National Aeronautics and Space Administration

NASA

A NASA OPEN-SOURCE SCIENCE MISSION: TOPS: TRANSFORM TO OPEN SCIENCE

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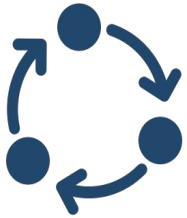
NASA Science Core Values

Transparent
scientific process and results should be visible, accessible, and understandable

Accessible
data, tools, software, documentation, and publications should be accessible to all (FAIR)
*Findable, Accessible, Interoperable, Reusable

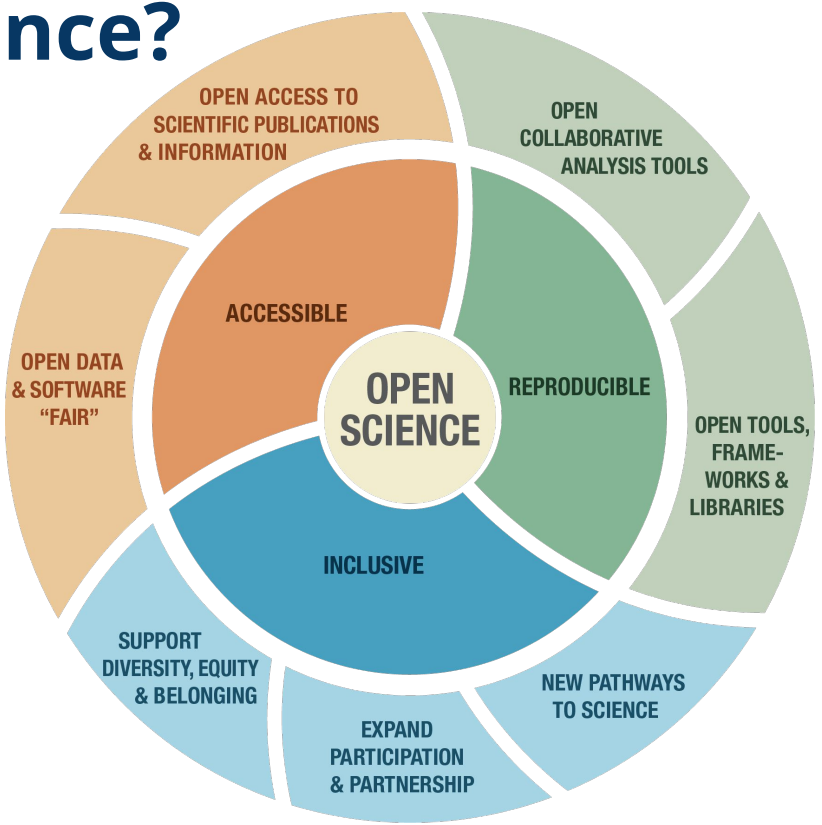
Inclusive
process and participants should welcome participation by and collaboration with diverse people and organizations



Reproducible
reproducible by members of the community

What is Open Science?

A **collaborative culture enabled by technology** that empowers the **open sharing of data**, **information**, **and knowledge** within the **scientific community and the wider public** to accelerate scientific research and understanding.



Another Leap Forward: Open-Source Science

Open-Source Science is NASA's method to put Open Science into practice.

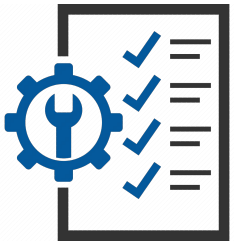
The strategy is focused around:

- **Opening** the entirety of the scientific process, ***from start to finish***
- **Broadening** community involvement in the scientific process
- **Increasing** the accessibility of data, software, and publications
- **Facilitating** inclusion, transparency, and reproducibility of science

Maximizing the scientific return of NASA data is the core of open source science.

Open-Source Science Initiative

Unlocking the full potential of a more equitable, impactful, efficient, scientific future



Policy development, education, compliance tools
Updating NASA policies on scientific information to better enable the activation of open science

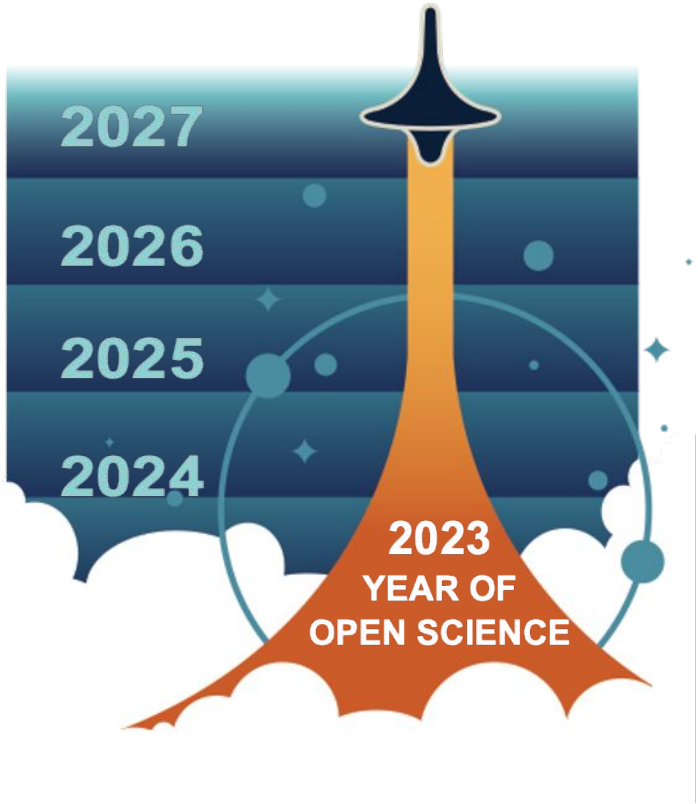
Core Services for Science Discovery
Developing core data and computing services to enable open science

ROSES Elements
Supporting open-source software, tools, frameworks, libraries, platforms, and training with over $5 million dollars in grants

Community Building & Partnerships - Transform to Open Science (TOPS)
Accelerating adoption of open science

A NASA OPEN-SOURCE SCIENCE INITIATIVE:
TOPS: TRANSFORM TO OPEN SCIENCE

Leading the Path to Open-Source Science



Transform to Open Science (TOPS) is a $40 million* 5-year NASA Science Mission Directorate initiative geared towards accelerating the adoption and understanding of open science

Key Goals:

- Increase understanding & adoption of open science
- Accelerate major scientific discoveries.
- Broaden participation by historically underrepresented communities

*pending appropriations

NASA's 2023 Year of Open Science

The Year of Open Science will build momentum and support the move towards more openness in science.

Engagement

Capacity Sharing Resources

Incentives

Moving towards Openness

Throughout 2023, TOPS will be energizing and uplifting open science across the scientific community through a suite of community building opportunities focused around:

- Recognizing open science practices
- Holding open, public meetings to support discourse around open science
- Sharing hidden knowledge
- Inclusive collaborations

Opening Up Science For All

TOPS is designing OpenCore: An Open Science Curriculum
5 Modules Organized as a Scientific Workflow

What is open science, why does it benefit me, and why does it benefit the greater scientific community?

How to share software

Best practices for sharing all results and analysis, as well as peer reviewing

ETHOS OF OPEN SCIENCE | OPEN TOOLS & RESOURCES | OPEN SOFTWARE | OPEN DATA | OPEN RESULTS

How to use popular open science tools

How to effectively use and share open data

Earn Badges at Each Level

Complete All 5 & earn TOPS Open Science Badge & Certification

Open Science in Action

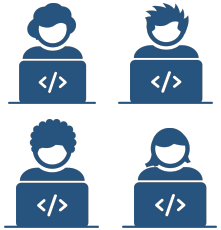
Capacity Sharing within the Community

TOPS Champions

Scientists to help teach modules at events and act as Open Science champions

Cohorts

Engage with learners through a virtual cohort model to increase Open Science Badge achievement



Summer Schools

Institutions selected to run 8-12 weeks of teaching the 5 modules to selected science teams + open competitive student/early career researchers

Curriculum Expansion

Groups funded to migrate/create discipline specific modules and data science skills modules to Open edX TOPS platform

Hackathons

More hackathons that advance data science skills and open science

To Change Everything, We Need Everyone And That Includes You!

To implement a cultural shift, we need community engagement from the broad spectrum across the scientific community!

- We are looking for community partners to co-develop Year of Open Science activities
  - Host and fund prizes and challenges,
  - Open, online open science curricula development,
  - Governance framework structures to develop open science action plans for science teams across agencies and institutions,
  - Budget for Year of Open Science activities to support open science learning and funding requirements across science teams

Learn more and collaborate with us - we're working on GitHub!

Questions?

Learn more and collaborate with us!

TOPS Email List

TOPS Website

Back Up

Astronomy Leading on Open Science

Highlights of AAS supporting Open Science include:

- AAS publications
  - Fully open access
  - Software publications and partnership with JOSS
  - Support from the AAS data and statistics editors
- AAS meetings
  - Inclusive practices as part of AAS meetings
  - Training including in AAS meetings

The wider astronomy community has a long legacy of open science:

- Data repositories and standard practices like International Virtual Observatory
- Leadership in Open Source Software
- arXiv and early adoption of preprints
- Unified Astronomy Thesaurus

OSSI wants to continue supporting and elevating existing open science practices while encouraging new innovative solutions. There are challenges for the different communities including training in the latest open science practices, ethics in data sharing, and recognition of open science practices.