National Aeronautics and Space Administration

2023: The Year of Open Science

Join NASA's Transform to Open Science Mission

NASA Transform to Open Science Mission
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Amy (Uyen) Truong, Chief Science Data Office Executive Officer


First Video of NASA's Ingenuity Mars Helicopter in Flight, Includes Takeoff and Landing (High-Res)
Watch later
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NASA
NEMO
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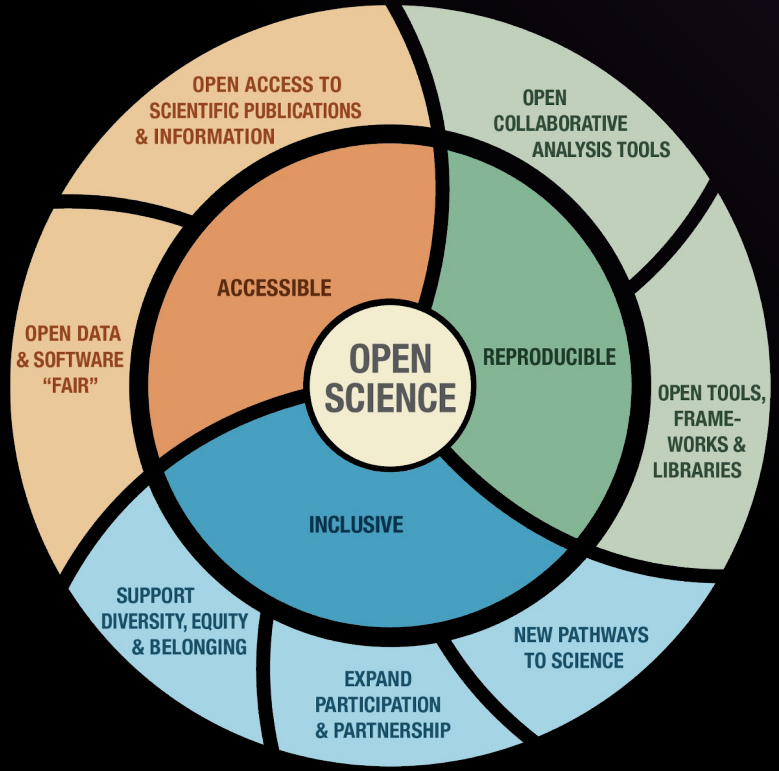
Open Science Accelerates Discoveries

We need **more** people - more hands, more eyes, more brains - with diverse experiences to participate so that we ask the best questions and find the best solutions

Open Science: More We Science



"We need more <u>WE science</u> rather than ME science."

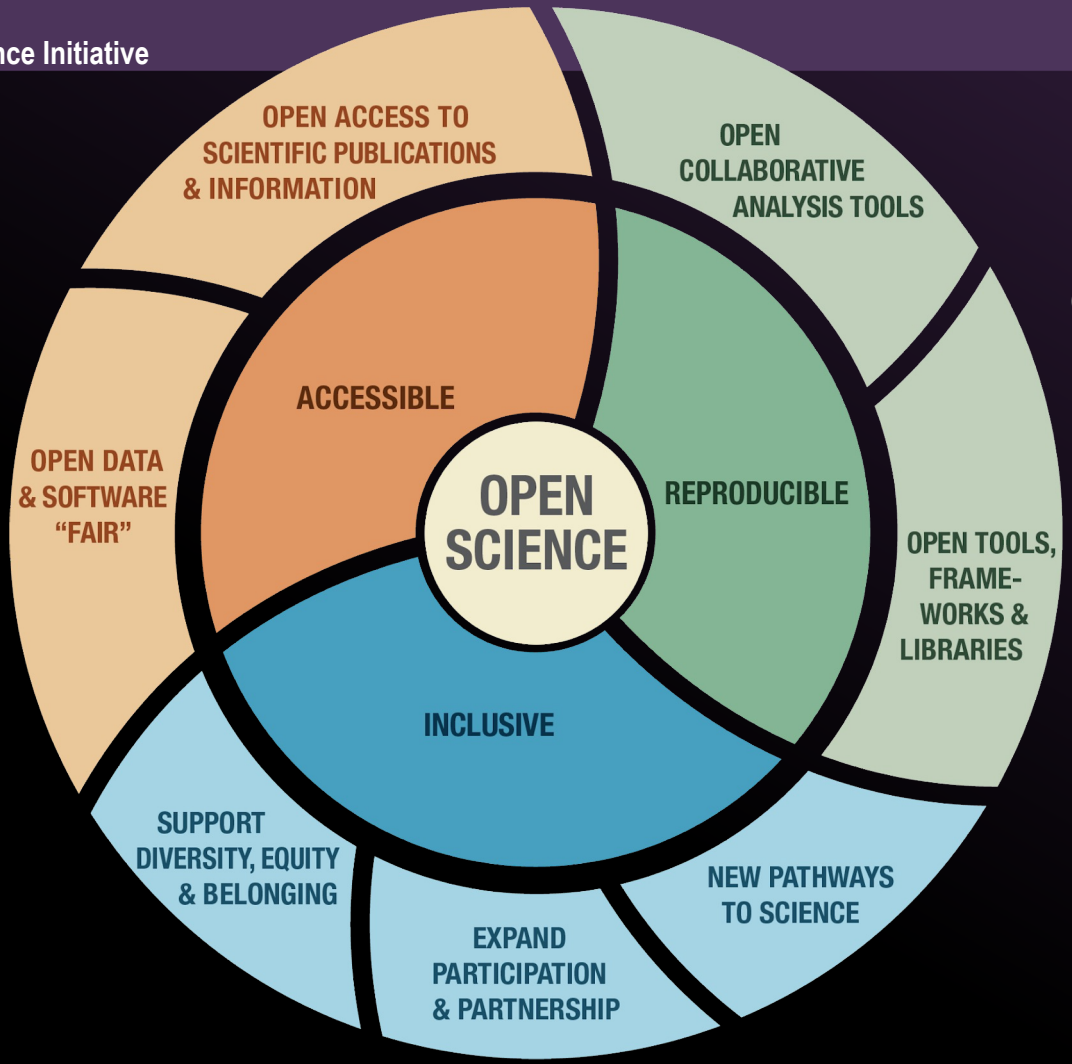
\- Harlan Krumholz,

Yale School of Medicine at 2022 CZI Meeting

Open science benefits everyone by producing research which is more accessible, reproducible, and inclusive.

Publications linked to open data-sets are cited more

Open-source software lowers the financial burden of getting started with research for non-R1 institutions



Open Access publications are cited more

Institutions with a higher proportion of women researchers publish more via open access

NASA is supporting scientists to integrate open science principles into the entire research workflow

NASA's Open-Source Science Initiative $20M/year

2023
is the
Year of Open Science!

NASA's 2023 Year of Open Science

…is the spark

TOPS Priorities:

CURRICULUM - Introduction to open science

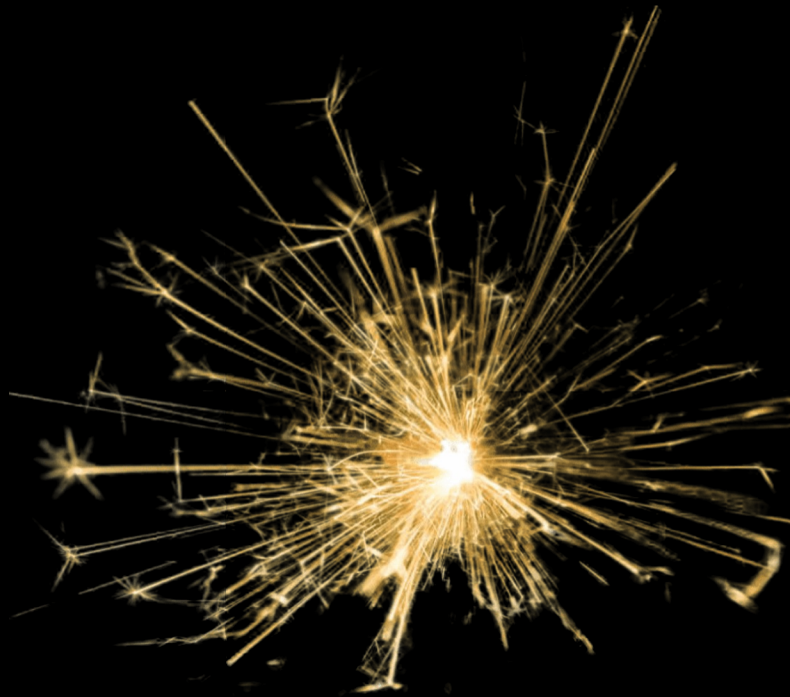
- 1000 scientists earn NASA TOPS open science certificates

EVENTS - Engage historically underrepresented groups

- Partner w/ Minority Serving Institutions (MSIs)
  - Marquee events, TOPS Annual Hackathon, Annual TOPS Internship program (3-4 people/year; All-in)
- Establishing Strategic Partnerships with external organizations focused on STEM engagement

OPPORTUNITIES - Develop incentives

- Pilot including open science activities in evaluations of 5+ NASA ROSES23 elements and at 5+ universities (Tenure and Promotion)
- Partner with societies on open science awards



2023 Year of Open Science

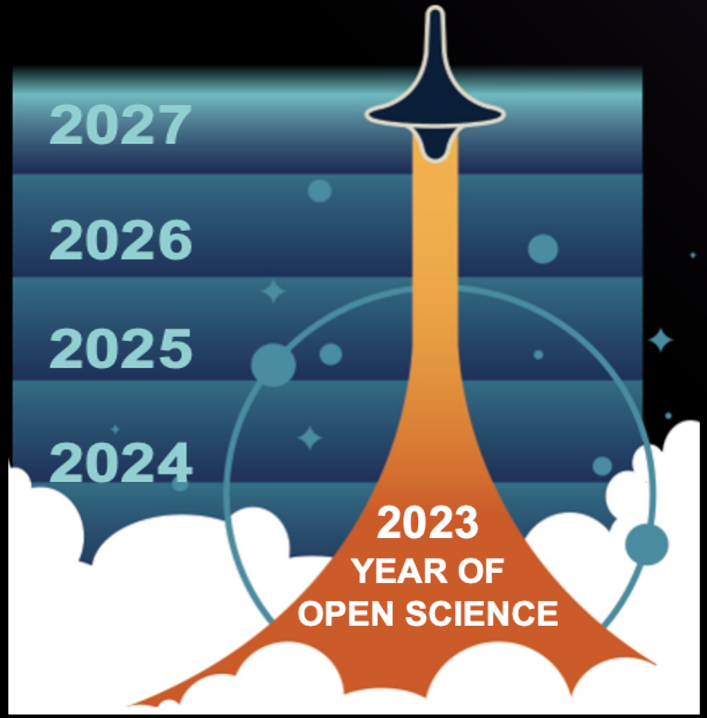
To Change Everything, We Need Everyone!

Year of Open Science Goals for everyone:

1. Develop a strategic plan for open science
2. Improve the transparency, integrity, and equity of reviews
3. Account for open science activities in evaluations
4. Engage underrepresented communities in the advancement of open science

NASA Open Science
Curriculum

TOPS is Increasing Understanding and Adoption of Open Science

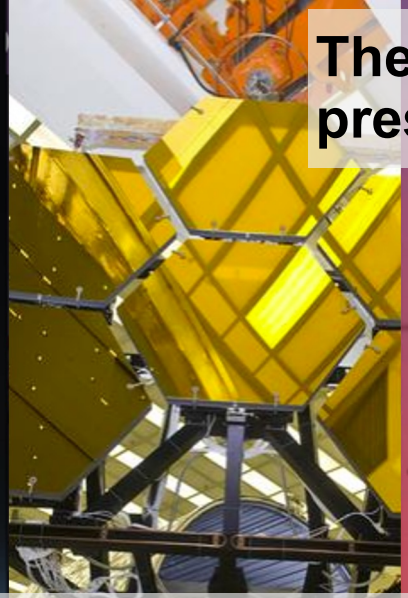


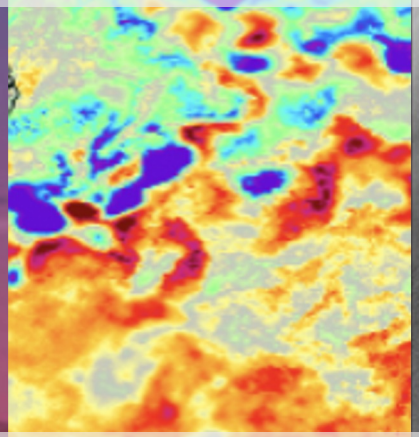
Developing the infrastructure to train 20,000 scientists and researchers as part of our five-year mission

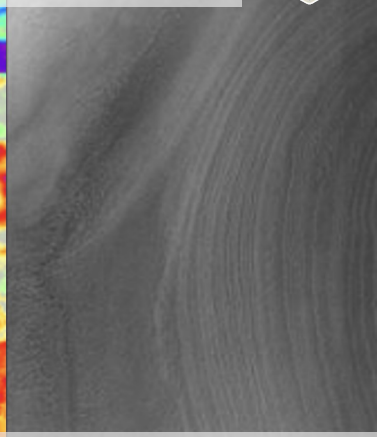
- Introduce those beginning their open science journey to important definitions, tools, and resources
- Provide participants at all levels recommendations on best practices from subject matter experts

Earn NASA Open Science Certification

The OpenCore: Benefits of open science presented as a scientific workflow







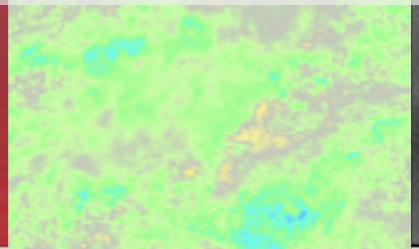
Ethos of Open Science

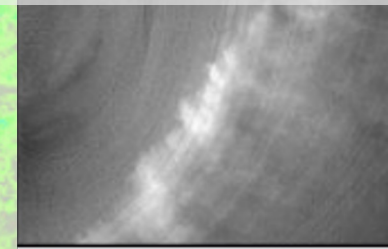
Open Science Tools

Open-source Software

Open Data

Open Results



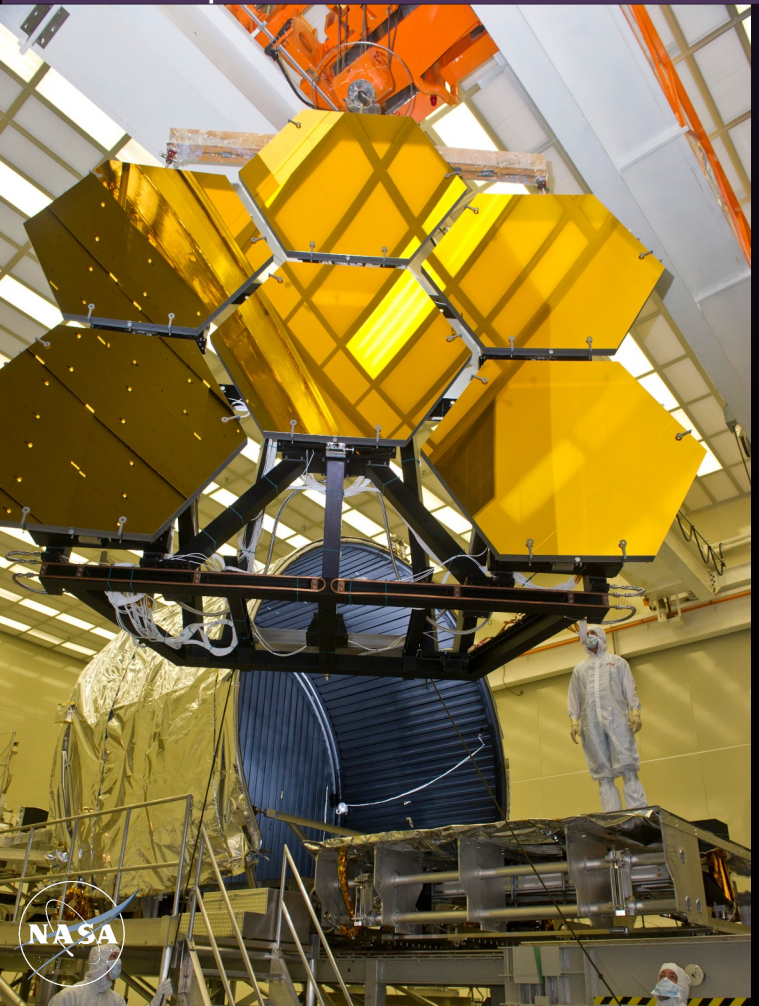


Images: JSC, JPL, & MSFC

Ethos of Open Science:

The Benefits and Motivations for Adopting Open Science Practices

- Introduction to the definitions and concepts central to open science
- Exploration of how to overcome challenges to open science adoption
- Best practices for building open science communities, increasing collaboration, and introducing open principles to project design
- How open science seeks to create a more diverse and equitable scientific community.

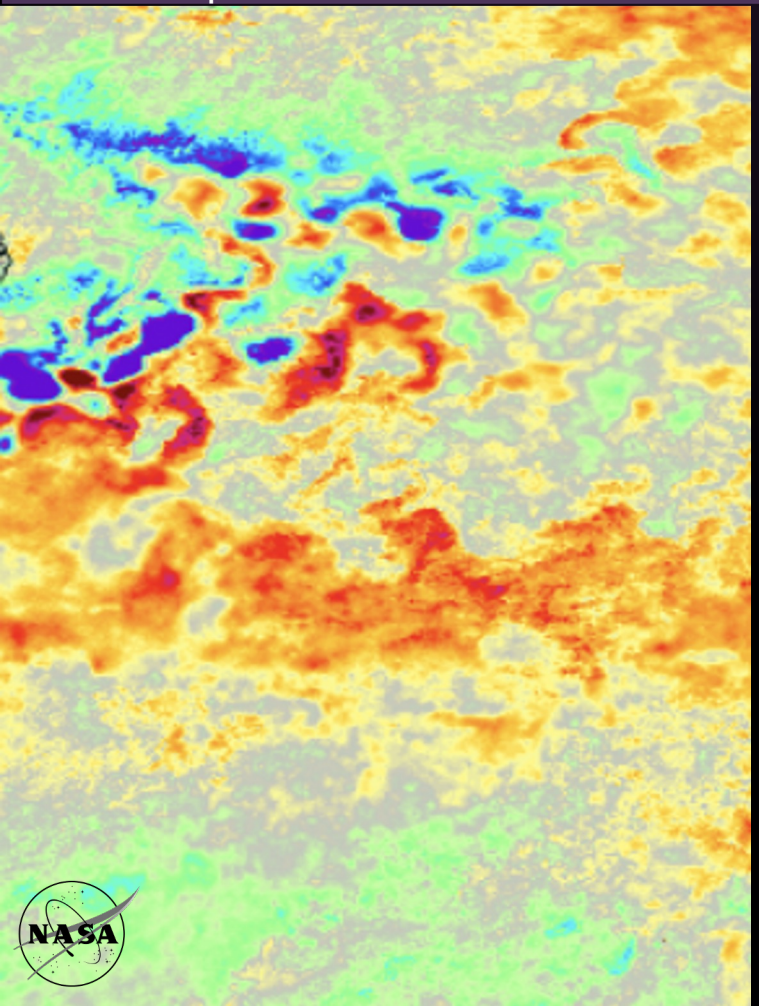


Open Science Tools:
Supporting the Open Science Researcher

- Hands-on experience working with different open science tools, databases and datasets
- Familiarity with open science policies
- How to find your open science community

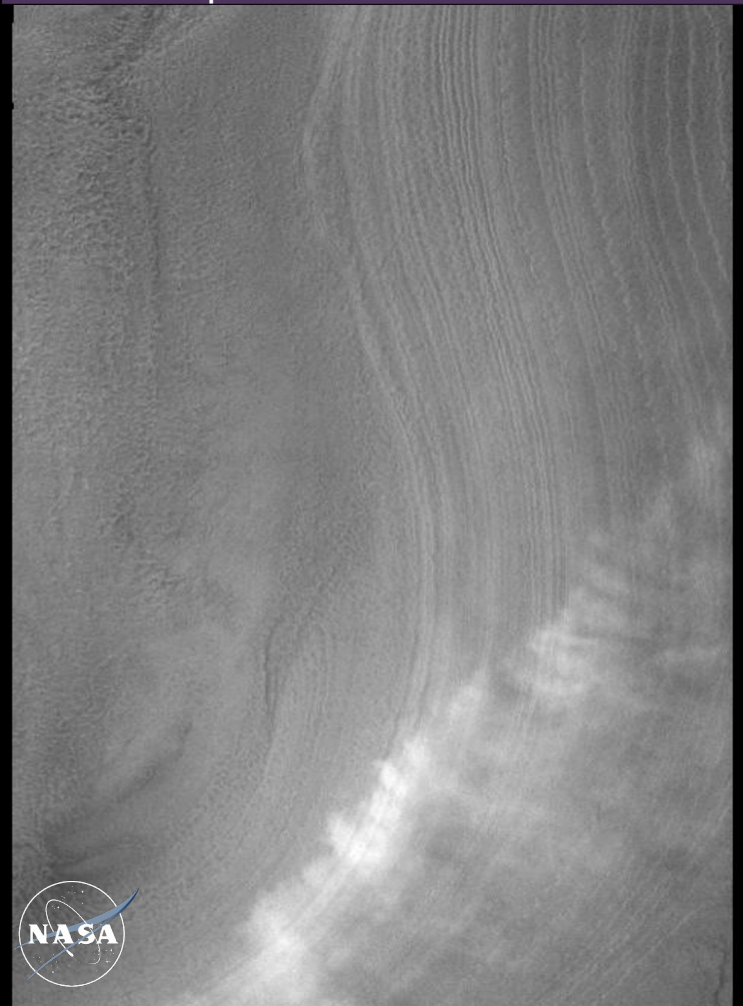
Open-Source Software:
Code for Research Reproducibility

- Understanding the impact of open-source code
- The importance of documenting code for research (even if it's just a script)
- Hands-on practice with choosing a software license, creating a README, and uploading code to GitHub and/or GitLab



Open Data:
Sharing Data to Increase the Reach of Science

- Making data findable, accessible, interoperable and reproducible (FAIR)
- Introduction to data management plans
- Assigning a license and/or copyright
- Metadata and persistent digital identifiers



Open Results:
Sharing Results with the World

- Understanding how open science principles help to increase the reproducibility and replicability of research
- Guidelines for choosing the best location for publication (“Green” versus “Gold” open access models)
- How to share research artifacts and works other than via publication
- Familiarity with virtual research environments and tools for an open research workflow

The NASA Open Science Certificate indicates researchers have key open science skills

- Able to use digital tools to perform open science (e.g., ORCID, Zenodo, Github accounts)
- Familiar with data management and software management plan best practices and resources
- Grow connections across a community of open science practitioners

*A **community developed** introduction to open science with inclusivity, accessibility, and diversity at the forefront.*

Ethos of Open Science at AMS!

- Workshops are being held throughout the week:
  - Today 9:00-11:30 AM
  - Wednesday 9:00-11:30 AM
  - Thursday 1:30-4:00 PM
- All workshops are in Room 401

Sign-up to take one the Ethos module here at AMS or find out when online course modules become available.

NASA Open Science
Events

TOPS is prioritizing outreach in 2023!

You will find TOPS at the conferences for…

AGU ADVANCING EARTH AND SPACE SCIENCE

CERN

AAS AMERICAN ASTRONOMICAL SOCIETY

SACNAS

EGU General Assembly

SASE SOCIETY OF ASIAN SCIENTISTS & ENGINEERS

LPSC 52 VIRTUAL CONFERENCE

ASGISR

AAAS AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

AMS American Meteorological Society

IEEE GRSS Geoscience and Remote Sensing Society

…and more!

NASA

TOPS is raising visibility of open science!

In person workshops to teach basic open science skills

Sessions to showcase open science research

Booth to sign up for virtual OpenCore workshops

Reach out to help or stop by the booth!

NASA Open-Source Science Initiative

Let's Talk Open Science at AMS

Tuesday, January 10

Celebrating Women in STEM, a 2-part panel discussion on Closing the Gender Gap

1:30 - 3:00 pm
and
3:45 - 5:00 pm
Room 109
(Meeting Rm Level)

Wednesday January 11

TOPS Keynote in New Python Tools in the Atmospheric & Oceanographic Sciences.	3:45 - 5:00 pm Room 407 (Meeting Rm Level)
How Open Science Increases Diversity, Equity, and Inclusion: interactive & innovative poster session	5:00 - 6:30 pm Hall A (Exhibit Hall Level)
Spend Happy Hour with the TOPS Team. We'd love to hear your stories and answer questions about open science.	6:00 - 8:00 pm Peakes Lounge (Convention Ctr Hyatt)

Join us!

NASA Open Science
Opportunities

OPEN CALLS

Information session for F.15 HPOSS on January 19, 1:00-2:00 pm ET

F.2	**Topical Workshops, Symposia, and Conferences**	Events, Hackathons, un-conferences, and challenges that build open science skills, particularly events focused on Science Mission Directorate data, software, or open science practices Proposals for ROSES-22 will be accepted until **May 12, 2023**
F.7	**Support for Open Source Tools, Frameworks, and Libraries**	Improvements and sustainment of high-value, open source tools, frameworks, and libraries that have made significant impacts to the SMD science community Proposals for ROSES-22 will be accepted until **February 14, 2023**
F.8	**Supplemental Open Source Software Awards**	Conversion of legacy software into modern code with open license Proposals for ROSES-22 will be accepted until March 29, 2023
F.15	**High Priority Open-Source Science**	Innovative open-source tools, software, frameworks, data formats, and libraries that will have a significant impact on the SMD science community Proposals may be submitted at any time until March 29, 2023

COMING SOON

F.14	**Transform to Open Science Training**	Tutorials showcasing open science in action and NASA cloud data, summer schools, virtual cohorts. Budget of $4.5M per year. Once every three years Coming again soon
F.16	**Supplement for Software Platforms**	Supplemental support of existing awards for use of scientific analysis platforms Deferred until ROSES 2023

Check out TOPS' proposal resources at https://nasa.github.io/Transform-to-Open-Science

There are actions you can take today to get more involved in open science!

And help others get involved, too!

Join an open science community!

Develop an Open Science Action Plan

Explore the Open Science Toolkit from the National Academies

Learn more about TOPS Open Science Activities!

NASA is looking ahead at really big challenges

“We need more WE science rather than ME science.”

\- Harlan Krumholz,

Yale School of Medicine at 2022 CZI Meeting

Join us in advocating for the open sharing of data, software and results!

Credit: Science: Nasa, ESA, Jian-Yang Li (PSI); animation: Alyssa Pagan (STScI)

Get NASA Open Science Certified!

Take the first module at AMS Room 401

Workshops are limited to 60, so sign up early!

- Monday 1:30-4:00 PM
- Tuesday 9:00-11:30 AM
- Wednesday 9:00-11:30 AM
- Thursday 1:30-4:00 PM

Enroll now!

Can't make it? Find out about future opportunities

Q&A

Sign up here to get Open Science certified!