



**STScI** | SPACE TELESCOPE  
SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

# JWST Proposals and Timeline

Jeff Valenti  
(on behalf of Science Mission Office)



## Main Points

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- Cycle 1 GTO program specification is almost complete
  - Observation list is published
    - Updates will be published 2017 November 15
  - APT files will be released to the public 2017 December 15
- DD ERS proposals are being reviewed
  - 106 proposals were submitted
  - TAC will meet 2017 October 9-10
- Cycle 1 GO proposal process is imminent
  - Call for Proposals will be released on 2017 November 30
  - Proposal deadline is 2018 March 2
  - TAC will meet at STScI on 2018 June 17-29
- JWST User Committee exists



## Charged time

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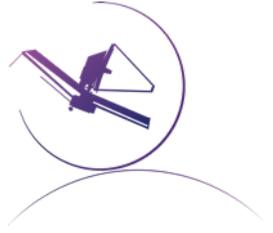
- APT reports *charged time* for JWST proposals and accepted programs
- JWST TAC will assess cost of each proposal in terms of *charged time*
- STScI directors will award each program a quota of *charged time*
- Programs are charged for the time APT predicts will be required to execute the observations plus a proportionate share of observatory overheads (e.g., generic instrument calibrations), using statistical estimates where appropriate (e.g., slew from the previous target).



## Three categories of JWST observing programs

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- **Guaranteed Time Observer (GTO) programs**
  - 4020 hours allocated over first 30 months (Cycles 1 through 3)
  - 3820 hours allocated to Cycle 1
- **Director's Discretionary (DD) programs**
  - Up to 10% per cycle (at most 877 hours)
  - Rapid response and targeted science programs (e.g., DD ERS program)
- **Guest Observer (GO programs)**
  - Open access for the community
  - ~80% of time in Cycles 1 through 5
  - ~6000 hours likely to be approved in Cycle 1



# Status of GTO programs

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## Cycle 1 GTO programs follow a three-stage process

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- Stage 1 – Text proposal and initial target list submitted on 2017 Apr 1
- Stage 2 – Lists of specific observations published on 2017 Jun 15
  - Available at <https://jwst.stsci.edu/science-planning/calls-for-proposals-and-policy/guaranteed-time-observations-program>
- Stage 3 – APT submissions from mid-June through November 2017
  - Observation descriptions will be finalized by 2017 Nov 15
  - Community will be informed of any changes
    - GTOs may drop observations, but may not add observations
  - APT file submission will be completed by 2017 Nov 30
  - APT files will be released to the public on 2017 Dec 15



## GTO Proposals: time requested

- GTOs must use 25% to 49% of the total time available to GOs and GTOs in Cycle 1 (NASA Policy 9)
- ~8000 GO + GTO hours available in Cycle 1
- Total GTO request in Cycle 1 is 3775 hours
  - ~245 hours remaining for Cycle 2 & 3

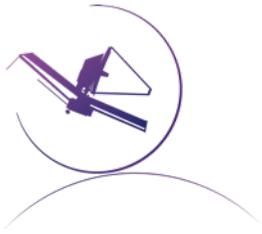
Name	GTO description	Cycle 1
Heidi Hammel	Interdisciplinary scientists	106 hours
Simon Lilly		112
Jonathan Lunine		100
Mark McCaughrean		40
Massimo Stiavelli		78
Rogier Windhorst		110
Gillian Wright	European MIRI Team PI	430
George Rieke	US MIRI Team PI	155
Marcia Rieke	NIRCam Team PI	905
René Doyon	NIRISS Team PI	448
Pierre Ferruit	NIRSpec Team PI	865
Matt Mountain	Telescope Scientist	192
Christine Chen	US MIRI Science Team	12
Scott Friedman		12
Karl Gordon		12
Tom Greene		60
Dean Hines		10
Margaret Meixner		57
Alberto Noriega Crespo		12
Mike Ressler		60
		3775 hours



## GTOs will make some data available sooner than required

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- NIRSpec/NIRCam program
  - Reduced proprietary periods for some datasets in GOODS (N) and GOODS (S) fields
    - Both NIRCam and NIRSpec data – raw data & standard pipeline reductions
    - Lessons learned for some datasets
    - Depending on detailed scheduling, GOODS (N) data may be available prior to the Cycle 2 deadline
    - GOODS (S) data will likely be scheduled in late 2019 & made available prior to Cycle 3 Call
- North Ecliptic Pole field (Windhorst et al)
  - Targets the JWST continuous viewing zone
  - Associated Cycle 25 HST imaging program
  - Identified as a community field for synoptic studies



# Status of DD Early Release Science proposals

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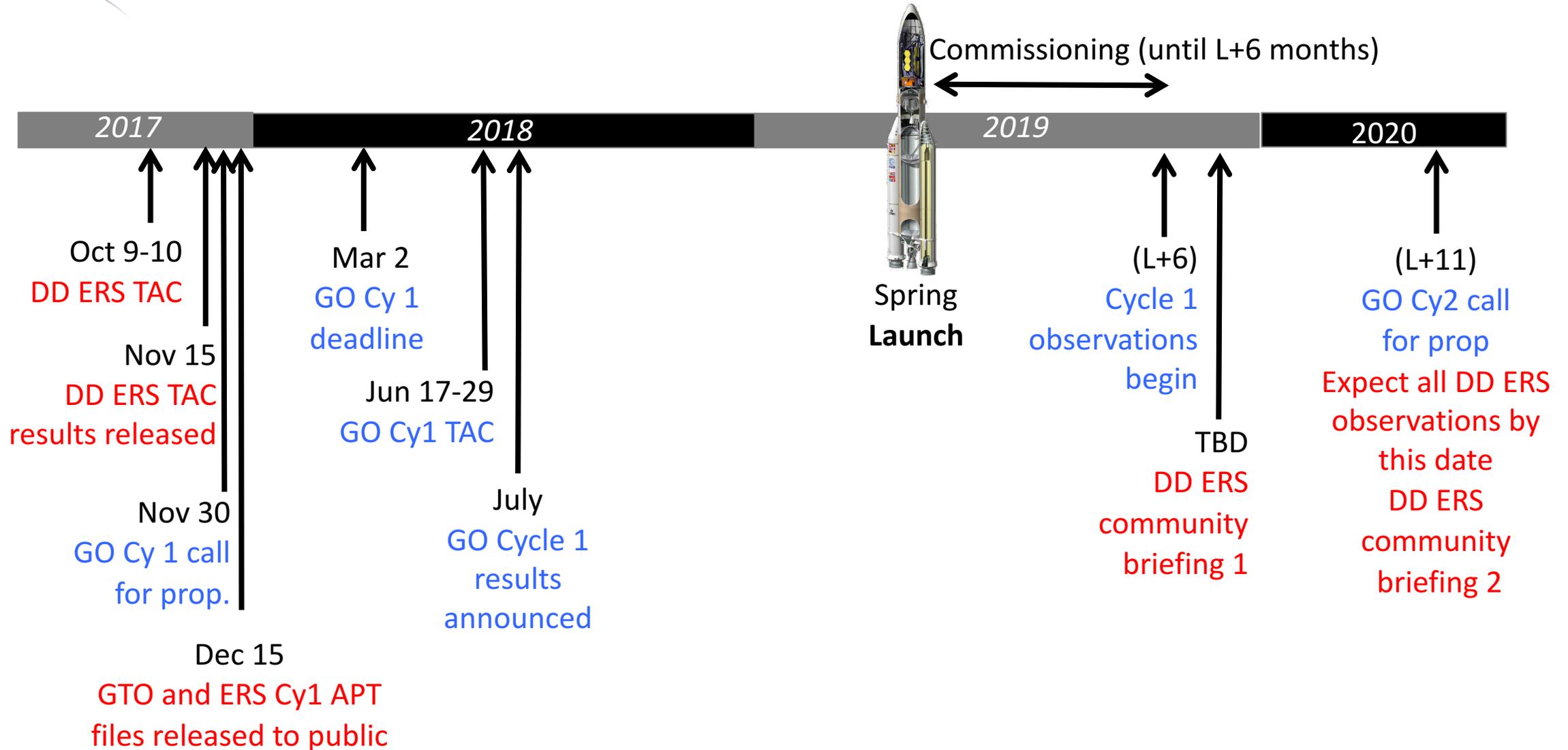
## Goals of Early Release Science (ERS) initiative

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- 500 hours of Director's Discretionary (DD) time
- Zero exclusive access period
- Anticipate selecting up to 15 proposals
- Goals:
  - Inform the astronomical community about **JWST's capabilities** through early access to **representative datasets and science enabling products**. Initial set of products to be released at the time of the Cycle 2 GO call (when very limited public data will be available)
  - APT files will also help Cycle 1 GO proposal preparation
  - **Legacy value**: enrich the overall scientific return of the mission in the JWST major science themes



# JWST Science Planning Timeline





## ERS submission results

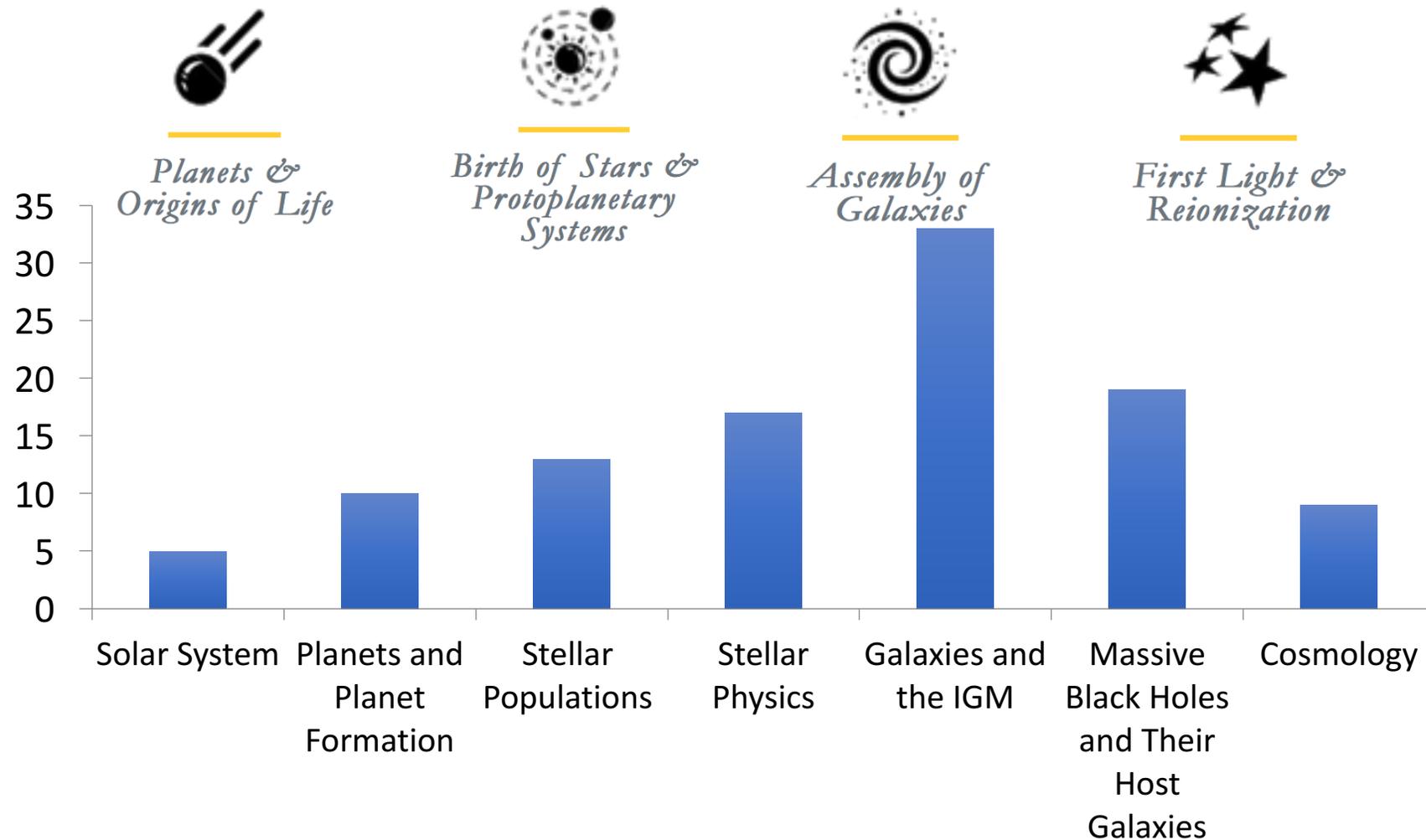
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- 200 notices of intent letters submitted
- 106 formal proposals submitted
- 3683.4 hours requested
  - Average of ~30 hours per proposal
  - Oversubscription factor of 7.4



# ERS proposal distribution by science category

Proposals cover all four JWST science themes





## ERS proposal distribution by instrument

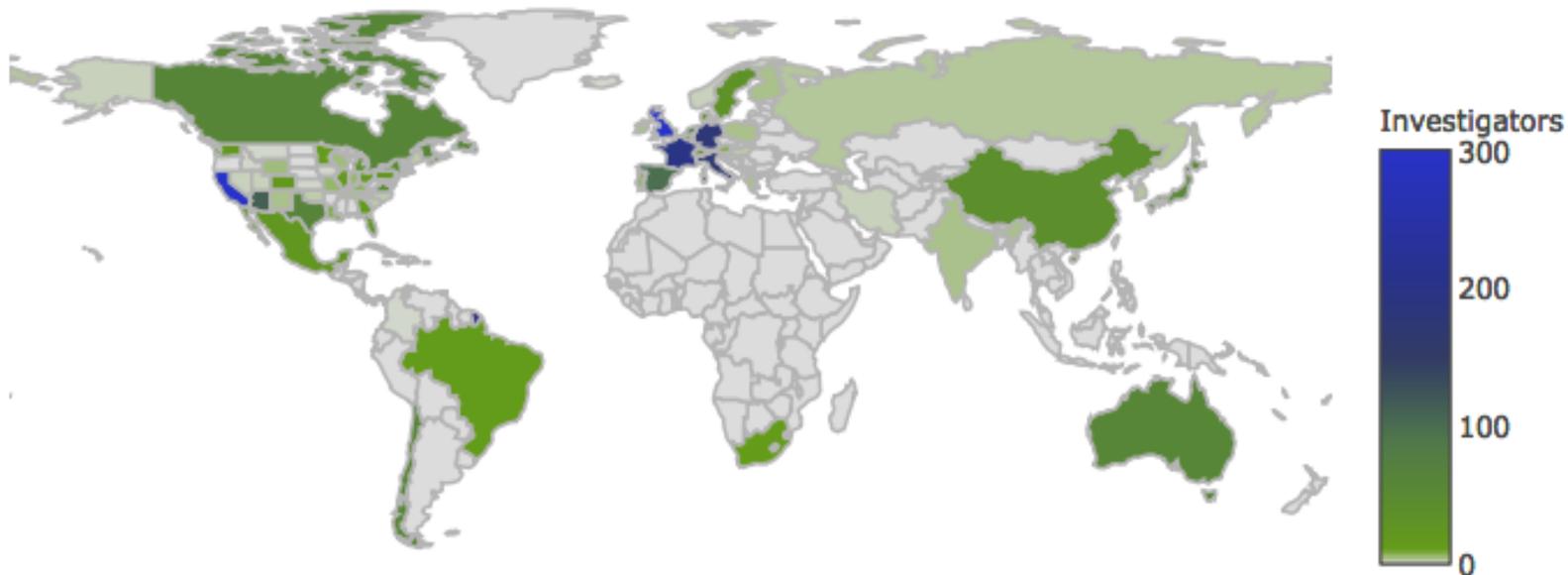
Wide range of observing modes requested

<b>Instrument</b>	<b>Prime Usage</b>	<b>Prime + Coordinated Parallel Usage</b>
MIRI	31%	30%
NIRCam	30%	33%
NIRISS	4%	6%
NIRSpec	35%	31%
	100%	100%



## ERS proposal distribution by country

Principal Investigators and Co-Principal Investigators are based in 15 countries, with representation including Co-Is and Collaborators from 38 countries, 43 U.S. states, and 1 U.S. territory.



<https://jwst.stsci.edu/news-events/news/News%20items/dd-ers-proposal-submission-statistics-are-now-available>



## ERS proposal statistics for ESA and CSA

ESA Investigators	
PI	35
Co-PI	26
Co-Is	586
Collaborators	573
	1220

CSA Investigators	
PI	0
Co-PI	6
Co-Is	41
Collaborators	14
	61

Average of 28 scientists per team  
Largest team has 138 investigators/collaborators



## ERS selection process

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- Time Allocation Committee (TAC) will meet 2017 Oct 9-10
- Four panels:
  - Exgal1 – distance scale, galaxy assembly & evolution, high redshift universe, lensing and galaxy clusters
  - Exgal2 – AGNs, QSOs, black holes, GRBs
  - Gal1 – solar system, exoplanets, debris disks, cool stars, and hot stars, including supernovae
  - Gal2 – stellar populations, galactic structure, nearby galaxies, star formation and the interstellar medium
- Panels include representatives from ESA and Canada



## ERS selection process – preliminary grades, triage

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- Preliminary grades in three categories (due 2017 Sep 28)
  - Effectiveness of the proposed observations in preparing the community for Cycle 2 JWST observations.
  - Utility of the science-enabling products and strength of the data analysis plan.
  - Overall scientific merit of the program.
- Triage process
  - Based mainly on preliminary grade #1, but will also consider the range of science topics and the use of different instrument modes.
  - 12-15 proposals per panel will be selected for discussion at the face-to-face meeting.
  - Panelists will have an opportunity to rescue a limited number of proposals from triage.



## ERS selection process – panel discussion, final selection

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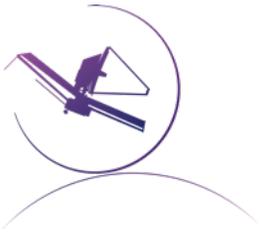
- Panel Discussion (2017 Oct 9-10)
  - Panelists will assign a **single score** to each proposal.
  - The top-ranked 4-5 proposals per panel will be brought forward by the panel chair for discussion with the Director.
- Final selection
  - Made by the STScI Director, who will take into account several factors, including distribution of science topics and instrument modes.
  - No fixed quota for the proposal selection from individual panels.



## ERS schedule for accepted proposals

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- Technical Reviews: 2017 Oct 11-16
- Notifications of accepted proposals: late October.
- APT submission deadline: 2017 Nov. 30
- APT file public release: 2017 Nov 30
- Observations begin when commissioning ends (nominally L+6 months)
  - Expect to complete ERS observations in first 5 months of science operations
- ERS teams brief the community:
  - Briefing I: progress on preparatory activities, readiness to process and analyze JWST data, lessons learned on JWST observation planning strategies. Date TBD, but will happen before the freeze for Cycle 2 tools and documentation allowing time to implement feedback when relevant/possible.
  - Briefing II: successes and challenges encountered based on the analysis of early data. Date TBD, close to the release of the Cycle 2 GO Call for Proposals



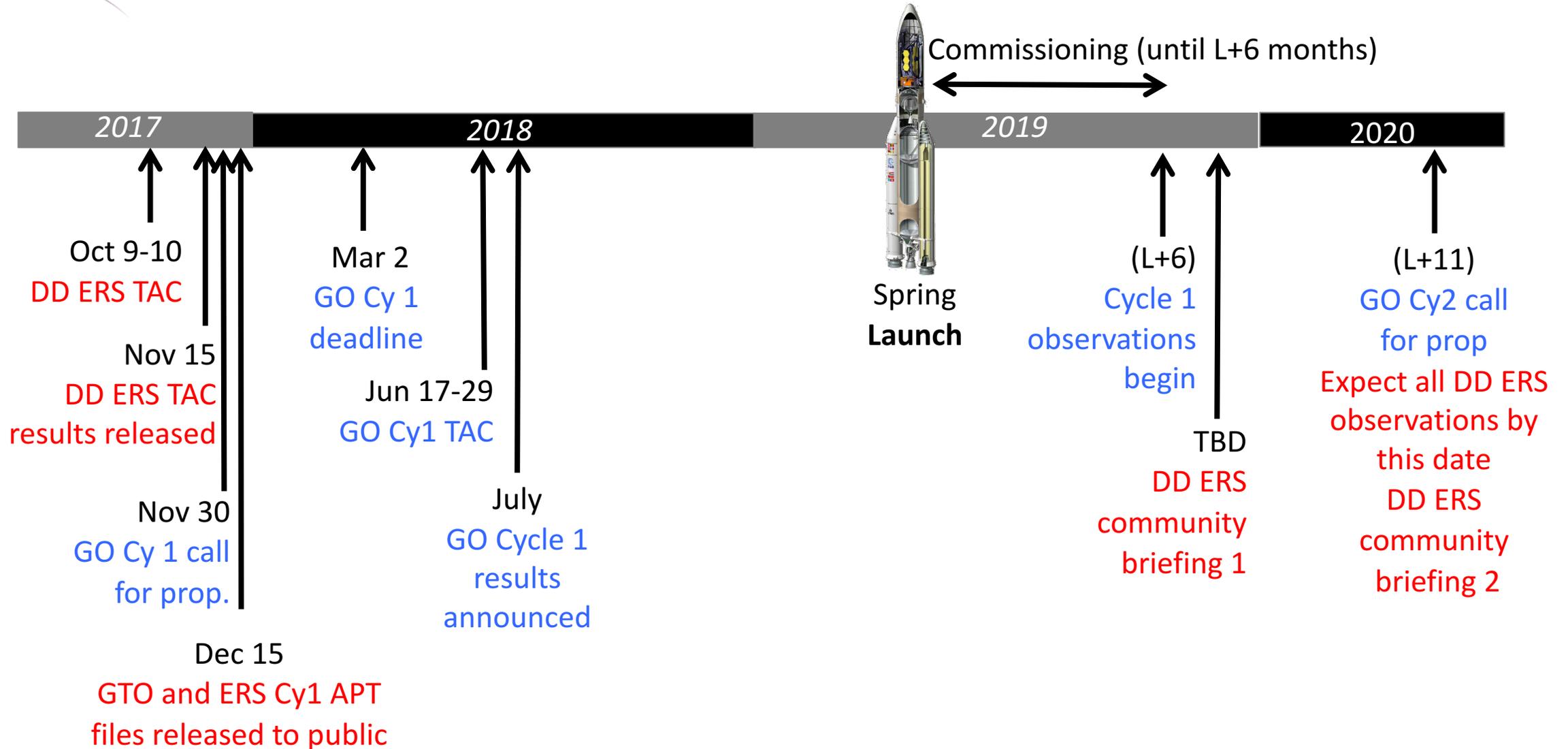
# Cycle 1 General Observer proposals

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Disclaimer: Call for Proposals is still in draft form



# JWST Science Planning Timeline





## General Observer proposals

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- **Small** (<25 hours, 12 month exclusive access period by default)
- **Medium** (25-75 hours, 12 month exclusive access period by default)
- **Large** (>75 hours, no exclusive access period by default)
  - Balance distribution of program sizes over all JWST cycles, but small programs will likely dominate Cycle 1, even though there will be no cap on program size.
- **Calibration**
  - Calibrate specialized modes that are uncalibrated or poorly calibrated
  - Develop specialized software for certain JWST calibration or reduction tasks
  - Proposers must contact the relevant instrument groups at STScI
- **Long-term**
  - Programs whose science requires multiple cycles (astrometry, variability)
  - Can be small, medium or large.



# Treasury and Survey observing proposals

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- Treasury
  - Provide high-level data products for the community
  - Enable a variety of compelling scientific investigations
  - No exclusive access period by default
- Survey
  - Fill schedule gaps, improve observing efficiency
  - Each observation can execute >25% of the year, minimal constraints
  - Targets all over the sky, small subset will actually be observed
  - Accomplish science goals with observations of whatever targets are observed



## Archival proposals

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- Archival data available in Cycle 1 includes data from ERS programs
- Types of archival proposals
  - Regular – improve or extend previous analyses (e.g., ERS programs)
    - Laboratory astrophysics relevant to JWST is an acceptable component of an archive proposal.
  - Legacy – generate homogeneous data products and tools for the community
  - Calibration – improve instrument calibration using data already in the archive
    - Proposers must contact the relevant instrument groups at STScI
  - Theory – new theory/models that enhance the value of JWST observations
  - Community data science software – community software that broadly enhances the value of JWST data
    - Non-US PI allowed, if US Co-I requests funding



## Director's discretionary time

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- Up to 10%/cycle i.e.  $\leq 877$  hours
- Rapid response observations.
- Targeted science programs (e.g. DD ERS program).
- Timely follow-up of new discoveries if the proposers demonstrate that the observations will provide a critical link in the understanding of the phenomena and that carrying them out quickly is particularly important for planning future observations with major facilities.
- No exclusive access period by default.



## No joint programs with other facilities in Cycle 1

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- Joint programs would further complicate JWST scheduling
- No joint programs with Hubble, Chandra, ALMA/NRAO, ground-based,...
- Data from other facilities that complement JWST observations may be included as a component of a JWST program



## Duplication policy

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- Duplicate observations are scrutinized in order to maximize scientific productivity, not to protect science programs
  - Observations should only be repeated if there is a scientific justification
- Observations flagged as duplicates will be checked
  - Proposals must provide a scientific justification for duplications of past observations
  - Assessment is usually based on a recommendation from the TAC
  - Final approval rests with the STScI Director



## Duplications: definitions

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- Duplications are defined by instrument mode
  - Observations are flagged as duplicate when they target the same astronomical source, and use the same instrument, the same spectral element and configuration (central wavelength), and exposure times within a factor of 4.
  - For imaging instruments, observations are flagged as duplications if the instrument Field of View overlaps by more than 50%.
  - For NIRSpec, potential duplications are flagged based on overlap in the Field of View
    - Flagged observations will be checked for duplication on a slit-by-slit basis
    - Repeat observations of a subset of the individual sources will generally be permitted since opening additional slits increases overall efficiency; decisions will be made on a case by case basis



## Duplications: priorities

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- Within the same cycle, GTO observations have priority over GO/ERS observations
  - GTO teams must provide a detailed list of targets & observing modes at least 2 months in advance of the Call for Proposals for each cycle (June 15 2017 deadline for Cycle 1)
  - Duplicate observations may be permitted if justified scientifically
- GO programs may not duplicate ERS observations without an appropriate scientific justification
- TAC-approved GO programs have priority over GTO and GO requests in subsequent cycles
- Separate proposals may propose programs with similar scientific goals and identical targets, but using different instruments
  - *These are not duplicate observations*
  - The TAC/external reviewers will provide a recommendation on whether the observations are complementary or scientifically redundant



## Coordinated parallels

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- JWST was conceived as a prime-only telescope, but operating instruments in parallel will increase the science return
- Coordinated parallels
  - Single program, complementary data, same exclusive access period
- Cycle 1 available combinations (additional may be added in the future):
  - NIRCam Imaging + MIRI Imaging
  - NIRCam Imaging + NIRISS WFSS
  - MIRI Imaging + NIRISS WFSS
  - NIRCam Imaging + NIRISS Imaging (NIRCam must be prime)
  - NIRSpec MOS + NIRCam imaging (NIRSpec must be prime)
- Only direct imaging with standard narrow, medium, or broad band filters is allowed for NIRCam and MIRI observations.



## Pure parallels

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- Separate proposals, distinct program, no exclusive access period
  - Parallel observations may not drive program parameters
  - Most two-instrument combinations will be available for pure parallel observations
- No parallel observations will be allowed for prime programs that require high stability (e.g., exoplanet transits, coronagraphy)



## Time constrained observations

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- Must be executed within a given absolute time period, within a window less than 24 hours (TBR). Examples include specific phases of variable stars, exoplanet transit observations, some solar system phenomena. Other possible time constrained observations are:
  - Observations that require a particular telescope orientation (or position angle)
  - Coordinated JWST observations with other observatories
  - Linked observations
- Some may also be time critical
- Will carry an additional overhead of 60 minutes/activation to account for the scheduling impact (JWST needs to arrive at the target at or before the observation start time and will likely have to wait)



## Targets of opportunity

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- Targets are expected transient phenomena that occur at an unpredicted location and time (e.g. comets, planetary atmospheric features, novae, supernovae, GRBs).
- Once triggered, observations are added to the JWST schedule.
- ToOs that require turnaround times...
  - > 14 days can be accommodated in the standard scheduling process
  - < 14 days are disruptive (limited to approx. 2 for GTOs, 6 for GOs).
  - < 3 days will carry an additional overhead of 45 minutes/activation (allows for impact on observing efficiency)



## Proposal process for Cycle 1 GTO and beyond

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- Like **Spitzer** and **Chandra**, proposals will be essentially complete at the time of submission, containing sufficient information to define scheduling constraints for all visits. Benefits:
  - **Identifies overheads:** JWST is at L2 and **visits are scheduled in an event-driven continuous process** (not orbits) → requires to know total time (including slews and instrumental overheads).
  - **Accelerates the intellectual cycle:** proposals can flow directly into the scheduling system, maximizing the amount of data available at the release of the next observing Cycle, guiding new observations.
  - **More time to provide user support.**
  - **Rapid construction of the long range plan allows to quickly assign execution position angles to observations that need these constraints,** based on available observation windows and the optional user Special Requirements on angle.



## Proposal process for Cycle 1 GTO and beyond

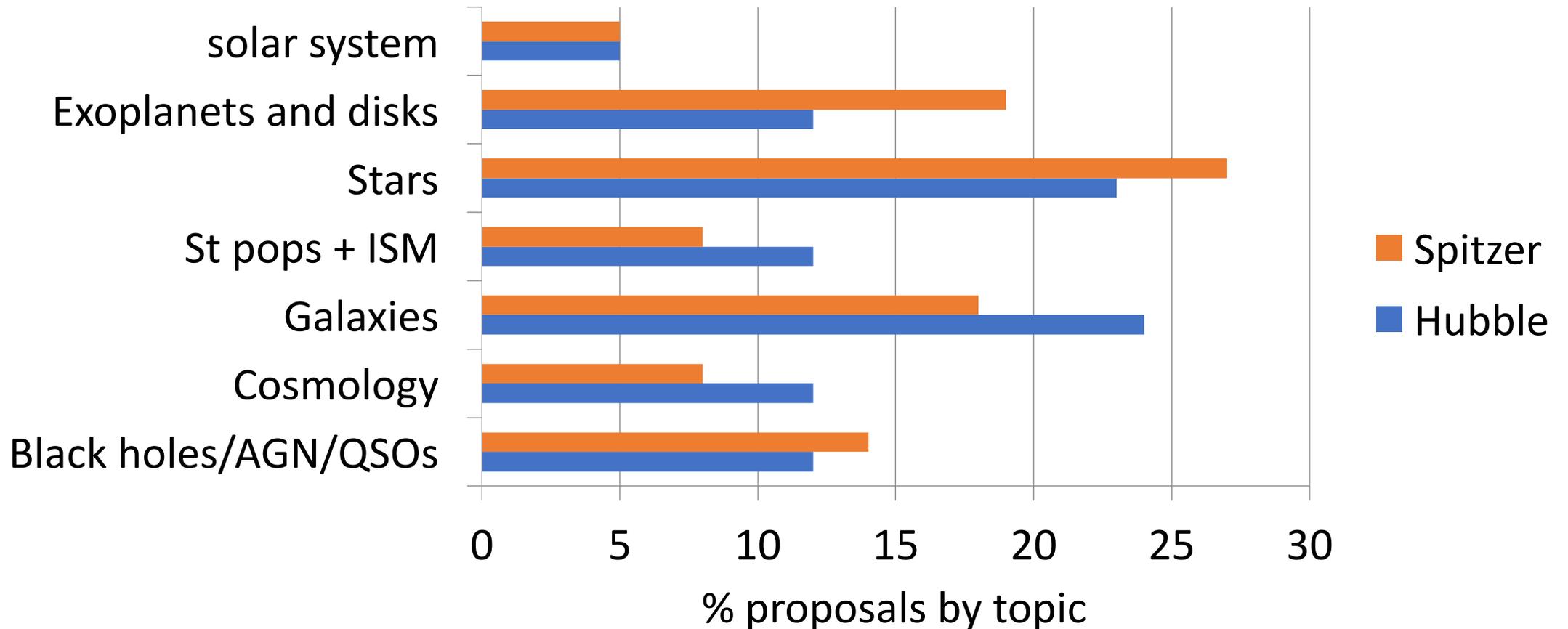
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- **How are we helping?**
  - APT templates to submit observing requirements (targets, instruments, filters, exposure times, dithers, observational sequence, roll angle, timing constraints...).
  - User support: Help Desk, user friendly wiki-style documentation (JDox), ERS program, proposal preparation workshops.
- **Exceptions** for proposals that cannot be fully specified at the time of submission (e.g. NIRSpec MOS, where the target selection requires to know the orientation, unknown at submission).



## Cycle 1 GO selection process

- Distribution of **science panels** guided by proposal pressure in Spitzer Cycle 5 & HST Cycle 24





## Cycle 1 GO selection process

- **Panel workload:** Assume ALMA-like numbers of proposals submitted per cycle, and aim for HST-like proposal pressure per panel (70-80 proposals/panel).

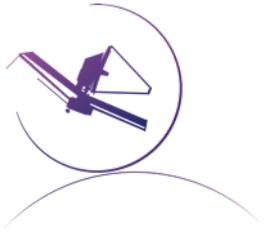
Topical panel		N=2000		N=1600	
	%	proposals	panels	proposals	panels
Black holes/AGN/QSOs	12	240	3	190	3
Cosmology	10	200	3	160	2
Galaxies & IGM	20	400	5	320	4
Stellar pops/ism	10	200	3	160	2
Stellar Physics	25	500	7	400	5
Exoplanets/disks	18	360	5	290	4
Solar system	5	100	2	80	1
			29		21



## Cycle 1 GO selection process

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- For planning purposes, assume  $N=1600$  & 21 panels
  - HST TAC currently utilizes 15 panels dispersed throughout STScI and JHU Physics & Astronomy
  - Expanding to 21 simultaneously supported panels is not feasible
- For JWST Cycle 1 we plan on distributing the TAC process over a 2-week period
  - Week 1 “Galactic”, Week 2 “Extragalactic”
  - 10-11 panels meet Monday-Wednesday noon
  - Panel chairs meet to consider Large/Treasury proposals Wednesday afternoon – Friday
- JWST Cycle 1 GO TAC is planned for June 17 – 29 2018 @STScI



# JWST Users Committee (JSTUC)

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## JSTUC charter

The Space Telescope Science Institute (STScI) and the NASA Goddard Space Flight Center (GSFC) have agreed to establish a joint James Webb Space Telescope (JWST) Users Committee (JSTUC) to **provide user advice to the observatory as a whole**. This establishes a practical way of ensuring that the observatory operations proceed in a coordinated manner in order to maximize its scientific performance.

The JSTUC will be established prior to JWST's launch and has a membership of 10-14 scientists, chosen jointly by the STScI Director and JWST Senior Project Scientist. The composition will initially consist of representatives of the JWST Guest Observer community (GOs - 10 members) and members of the JWST Instrument Definition teams (GTOs – 4 members). GTOs will be represented on the JSTUC until the end of the period where their guaranteed observations are being executed, 30 months following the completion of commissioning. To allow for balance between continuity and new input, GO members will be appointed for a two-year term starting on the date of the first meeting attended. The Director, with the concurrence of the Senior Project Scientist, can ask a member to serve for one more year if mutually agreeable. **At least two of the GO representatives will be astronomers from ESA nations and one will be an astronomer from Canada; those members will be appointed with ESA and CSA concurrence, respectively.**



# JSTUC Membership

## Voting members

Name	Institution
James Bullock	<b>Chair:</b> University of California, Irvine
Kat Barger	Texas Christian University
Natalie Batalha	NASA-Ames
Sadia Caballero-Nieves	Florida Institute of Technology
<b>Stephane Charlot</b>	<b>Institute d'Astrophysique</b>
Duncan Farrah	Virginia Tech
Tom Greene	NASA-Ames
Amanda Hendrix	Planetary Science Institute
Kelsey Johnson	University of Virginia
Heather Knutson	California Institute of Technology
David Lafrenière	Université de Montréal
Mario Mateo	University of Michigan
Els Peeters	University of Western Ontario
<b>Laura Pentericci</b>	<b>INAF, Osservatorio Astronomica di Roma</b>
Mike Ressler	NASA-JPL
<b>Johan Richard</b>	<b>Université de Lyon</b>
Tomasso Treu	University of California, Los Angeles

## Non-voting members

Name	Institution	Notes
Jean Dupuis	CSA	CSA, ex officio
<b>Pierre Ferruit</b>	<b>ESTEC</b>	<b>ESA, ex officio</b>
<b>Antonella Nota</b>	<b>STScI</b>	<b>ESA, ex officio</b>
Eric Smith	JWST Program Scientist	NASA, Ex officio
John Mather	JWST Senior Project Scientist	NASA, Ex officio
Ken Sembach	STScI, Director	Ex officio
Neill Reid	STScI, Science Mission Office	Ex officio
Alessandra Aloisi	STScI, Science Mission Office	Ex officio
<b>Alistair Glasse</b>	<b>Royal Observatory, Edinburgh</b>	<b>MIRI team observer</b>



## JSTUC schedule

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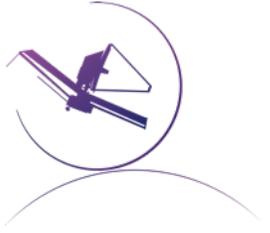
- The first JSTUC meeting was held on September 14 & 15, 2017 at STScI
  - Program and presentations will be available at <https://jwst.stsci.edu/science-planning/user-committees/jwst-users-committee-jstuc>
- Subsequent meetings will be held at intervals of ~6 months



## Main Points

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  - Observation list is published
    - Updates will be published 2017 November 15
  - APT files will be released to the public 2017 December 15
- DD ERS proposals are being reviewed
  - 106 proposals were submitted
  - TAC will meet 2017 October 9-10
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  - Proposal deadline is 2018 March 2
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- JWST User Committee exists



# Back-up

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## ERS proposal distribution by template

Instrument	Mode	# of Proposals	Prime %	Coordinated Parallel %	Total
MIRI	Medium Resolution Spectroscopy	17	18.2%	0.0%	16.3%
	Coronagraphy	3	0.5%	0.0%	0.5%
	Imaging	45	11.3%	19.0%	12.1%
	LRS	6	1.3%	0.0%	1.2%
NIRCam	Coronagraphy	4	0.9%	0.0%	0.8%
	Grimm Time Series	2	0.9%	0.0%	0.8%
	Imaging	63	23.5%	60.4%	27.4%
	Time Series	1	0.4%	0.0%	0.3%
	Wide Field Slitless Spectroscopy	11	4.1%	0.0%	3.7%
NIRISS	Imaging	7	0.0%	19.0%	2.0%
	Aperture Mask Interferometry	4	0.5%	0.0%	0.5%
	Single-Object Slitless Spectroscopy	1	0.5%	0.0%	0.5%
	Wide Field Slitless Spectroscopy	7	2.7%	1.6%	2.6%
NIRSpec	Bright Object Time Series	3	1.4%	0.0%	1.3%
	Fixed Slit Spectroscopy	8	1.7%	0.0%	1.6%
	IFU Spectroscopy	46	22.6%	0.0%	20.2%
	Multi-Object Spectroscopy	17	9.3%	0.0%	8.4%
			100%	100%	100%