GO JWST proposals

Feedback from a former JWST panelist

Andrea Fortier - 19th September 2023 - Bern

JWST Telescope Allocation Committee (TAC)

The task of the JWST TAC is to recommend a Science Program to the STScI Director in response to the Call for Proposals. Proposals are selected through competitive peer review.

Dual Anonymous Proposals Guide for Reviewers

Peer review of JWST Cycle 2 proposals will be Dual Anonymous. At the time of the review, proposers will not know the identities of panel members and panel members will not know the identities of the proposal teams.

Categories

General Observer (GO) Proposals

A GO Proposal may be submitted for any amount of observing time, counted in hours, including all overheads. GO Proposals are classified as Small (≤ 25 hours), Medium (> 25 and ≤ 75 hours) and Large (>75 hours). The classification into these categories is the total charged time for the observatory, including overheads. Proposals in these categories can request observing time in future cycles as a Long-Term Proposal when this is scientifically justified, however the program's total time, and hence its category, will be determined from the sum total of time for all cycles in the request. The additional category of Treasury Proposals is designed to stimulate certain types of ambitious and innovative proposals that may not naturally fit into the Small, Medium, or Large Proposal categories.

There are also opportunities to apply for Joint Observing programs to obtain multi-wavelength data and Calibration Proposals to provide calibrations for non-standard instrumentation modes.

Archival Research (AR) Proposals

The JWST Archival Research (AR) Program can provide financial support for the analysis of such data sets (as Regular or Legacy AR proposals), or the theory (as AR Theory), or cloud computing (as Cloud Computing Proposals), or science software (as Community Data Science Software Proposals) which maximize their use. There is also an opportunity to support calibration activities (as Calibration AR Proposals) beyond what is produced by the standard calibration pipeline. All AR Proposals must include an analysis plan. Proposals for AR funding are considered at the same time, and by the same reviewers, as proposals for observing time, on the same basis. Laboratory astrophsyics and citizen science are acceptable components of archival proposals.

Scientific Category

Specify one Scientific Category from the list below. Please adhere to our definitions of these categories. If you find that your proposal fits into several categories, then select the one that you consider most appropriate. If you are submitting a Calibration AR Proposal, then choose the Scientific Category for which your proposed calibration will be most important. STScI reserves the right to re-assign proposals to categories to ensure the highest chance of the proposal being reviewed by the proper expertise.

- **SOLAR SYSTEM ASTRONOMY:** This includes all objects belonging to the solar system (except the Sun, Mercury, Venus, Earth and Moon), such as planets, minor planets, comets, asteroids, planetary satellites, and Kuiper-belt objects.
- **EXOPLANETS AND EXOPLANET FORMATION:** This includes all objects belonging to 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. This category will be merged with Galaxies to form the panels.
- **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, the extra-galactic distance scale and reionization.

Proposals in these Scientific Categories will be reviewed by panels of the same names.

Proposals reviewed by the Discussion panels are subject to a two-stage review process:

1) preliminary grading; and
2) the review meeting.

Discussion panelists will read and grade all proposals that they are assigned, and write feedback comments for a subset of those. They also advise their Panel Chair on a subset of the Large, Treasury and Legacy proposals assigned for review to the Executive Committee.

Prep Work & General Info	Preliminary Grading	Pre-Meeting	Discussion Meeting	Post-Meeting

During preliminary grading, every proposal is assigned 5 panelists. All 5 panelists are **Graders**. Of these, 1 panelist will be designated **Primary Reviewer** and 1 will be designated **Secondary Reviewer**. Primary and Secondary Reviewers grade their assigned proposals.

We try to distribute the assignments equally among panelists. You should expect to grade **all** your assignments, but will only be primary on ~1/5 of them, and secondary on another ~1/5. (Proposal loads vary between panels, but numbers are typically around 30-50 proposals total for grading, with a subset of around 8 primary and around 8 secondary.)

During the panel meeting, only a subset of proposals will be discussed. **All** unconflicted panelists will discuss and grade a proposal. The primary/secondary reviewer assignments remain the same.

Why triage?

Panels typically receive more proposals than can reasonably be discussed during the panel meeting. The triage step removes the lower-ranked proposals from consideration and ensures that the discussion time is focused on the higher-ranked, competitive proposals.

Number of hours and goals of ranking

Each panel has a nominal allocation of N hours, which will be communicated by SPG. The number of hours is different for each panel and the allocations are determined by the relative proposal pressure and hour pressure across the panels. Panel members should review the rank order list to determine whether the highly-ranked proposals above the nominal cutoff line ("the 1N line") provide an appropriate science balance for the panel. There may be a consensus that some science areas have been unduly favored. There may also be cases where the chair identifies highly ranked proposals that have a science overlap with proposals highly ranked by another panel. The panel members can make a consensus decision to re-rank (but not re-grade) proposals to provide an appropriate reflection of the science topics reviewed by the panel.

Final recommendation

Panelists are asked to rank proposals all the way down to twice the hour allocation (the 2N line); this is in case any changes need to be made to the top-ranked proposals (for example, an approved proposal in another panel proposes the same observations, thus making the proposal in the panel a duplication). Panelists are also asked to set a do-not-approve line, if they deem it appropriate.

Selection criteria

Proposals reviewed by external panelists are subject to a single-phase review; proposals reviewed by the virtual topical panels are subject to a two-stage review process: 1) preliminary grading and triage; and 2) the review meeting. In all cases, panelists use the same scoring system.

Each topical panel covers a very broad science category, and each science category contains a number of narrower sub-fields. Ideally a proposal will be impactful to both the narrow sub-field of the proposal and to other sub-fields within the science category or in other science categories. Proposals will be assessed on an absolute scale against three primary criteria described in the Call for Proposals with a separate grade given for each.

- *Impact within the sub-field:*
  - *The scientific merit of the program and its contribution to advancement of knowledge.*
  - Will the proposed program improve our understanding of the objects, classes of object, or specialist topics under study in the proposal? By how much? How relevant is the proposed work to the immediate sub-field of the proposal?
  - The immediate sub-field of the proposal is the niche area of the program, not the whole broad science area of the topical panel to which it was assigned. The evaluation should be based on what is written in the proposal, not on the reviewer's broader knowledge, even if the reviewer is an expert in the sub-field. Though, in most cases, the reviewer will *not* be an expert in the sub-field of the proposal, and the proposal should have been written accordingly.
- *Out of field impact:*
  - *The program's impact for astronomy in general.*
  - Are there implications for other science areas and/or insights into larger-scale questions? Will the proposed program improve our understanding of science areas beyond the immediate sub-field of the proposal? How broad and how significant is this new understanding?
  - The proposal does not have to impact ***all*** of astronomy, but should ideally impact a number of other sub-fields or provide significant impacts in at least one other sub-field. The out-of-field impacts could be in other areas within the topical science panel of the proposal, or in other topical science areas. This evaluation should be based on what is written in the proposal, not on the reviewer's broader knowledge.
- *Suitability:*
  - *The necessity for JWST observations or relevance to JWST science.*
  - For GO and AR programs: a demonstration that the unique capabilities of JWST are required to achieve the science goals; how much of an advantage does JWST data offer over other facilities?
  - For Theory programs: a demonstration of broad applicability to JWST observational programs.

The final grade is the straight average of these values.

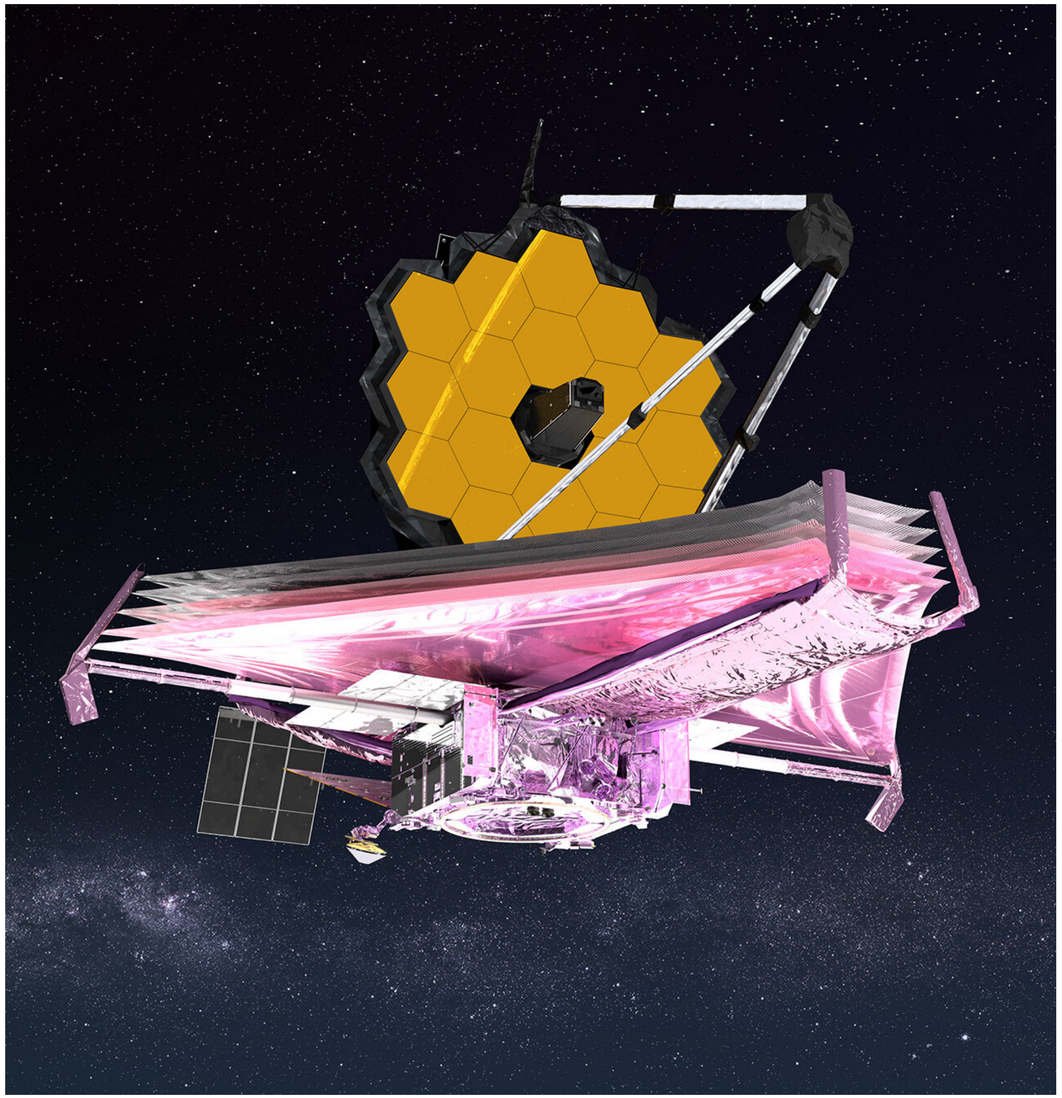
Recommendations for writing a proposal

- Explicitly address the following points:
  - Why your science case is important **WITHIN** the field?
  - What is the **BROADER** astronomical relevance of your science case?
    Try always to explicitly say what the impact is in a broader astronomical context. It is very important that the observations will not only answer specific questions of a particular target but that they also have an impact on other fields (e.g. planet formation, moon formation, etc.).
  - **WHY** is **JWST** absolutely necessary to achieve your science case?

- Keep in mind that not everybody on the panel is an expert in your field. Make sure you provide *clearly* the background for your science case.
- Don't think that the references in your proposal speak for themselves. They should *support* something that you *explicitly* mention.
- *Anticipate* the questions that the reviewers may ask themselves while reading your proposal and provide the answer.

Recommendations for writing a proposal (cont.)

- Provide simulations of the data you expect to get and how you will handle it → *convince* the panel that there will be a sound result after you get the data. Don't forget to state all the *assumptions* made clearly.
- Always justify the *target selection*. Why is your target important for your science goal? Are there other targets that are also suitable? Explain how you concluded that your target is **THE** target.
- Data included in the proposal: ALWAYS with *error bars.*
- Make sure that the data that JWST will get for you will always answer important questions, even for a *null result*. Don't give the impression that you go fishing.
- *Figures*: should be clear (all symbols explained) and as simple as possible. Figures can be your ally or your enemy.
- Triple-check the numbers you provide in your proposal. *Typos* can be fatal.



Good luck!