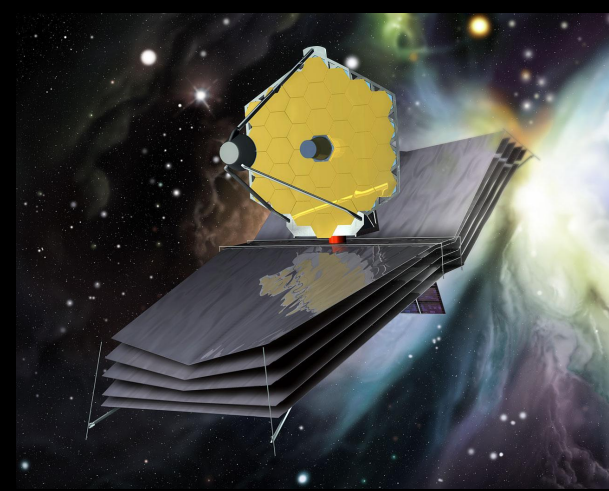
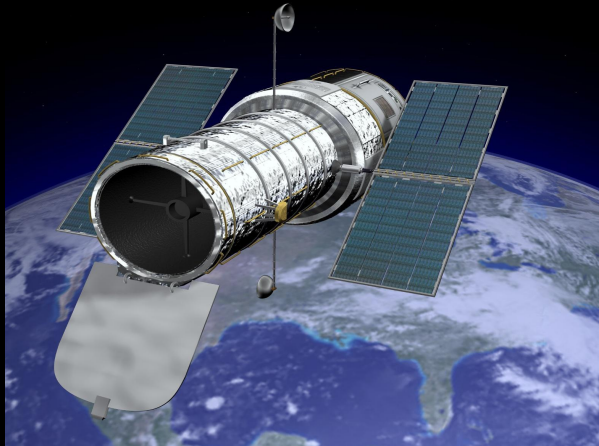


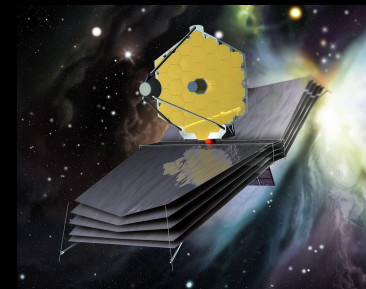
Long-term Variability Monitoring Strategies for HST and JWST

LTVM Working Group
Virtual Town Hall

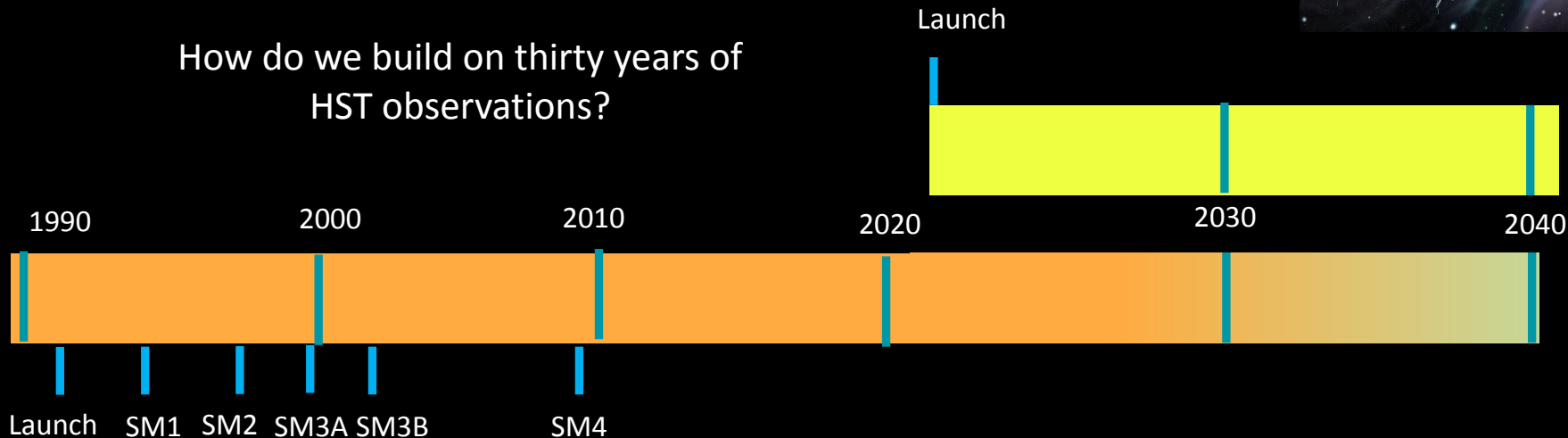


*Seeking community input on
key science areas that exploit
long time-baseline
observations.*

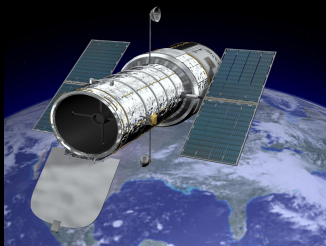
LTVM Strategies for HST and JWST



How do we build on thirty years of HST observations?

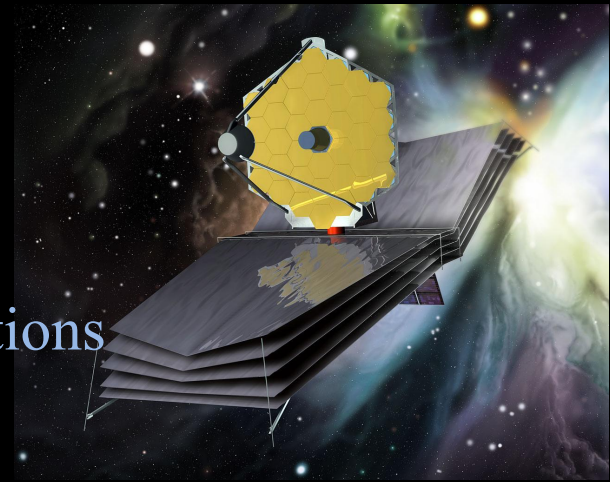


How do we build for 20+ years of JWST?
And, potentially, 10 years or more of HST?

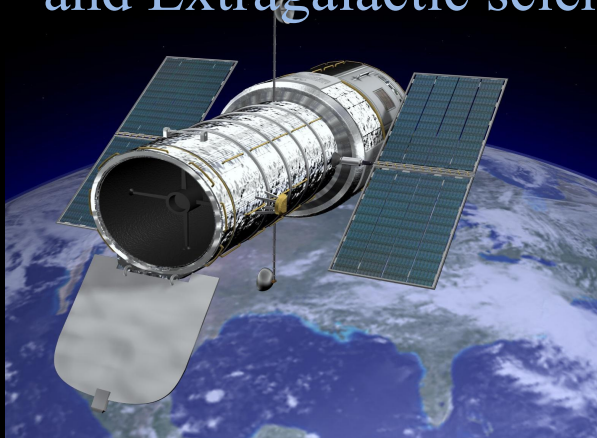


Long-Term Variability Monitoring Strategies for HST and JWST

“Variability” includes photometry, spectroscopy, or astrometric motion; “Long-Term” refers to observations incompatible with standard proposal cycles

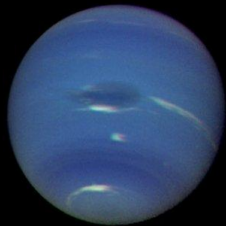
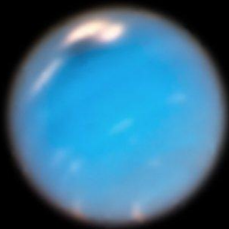
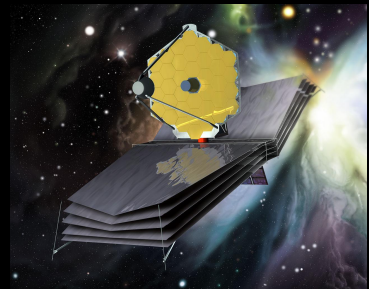


Spans a wide range of local, Galactic, and Extragalactic science topics, e.g.:

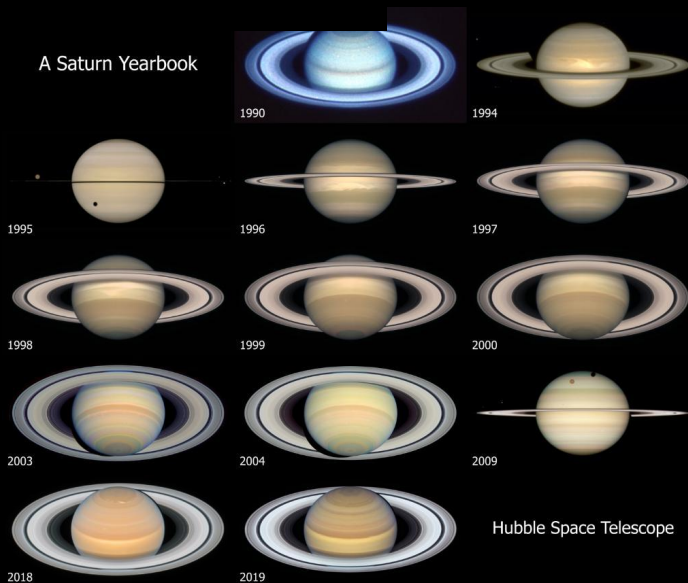


- Transients
- Solar system objects
- Jets & outflows
- Variable stars
- Proper motions of stellar streams, clusters and nearby galaxies
- AGN
- High redshift phenomena, and more

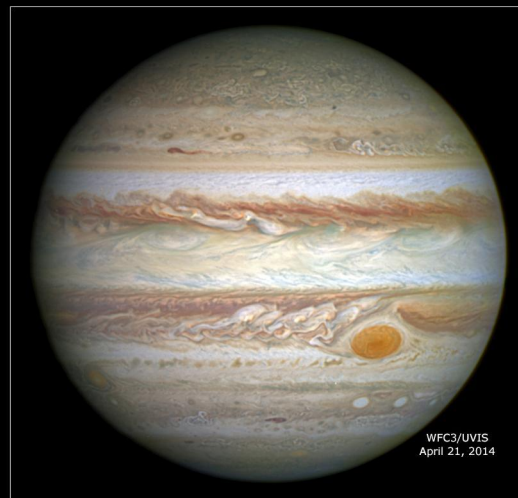
Monitoring the giant planets



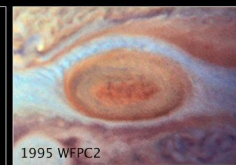
A Saturn Yearbook



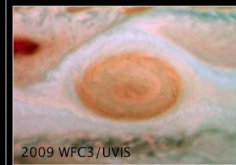
Hubble Space Telescope



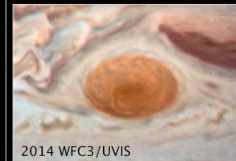
WFC3/UVIS
April 21, 2014



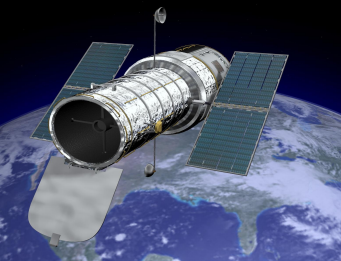
1995 WFC2



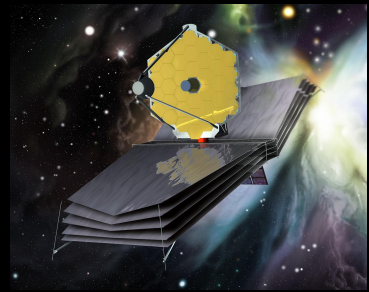
2009 WFC3/UVIS



2014 WFC3/UVIS

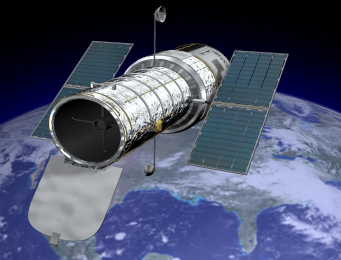
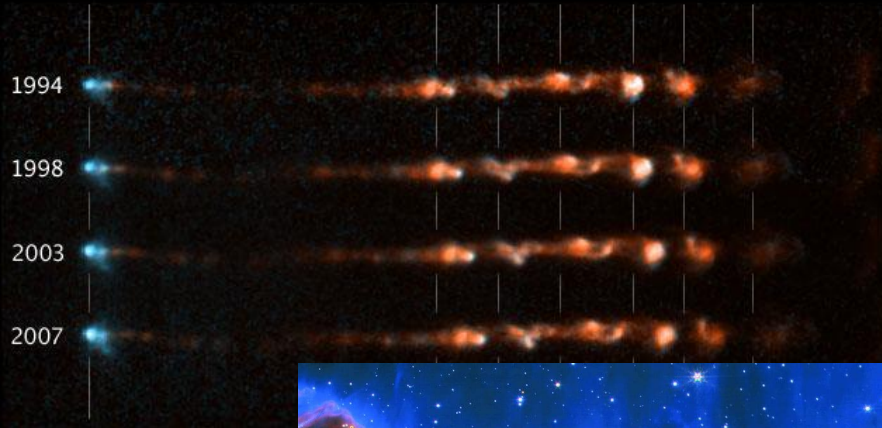


Jets, shocks and star formation



HH 34

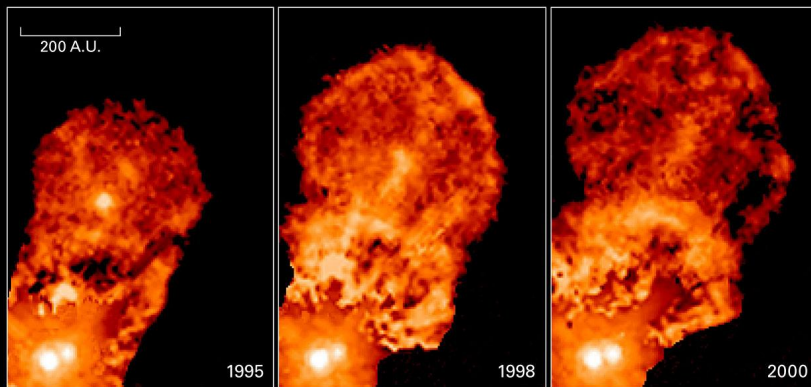
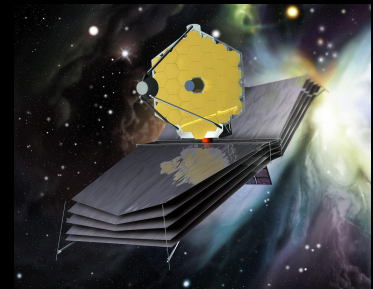
Hubble Space Telescope



HH46-47 HST timelapse

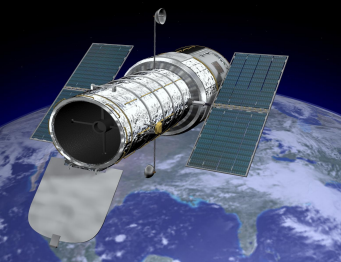
<https://hubblesite.org/contents/news-releases/2011/news-2011-20.html>

Stellar evolution & stellar death

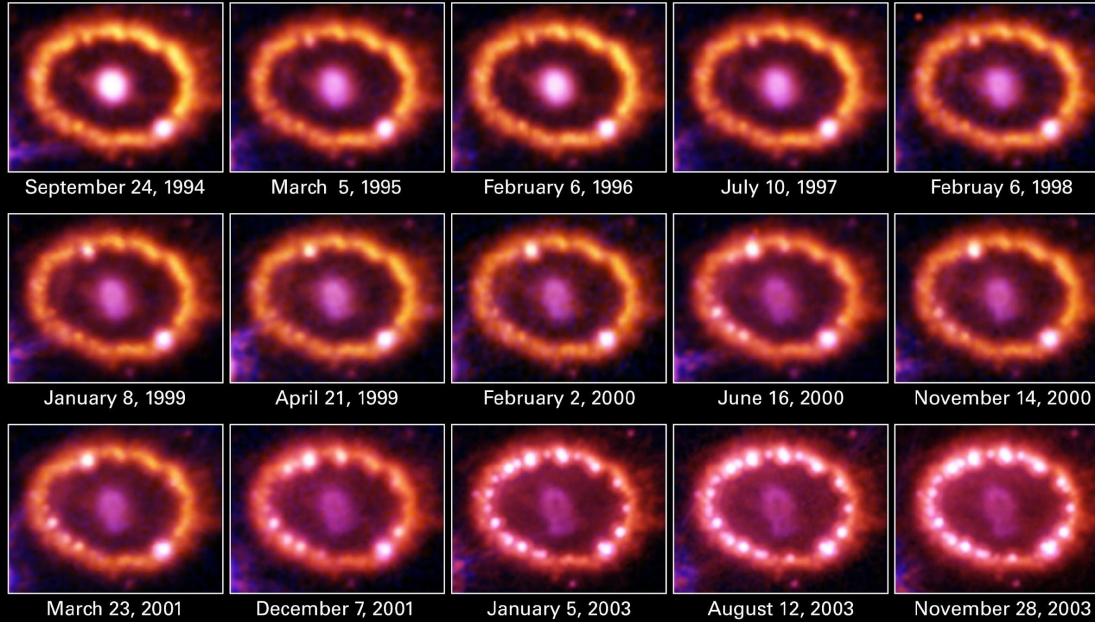
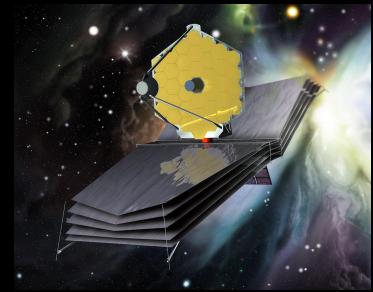


Hot Gas Bubble Ejected by Binary Star XZ Tauri
Hubble Space Telescope • WFPC2

NASA and J. Krist (STScI) • STScI-PRC00-32



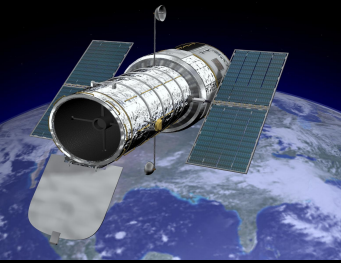
Stellar evolution & stellar death



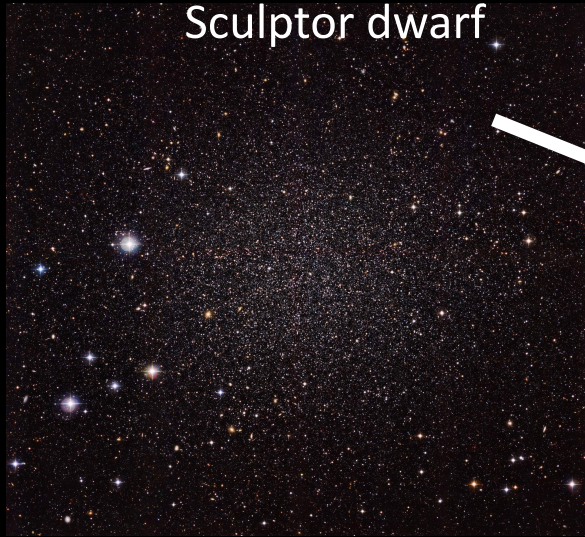
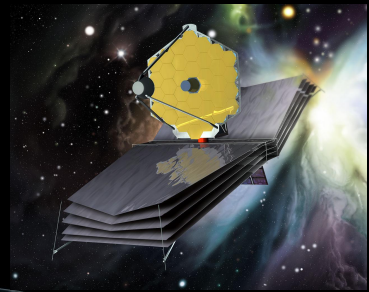
Supernova 1987A • 1994-2003
Hubble Space Telescope • WFPC2 • ACS

NASA and R. Kirshner (Harvard-Smithsonian Center for Astrophysics)

STScI-PRC04-09b



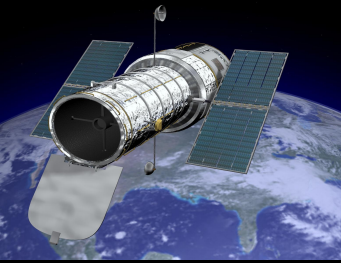
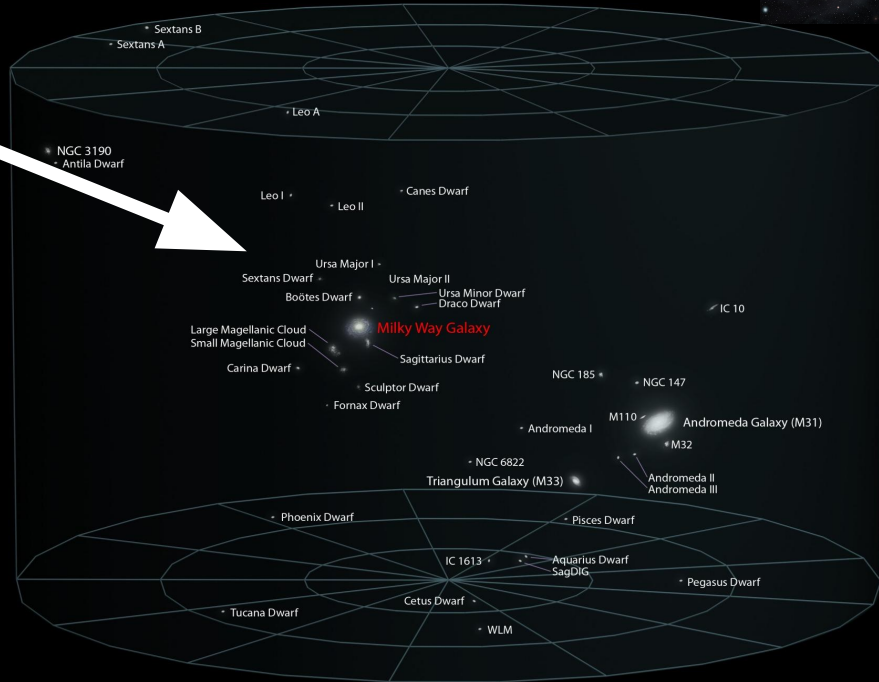
Galactic Dynamics



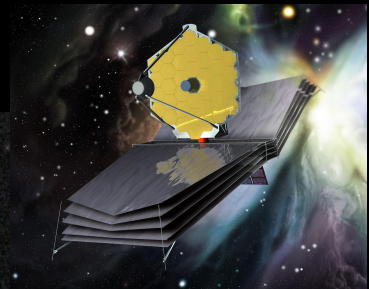
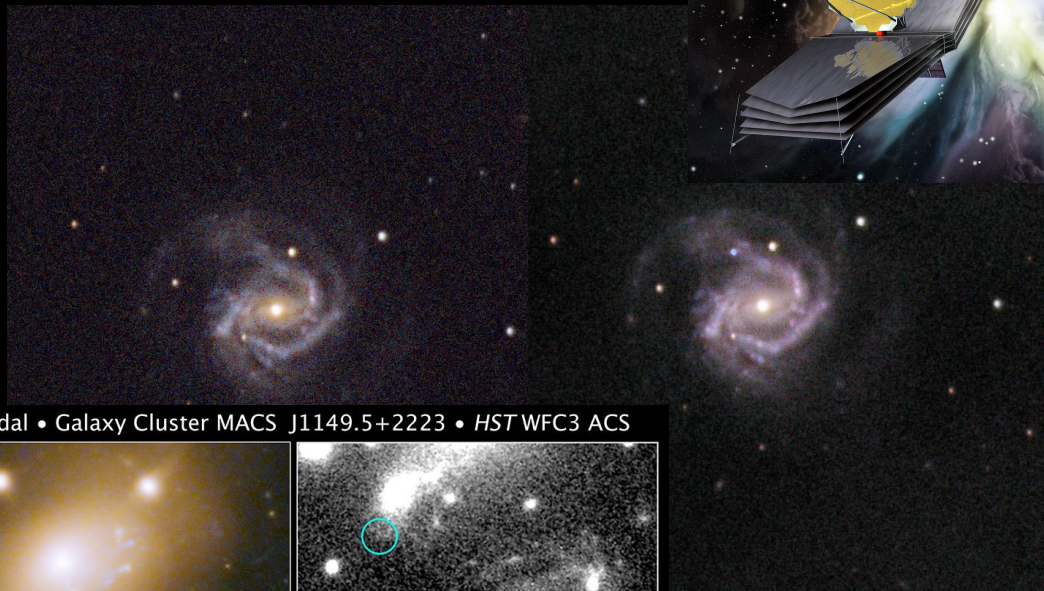
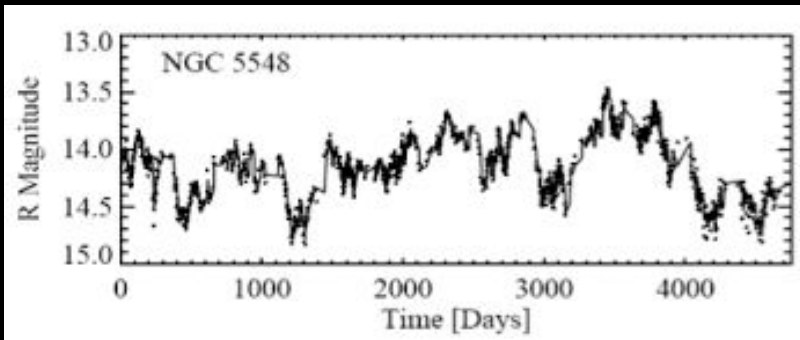
Sculptor dwarf

1 mas/yr \sim 470 km/sec

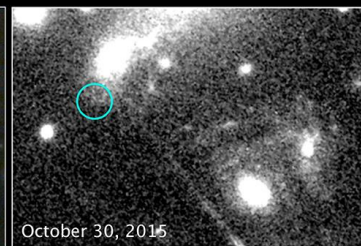
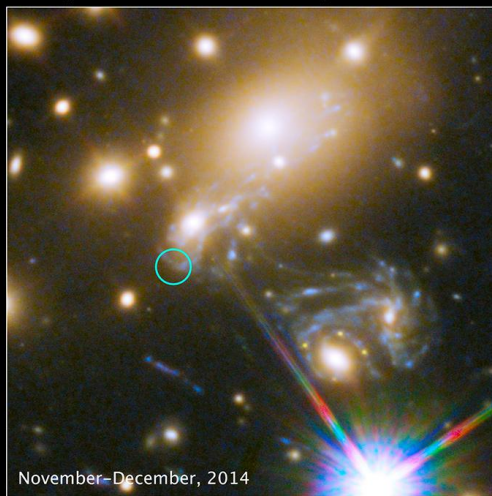
Local Galactic Group



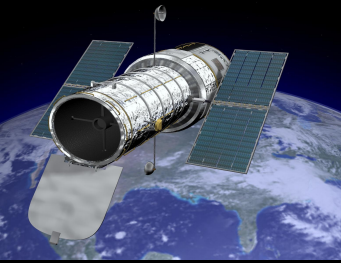
AGN & Supernovae



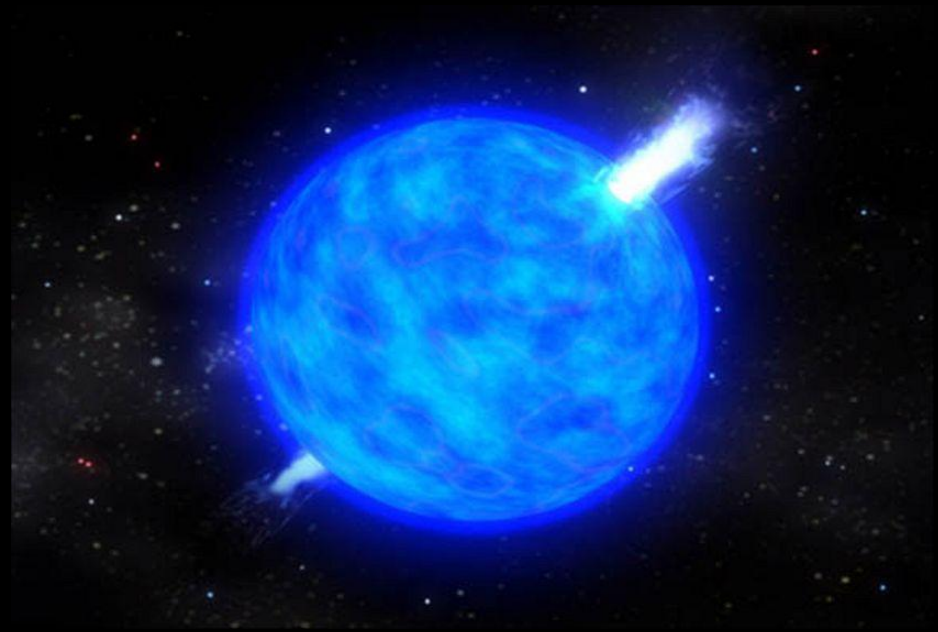
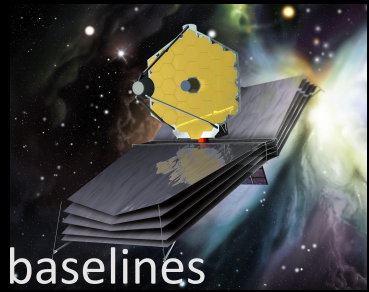
Supernova Refsdal • Galaxy Cluster MACS J1149.5+2223 • *HST* WFC3 ACS



Kilonovae & First Stars



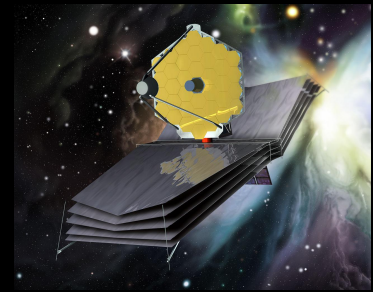
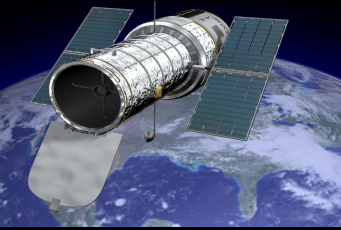
Probing to $z > 12$ over multi-year baselines



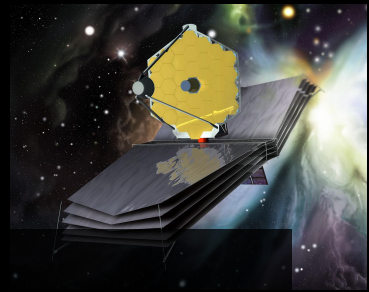
Long-Term Variability Monitoring Strategies for HST and JWST

Working Group chartered to:

- Solicit input from the community on key science areas that can exploit long time-baseline observations, based either on past observations or laying the foundation for future investigations;
- Identify science themes that should be prioritized for exploration by future General Observer programs and/or Archival analyses;
- Provide advice on the optimal timing for substantive follow-up observations and suggest mechanisms for enabling those observations;
- Comment on the appropriate scale of resources likely required to support those programs;
- Develop a specific concept for an observing program that will utilize JWST's imaging and spectroscopic capabilities to probe transient phenomena at high redshift, with the goal of starting implementation of the program in JWST Cycle 2.
- <https://outerspace.stsci.edu/display/HPR/Long-term+variability+monitoring+strategies+for+HST+and+JWST>



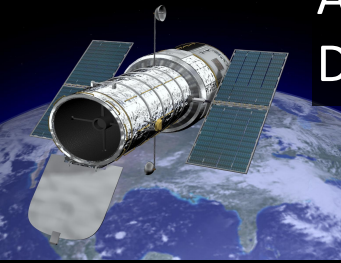
Long-Term Variability Monitoring Strategies for HST and JWST



Working Group membership

Co-chairs: Dana Casetti (Southern Connecticut University)
and Saurabh Jha (Rutgers University)

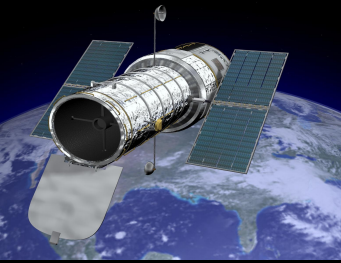
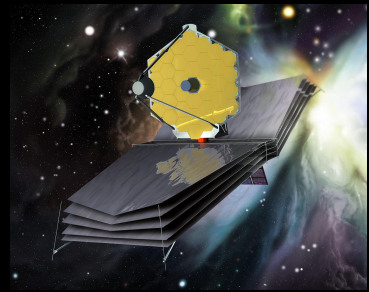
Members: Gary Bernstein (U. Penn.), Matt Hayes (Stockholm),
Lidia Oskinova (Potsdam), Andrew Pace (Carnegie Mellon),
Robert Quimby (San Diego State), Megan Reiter (Rice),
Armin Rest (STScI), Adam Riess (JHU/STScI), David Sand (Arizona),
Dan Weisz (Berkeley)



Community Input

Request for input issued mid-June, two options:

- A. [General Survey](#) to solicit feedback on potential science topics and observing strategies for HST and/or JWST
- B. Call for short (1 page) contributions on either
 - Long time baseline science opportunities in any science area with either HST or JWST – programs not accommodated with standard cycle calls, or
 - Specific ideas for a JWST DDT program aimed at probing high redshift transients
- email to wg-longterm@stsci.edu



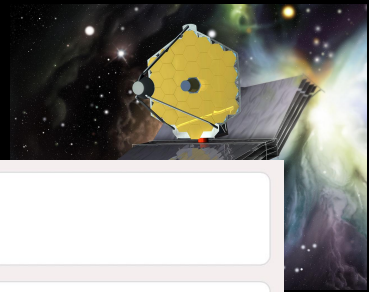
due September 8, 2023

details at

<https://outerspace.stsci.edu/display/HPR/Long-term+variability+monitoring+strategies+for+HST+and+JWST>



Survey (all questions are optional):



Science Categories

Considering the categories below, please choose three that you would prioritize for long-term monitoring science with HST and/or JWST.

- AGN
- Nearby galaxies
- Proper motion studies (nearby galaxies and clusters)
- Software/Infrastructure
- Solar system objects
- Transients
- Variable stars (Galactic, extragalactic, long and short variability)
- Other: _____

Please elaborate on your choices above, if you wish.

Your answer _____

Archival Data and Future Observations

What existing data in the HST/JWST archives should be supplemented by future observations to enable long-term science?

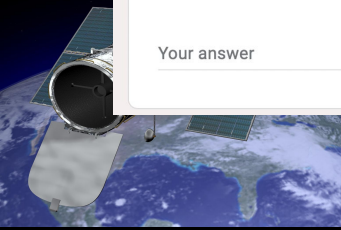
Your answer _____

What JWST/HST observations should be implemented soon to allow for future long-term science with JWST?

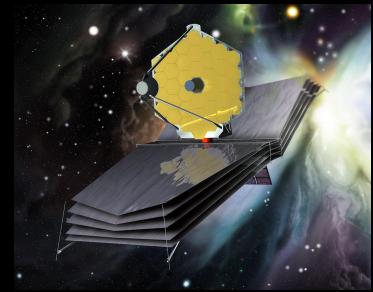
Your answer _____

What JWST/HST observations should be implemented soon to allow for future science with upcoming facilities such as the Nancy Grace Roman Space Telescope, large ground-based telescopes, and/or future space telescopes?

Your answer _____



Survey (all questions are optional):



JWST DDT for High-Redshift Transients

Our working group has also been directed to develop a specific concept for a Director's Discretionary Time observing program that will use JWST's imaging and spectroscopic capabilities to probe transient phenomena at high redshift, with a goal of starting implementation of the program in JWST Cycle 2.

What science questions should such a program aim to address?

Your answer

What observations would be needed to address those questions?

Your answer

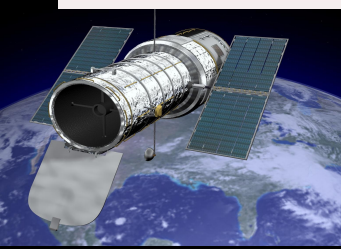
Archive Tools and Proposing

What archival tools or capabilities do you see missing from the current MAST archive that would improve long-term monitoring science?

Your answer

What changes to the proposal process are needed to implement long-term baseline observations?

Your answer

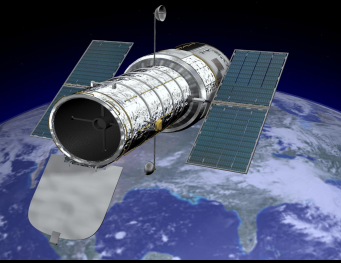
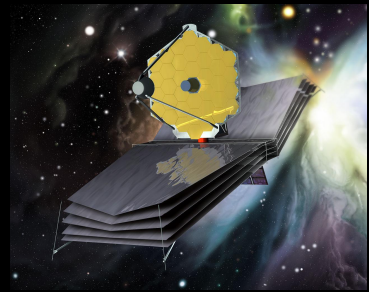


<https://docs.google.com/forms/d/e/1FAIpQLSfFCd4vY4QP0mOkACwScC-CHawrUPBDIXr8PGbOeAWZvsrIPQ/viewform>

Community Input

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- email to wg-longterm@stsci.edu



due September 8, 2023

details at

<https://outerspace.stsci.edu/display/HPR/Long-term+variability+monitoring+strategies+for+HST+and+JWST>



Call for Community Input - June 15, 2023

The WG encourages input either by completing this short, [on-line survey](#) and/or in the form of short contributions submitted to STScI **by Friday, September 8, 2023**. We request these be in PDF format and ideally limited to 1 page (+ figures/references), but any reasonable length will be accepted. Contributions do not need to be anonymized and multiple co-authors are welcome. Submissions will guide the working group recommendations, but will not be shared publicly.

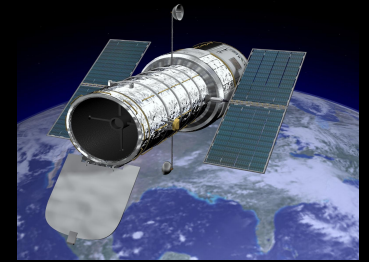
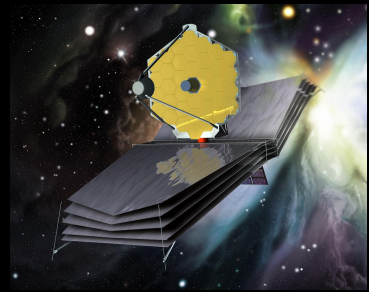
PDF contributions should be e-mailed to wg-longterm@stsci.edu by the September 8th deadline.

Submissions should explicitly specify which of these two topics is being addressed:

- **Long time baseline science opportunities:** We are interested in learning about the key science that would be enabled with long time baseline observations and science themes that should be prioritized in General Observer and Archival proposals. **For our purposes, long time baselines refer to those that are not easily accommodated in the standard proposal process.** Observations could include, but are not limited to, photometric or spectroscopic variability, and astrometric motions.
- **JWST DDT for high-redshift transients:** Our working group has also been directed to develop a specific concept for a Director's Discretionary Time observing program that will use JWST's imaging and spectroscopic capabilities to probe transient phenomena at high redshift, with a goal of starting implementation of the program in JWST Cycle 2. We are interested in understanding the science cases that should be prioritized for such a program.

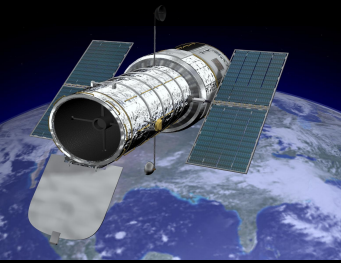
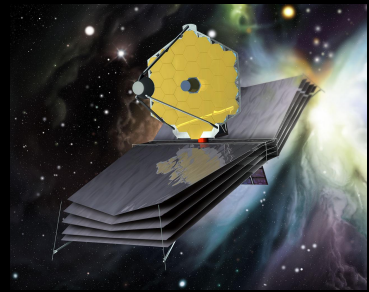
In all cases, in addition to the science, we are soliciting input about the observational resources that would be required, advice about timing and sky location for the observations, and suggestions for mechanisms to promote this science in the broad portfolio of HST and JWST programs.

<https://outerspace.stsci.edu/display/HPR/Long-term+variability+monitoring+strategies+for+HST+and+JWST>

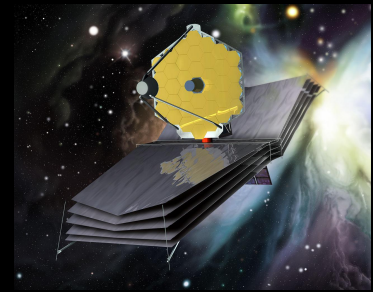


Timeline

- September 8, 2023: due date for community input via survey form or short contributions
- Fall 2023: working group will make interim recommendations to STScI Director, STUC, and JSTUC
- January 2024: working group will present final report
- Working group is *advisory* to STScI Director who will make final decisions on implementation, etc.



Long-Term Variability Monitoring Strategies for HST and JWST



Questions & General Discussion

<https://outerspace.stsci.edu/display/HPR/Long-term+variability+monitoring+strategies+for+HST+and+JWST>

