
Astrophysics Source Code Library

Making codes discoverable since 1999

Search Site Search

Home About Resources Browse Submissions News Forum Dashboard

## Welcome to the ASCL

The Astrophysics Source Code Library (ASCL) is a free online registry for source codes of interest to astronomers and astrophysicists, including solar system astronomers, and lists codes that have been used in research that has appeared in, or been submitted to, peer-reviewed publications. The ASCL is indexed by the [SAO/NASA Astrophysics Data System](#) (ADS) and Web of Science and [is citable](#) by using the unique ascl ID assigned to each code. The ascl ID can be used to link to the code entry by prefixing the number with ascl.net (i.e., [ascl.net/1201.001](#)).

### Most Recently Added Codes

2022 Nov 15

[submitted] [PTAfast](#)  
Bernardo, Reginald Christian; Ng, Kin-Wang

Fast python code for the calculation of stochastic gravitational wave background spatial correlations in a pulsar timing array. This is based on a power spectrum formalism discussed in detail in arXiv:2208.12538 and arXiv:2209.14834.

2022 Oct 30

[ascl:2210.030] [cuvarbase: fast period finding utilities for GPUs](#)  
Hoffman, John

cuvarbase provides a Python library for performing period finding (Lomb-Scargle, Phase Dispersion Minimization, Conditional Entropy, Box-least squares) on astronomical time-series datasets. Speedups over CPU implementations depend on the algorithm, dataset, and CPU capabilities but are typically  $\sim 1-2$  orders of magnitude and are especially high for PLSC and Lomb-Scargle.

<https://ACSL.net>

Search bio.tools 27025 tools Explore Login Sign-up

Sort by Updated Added Name Citation Count Publication Date Display as Compact Detailed

**galba**

GALBA is a pipeline for fully automated prediction of protein coding gene structures with AUGUSTUS in novel eukaryotic genomes for the scenario where high quality proteins from a closely related species are available.

Workflows Genomics Gene transcripts

Genome annotation Homology-based gene prediction

Command-line tool Artistic-1.0

**COPASI**

Open-source software application for creating and solving mathematical models of biological processes such as metabolic networks, cell-signaling pathways, regulatory networks, infectious diseases, and many others. It includes features to define models of biological processes, simulate and analyze these models, generate analysis reports, and import/export models in SBML format.

Systems biology

Network simulation Modelling and simulation

Command-line tool Library Desktop application Artistic-2.0 de.NBI EBI Training Tools

**pHisPred**

<https://bio.tools>

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swMATH Documents Authors Serials Software Classification Formulæ

Structured Search

si:5781 Q Fields Operators Help

## Eigen

swMATH ID: 5781

Software Authors: Benoît Jacob, Gaël Guennebaud

Description: Eigen is a C++ template library for linear algebra: vectors, matrices, and related algorithms. It is versatile, fast, elegant and works on many platforms.

Homepage: [http://eigen.tuxfamily.org/index.php?title=Main\\_Page](http://eigen.tuxfamily.org/index.php?title=Main_Page)

Programming Languages: C++

Keywords: Scientific/Engineering; Visualization; Mathematics; Software Development; Libraries; Linear Algebra

Related Software: R; GitHub; PETSc; Matlab; Gmsh; Boost C++ Libraries; CUDA; Python; Triangle; CGAL; CHOLMOD; MKL; LAPACK; NumPy; Boost; FFTW; RcppEigen; deal.ii; FEniCS; Rcpp

Cited in: 198 Publications

Cited by 488 Authors all

Cited in 69 Serials all

Cited in 34 Fields all

6 Fiskopoulos, Vissarion  
5 Di Pietro, Daniele Antonio  
5 Emiris, Ioannis Z.  
4 Darve, Eric  
4 Dawson, Clint N.

17 Journal of Computational Physics  
16 Computer Methods in Applied Mechanics and Engineering  
15 SIAM Journal on Scientific Computing  
9 Computer Aided Geometric Design  
8 Journal of Scientific Computing

121 Numerical analysis (65-XX)  
43 Fluid mechanics (76-XX)  
29 Computer science (68-XX)  
28 Partial differential equations (35-XX)  
23 Mechanics of deformable solids (74-XX)

Citations by Year

30  
20  
10  
0

[https://zbmath.org/software \(swMath\)](https://zbmath.org/software/swMath)

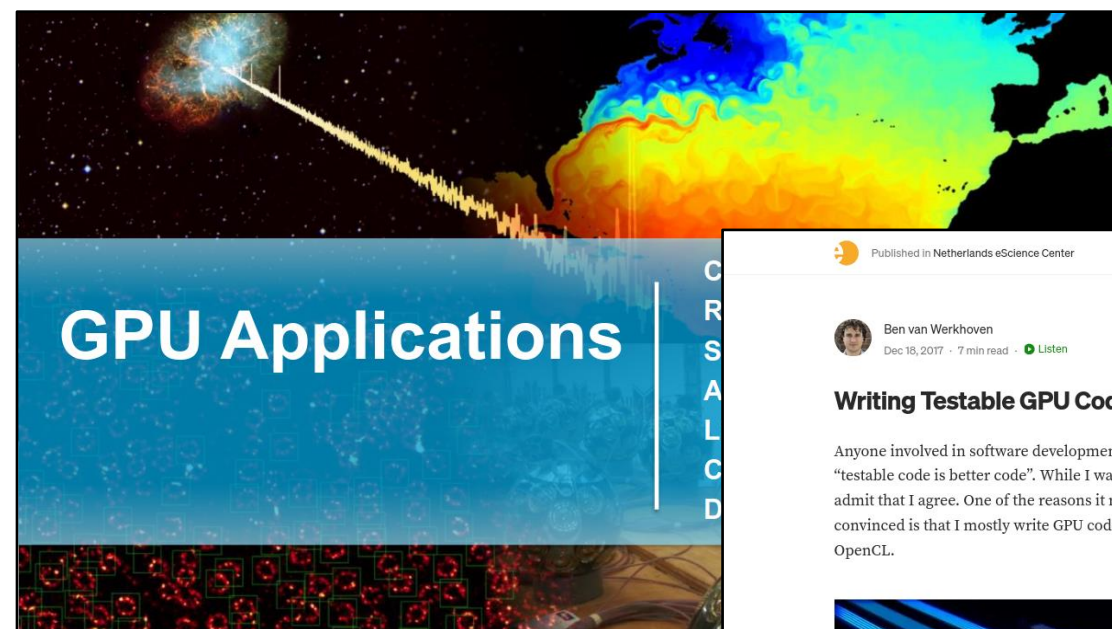
## Advantages of using registries:

- they share software by publish metadata
- domain specific curated collections
- assign a unique ID
- (indirectly) collect citation metrics

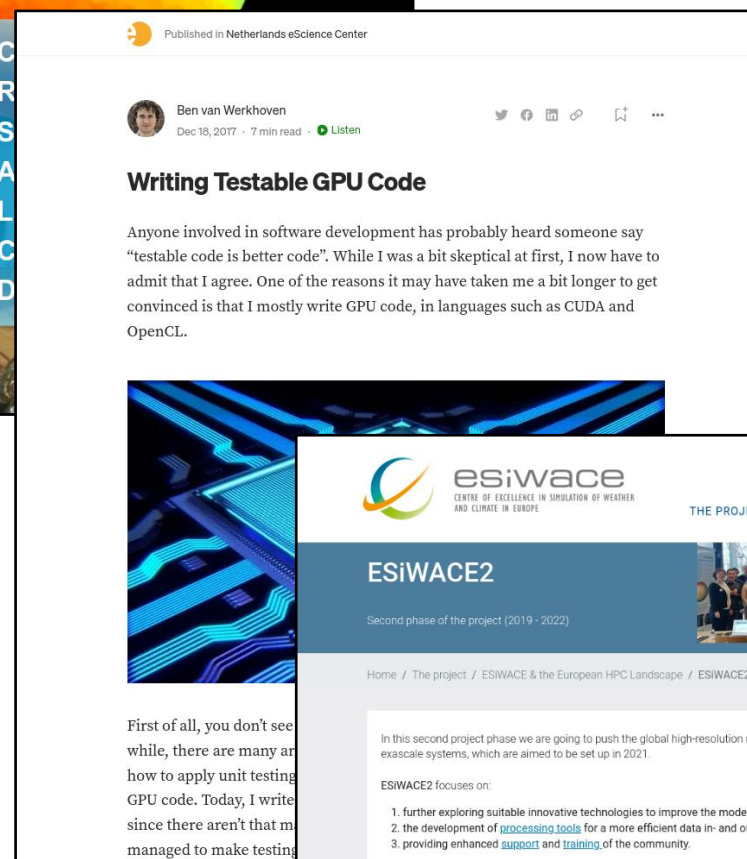
## Disadvantages of these registries (for us):

- domain specific & not all domains represented
- limited human-readable content
- limited ways to showcase role of software in research
- don't help an organization keep track of output and show overall impact

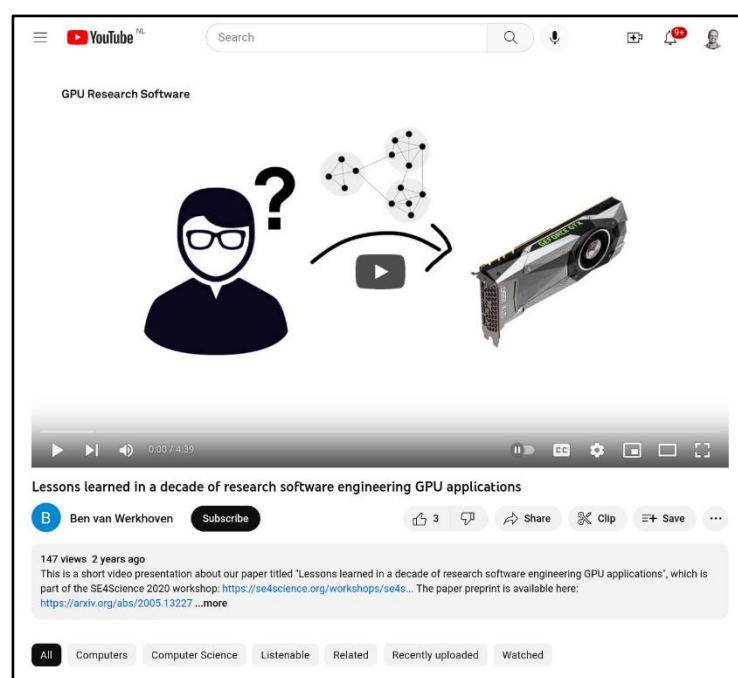
# Our approach: show research context of research software



presentations



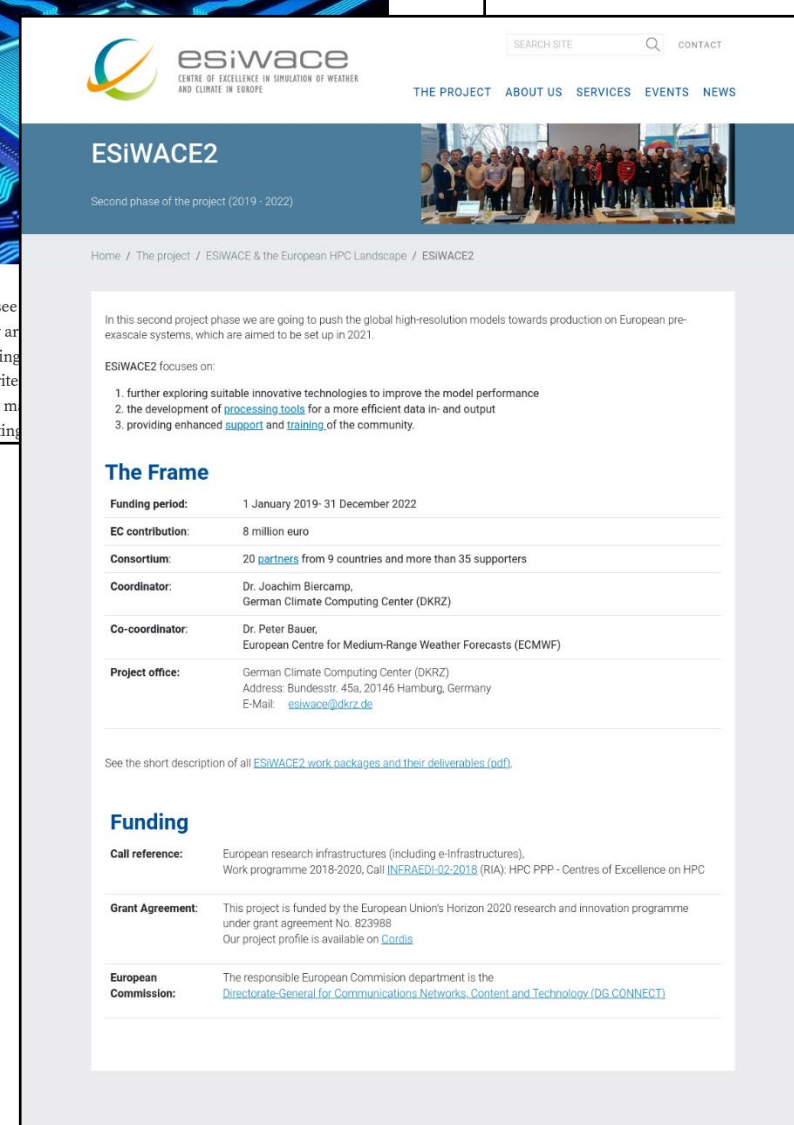
blogs



videos



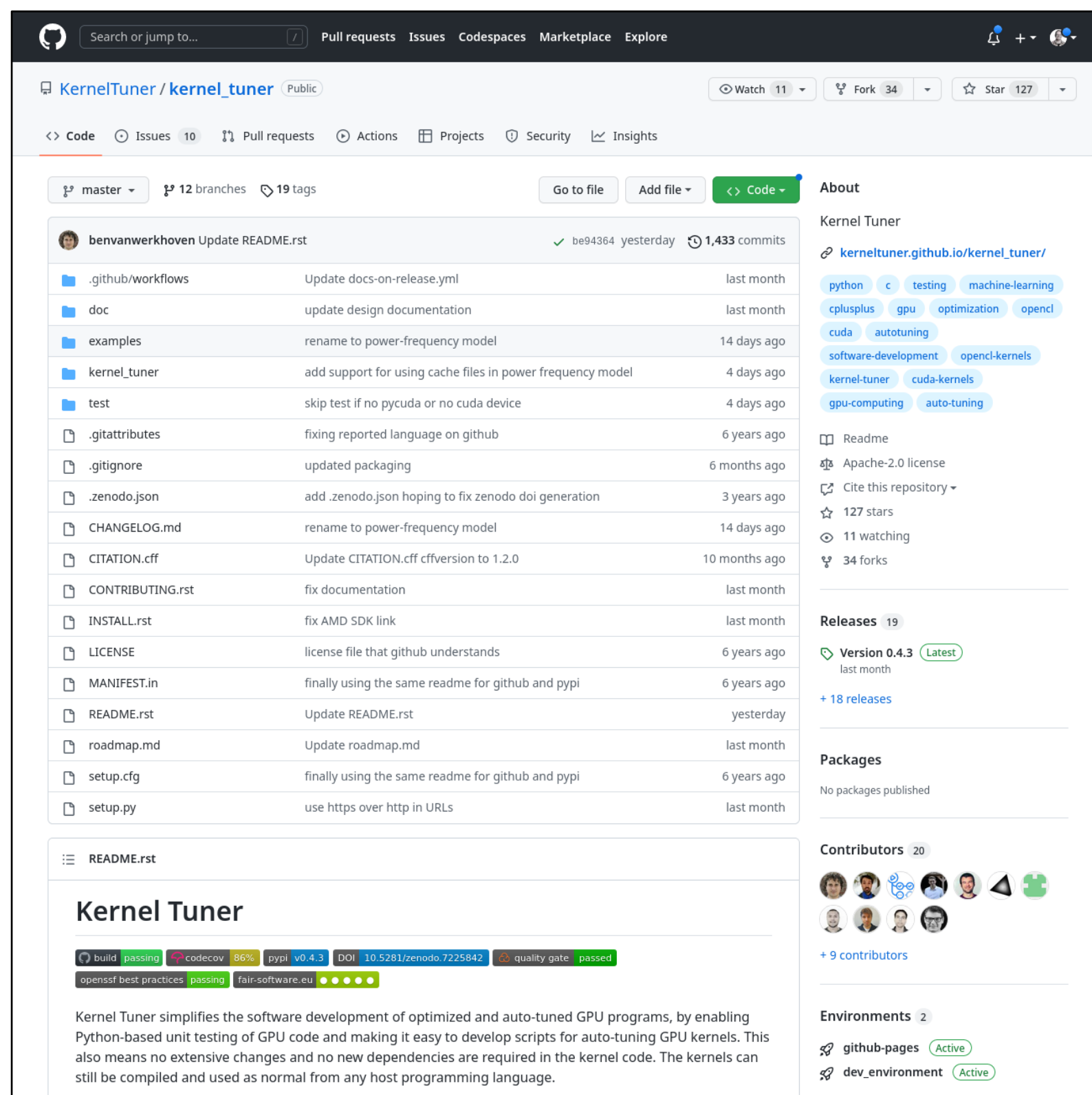
tutorials



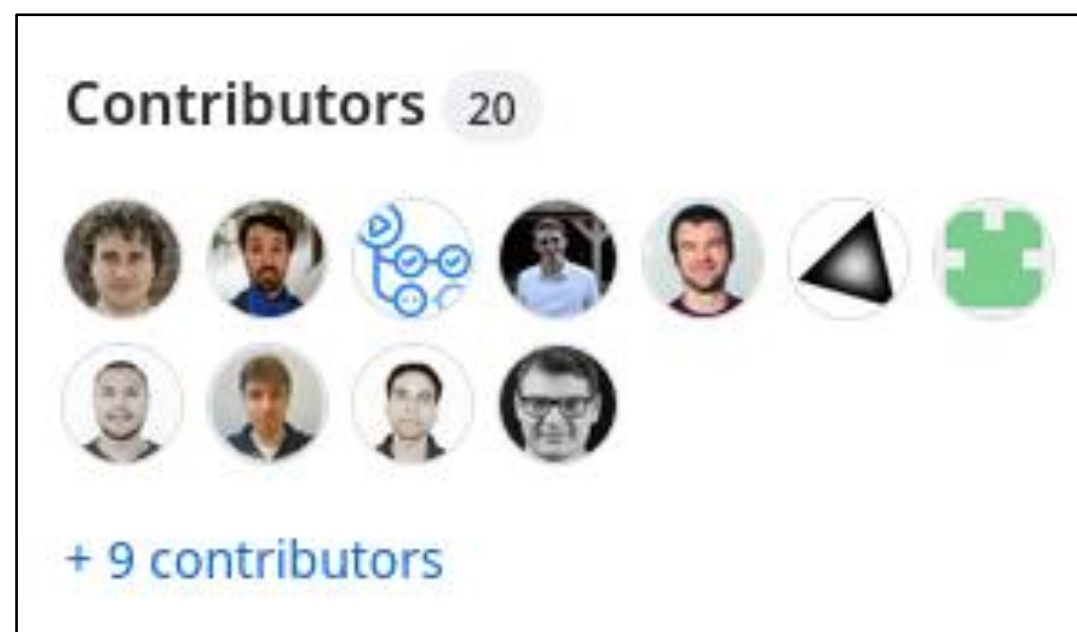
projects



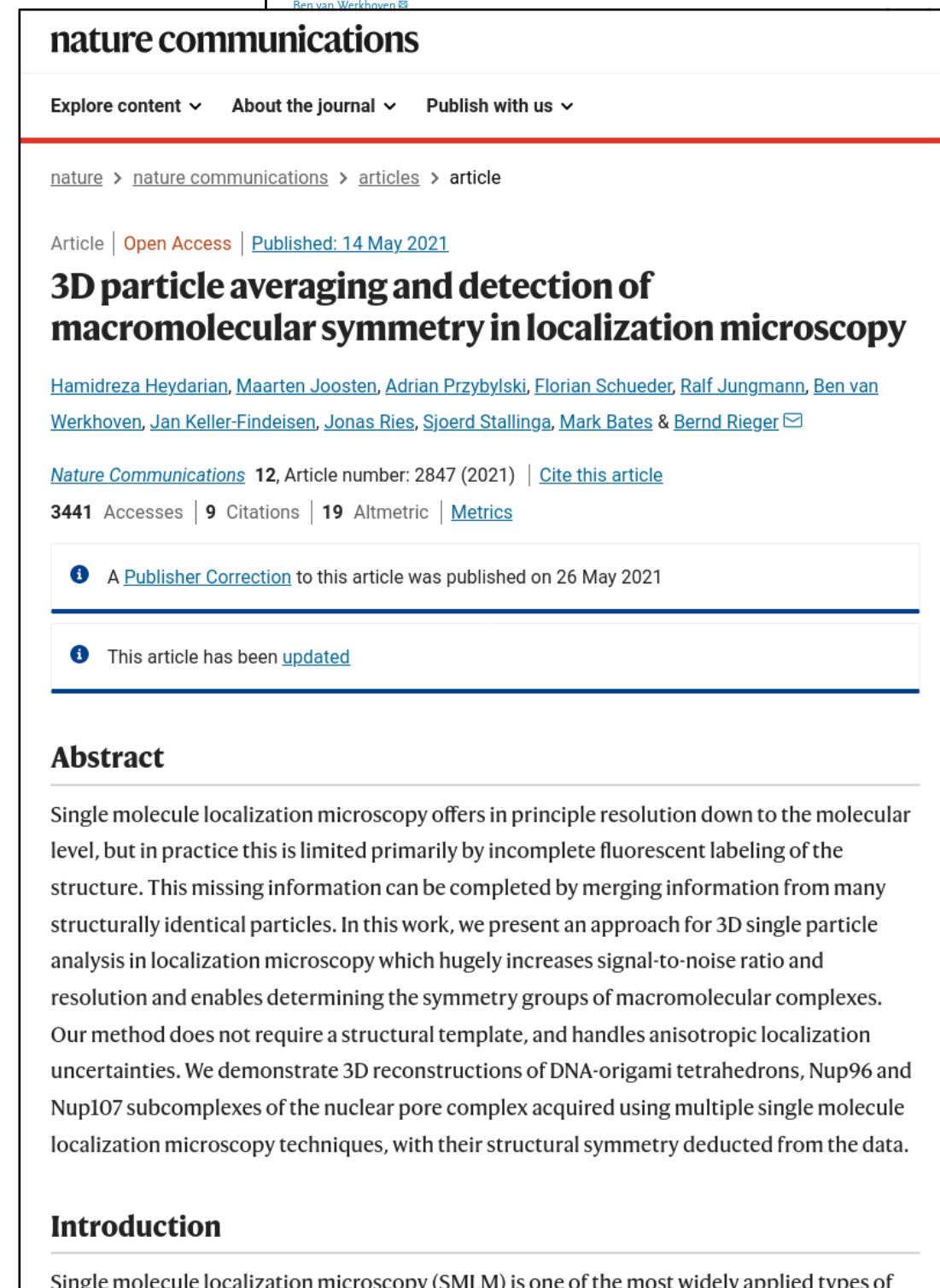
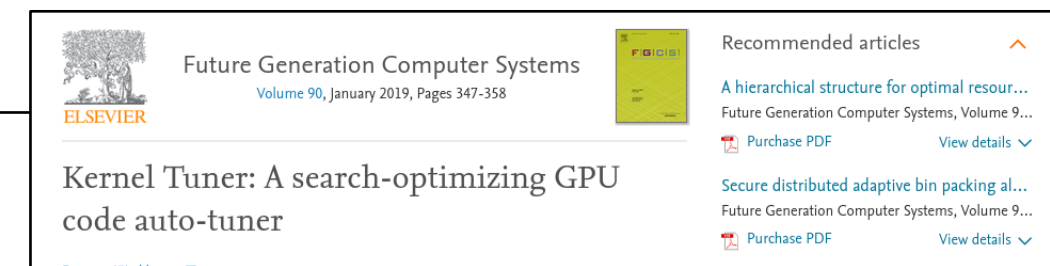
participating organizations



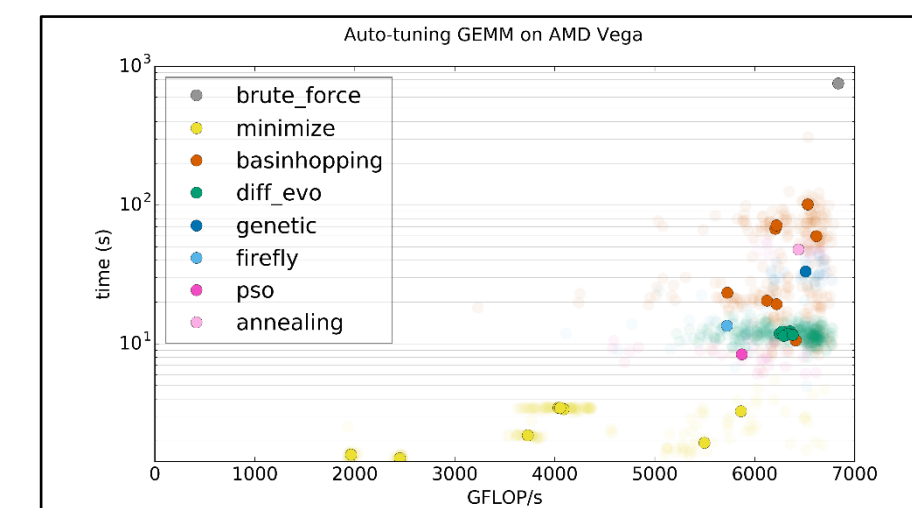
[https://github.com/KernelTuner/kernel\\_tuner](https://github.com/KernelTuner/kernel_tuner)



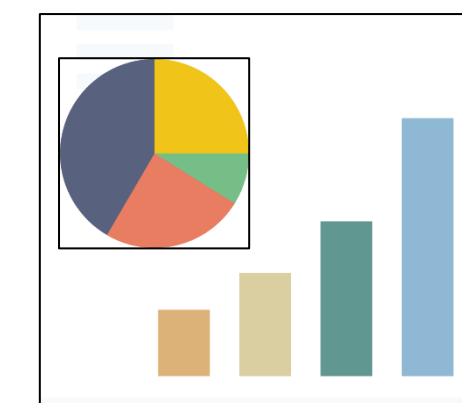
RSEs & other contributors



publications

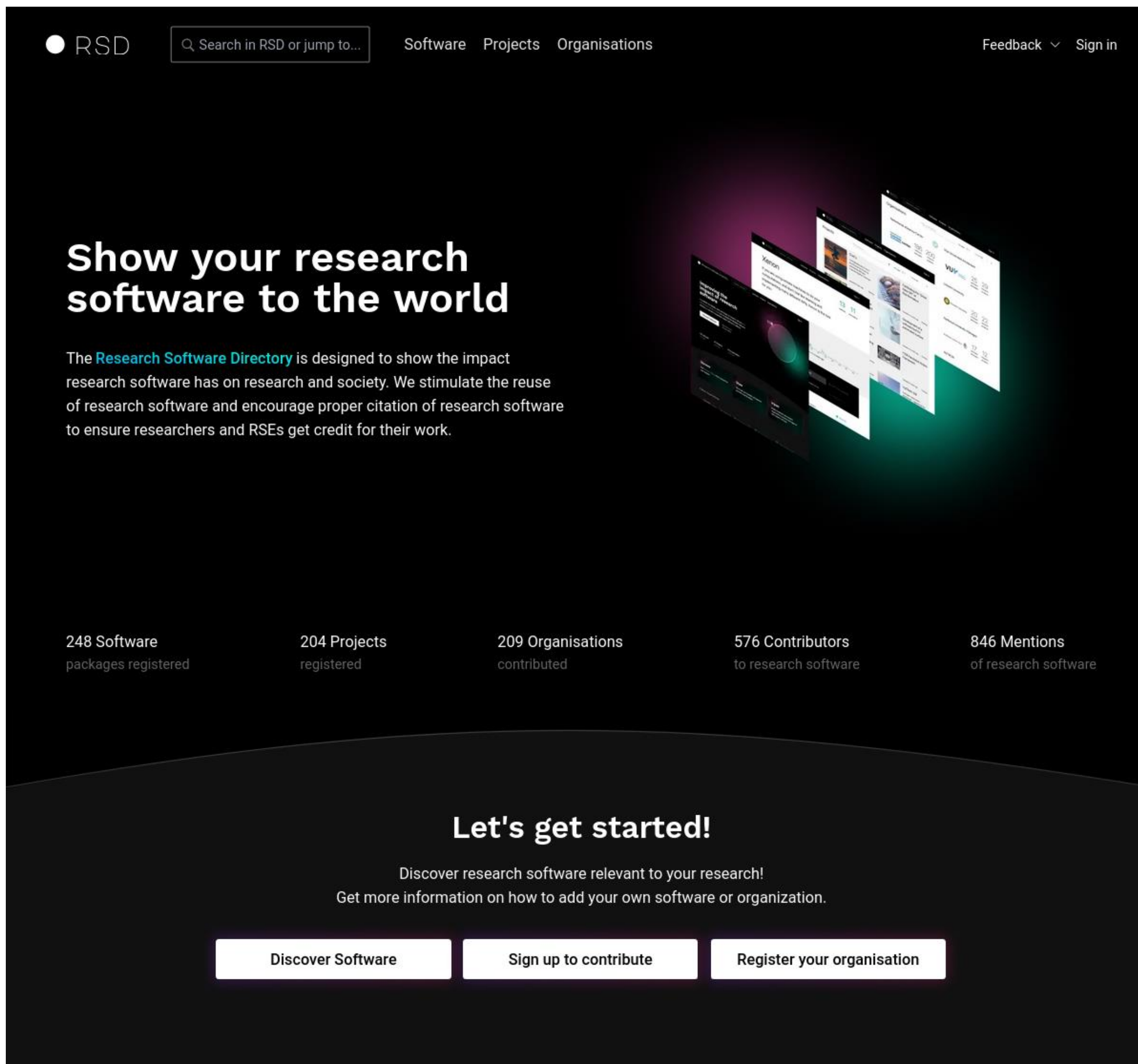


datasets



impact metrics (todo)

# The Research Software Directory



The screenshot shows the homepage of the Research Software Directory (RSD). At the top, there is a navigation bar with the RSD logo, a search bar, and links for Software, Projects, Organisations, Feedback, and Sign in. The main content area features a large heading "Show your research software to the world" and a subheading explaining the directory's purpose. Below this, there are five statistics: 248 Software packages registered, 204 Projects registered, 209 Organisations contributed, 576 Contributors to research software, and 846 Mentions of research software. A "Let's get started!" section follows, with a call to action and three buttons: "Discover Software", "Sign up to contribute", and "Register your organisation".

RSD Search in RSD or jump to... Software Projects Organisations Feedback Sign in

## Show your research software to the world

The **Research Software Directory** is designed to show the impact research software has on research and society. We stimulate the reuse of research software and encourage proper citation of research software to ensure researchers and RSEs get credit for their work.

248 Software packages registered    204 Projects registered    209 Organisations contributed    576 Contributors to research software    846 Mentions of research software

### Let's get started!

Discover research software relevant to your research!  
Get more information on how to add your own software or organization.

Discover Software    Sign up to contribute    Register your organisation

<https://research-software-directory.org>

The Research Software Directory is an online service designed to **collect** and **present** this collection of “related research information” in a structured way. Our goals:

**Enable RSEs** to show the impact their software has in research and society

**Help researchers** to find research software they need to do their research

**Allow organisations** to collect information about the research software output they produce

**Encourage citation** of research software in other research outputs.

# Research Software Directory = Open Source

RSD Search in RSD or jump to... Software Projects Organisations Feedback Sign in

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Discover Software    Sign up to contribute    Register your organisation

<https://research-software-directory.org>

7/7/2022 Launched by eScience Center

Used by 8 Dutch research institutes + several international

netherlands  
**eScience center**

**open source** and shared codebase at:

<https://github.com/research-software-directory/RSD-as-a-service>

Research Software Directory Search or jump to... Software Projects Organisations Sign in

## HELMHOLTZ

Research for grand challenges.

### Promote and Discover Research Software

Because software matters

Browse software

#### Software Spotlights

The latest outstanding software product developed in Helmholtz.

MassBank Search Contents Download Accession Go More

#### MassBank Record: UA002903

Atrazine; APCI-ITFT; MS2; CE: 35%; R=30000; [M+H]+

Mass Spectrum

Abundance

m/z

#### MassBank

MassBank is an open source mass spectral library for the identification of small chemical molecules of metabolomics, exposomics and environmental relevance.

#### Discover software by research topic

Energy    Earth & Environment    Health  
Information    Aeronautics, Space and Transport    Matter

<https://helmholtz.software>

29/7/2022 Launch by Helmholtz

Available to all Helmholtz Institutes

**HIFIS** HELMHOLTZ  
FEDERATED  
IT SERVICES

# Research Software Directory = Open Source

RSD

Search in RSD or jump to...

Software Projects Organisations

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248 Software packages registered

204 Projects registered

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576 Contributors to research software

846 Mentions of research software

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Discover Software Sign up to contribute Register your organisation

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7/7/2022 Launched by eScience Center

Used by 8 Dutch research institutes + several international

netherlands  
**eScience center**

**open source** and shared codebase at:

<https://github.com/research-software-directory/RSD-as-a-service>

Imperial College  
London

Research Software Directory

Search or jump to...

Software Projects Organisations

Sign in

## Promote and Discover Research Software

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### Software Spotlights

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MassBank Search Contents Download Accession Go More

#### MassBank Record: UA002903

Atrazine; APCI-ITFT; MS2; CE: 35%; R=30000; [M+H]+

Mass Spectrum

Abundance

m/z

Accession: UA002903  
Record Title: Atrazine; APCI-ITFT; MS2; CE: 35%; R=30000; [M+H]+  
Date: 2014.06.24  
Authors: C. Gallampois (Umea), E. Schymanski (Eawag), W. Brack (UFZ)  
License: CC BY  
Copyright: Copyright (C) Eawag, 2014  
Publication: Multi-criteria approach for tentative identification of polycyclic aromatic hydrocarbons

#### MassBank

MassBank is an open source mass spectral library for the identification of small chemical molecules of metabolomics, exposomics and environmental relevance.

### Discover software by research topic

Energy Earth & Environment Health  
Information Aeronautics, Space and Transport Matter

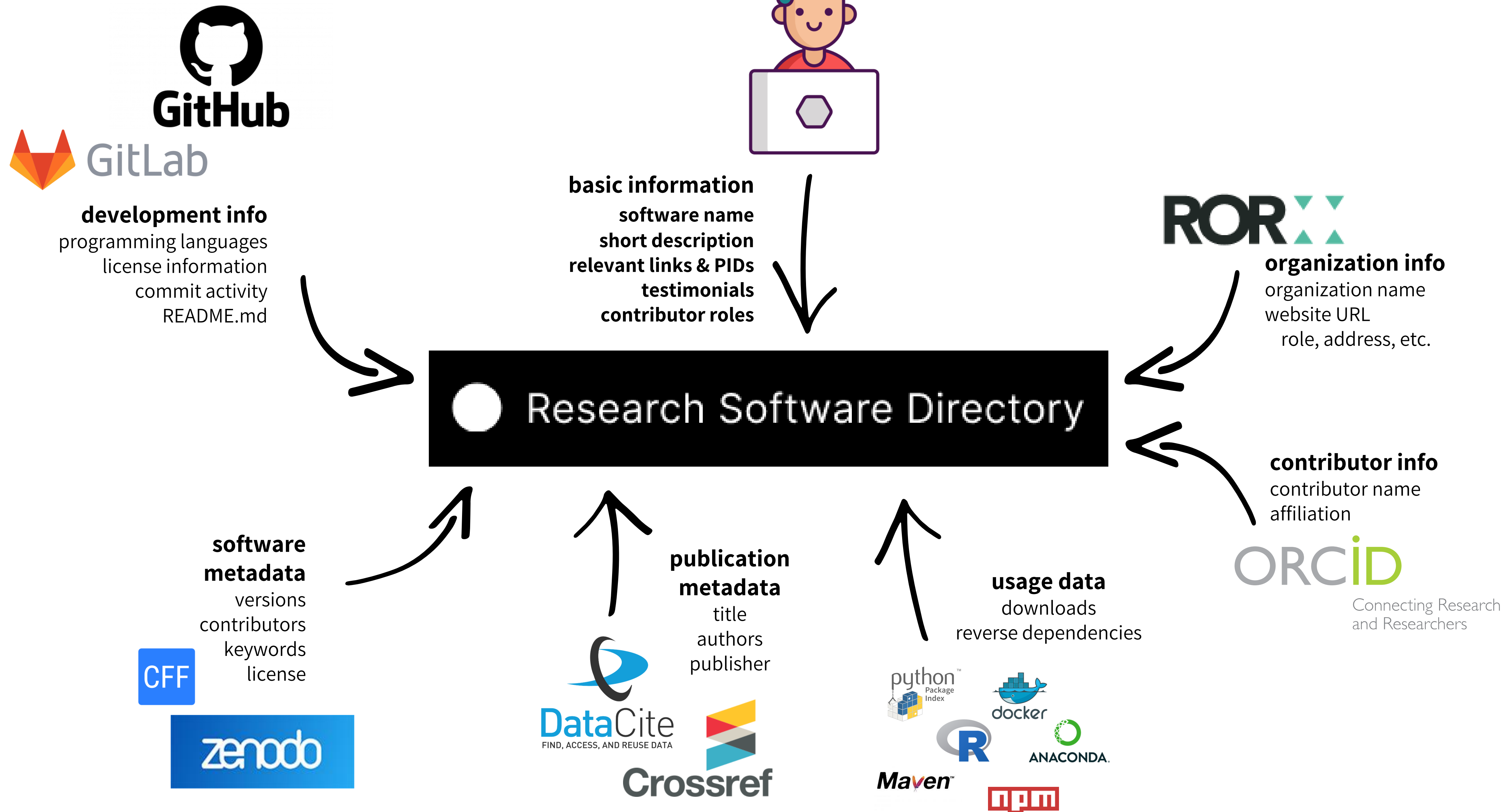
<https://helmholtz.software>

29/7/2022 Launch by Helmholtz

Available to all Helmholtz Institutes

**HIFIS** HELMHOLTZ  
FEDERATED  
IT SERVICES

# Many data sources + automatic harvesting





# User friendly data curation interface

The screenshot shows the 'Kernel Tuner' page on the Research Software Directory. The interface is clean and organized into several sections:

- Navigation:** Top bar with 'Research Software Directory', search bar, and navigation links for 'Software', 'Projects', and 'Organisations'. A user profile 'JM' is visible in the top right.
- Left Sidebar:** A vertical menu with icons and labels for 'Information', 'Contributors', 'Organisations', 'Mentions', 'Testimonials', 'Related topics', and 'Maintainers'. Each item indicates whether the information is 'Required' or 'Optional'.
- Software Information:** A form for entering details about the software, including RSD path, Name, Short description, Software URLs, and Repository URL. Each field has a character count and a 'Suggestion' button.
- Description:** A section for writing the software description, with radio buttons for 'Document URL' and 'Custom markdown'. A preview window shows the rendered markdown.
- Status:** A section indicating the software is 'Published' with a green toggle.
- Citation:** A section for generating citation files, showing the Concept DOI (10.5281/zenodo.1220113) and a 'VALIDATE DOI' button.
- Keywords:** A section for adding keywords, with a list of suggested keywords like 'Big Data', 'GPU', 'High Performance Computing', etc.
- Licenses:** A section for adding licenses, with a list of suggested licenses like 'Apache-2.0'.

Free to use for RSEs and researchers

- sign-in via SURFConext, ORCID or Helmholtz AAI

Collect all related information on software in one place

Easy to use without extensive technical knowledge

We automatically **harvest** data where possible

- Contributors via ORCID / DOI+CFF
- Organisations via ROR
- Keywords & licences from DOI
- Releases & mentions via DOI
- Descriptions via source repository in gitlab/github

# Generated software pages (& project pages)

generated software pages



export metadata



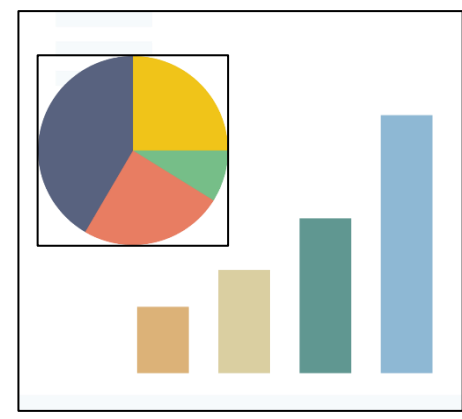
generated organisation pages

Organisations

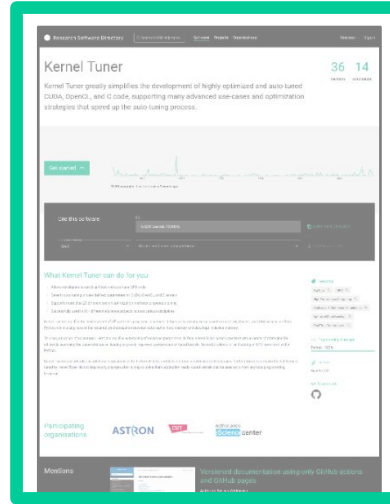
Organisation	software packages	research projects
Netherlands eScience Center	191	200
Vrije Universiteit Amsterdam	25	29
University of Amsterdam	17	35
Utrecht University	20	22
Canarie	40	0
Digital Research Alliance of Canada	40	0
Delft University of Technology	15	22
Radboud University Nijmegen	17	12
Wageningen University & Research		
ASTRON		

(generated project pages)

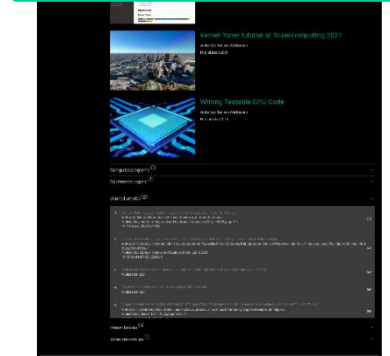
generated metrics? (TODO)



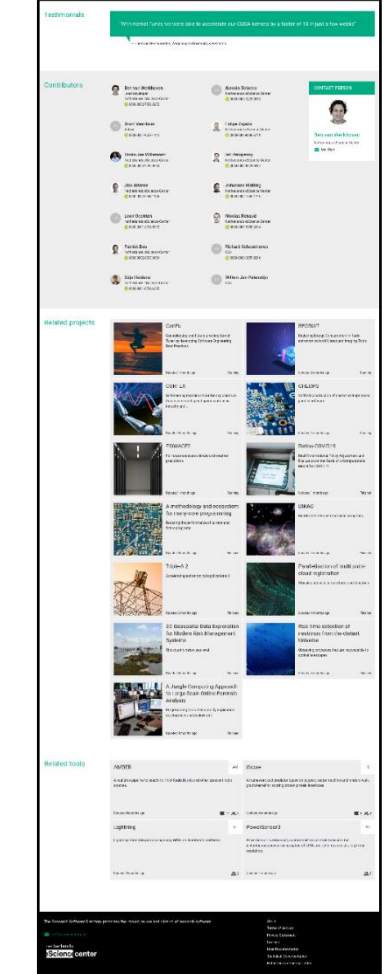
# Basic information



name & description

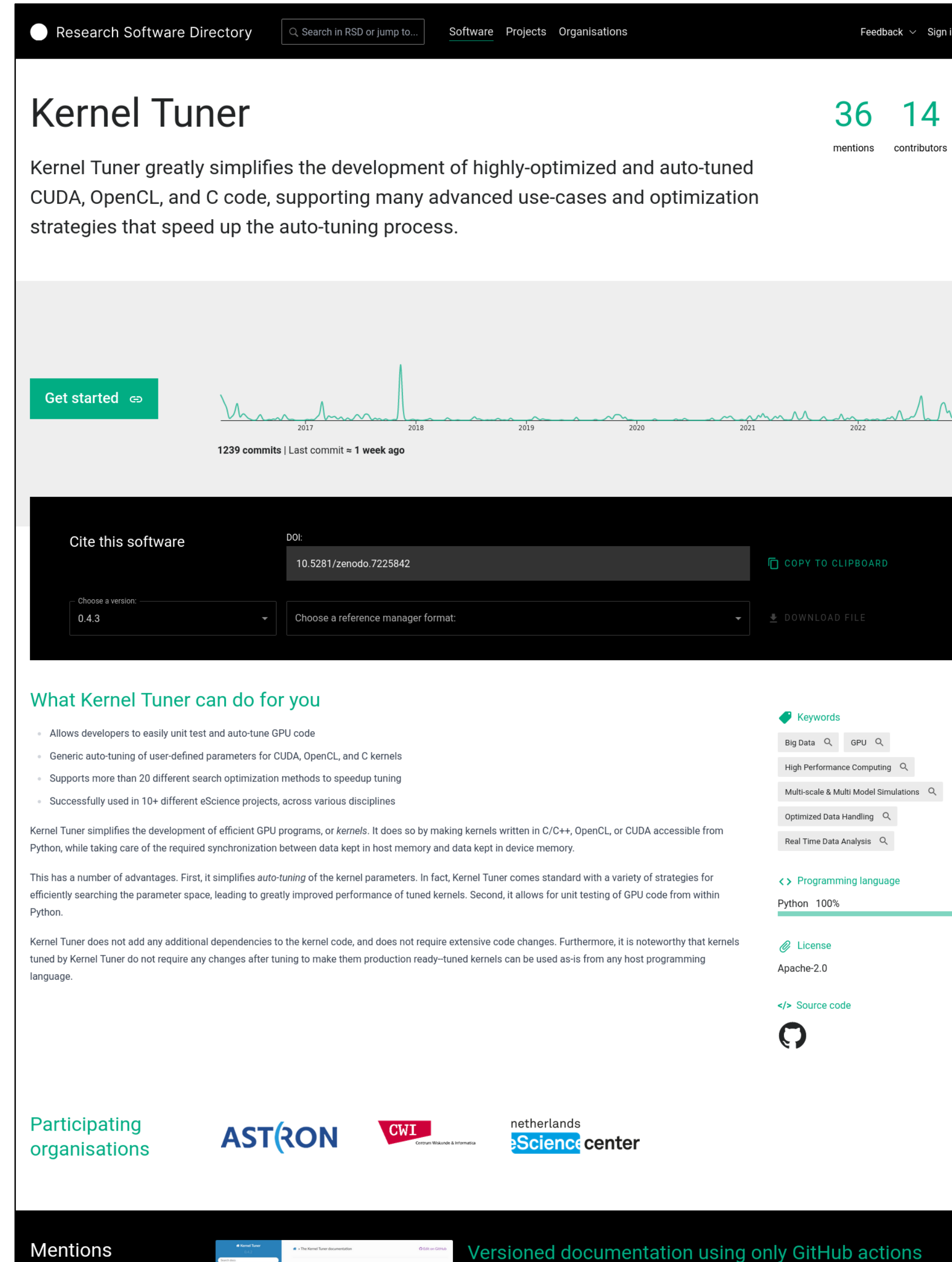


getting started link  
(to external webpage)



full page

detailed description



Research Software Directory

## Kernel Tuner

36 mentions 14 contributors

Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.

[Get started](#)

1239 commits | Last commit = 1 week ago

Cite this software

DOI: 10.5281/zenodo.7225842

Choose a version: 0.4.3

Choose a reference manager format:

Keywords: Big Data, GPU, High Performance Computing, Multi-scale & Multi Model Simulations, Optimized Data Handling, Real Time Data Analysis

Programming language: Python 100%

License: Apache-2.0

Source code

Participating organisations: ASTRON, CWI, netherlands Science center

Mentions

Versioned documentation using only GitHub actions

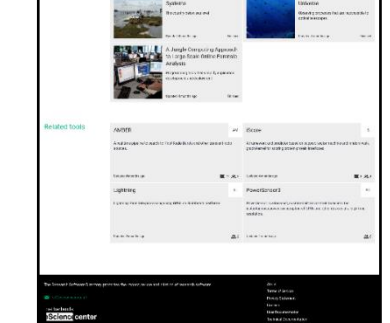
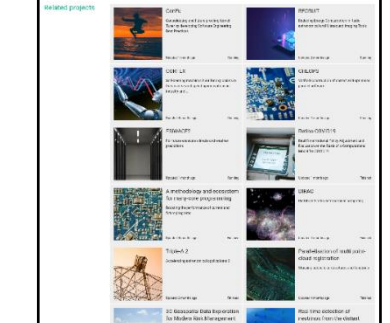
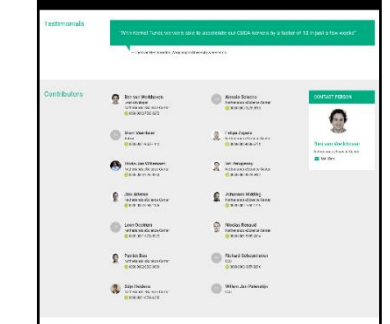
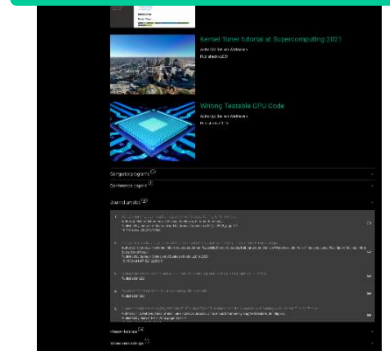
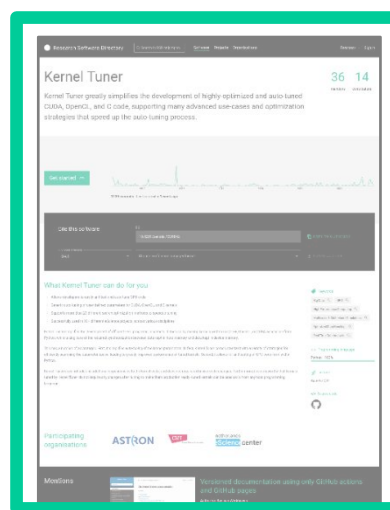
keywords

used programming languages & license

source code repository link

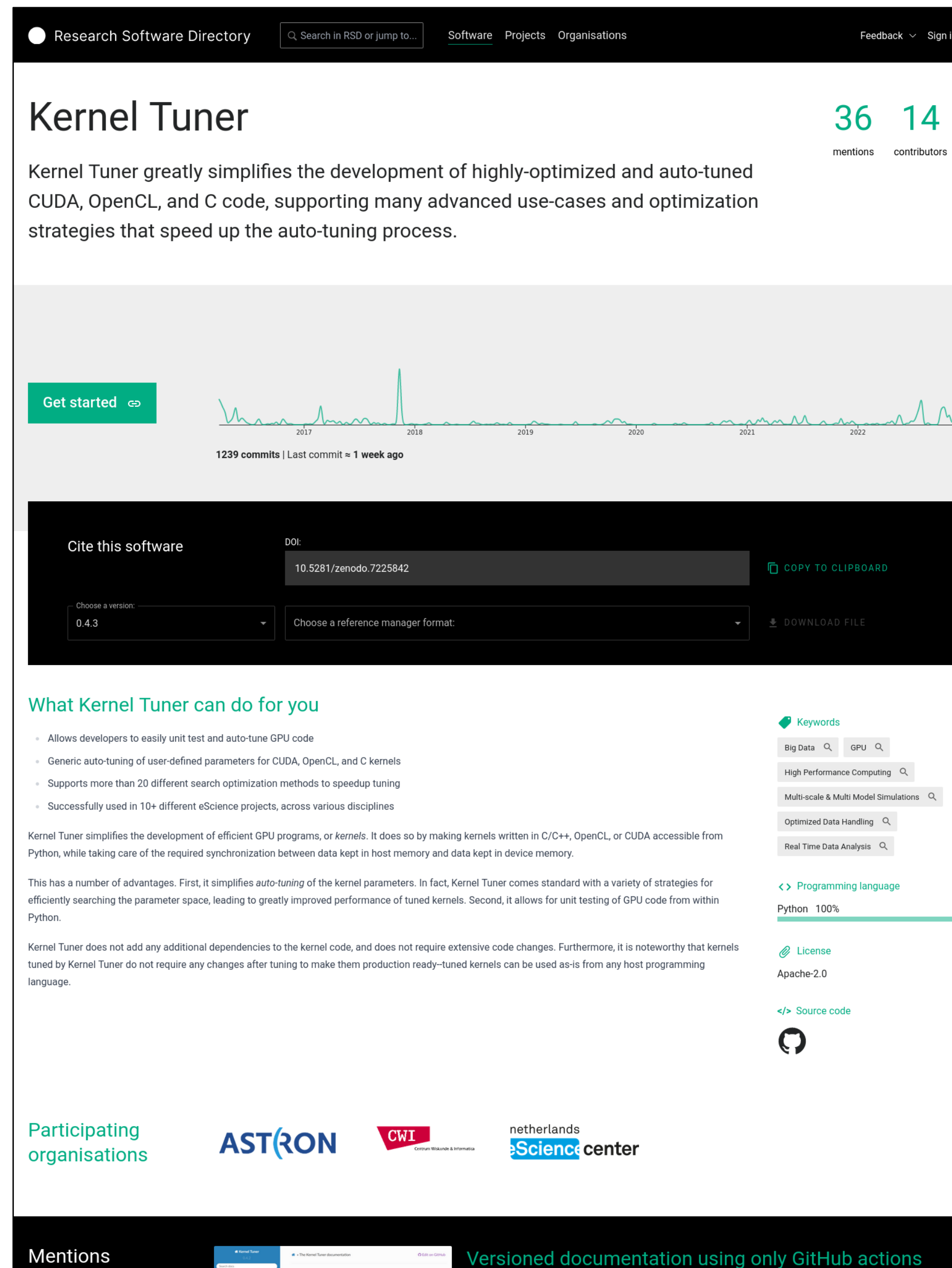
<https://research-software-directory.org/software/kernel-tuner>

# Community, development activity



full page

participating organizations →



Research Software Directory

## Kernel Tuner

36 mentions 14 contributors

Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.

Get started

1239 commits | Last commit = 1 week ago

Cite this software

DOI: 10.5281/zenodo.7225842

Choose a version: 0.4.3

Choose a reference manager format:

What Kernel Tuner can do for you

- Allows developers to easily unit test and auto-tune GPU code
- Generic auto-tuning of user-defined parameters for CUDA, OpenCL, and C kernels
- Supports more than 20 different search optimization methods to speedup tuning
- Successfully used in 10+ different eScience projects, across various disciplines

Keywords: Big Data, GPU, High Performance Computing, Multi-scale & Multi Model Simulations, Optimized Data Handling, Real Time Data Analysis

Programming language: Python 100%

License: Apache-2.0

Source code

Participating organisations: ASTRON, CWI, netherlands Science center

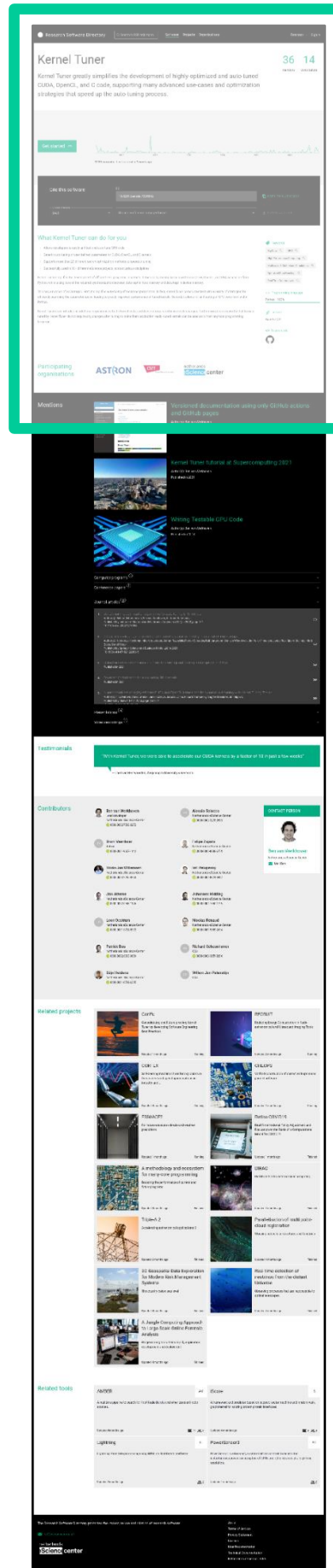
Mentions: Versioned documentation using only GitHub actions

← contributor and mention count

← development activity

<https://research-software-directory.org/software/kernel-tuner>

# Citation information



full page

Research Software Directory

## Kernel Tuner

36 14  
mentions contributors

Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.

Get started

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- Successfully used in 10+ different eScience projects, across various disciplines

Keywords

Big Data GPU

High Performance Computing

Multi-scale & Multi Model Simulations

Optimized Data Handling

Real Time Data Analysis

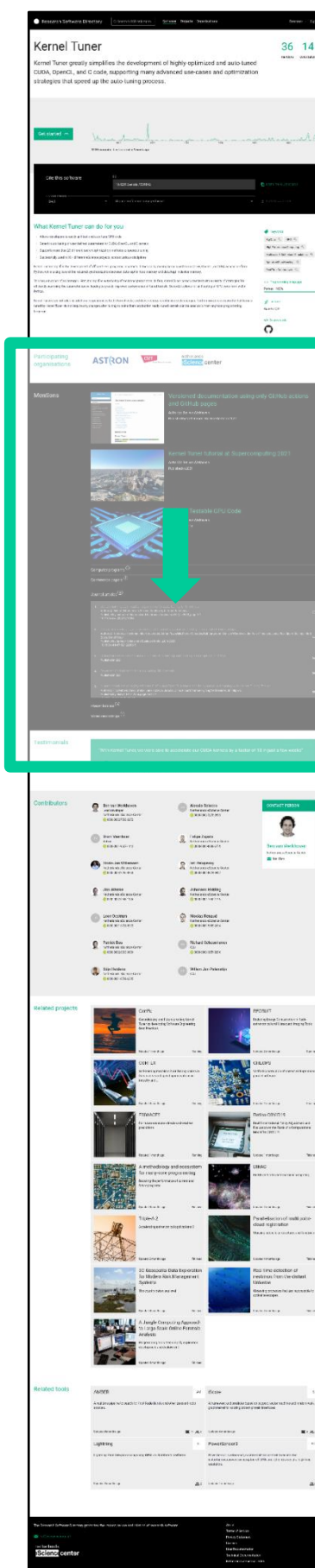
Mentions

Versioned documentation using only GitHub actions

← citation information

<https://research-software-directory.org/software/kernel-tuner>

# Mentions: related research output



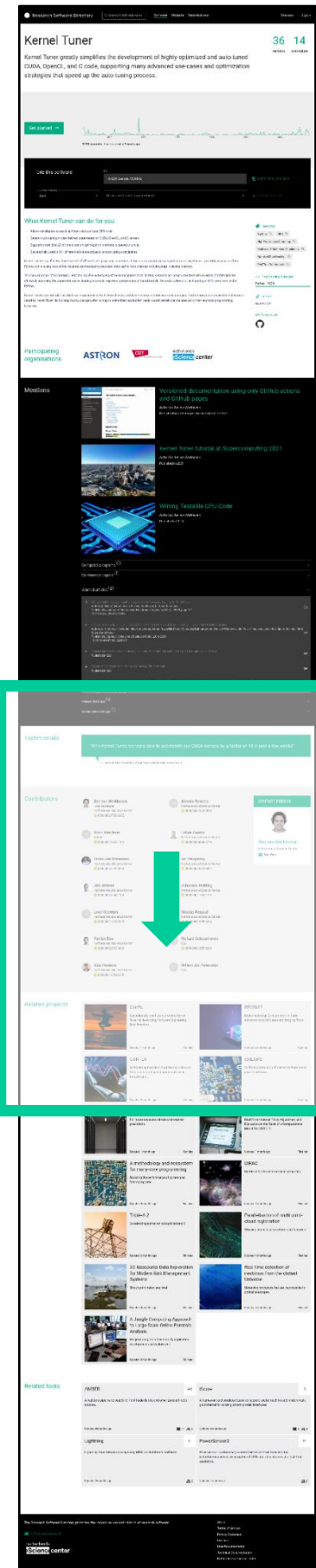
full page

highlights →

mentions grouped per type  
publications, presentations,  
blogs, videos, etc. →

← expanded list of  
journal publications  
(with links)

# Contributors, testimonials, related projects



full page

user testimonials →

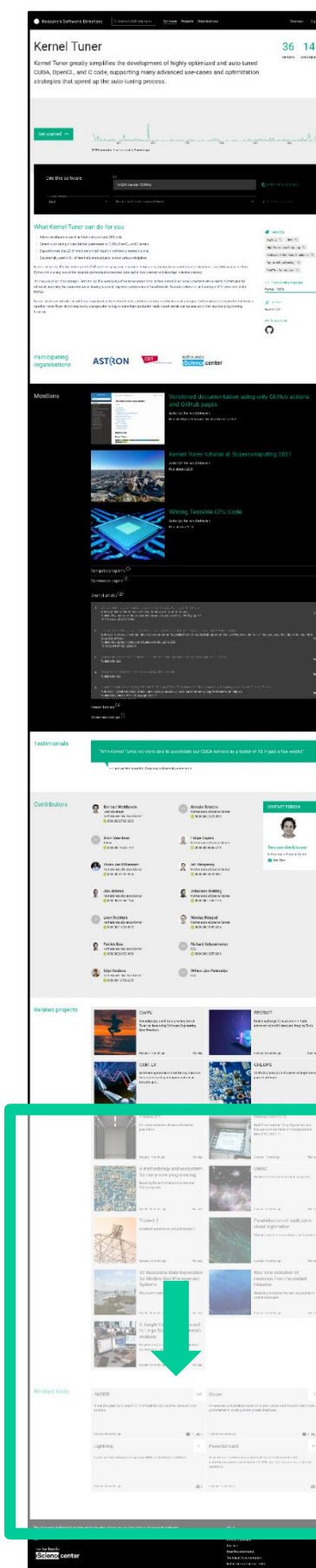
list of contributors with name, ORCID, image, **role** →

A detailed view of the website's content. The top section is 'Testimonials', featuring a green quote: "With Kernel Tuner, we were able to accelerate our CUDA kernels by a factor of 10 in just a few weeks" by Chiel van Heerwaarden. Below is the 'Contributors' section, a grid of 12 contributor cards. Each card includes a profile picture, name, role, affiliation, and ORCID icon. A 'CONTACT PERSON' callout box highlights Ben van Werkhoven. The bottom section is 'Related projects', showing four project cards: ConFu, RECRUIT, CORTEX, and CHEOPS, each with a thumbnail, title, description, and status.

← contact person

← projects using the software

# Related projects and software



full page

list of related software in the RSD



	Model for COVID19 Updated 1 month ago Running		Model for COVID19 Updated 1 month ago Finished
	A methodology and ecosystem for many-core programming Boosting the performance of current and future programs Updated 4 months ago Finished		DIRAC Distributed radio astronomical computing Updated 4 months ago Finished
	Triple-A 2 Accelerating astronomical applications 2 Updated 2 months ago Finished		Parallelisation of multi point-cloud registration Studying subcellular structures and functions Updated 4 months ago Finished
	3D Geospatial Data Exploration for Modern Risk Management Systems The country below sea level Updated 4 months ago Finished		Real-time detection of neutrinos from the distant Universe Observing processes that are inaccessible to optical telescopes Updated 4 months ago Finished
	A Jungle Computing Approach to Large-Scale Online Forensic Analysis Programming tools that simplify application development and deployment Updated 4 months ago Finished		

← projects using the software (continued)

### Related tools

<b>AMBER</b> AM	<b>iScore</b> IS
A real-time pipeline to search for Fast Radio Bursts and other transient radio sources. Updated 4 months ago 12 3	A framework and predictor based on support vector machine and random walk graph kernel for scoring protein-protein interfaces. Updated 4 months ago 3 4
<b>Lightning</b> LI	<b>PowerSensor3</b> PO
Lightning: Fast data processing using GPUs on distributed platforms Updated 4 months ago 2	PowerSensor is a low-cost, custom-built device that measures the instantaneous power consumption of GPUs and other devices at a high time resolution. Updated 1 month ago 6













The Research Software Directory promotes the impact, re-use and citation of research software. [About](#)



# Organizations overview

Research Software Directory  Software Projects Organisations Feedback + JM

Organisations  Per page 12 1-12 of 352

<b>Netherlands eScience Center</b> ✓  228 software packages 269 research projects	<b>Digital Research Alliance of Canada</b> ✓  62 software packages 0 research projects	<b>Utrecht University</b> ✓  30 software packages 31 research projects
<b>Canarie</b> ✓  50 software packages 0 research projects	<b>University of Twente</b> ✓  11 software packages 21 research projects	<b>Wageningen University &amp; Research</b> ✓  13 software packages 19 research projects
<b>Maastricht University</b> ✓  17 software packages 9 research projects	<b>University of Groningen</b> ✓  6 software packages 15 research projects	<b>Leiden University</b> ✓  5 software packages 9 research projects
<b>Interdisciplinary Physics Team (InPhyT)</b> ✓  5 software packages 3 research projects	<b>Amsterdam University Medical Centers</b> ✓  2 software packages 2 research projects	<b>SRON Netherlands Institute for Space Research</b> ✓  2 software packages 1 research projects

< 1 2 3 4 5 ... 30 >

The organizational overview shows aggregated numbers of software (and projects) per organization.

# Overview per organization

The screenshot displays the 'Research Software Directory' website. The top navigation bar includes the site name, a search bar, and links for 'Software', 'Projects', and 'Organisations'. The main header identifies the 'Netherlands eScience Center' and provides a breadcrumb trail: 'ORGANISATIONS > NETHERLANDS-ESCIENCE-CENTER'. A left sidebar lists categories: 'Software (228)', 'Releases (1120)', 'Projects (269)', and 'Research units (4)'. Below this is a profile card for the 'netherlands eScience center' with details on type (NONPROFIT), location (Amsterdam), and links (Website, ROR info). The main content area, titled 'Software', shows a list of software items with pagination (1-6 of 228). The items listed are:

Software Name	Category	Description	Updated	Comments	Users
Citation File Format	CI	The Citation File Format lets you provide citation metadata for software or datasets in plaintext files that are easy to read by both humans and machines.	Updated 11 months ago	20	2
DIANNA	DI	Deep Insight And Neural Network Analysis, DIANNA is the only Explainable AI, XAI library for scientists supporting Open Neural Network Exchange, ONNX - the de facto standard models format.	Updated 1 week ago	12	11
sv-callers	SV	Highly portable parallel workflow to detect structural variants in cancer genomes.	Updated 11 months ago	12	4
GGIR	GG	Converts raw data from wearables into insightful reports for researchers investigating human daily physical activity and sleep.	Updated 11 months ago	120	7
ESMValTool	ES	The Earth System Model eValuation Tool is a community diagnostics and performance metrics tool for the evaluation of Earth System Models that allows for routine comparison of models and observations.	Updated 11 months ago	81	84
Kernel Tuner	KE	Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.	Updated 2 months ago	40	14

At the bottom, a pagination bar shows the current page is 1 of 38.

Each organization has its own page showing metadata and software....

# Initial organizational metrics

Research Software Directory  Software Projects Organisations Feedback Sign in

## Netherlands eScience Center

ORGANISATIONS > NETHERLANDS-ESCIENCE-CENTER

- Software (228)  
Participating organisation
- Releases (1120)**  
Software releases
- Projects (269)  
Participating organisation
- Research units (4)  
Departments or institutions

netherlands  
**eScience center**

Type

NONPROFIT

Location

Netherlands eScience Center  
Amsterdam, Netherlands

Links

- Website
- ROR info

### Releases per year

2023	2022	2021	2020	2019	2018	2017	2016	2015
138	211	157	192	128	137	113	42	2

### 2023

138 releases

- Jun 27, 2023 **Vantage6** [↗](#) version/3.10.4 [↗](#)  
Frank Martin, Bart Van Beusekom, Melle Sieswerda, Johan Van Soest, Hasan Alradhi, Arturo Moncada-Torres, Alexander Harms, Jasper Snel  
DOI: 10.5281/zenodo.8085040
- Jun 23, 2023 **cuda wrappers** [↗](#) 0.4.0 [↗](#)  
John W. Romein, Bram Veenboer, Steven Vlugt, Mattia Mancini, Bouwe Andela, Leon Oostrum, Laura Ootes, Ben Werkhoven, Alessio Sclocco, Faruk Diblen, Jurriaan H. Spaaks, Abel Soares Siqueira  
DOI: 10.5281/zenodo.8075251
- Jun 23, 2023 **Research Software Directory (Next Generation)** [↗](#) v1.24.0 [↗](#)  
Ewan Jacov Cahen, Dusan Mijatovic, Jesus Garcia Gonzalez, Jason Maassen, Maaik Jong, Christian Meeßen, Matthias Rüster, Marc Hanisch, Norman Ziegner  
DOI: 10.5281/zenodo.8073914
- Jun 22, 2023 **MUSCLE3** [↗](#) 0.7.0 [↗](#)  
Lourens Veen  
DOI: 10.5281/zenodo.8072244
- Jun 22, 2023 **PowerSensor3** [↗](#) v1.1.0 [↗](#)  
Leon Oostrum, John Romein, Ben van Werkhoven, Quinten Twisk, Gijs Schoonderbeek, Steven van der Vlugt  
DOI: 10.5281/zenodo.8070656
- Jun 20, 2023 **Vantage6** [↗](#) version/3.10.3 [↗](#)  
Frank Martin, Bart Van Beusekom, Melle Sieswerda, Johan Van Soest, Hasan Alradhi, Arturo Moncada-Torres, Alexander Harms, Jasper Snel  
DOI: 10.5281/zenodo.8058606
- Jun 20, 2023 **Vantage6** [↗](#) version/3.10.2 [↗](#)  
Frank Martin, Bart Van Beusekom, Melle Sieswerda, Johan Van Soest, Hasan Alradhi, Arturo Moncada-Torres, Alexander Harms, Jasper Snel  
DOI: 10.5281/zenodo.8058491
- Jun 19, 2023 **duqtools** [↗](#) 1.9.0 [↗](#)  
Stef Smeets, Victor Azizi, Aaron Ho  
DOI: 10.5281/zenodo.8055483
- Jun 19, 2023 **Vantage6** [↗](#) version/3.10.1 [↗](#)

... as well as yearly overviews of software releases related to this organization.

Additional metrics are in development, as well as APIs that allow harvesting these metrics.

# We are not competing

The screenshot shows the RSD page for 'sv-callers'. At the top, it says 'Research Software Directory' with a search bar and navigation links for 'Software', 'Projects', and 'Organisations'. The main heading is 'sv-callers' with '12' mentions and '4' contributors. Below this is a description: 'Highly portable parallel workflow to detect structural variants in cancer genomes.' There is a 'Get started' button and a commit history graph showing 69 commits. A 'Cite this software' section provides a DOI (10.5281/zenodo.7251790) and options to download a citation file. A 'What sv-callers can do for you' section lists features like comprehensive detection of structural variants (SVs) and support for both single-sample and paired-sample analyses. It also includes a 'Keywords' section with terms like 'High Performance Computing' and 'Workflow Technologies'. At the bottom, there are logos for participating organizations: netherlands Science center and UMC Utrecht.

The screenshot shows the bio.tools page for 'sv-callers'. The header includes 'Search bio.tools' and '28221 tools'. The main heading is 'sv-callers' with a 'Verified' badge and the URL 'https://www.research-software.nl/software/sv-callers'. It lists available versions (1.0.0 to 1.2.2) and categories like 'Bioinformatics', 'Genomics', 'DNA structural variation', 'Workflows', and 'Structural variation'. A central diagram shows the workflow: 'Sequence alignment (nucleic acid) (BAM)' and 'DNA sequence (FASTA)' feed into 'Structural variation detection', which outputs 'Sequence variations (VCF)'. Below this, there are sections for 'Credits & Support' (listing developers and maintainers like Arnold Kuzniar), 'Documentation' (with a 'User manual' link), 'Downloads' (with a 'Tool wrapper (Other)' link), and 'Publication details' (listing a primary paper and other related works).

<https://bio.tools/sv-callers>

<https://research-software-directory.org/software/sv-callers>

Software can be in multiple registries

- They may offer different metadata
- They may reach a different audience
- They may harvest different information from external sources

We should prevent duplication of effort

- synchronize this information automatically wherever possible

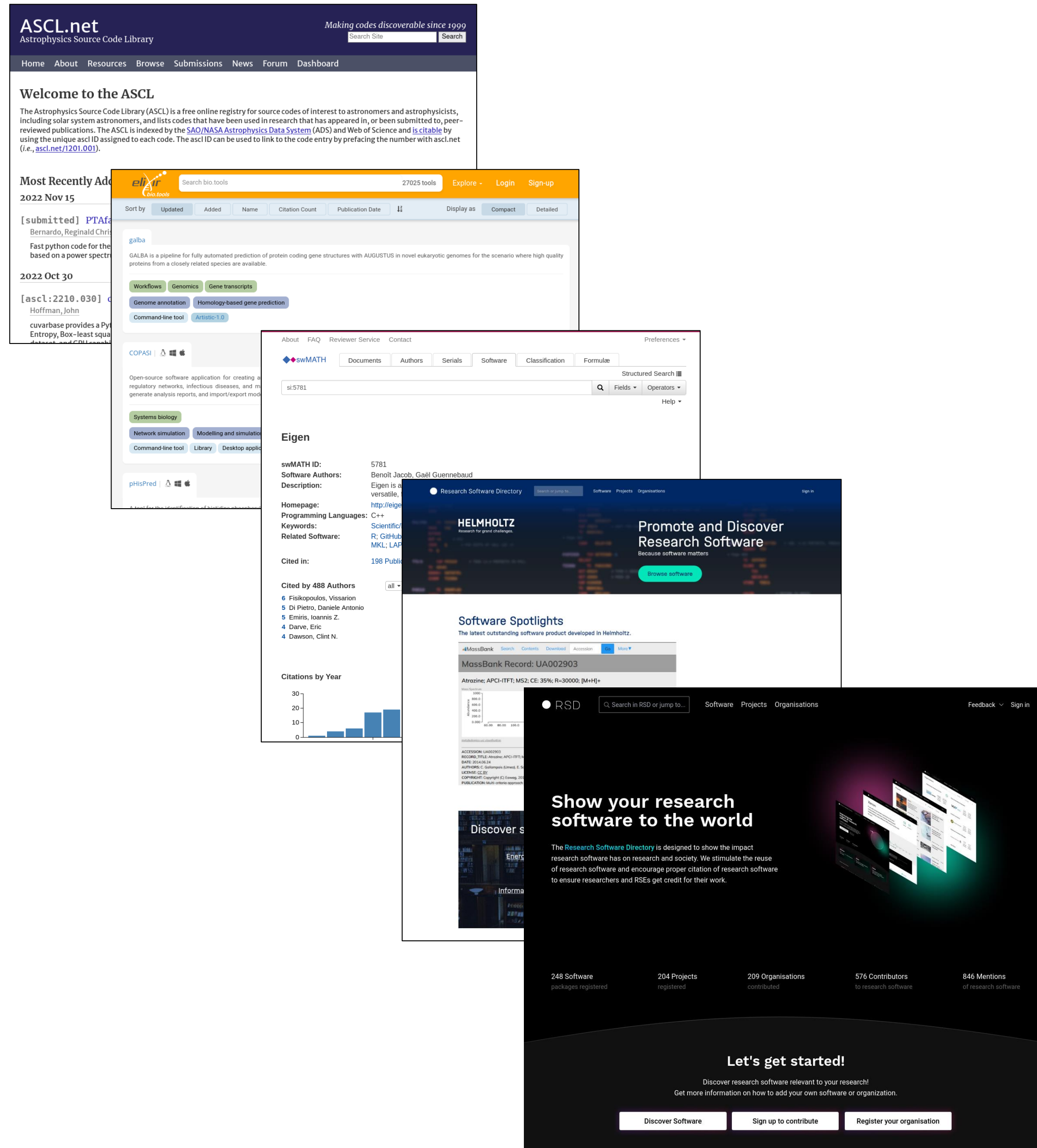
## In operation & actively being developed



Research Software Directory is actively being used and developed. Our plans for the near future are:

- ↻ Increase the user base, develop tutorials for organizations and end-users.
- ↻ improve look and feel of all pages and improve search.
- ↻ harvest various indicators on software impact and quality and figure out how to display them both per software and (aggregated) per organization.
- ⌚ research community curated software collections (inspired by bio.tools)
- ⌚ link to / harvest from other research software directories
- ⌚ federated search between different directories

# Conclusion



Software registries help improve the visibility of research software and show its impact

Different approaches:

- domain specific
- organization specific
- publication focus
- metadata focus
- impact focus

Metadata exchange can prevent duplication of effort

**Please pick one (or more) suitable to your needs and register your software today!**

**Show your research software to the world**

The **Research Software Directory** is designed to show the impact research software has on research and society. We stimulate the reuse of research software and encourage proper citation of research software to ensure researchers and RSEs get credit for their work.

248 Software packages registered    204 Projects registered    209 Organisations contributed    576 Contributors to research software    846 Mentions of research software

**Let's get started!**

Discover research software relevant to your research!  
Get more information on how to add your own software or organization.

Discover Software    Sign up to contribute    Register your organisation

The screenshot shows the Research Software Directory homepage. It features a dark background with white and teal text. At the top, there's a main heading and a sub-heading. Below that, five statistics are listed. A central section titled 'Let's get started!' contains a call to action and three buttons: 'Discover Software', 'Sign up to contribute', and 'Register your organisation'. Three teal arrows point from these buttons to external text labels at the bottom of the slide.

**browse content  
as visitor**

**sign up as  
a researcher /RSE / team**

**sign up as  
organisation**

You are welcome to:

- browse, search & harvest content
- sign up as an individual / team
- sign up as an organization
- join our the open source development

<https://research-software-directory.org>

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# Questions?



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