2023
Year of
Open Science

NASA Transform to Open Science Mission
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Dr. Steve Crawford, Science Policy Officer SMD
Dr. Elena Steponaitis, SMD Development Program Executive
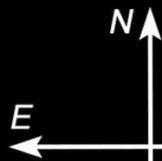Amy (Uyen) Truong, Chief Science Data Office Executive Officer

NASA is looking ahead at really big challenges

Dimorphos
HST WFC3/UVIS

F350LP

We need ***more*** <u>WE science</u> rather than ME science[1]– openly sharing data, software, & results

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1: quote from Harlan Krumholz, Yale School of Medicine at 2022 CZI meeting

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
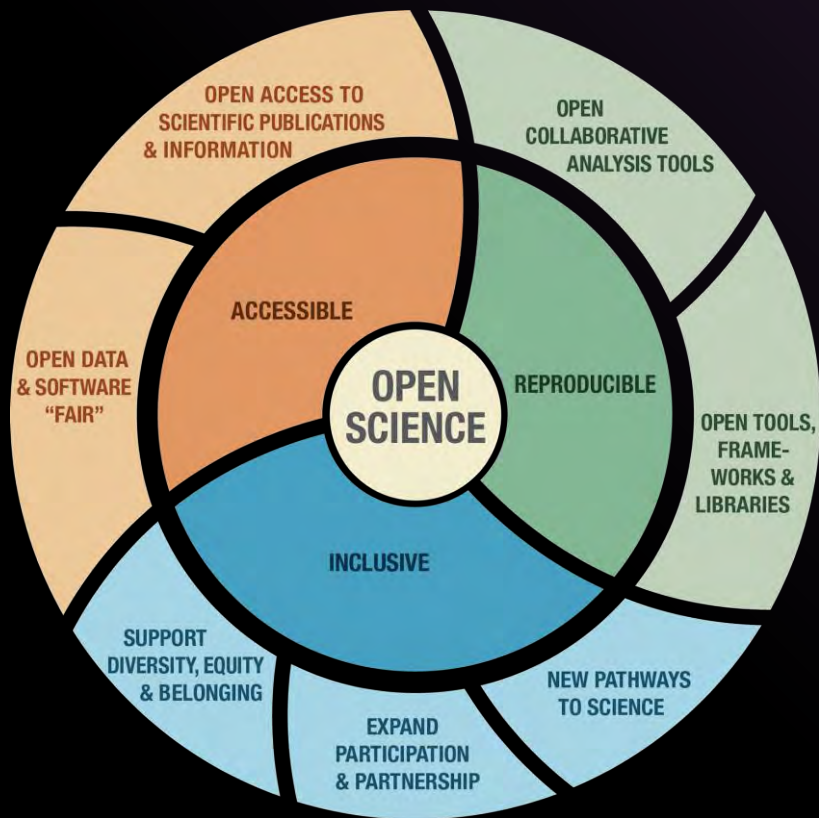
Image credit: JPL

What can we do about this?

Open Science is Accessible, Reproducible & Inclusive

Creates research that is:

- Cited more
- Has a bigger impact
- Increases transparency
- More inclusive

Inclusive science means more:

- Collaborative projects
- Access to 'hidden knowledge'
- Equitable Systems
- Increased Participation

Incentives & Support for Changing the Culture of Science

Policy

Infrastructure

Funding

Outreach

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

TOPS
NASA

SMD Scientific Information Policy (SPD-41A)*

Scientific Information Policy Website & FAQ : <u>Science Information Policy | Science Mission Directorate</u>

SPD-41a brings together existing NASA and Federal guidance on open data, software, and publications

SPD-41a is forward looking: Applies to new missions and grants proposed to ROSES23. Existing missions & grants should adopt it consistent with their available resources.

SPD-41a is compliant with the new memo from the OSTP on "Ensuring free, immediate, and Equitable Access to Federally Funded Research"

↓ SPD-41A Highlights ↓

Peer-reviewed publications made openly available consistent with the OSTP memo

Data and software shared at the time of publication

Missions data released as soon as possible and unrestricted mission software developed openly

Science workshops and meetings held openly to enable broad participation.

*anticipated release Dec 2022

Infrastructure: Core Services

SMD Data Catalog	Publications Search	Science Platforms

↓ **Details** ↓

Develop and implement an SMD data catalog to support discovery and access to complex scientific data across Divisions. Create a community of practice around data & information standards.	Extend the primary digital library portal for researchers in astrophysics, planetary science & heliophysics, the Astrophysics Data System (ADS), to support Earth and Biological and Physical Sciences	On-going Data & Compute Architecture study to identify scientific data and computing capabilities and architectures that enable Open Science and opportunities that will ensure long-term evolution and sustainability to enable open science.

NASA Funding

F.2 Topical Workshops, Symposia, and Conferences

Events, Hackathons, un-conferences, and challenges that build open science skills, Training in open science. Rolling deadline.

F.7 Support for Open Source Tools, Frameworks, and Libraries

Support and maintain open sources tools, frameworks, and libraries that are significantly used by the SMD community. $2M awarded in ROSES20 to 8 programs. Once every 3 years

F.8 Supplemental Open Source Software Awards

Supplemental award to encourage the conversion of legacy software to open source. $200K awarded in ROSES20 to 6 awards. Yearly, $250K available, rolling deadline.

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.

F.15 High Priority Open-Source Science

Supporting innovative open source tools, software, frameworks, data formats, and libraries. Budget ~$1M. Yearly, rolling deadline.

F.16 Supplement for Software Platforms

Supplemental support to existing awards for usage of scientific platforms. Budget TBD.

NASA Outreach

NASA's Transform to Open Science (TOPS) is a $40 million 5-year mission to accelerate adoption of open science

TOPS' Strategic Goals:

- Support 20K researchers to earn NASA's open science badge
- Double the participation of historically excluded groups across NASA science
- Enable five major scientific discoveries through open science principles

Engagement   **Capacity Sharing**   **Incentives**   **Coordination**

Join us as we embark on the 2023 Year of Open Science with NASA TOPS!

NASA's 2023 Year of Open Science

…is the spark

TOPS Priorities:

1. Release an introduction to open science curriculum

2. Engage with historically underrepresented groups

3. Develop open science incentives

2023 Year of Open Science
Join us!

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

Q&A

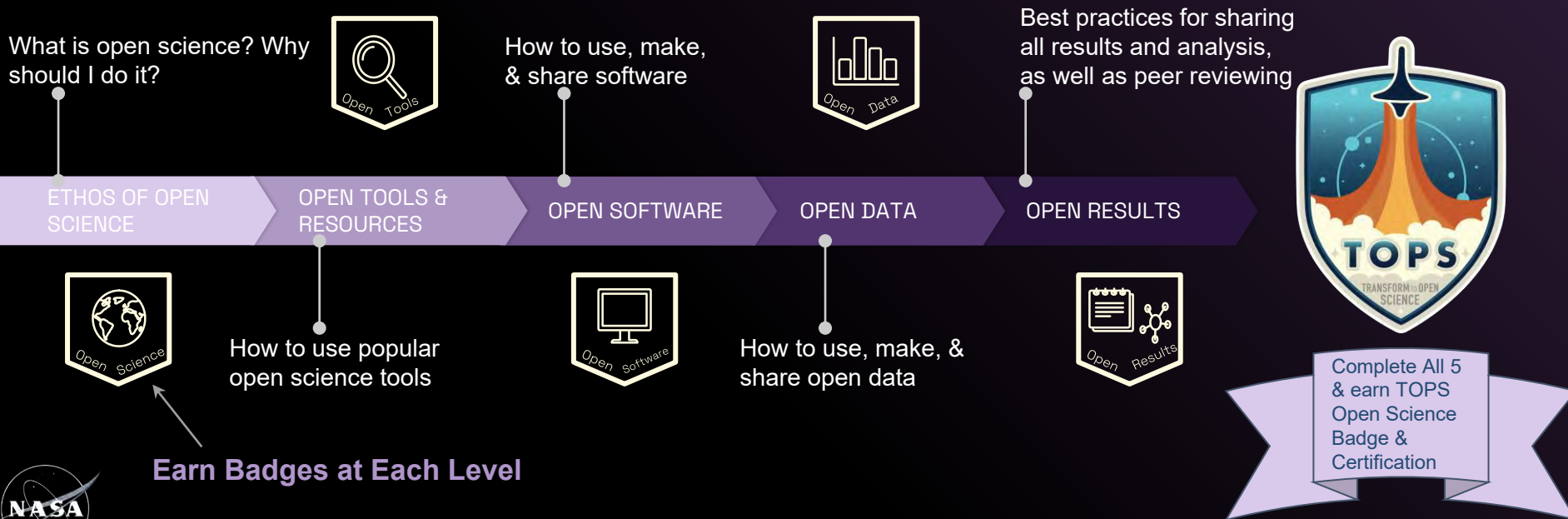Learn more and collaborate with us!

TOPS Email List

TOPS Website

Backup

Introduction to Open Science Curriculum

- Workshop materials and Open edX MOOC
- Completed independently (MOOC) or at workshops (in-person/online)
- Earn NASA TOPS open science certification

What is open science? Why should I do it?

How to use, make, & 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

Open Science

How to use popular open science tools

Open Software

How to use, make, & share open data

Open Results

Complete All 5 & earn TOPS Open Science Badge & Certification

Earn Badges at Each Level

TOPS Presence during Year of Open Science - Society Engagement

Conference	Date	Size	BPS	PDS	Helio	Earth	Astro	HUGS*
AGU Fall	Dec	25K	x	x	x	x	x	
AMS	Jan	6K			x	x		
AAAS	Mar	9K	x	x	x	x	x	
LPSC	Mar	2K		x				
EGU	Apr	18K	x	x	x	x	x	
AAS	Jun	3K		x	x		x	
IGARSS	Jul	3K				x		
SASE	Oct	3K						x
Amer. Indian Sci.&Eng	Oct	2K						x
SACNAS	Oct	6K						x
ASGSR	Nov	1K	x					
AGU Fall	Dec	25K	x	x	x	x	x	
Targeted workshops	May/Sep	200						x
Totals		**~100K**	**5**	**6**	**6**	**6**	**5**	**4**

*HUGS- historically underrepresented groups

NASA's 2023 Year of Open Science

…is the spark

TOPS Year of Open Science Priorities:

1. Release an introduction to open science curriculum
   a. 1000 scientists earn NASA TOPS open science certificates
2. Engage with historically underrepresented groups
   a. Partner w/ Minority Serving Institutions (MSIs)
      i. 2 marquee events
      ii. TOPS Annual Hackathon
      iii. Annual TOPS Internship program (3-4 people/year; All-in)
   b. Establishing Strategic Partnerships with external organizations focused on STEM engagement
3. Develop open science incentives:
   a. Pilot including open science activities in evaluations of 5+ NASA ROSES23 elements and at 5+ universities (Tenure and Promotion)
   b. Partner with societies on open science awards