

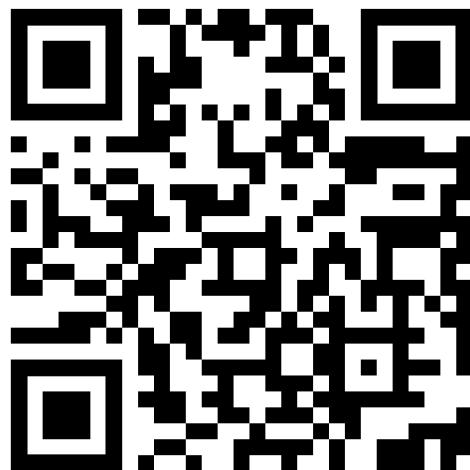
ASTR 578: Spring 2026

Prof. Besla (she/her)

Complete this pre-survey please!

Link here:

<https://forms.gle/JsRGHw5dw5FbivUJ6>



The Main Goals

- To help you understand how to frame an argument - scientific writing is argumentative writing.
- To teach you how to write successful proposals, papers, postdoc applications, abstracts in general.
- To help you understand how to assess and improve the "impact" of your writing through public speaking, proposals, citations, etc.
- To discuss the research ethics that should inform your practice, including how you write/develop a paper/proposal/lead teams.

Why does Improving your Scientific Writing skills Matter?

Why does improving your Scientific Oral Communication Skills Matter?

What are Research Ethics?

Why do Research Ethics Matter?

Why do Research Ethics Matter?

The pursuit of science, and scientific excellence, is inseparable from the humans who animate it.

- SotP Appendix N Astro 2020 Decadal

What is the utility of Generative Artificial Intelligence in Scientific Writing?

- Pros?

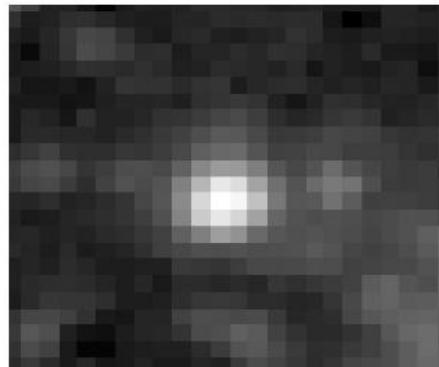
What is the utility of Generative Artificial Intelligence in Scientific Writing?

- Cons?

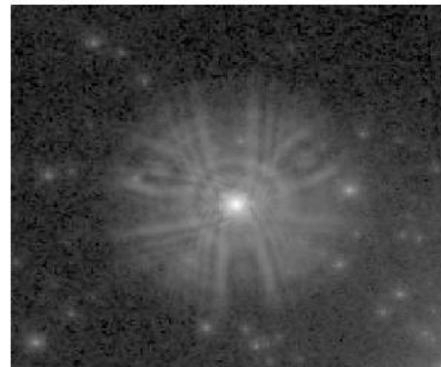
Scientific Writing: Why JWST/HST Proposals?

HST: Brief History

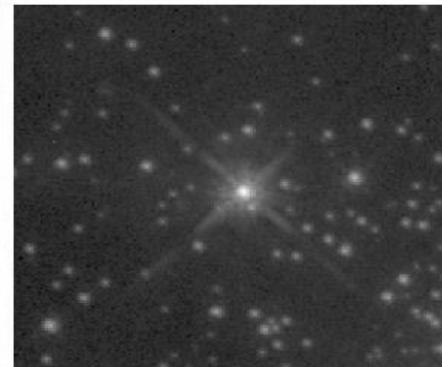
- Envisioned in the 1940s, built in the 70s-80s
- \$1.7 billion at launch (\$4.7 billion adjusted to 2010 inflation) (Lifetime Operation is much higher ~\$11 bill)
- 2.4-meter reflecting telescope
- Deployed in a low-Earth orbit (600 km) by the crew of Discovery on 25 April 1990.
- Spherical Aberration discovered ~month after launch. Endeavour corrected with COSTAR in 1993 (SM1)



Ground Image



Wide Field and Planetary Camera 1



WFPC2

SM4 Servicing Mission (2009)
On-site repair of ACS and STIS, added COS, WFC3

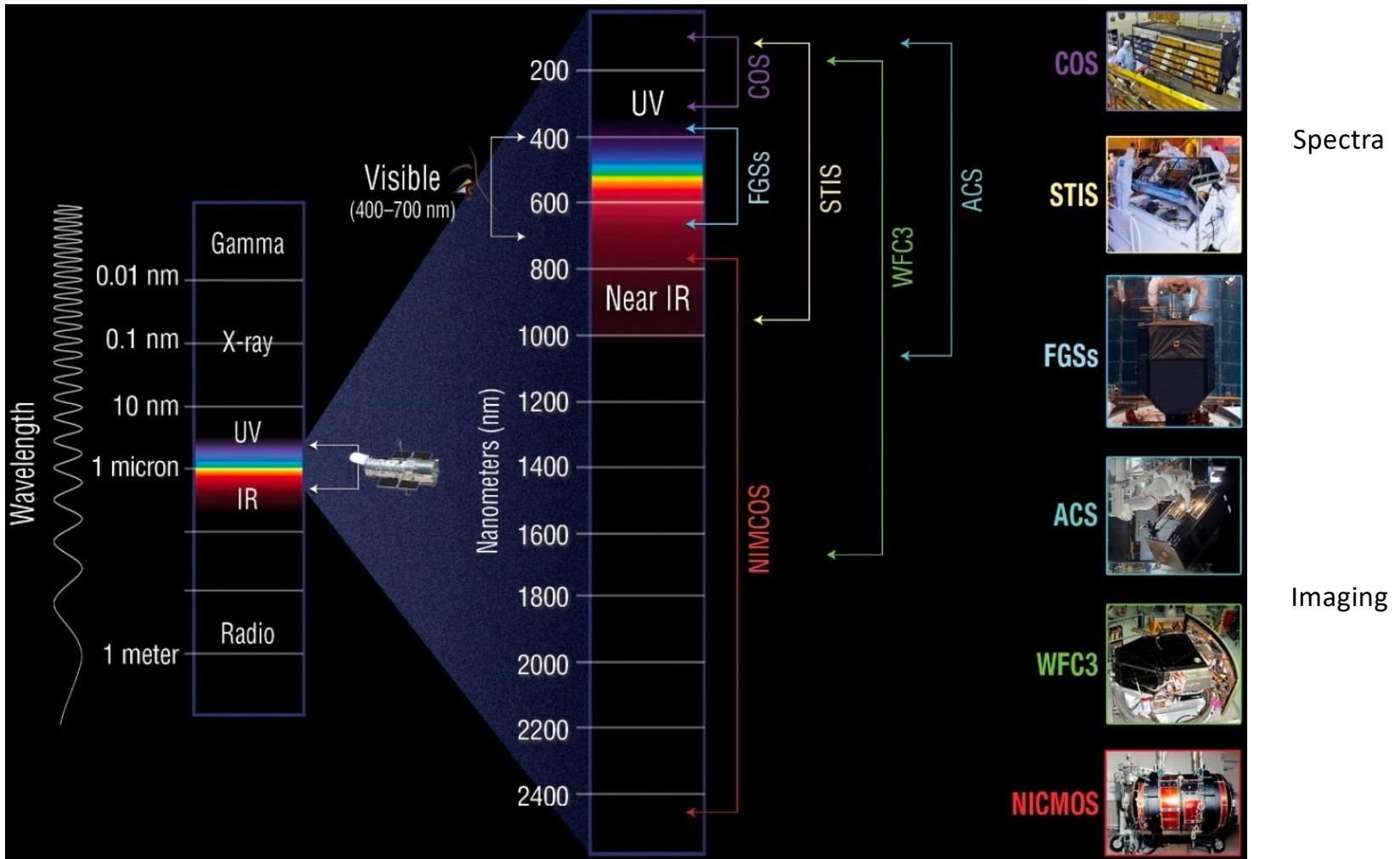


Wide Field Planetary Camera 1



Wide Field Planetary Camera 2

M100



- Cycle 33: Overall, 282 reviewers from all over the globe reviewed 800 proposals. Of these, 151 proposals were accepted, a success rate of 19%,
- The overall success rate for Cycle 33 proposals was 18.9%, compared to 17.4% in Cycle 32 and 16.7% in Cycle 31.
- Cycle 34 Phase I proposal deadline: **Thursday, April 16, 2026 at 8:00pm EDT**

Table 1: Summary of Requested and Approved Proposal Statistics

Proposals	Requested	Approved	% Accepted	ESA Approved	ESA % Total
General Observer	682	130	19.1%	30	23.1%
Very Small	328	75	22.9%		
Small	215	36	16.7%		
Medium	98	12	12.2%		
Large and Treasury*	41	7	17.1%		
Snapshot (SNAP)	38	10	26.3%	1	10.0%
Archival Research (AR)	80	11	13.8%	1	9.1%
Regular AR	54	8	14.8%		
Regular Theory	26	3	11.5%		
Total	800	151	18.9%	32	22.9%
Primary Orbits	17,647	2,731	15.5%	530	19.4%

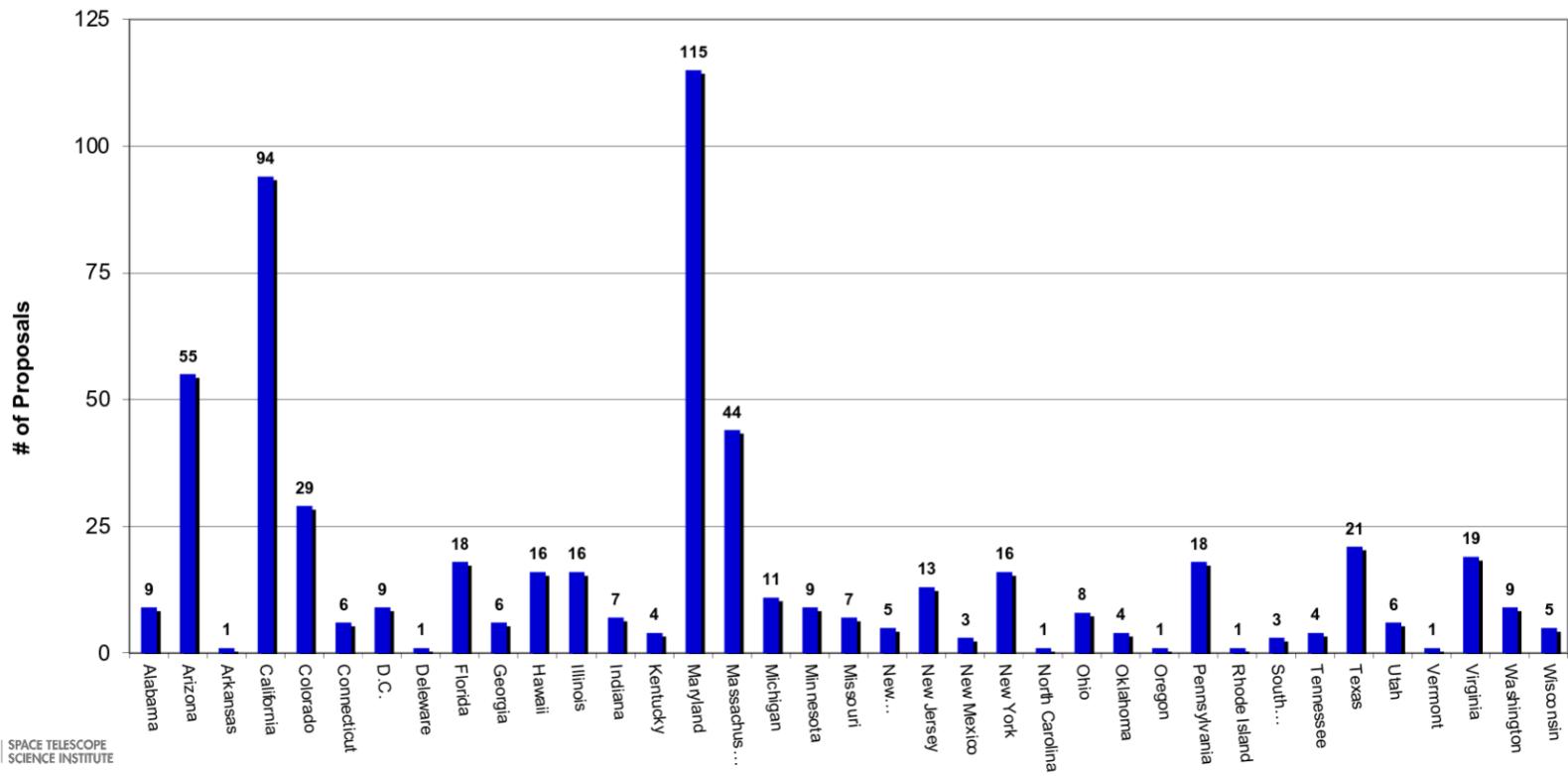
2021 .. For reference

Cycle 29 TAC Summary Results

Category	Requested	Approved	Percentage Approved	ESA Approved	ESA Approved Percentage
GO Proposals	926	126	13.6%	29	23.0%
Snapshots	44	13	29.5%	4	30.8%
Archival	95	28	29.5%	0	0.0%
AR Legacy	21	5	23.8%	0	0.0%
Theory	43	8	18.6%	0	0.0%
Total	1,129	180	15.9%	33	23.7%
Primary Orbits	22,067	2,695	12.2%	421	15.7%



PI States and Territories

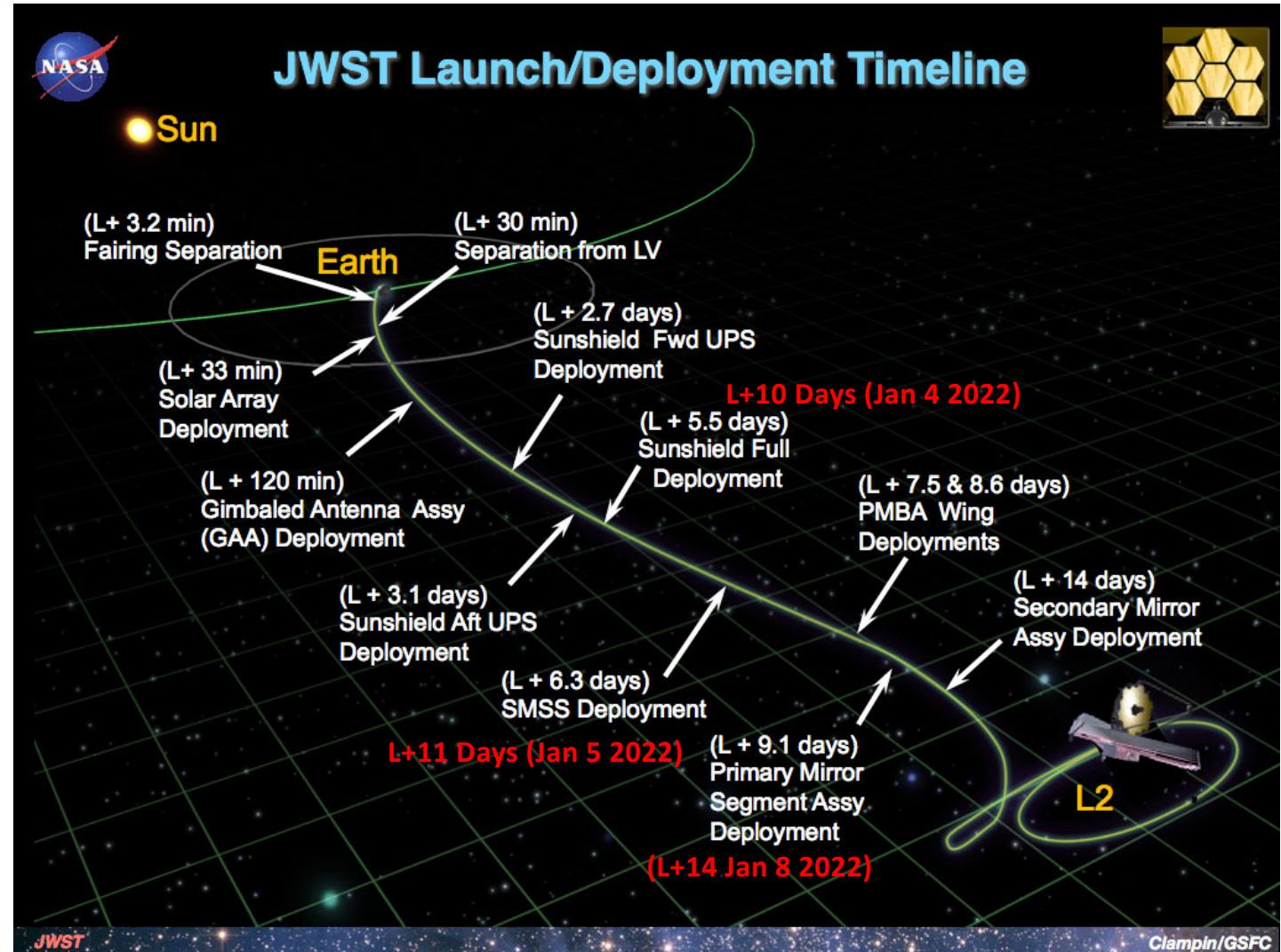


Planning for HST successor began in early '90s

High Prioritization of the "Next Generation Space Telescope" (NGST) in the Astro2000 Decadal.

Lifetime Cost:
US \$9.7 billion
=
US \$8.8 billion on design/development

US \$861 million for 5 yrs of mission operations

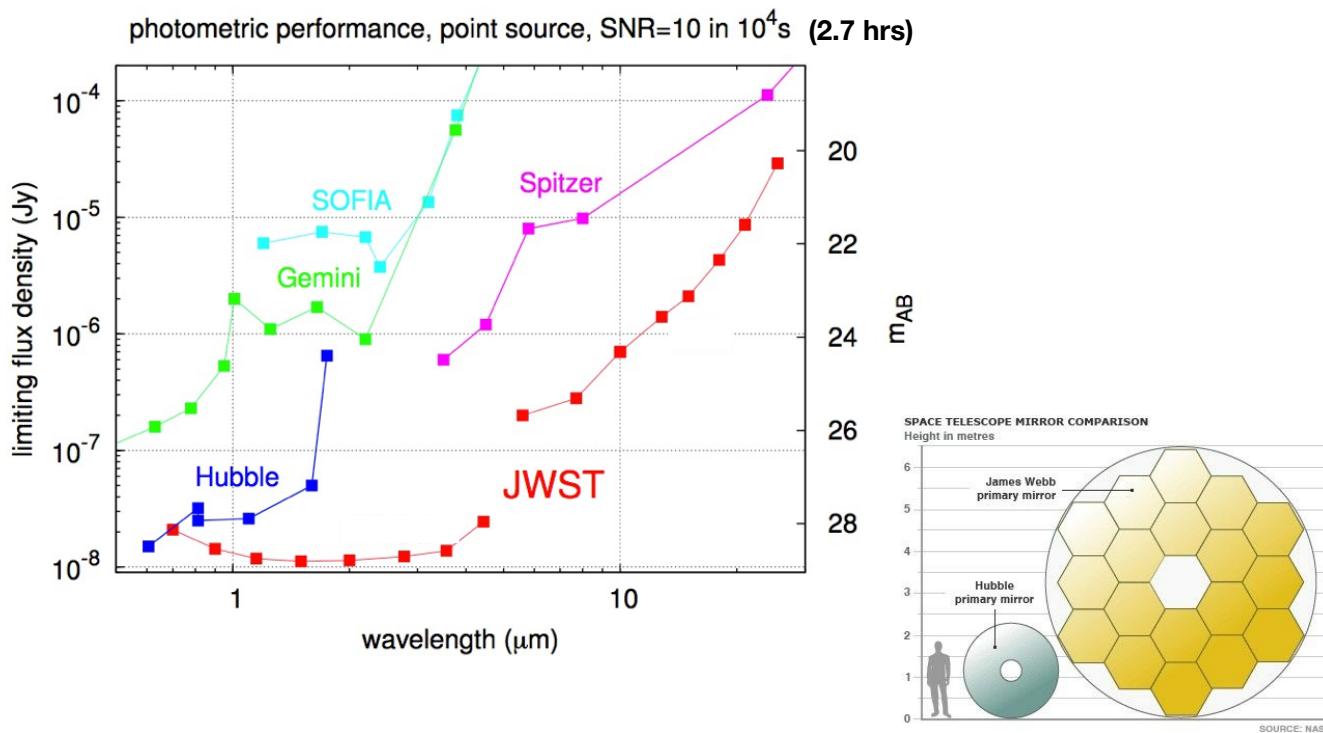




Cycle 5 Science Timeline

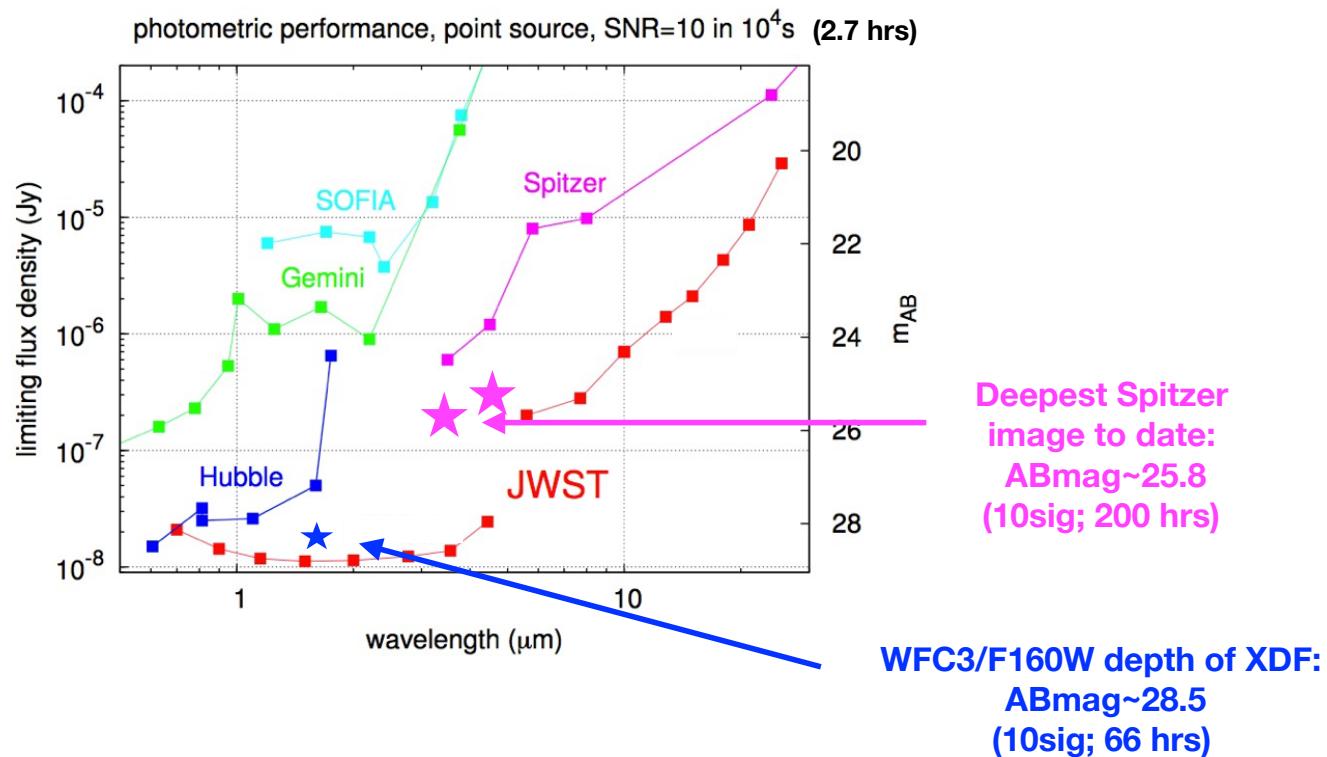
Date	Milestone
August 1, 2025	Cycle 5 Call for Proposals
October 15, 2025	JWST Cycle 5 Proposal Deadline
November 12, 2025	Cycle 5 Proposals Released to the TAC
February 2– 6, 2026	Telescope Allocation Committee Meetings: Discussion Panels
February 9 – 12, 2026	Telescope Allocation Committee Meetings: Executive Committee
February 26, 2026	Director's Review
Mid March, 2026	PI notification letters are distributed
July 1, 2026	Beginning of Cycle 5 Observations

JWST: Largest astronomical mirror in space Most sensitive infrared instruments



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JWST: Largest astronomical mirror in space Most sensitive infrared instruments



JWST Instrument Summary



MIRI = Mid-InfraRed Instrument

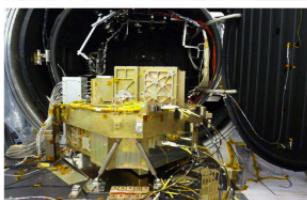
50/50 partnership between a nationally funded consortium of European institutes (MIRI EC) under the auspices of ESA and NASA/JPL

PIs: G. Wright and G. Rieke



NIRSpec = Near-infrared Spectrograph

Provided by the European Space Agency, built by an industrial consortium led by Airbus Defence and Space

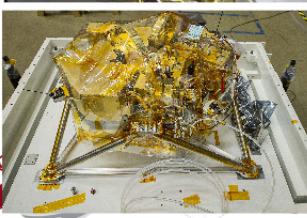


NIRISS = Near-infrared Imager and Slitless Spectrograph

FGS = Fine Guidance Sensor

Provided by the Canadian Space Agency

PIs: R. Doyon & C. Willott



NIRCam = Near-InfraRed Camera

Developed under the responsibility of the University of Arizona

PI: M. Rieke



European Space Agency

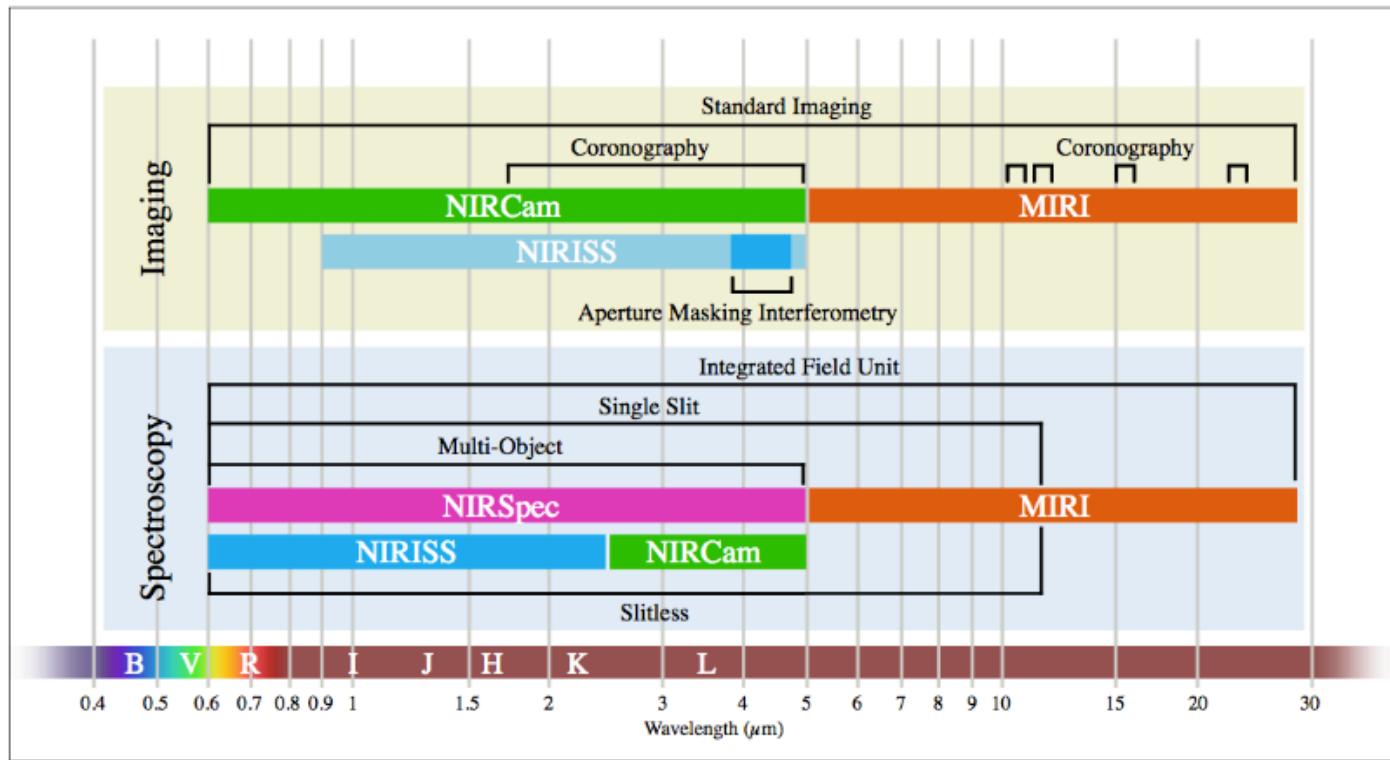
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jwst

JWST capabilities



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JWST Cycle 4



Summary Results

Proposals	Reviewed	Approved	% Accepted
General Observer	2082	241	12%
Survey	50	8	16%
Regular AR	106	15	14%
AR Legacy	20	2	10%
Theory	88	8	9%
Total	2346	274	12%
Primary Hours	74538	8530	11%



Summary Results

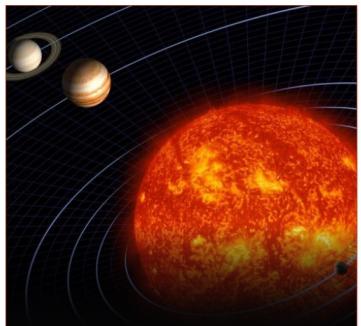
JWST Cycle 1 for reference

Proposals	Requested	Approved	% Accepted	CSA Accepted	CSA % Total	ESA Accepted	ESA % Total
General Observer	1084	266	25%	10	4%	89	33%
Survey	13	0	0%	0	0%	0	0%
Regular AR	41	15	37%	0	0%	0	0%
AR Legacy	3	0	0%	0	0%	0	0%
Theory	31	5	16%	0	0%	0	0%
Total	1172	286	24%	10	4%	89	33%
Primary Hours	24440	6031	25%	249	4%	1786	30%

- CSA & ESA Hours/Proposals are for GO/Survey only
- 50 Hours are from Calibration Pool

Key Science Research Themes Being Studied with HST

<https://www.stsci.edu/hst/about/key-science-themes>



Solar System >

Contributing to our understanding of planetary atmospheres



Exoplanets >

Revealing the complexity of other worlds



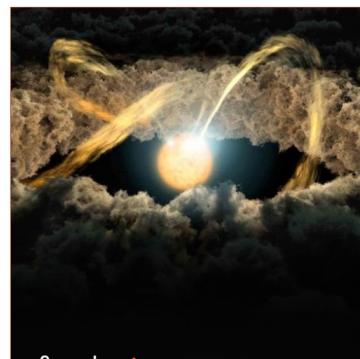
Stars and their Environments >

Understanding the lifecycles of stars



Galaxies >

Revealing the diverse collection of galaxies in the Universe



Cosmology >

Revealing the structure and the contents of the universe with HST

<https://science.nasa.gov/mission/webb/science-overview/>

SCIENCE

Webb's Science Themes

The James Webb Space Telescope will be a giant leap forward in our quest to understand the Universe and our origins. Webb will examine every phase of cosmic history: from the first luminous glows after the Big Bang to the formation of galaxies, stars, and planets to the evolution of our own solar system.



Early Universe

Webb will be a powerful time machine with infrared vision that will peer back over 13.5 billion years to see the first stars and galaxies forming out of the darkness of the early universe.

[Read More ▶](#)



Galaxies Over Time

Webb's unprecedented infrared sensitivity will help astronomers to compare the faintest, earliest galaxies to today's grand spirals and ellipticals, helping us to understand how galaxies assemble over billions of years.

[Read More ▶](#)



Star Lifecycle

Webb will be able to see right through and into massive clouds of dust that are opaque to visible-light observatories like Hubble, where stars and planetary systems are being born.

[Read More ▶](#)



Other Worlds

Webb will tell us more about the atmospheres of extrasolar planets, and perhaps even find the building blocks of life elsewhere in the universe. In addition to other planetary systems, Webb will also study objects within our own Solar System.

[Read More ▶](#)

JWST Key terms: <https://jwst-docs.stsci.edu/jppom/jwst-proposal-level-information/jwst-science-keywords#gsc.tab=0>

SOLAR SYSTEM ASTRONOMY:

This includes all objects belonging to the solar system (except the Sun, Mercury, and Venus), such as planets, minor planets, comets, asteroids, planetary satellites, and Kuiper-belt objects.

EXOPLANETS AND EXOPLANET FORMATION:

This includes all objects belonging to known extrasolar planetary systems, and observations of their host stars, as well as all studies of circumstellar and proto-planetary disks.

STELLAR PHYSICS AND STELLAR TYPES

: This includes stars of all temperatures and evolutionary phases, including pre-main sequence stars, supernovae, pulsars, X-ray binaries, CVs, and planetary nebulae. It also applies to ISM and circumstellar matter in the Milky Way.

• STELLAR POPULATIONS AND THE INTERSTELLAR MEDIUM

: This includes resolved stellar populations in globular clusters, open clusters or associations, and the general field of the Milky Way and other nearby galaxies. Studies of color-magnitude diagrams, luminosity functions, initial-mass functions, internal dynamics and proper motions are in this category.

•

GALAXIES

: This includes studies of the initial mass function, stellar content and globular clusters in distant galaxies, galaxy morphology and the Hubble sequence, and low surface-brightness galaxies. Starbursts, IR-bright galaxies, dwarf galaxies, galaxy mergers and interactions may fall under this heading. This category also includes studies of gas distribution and dynamics in distant galaxies. Starbursts, IR-bright galaxies, dwarf galaxies, galaxy mergers, and interactions may also fall under this heading if the emphasis is on the ISM.

THE INTERGALACTIC MEDIUM AND THE CIRCUMGALACTIC MEDIUM

: This category includes the physical properties and evolution of absorption-line systems detected along the line of sight to quasars, inflow and outflow of gas to the CGM /IGM, and other observations of the diffuse IGM, and the spectroscopy and imaging of damped Ly-alpha systems.

SUPERMASSIVE BLACK HOLES AND ACTIVE GALAXIES

: This encompasses active galaxies and quasars, including both studies of the active phenomena themselves, and of the properties of the host galaxies that harbor AGNs and quasars. The definition of AGN is to be interpreted broadly; it includes Seyfert galaxies, BL Lac objects, radio galaxies, blazars, and LINERs.

LARGE SCALE STRUCTURE OF THE UNIVERSE

: This includes studies of the structure and properties of clusters and groups of galaxies, strong and weak gravitational lensing, galaxy evolution through observations of galaxies at intermediate and high redshifts (including for example, the Hubble Deep Fields), cosmology in general, the structure of the universe as a whole, cosmological parameters and the extra-galactic distance scale.