

OSCAR

Open Science Clusters' Action
for Research & Society

The ESCAPE Science Cluster

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Funded by
the European Union

ESCAPE is one of the five Science Clusters established to link EOSC with ESFRI-endorsed Research Infrastructures (RIs) and other world-class RIs (H2020 FP).



<https://science-clusters.eu/>

The 5 Science Clusters are:

- ENVRI - Environmental Science
- ESCAPE - Astronomy and Particle Physics
 - LS RI - Life Science
- PaNOSC - Photon and Neutron Science
- SSHOC - Social Sciences and Humanities

- ESCAPE currently not an EOSC Node, but CERN partner RI hosts a thematic node.
- Strategy aligned with national initiatives (PUNCH4NFDI, INFN).

 EOSC Node | CERN
Physical Sciences & Engineering

ESCAPE Open Collaboration Work Programme

Entities

ESCAPE CC
 Operating the community-based "Competence Center" for EOSC-alignment, train and support, extended outreach, financial model for services and networking with other SCL-CCs

ESCAPE EVSI
 R&I for an "European Virtual Institute for Research Software" for advanced technologies

ESCAPE VRE Virtual Research Environment
 A web-based highly-composable research-enabling interoperable data platform

Working Groups

ESCAPE DIOS Data Infrastructure for Open Science
 Access physical & e-infrastructures
 Processing & Analysis
 Security & Operations

ESCAPE
 European Science Cluster of Astronomy & Particle physics ESFRI research infrastructures

ESCAPE OSSR Open-source Scientific Software and Service Repository
 Aggregator & Integrators
 Sharing and Discover
 Training & Support

ESCAPE ESAP ESFRI Science Analysis Platform
 Processing & Analysis
 Sharing and Discovery
 Training & Support

ESCAPE CS Citizen Science
 Sharing and Discovery

ESCAPE VO Virtual Observatory
 Processing & Analysis
 Sharing and Discovery
 Training & Support

Programmes

ESCAPE COSO
 Challenging "Open Science Objectives" by RI commitments in Open Science Projects (OSP) as well as Cross-Cluster Open Science Projects (COSP)

ESCAPE TECH
 Bring the FAIRness within technology, R&D and innovation projects as well as explore new "close-to-sensors" low-latency open-data science

ESCAPE CARS
 Career development and rewarding for researcher committing in Open Science. Planning, tracking, and assessing scientific knowledge production

ESCAPE SDSS
 Building synergies on "Sector Data Spaces" for Society: Green deal, Health, Manufacturing, Education and Skills

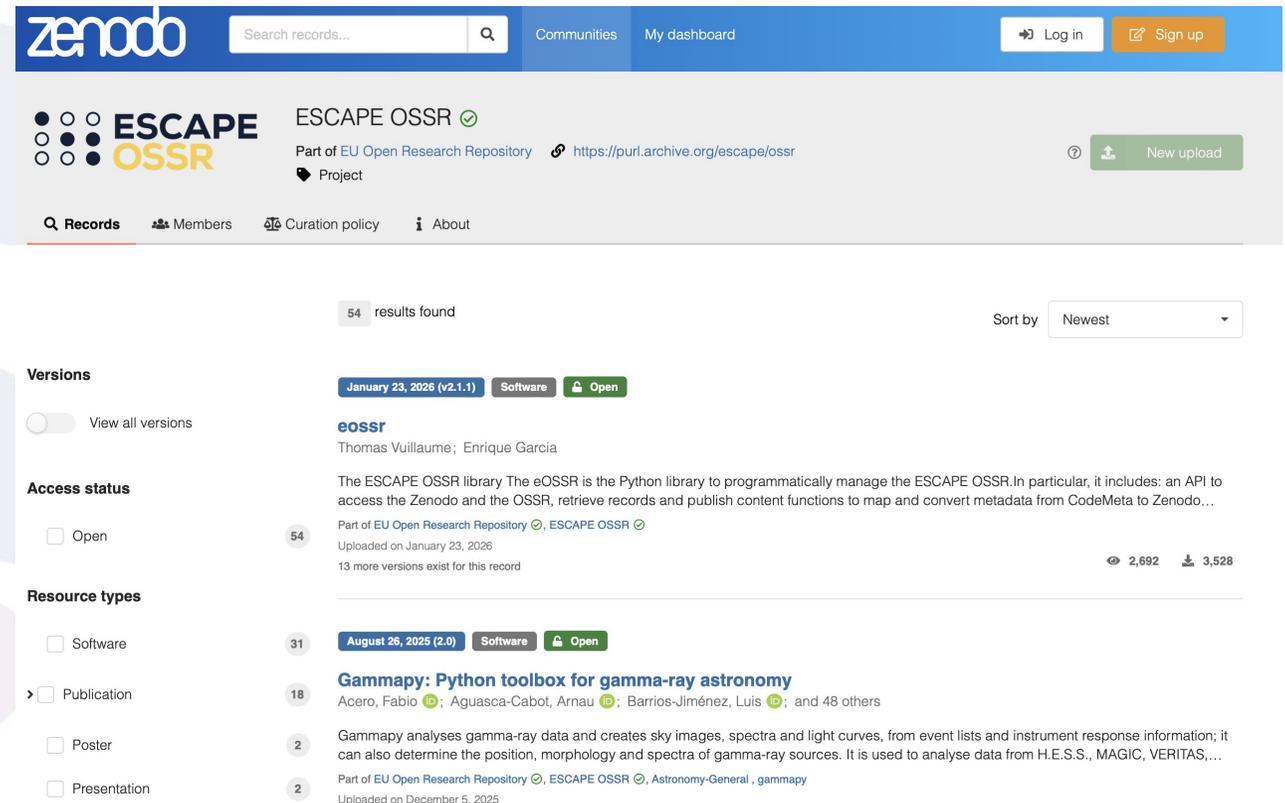
Part of the mission of ESCAPE is to provide mentoring to **onboard into EOSC** open science results from the projects funded under the OSCARS calls.

Outputs should be Findable, Accessible, Interoperable, Reusable (FAIR).

- Make your astronomical data FAIR following VO interoperability standards
- Upload software, data, publications and other project outputs to the [ESCAPE OSSR](#) Community on Zenodo, following the onboarding procedure.
- Make your software discoverable and reusable on the [ESCAPE VRE](#) hosted at CERN.
- Discoverable on [OSCARS](#) website and [ESCAPE](#) website.

The ESCAPE OSSR ([Vuillaume et al. 2023](#)) set up a **sustainable open-access repository to share scientific software**, digital libraries for data analysis, datasets, data products for the ESCAPE science cluster community.

- ESCAPE OSSR Zenodo Community
- Software guidelines and recommendations (as described in EOSC EVERSE)
- validation tool for software metadata
- eOSSR Python library
- Curated review process

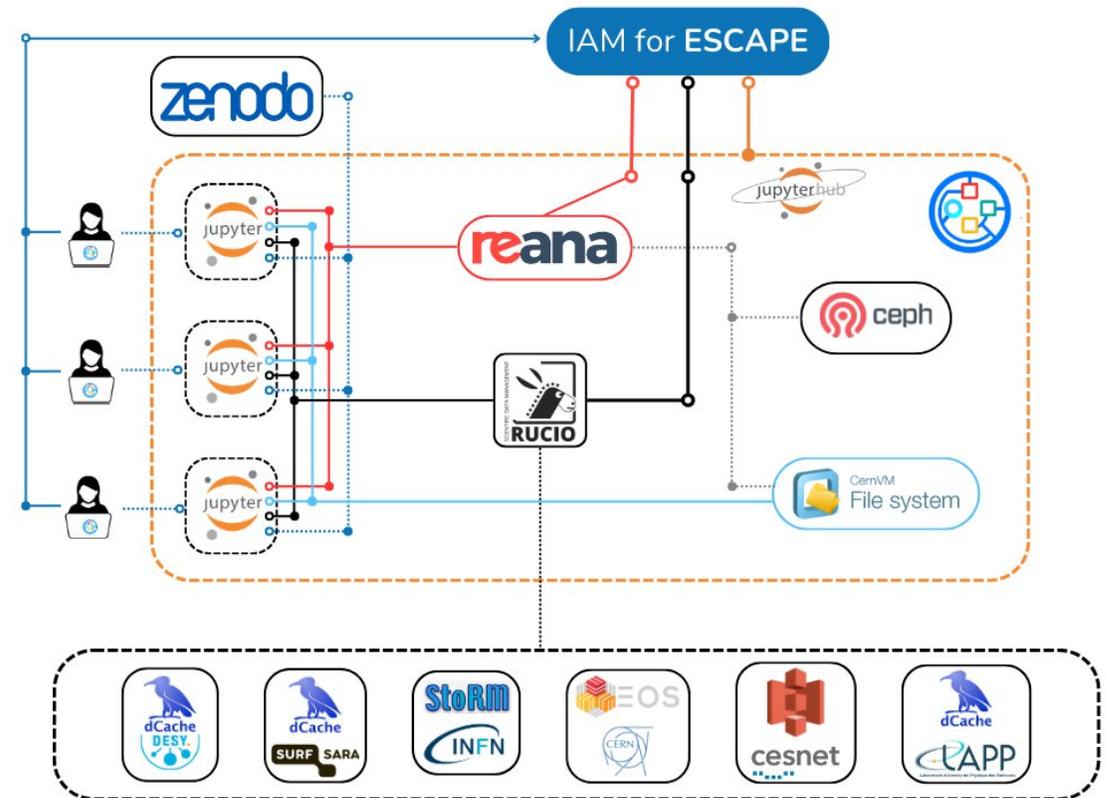


The screenshot shows the Zenodo interface for the ESCAPE OSSR community. The header includes the Zenodo logo, a search bar, and navigation links for 'Communities' and 'My dashboard'. The main content area displays the 'ESCAPE OSSR' project page, which is part of the EU Open Research Repository. It features a 'New upload' button and navigation links for 'Records', 'Members', 'Curation policy', and 'About'. Below the header, there are filters for 'Versions' (with a 'View all versions' toggle), 'Access status' (with an 'Open' checkbox), and 'Resource types' (with checkboxes for 'Software', 'Publication', 'Poster', and 'Presentation'). The search results show 54 records found, sorted by 'Newest'. The top result is 'eOSSR' by Thomas Vuillaume and Enrique Garcia, uploaded on January 23, 2026, with 2,692 views and 3,528 downloads. The second result is 'Gammapy: Python toolbox for gamma-ray astronomy' by Acero, Fabio, Aguasca-Cabot, Arnau, Barrios-Jiménez, Luis, and 48 others, uploaded on December 5, 2025.

Leverage the ESCAPE VRE ([Garcia et al. 2025](#)) and share your **containerized software to run analysis** within your scientific community!

- [AAI](#): A federated and reliable **Authentication and Authorization** layer
- [The Rucio Data Lake](#): A **federated distributed storage** solution, providing functionalities for data injection and replication through a Data Management framework (Rucio)
- [REANA](#): A **computing** cluster supplying the processing power to run full analyses with REANA, a re-analysis service
- [CVMFS](#): A read-only file system designed to distribute software, and more.
- [JupyterHub](#): A **notebook interface** with containerised environments to hide the infrastructure's complexity from the user.

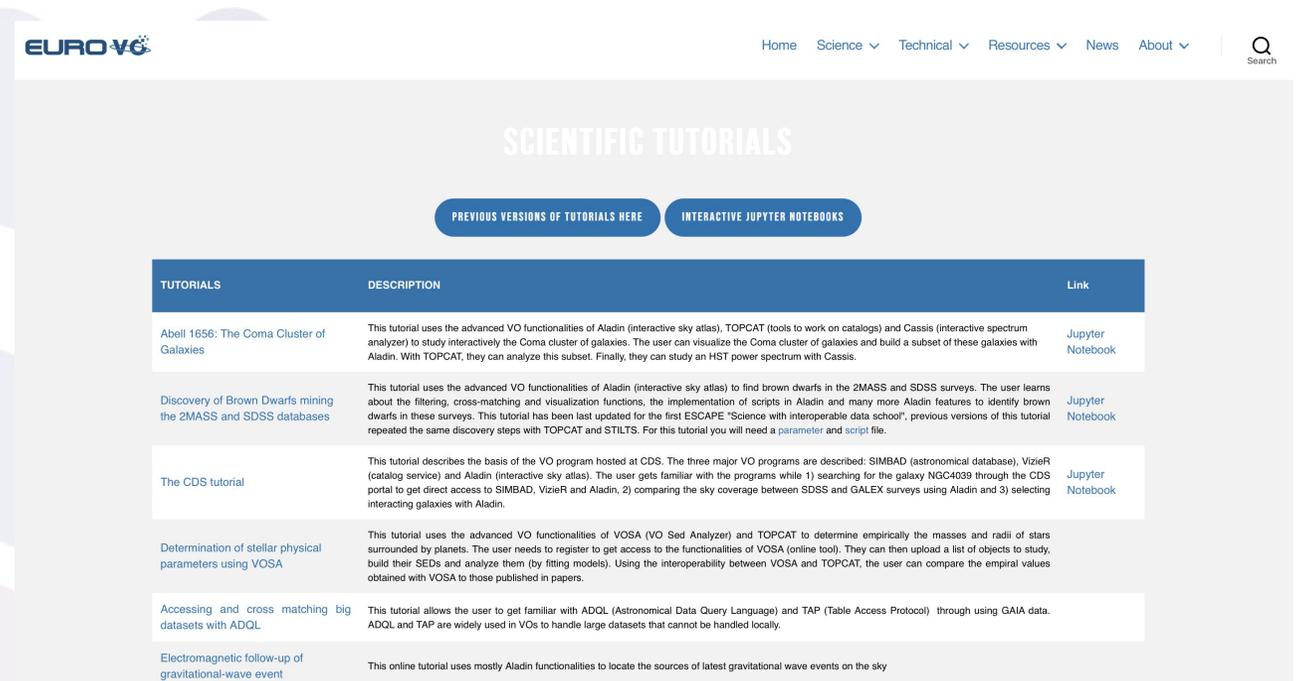
A long track record of successful adoption in scientific training schools and projects (e.g. GW School, EOSC Future TSP)



Credit: G. Guerrieri and the VRE WG

The [ESCAPE VO](#) WG adapts, extends, and develops International Virtual Observatory Alliance (IVOA) **interoperability standards** for access to large astronomy data catalogues and services, for the ESFRI partners within ESCAPE and the astronomy community.

- IVOA standards to publish astronomical data
- Runs training events and technology forum for data providers, scientists
- Access a VO interface.
- Search for the specific data or services that you need for your research (e.g. with TOPCAT)
- Access and reuse astronomical data (e.g. with the ESO Science Portal)



TUTORIALS	DESCRIPTION	Link
Abell 1656: The Coma Cluster of Galaxies	This tutorial uses the advanced VO functionalities of Aladin (interactive sky atlas), TOPCAT (tools to work on catalogs) and Cassis (interactive spectrum analyzer) to study interactively the Coma cluster of galaxies. The user can visualize the Coma cluster of galaxies and build a subset of these galaxies with Aladin. With TOPCAT, they can analyze this subset. Finally, they can study an HST power spectrum with Cassis.	Jupyter Notebook
Discovery of Brown Dwarfs mining the 2MASS and SDSS databases	This tutorial uses the advanced VO functionalities of Aladin (interactive sky atlas) to find brown dwarfs in the 2MASS and SDSS surveys. The user learns about the filtering, cross-matching and visualization functions, the implementation of scripts in Aladin and many more Aladin features to identify brown dwarfs in these surveys. This tutorial has been last updated for the first ESCAPE "Science with interoperable data school", previous versions of this tutorial repeated the same discovery steps with TOPCAT and STILTS. For this tutorial you will need a parameter and script file.	Jupyter Notebook
The CDS tutorial	This tutorial describes the basis of the VO program hosted at CDS. The three major VO programs are described: SIMBAD (astronomical database), VizieR (catalog service) and Aladin (interactive sky atlas). The user gets familiar with the programs while 1) searching for the galaxy NGC4039 through the CDS portal to get direct access to SIMBAD, VizieR and Aladin, 2) comparing the sky coverage between SDSS and GALEX surveys using Aladin and 3) selecting interacting galaxies with Aladin.	Jupyter Notebook
Determination of stellar physical parameters using VOSA	This tutorial uses the advanced VO functionalities of VOSA (VO Sed Analyzer) and TOPCAT to determine empirically the masses and radii of stars surrounded by planets. The user needs to register to get access to the functionalities of VOSA (online tool). They can then upload a list of objects to study, build their SEDs and analyze them (by fitting models). Using the interoperability between VOSA and TOPCAT, the user can compare the empirical values obtained with VOSA to those published in papers.	
Accessing and cross matching big datasets with ADQL	This tutorial allows the user to get familiar with ADQL (Astronomical Data Query Language) and TAP (Table Access Protocol) through using GAIA data. ADQL and TAP are widely used in VOs to handle large datasets that cannot be handled locally.	
Electromagnetic follow-up of gravitational-wave event	This online tutorial uses mostly Aladin functionalities to locate the sources of latest gravitational wave events on the sky	

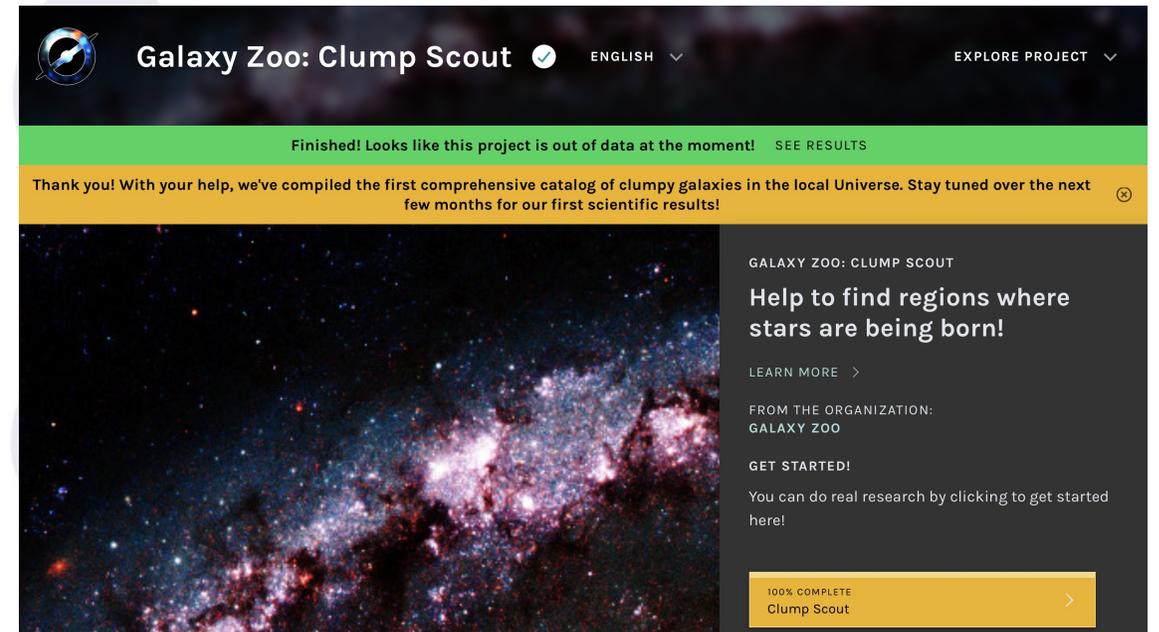
Credit: M. Allen and the VO WG

The ESCAPE CS WG allows the science-inclined public to take part in research projects to perform tasks that could not otherwise be solved algorithmically to contribute fundamental scientific discoveries.

It provides expertise in design and implementation of citizen science project and guidance to increase engagement of the general public.

Successful examples:

- [Galaxy Zoo Clump Scout](#)
- [Radio Galaxy Zoo: LOFAR](#)
- [Black Hole Hunters](#)



From: <https://www.zooniverse.org/projects/hughdickinson/galaxy-zoo-clump-scout>

Get in touch with the **ESCAPE Competence Centre!**

competence.centre@projectescape.eu

And link with the **ESCAPE Working Groups!**

- Data Infrastructure for Open Science ([DIOS](#), [VRE](#)): G. Guerrieri
- Virtual Observatory ([VO](#)): M. Allen
- Open-source Scientific Software and Service Repository ([OSSR](#)): K. Graf
- Citizen Science ([CS](#)): S. Serjeant



OSCARS

Thank you