



STScI | SPACE TELESCOPE
SCIENCE INSTITUTE

EXPANDING THE FRONTIERS OF SPACE ASTRONOMY

JWST Cycle 1 GO/AR grants update

JSTUC meeting: October 4 2021

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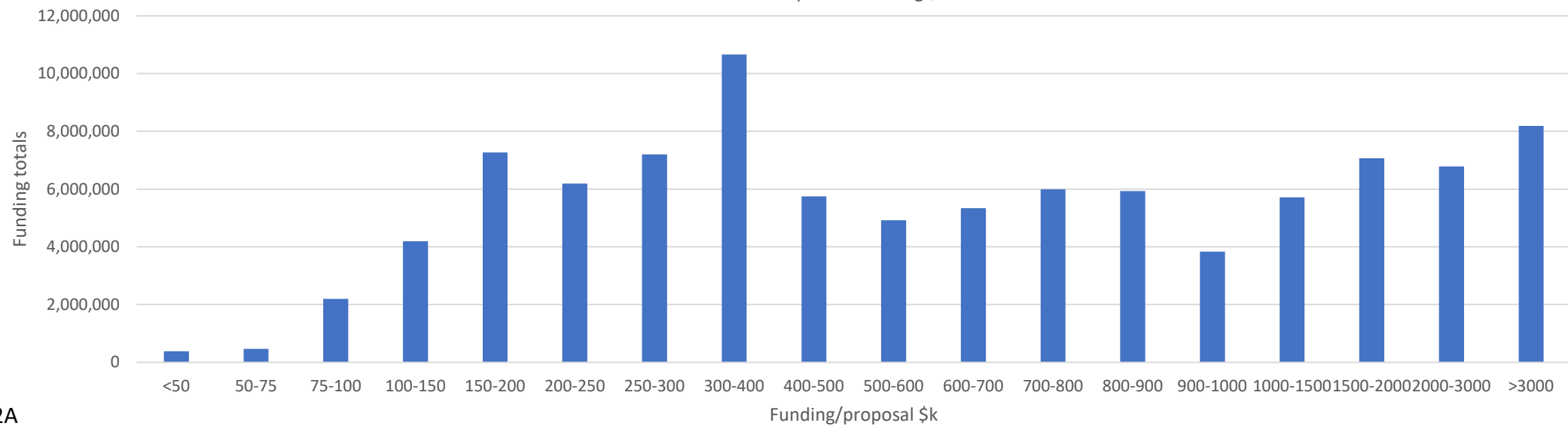
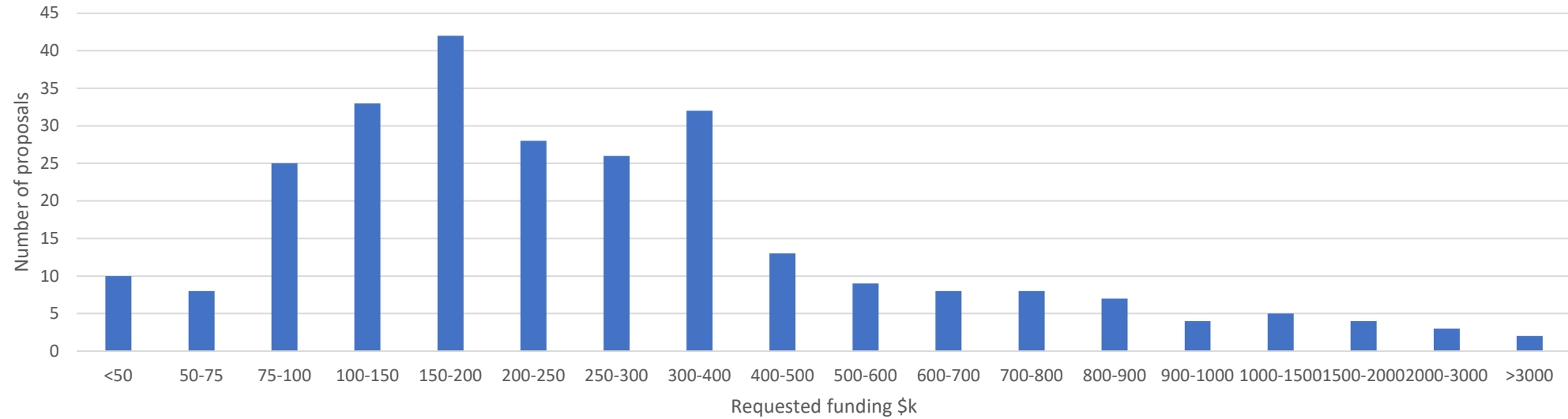


The challenge

- JWST Cycle 1 Program includes 266 GO programs and 20 AR programs
 - 180 US PIs, 89 ESA PIs, 10 CSA PIs, 7 foreign PIs
- Budget proposals submitted for 268 programs
 - 178 US PIs, 77 ESA PIs, 8 CSA PIs, 5 foreign PIs
- Total request amounts to ~ \$99.5 million, significantly higher than the anticipated funding levels
- JSTUC recommended reviewing a subset of the submitted budget requests to
 - Verify the level of funding required to support JWST Cycle 1 science, as described in the telescope proposals
 - Provide an assessment of potential inequities in the budget requests – in particular, are there notable disadvantages for proposers without past HST experience?



Original budget requests





Cycle 1 Budget Task Force assessment process

- STScI constituted a Cycle 1 Budget Task Force to assess the budget requests
 - Task Force members comprise the Cycle 1 Financial Review Committee, supplemented by three representatives from the JSTUC
- Task Force assessed the budget requests following standard FRC procedure
 - Primary and secondary reviewer assigned to each program
 - They provide initial assessments for further discussion by the full task force
 - Conflict of interest is taken into account following standard protocols
 - Reviewers assess
 - if the funding requested is reasonable, allowable, and allocable to reduce, analyze, and publish results that meet the TAC-approved science goals
 - Identify effort that is over-scoped or outside the analysis described in the science proposal
 - Identify excessive cost (in any cost category)
 - Note that programs are generally expected to be completed with 1-2 years funding
 - Grants Administration staff review the budget requests for unallowable costs
- Any reductions are identified as line-item costs within the budget
 - For assessment purposes, these are aggregated as fractional reductions to the total request
 - This is consistent with standard FRC protocol; after review, PIs are given a not-to-exceed budget and have discretion to allocate funding within that limit



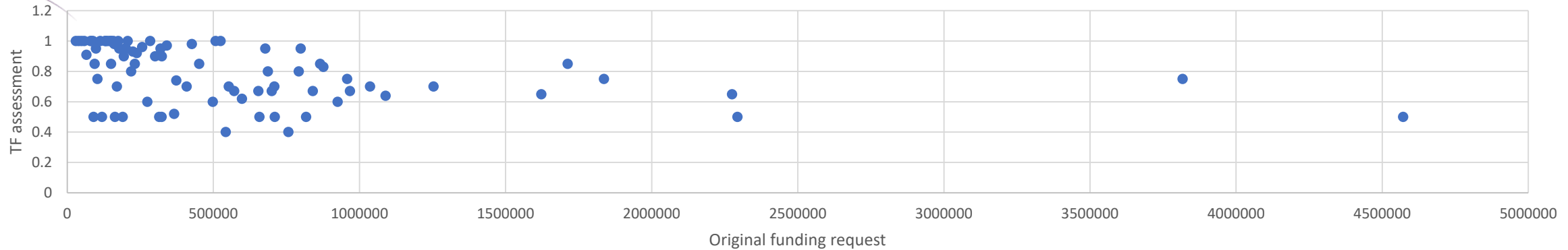
Budget assessment schedule

- Initial Task Force assessment included a representative sample of 65 programs
 - Programs were ordered by total budget request and every 4th program selected for assessment
 - Sample includes GO, pure parallel and AR programs
- Task Force met from July 20-23
 - July 20-22 devoted to program assessments
 - Task Force provided broader feedback on July 23
 - Recommendations for addressing the Cycle 1 budget shortfall
 - Included a recommendation to complete assessments of all proposals requesting >\$500,000
 - Advice on preparing the community for Cycle 2 (*)
- Following the Task Force recommendation, subsequent meetings scheduled on August 27 and September 3 to assess the remaining large (budget) programs

* This presentation focuses on Cycle 1 budget adjustments; Cycle 2 recommendations are included in the backup slides and will be the subject of future discussions.



Task Force Findings



- The overall level of resources requested is over-scoped by ~30%
 - Reflects redundant work effort, expanded scope of activities and some excessive costs (travel, publications)
 - A significant number of programs request 3 years funding without a clear justification
 - Substantive over-budgeting is prevalent (but not ubiquitous) in the larger programs
 - Assessments generally indicate smaller cuts for smaller programs
 - Only 10 of 48 programs requesting <\$500,000 were assessed as requiring cuts >30%
- The required funding is therefore generally consistent with level recommended by the JSTAC,
 - Scaled to present time, ~\$65-70 million
- Funding at <50% of this level will disproportionately impact the scientific productivity of US researchers
 - Science will not only be delayed, but the reduced funding will result in fewer community members with direct expertise in analyzing JWST data, limiting the pool for future proposal cycles. Deferred science could become lost science.



Equity

- The JSTUC raised concerns over the extent to which proposers with no past HST experience might be disadvantaged by the JWST grants process
- The Task Force assessments do not identify this as a major issue
 - Most budget requests were reasonably well matched in scope and work effort relative to the science goals in the original proposal
 - There was only one case among those reviewed where the budget request was notably under-scoped
 - There are more cases where the resource request is over-scoped, and appropriate cuts were recommended.
- The Task Force noted that there are proposals with similar science goals that request different resources. These difference can reflect multiple factors
 - How work is shared with foreign co-Is
 - Whether the work is carried out by senior or junior researchers
 - The extent to which infrastructure support is already available at the parent institutions
- There is no simple correlation between instrument mode and complexity of analysis
- There was strong consensus that an FRC-style review is crucial to understanding these issues rather than relying on a formulaic approach.



Task Force recommendations – report,

Cycle 1

- NASA should give serious consideration to finding additional funding for JWST Cycle 1 programs [*NASA is taking action*]
- Complete assessments of all large (>\$500K) programs to give fair basis for cuts [*done*]
- Provide foundation funding for small programs
- Cap funding for travel and publications
- Cut the third year of work when not justified



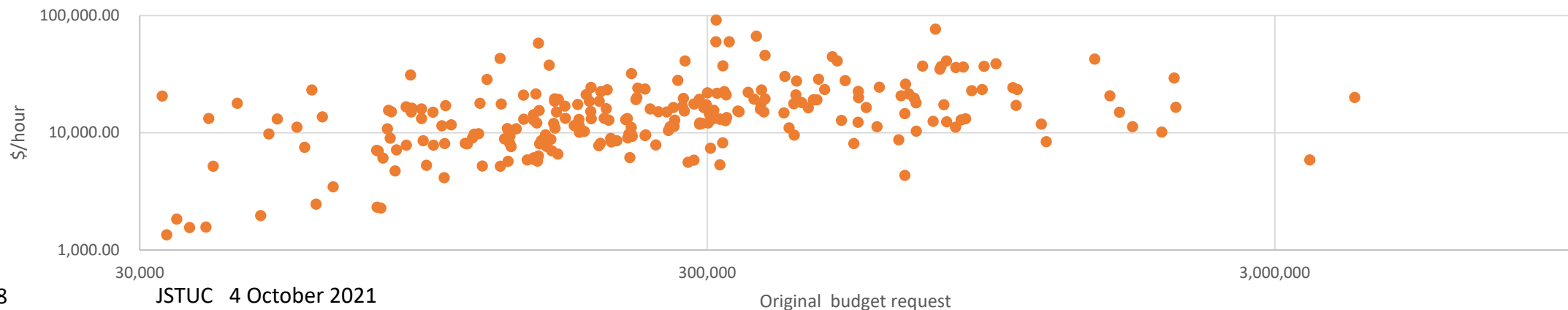
Next steps

The Task Force reductions alone, even if applied to all programs, are unlikely to reduce the total budget request to match the available funding

- There needs to be a process to apply further cuts in an even-handed fashion

Follow a two-stage process

1. Use the Task Force assessments to establish a reference budget for each program
2. Develop an appropriate scalable formula
 1. Minimise reductions for the smaller programs
 2. Use progressive scaling to apply higher reductions to more expensive programs, where more expensive is measured in \$/hour. Median value is ~\$13,250/hour, average ~\$14,500/hour





Determining reference budgets

Fixed adjustments:

- Cap travel and publications at fixed values for all programs
 - Follows the Task Force recommendation to emphasise support for personnel
- Programs reviewed by the task force
 - Apply the TF assessment to scale funding for all programs >\$500,000
 - Apply the TF assessment for smaller programs where the reduction in funding is at least 30%
 - Adopt the original budget request for the remaining smaller programs
- Programs not reviewed by the task force
 - Eliminate 3rd year of funding where not explicitly justified in the budget proposal
 - Adopt the original budget request as reference for all other programs



Budget adjustment

- Set a base level for funding
 - This is the “untaxed” portion of the requested funding
 - Eg, base level = \$70,000 (~6 months postdoc)
 - Programs < \$70,000 have no subsequent reductions
 - Programs > \$70,000 have progressive scaling applied to all funding above \$70,000
- Archival programs
 - 20 programs requesting \$90K - \$325K
 - Apply a straight percentage cut, C, or reduce to base level
- GO programs
 - Compute \$/hour for each program and <\$/hour>
 - Apply proportional reductions for programs that exceed <\$/hour>, i.e. a wealth tax
 - Apply more substantial reductions for pure parallel programs since they are contingent on the availability of suitable prime observations



Analytic example

Set base level, B, for funding

Compute \$/hr for each program, E, and <\$>/hour, E_{AV}

Consider program X assigned total funding F (after capping travel & pubs):

If $E < E_{AV}$,

$$F_{rev} = B + (F-B) * 2 / R \quad \text{constant scaling factor}$$

If $E > E_{AV}$,

$$F_{rev} = B + (F-B) * (1 + (E_{AV}/E)^p) / R \quad \text{greater scaling (decrease) for higher E}$$

Where R is the overall reduction factor and p sets the scale for the wealth tax;

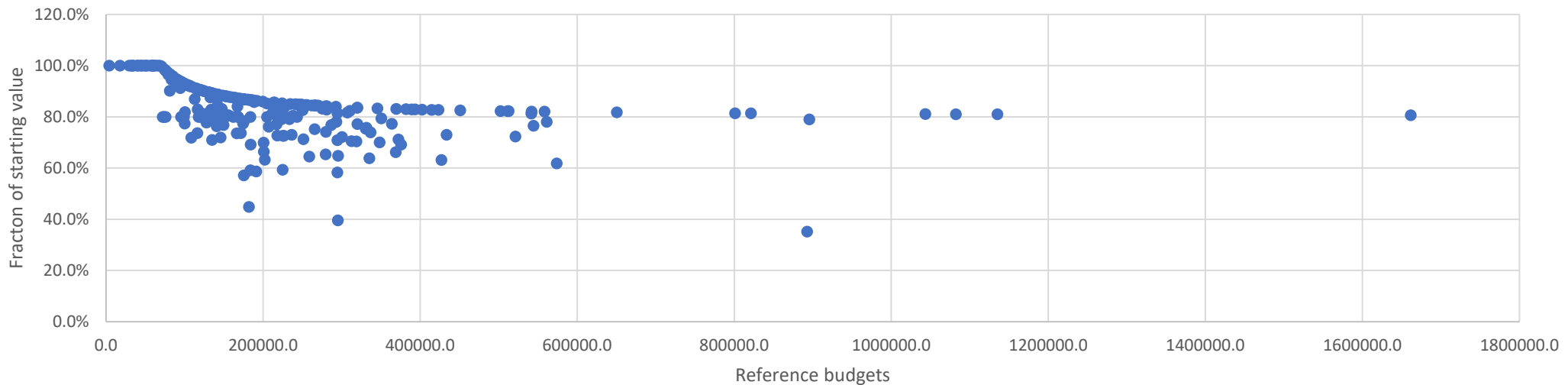
R, p are adjusted to match the total available funding

R can be increased for specific types of program (ie pure parallel)



Worked example

- Cap travel at \$12,000 and publications at \$7,000
 - Reduces total budget request by \$4 million and \$1 million respectively
- Apply adjustments to define reference budgets for each program
 - Reduces the total funding request from \$99.1 million to \$75.6 million
- Set baseline funding level $B = \$70,000$; $\langle \$/\text{hour} \rangle = 14,500$
 - GO programs: factor, $R = 2.5$; power, $p = 1.2$; $R_{\text{par}} = 6$
 - AR programs, $C = 0.8$
- Total allocation = \$59.1 million

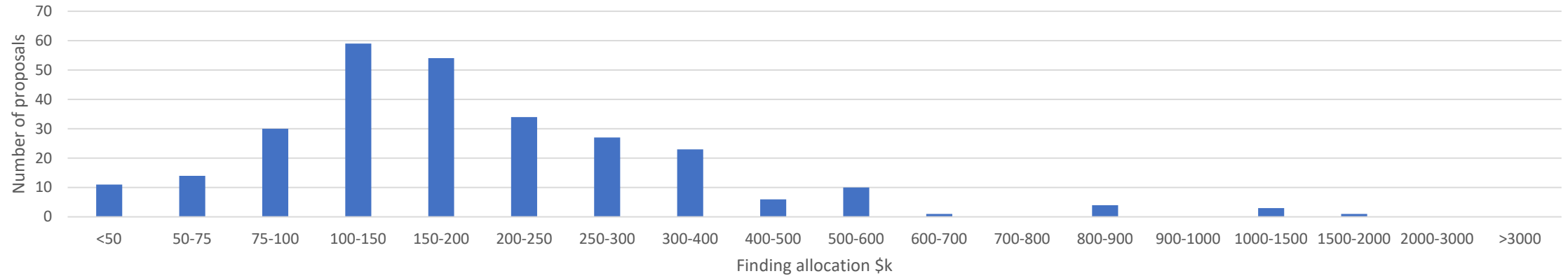




Budget distribution

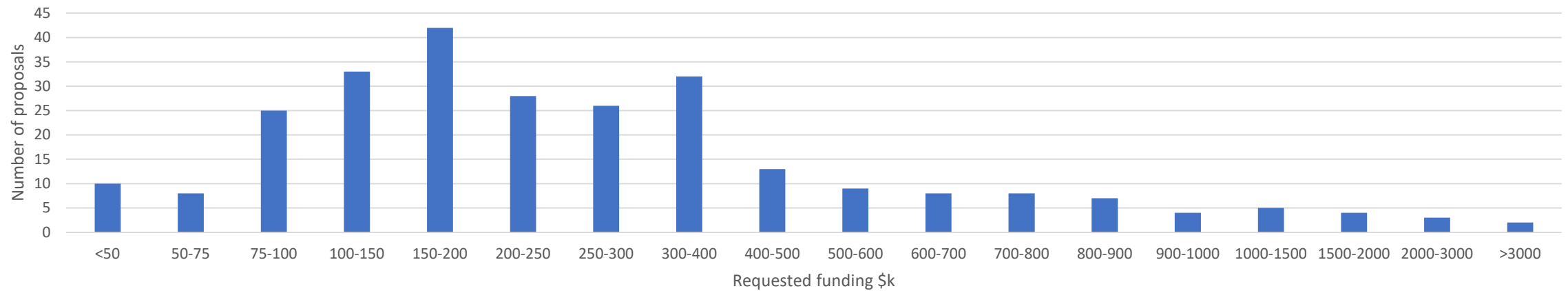
Adjusted budgets

Total = \$60 million



Initial Budget requests

Total = \$99.5 million





Summary

- The Cycle 1 Task Force assessment is complete
 - Characterised the level of funding required to achieve the JWST science goals
 - Provided assessments of the appropriate level of funding for large (budget) programs
 - Provided guidance on appropriate means of scaling other budget
- Based on the Task Force recommendations, we have developed a process to match the available funding levels
 - Cap travel and publication costs
 - Foundation funding for all programs
 - Apply a progressive scaling to apply smaller reductions to programs that are less expensive in \$/hour
- We ask the JSTUC to endorse this process



Addendum

News items

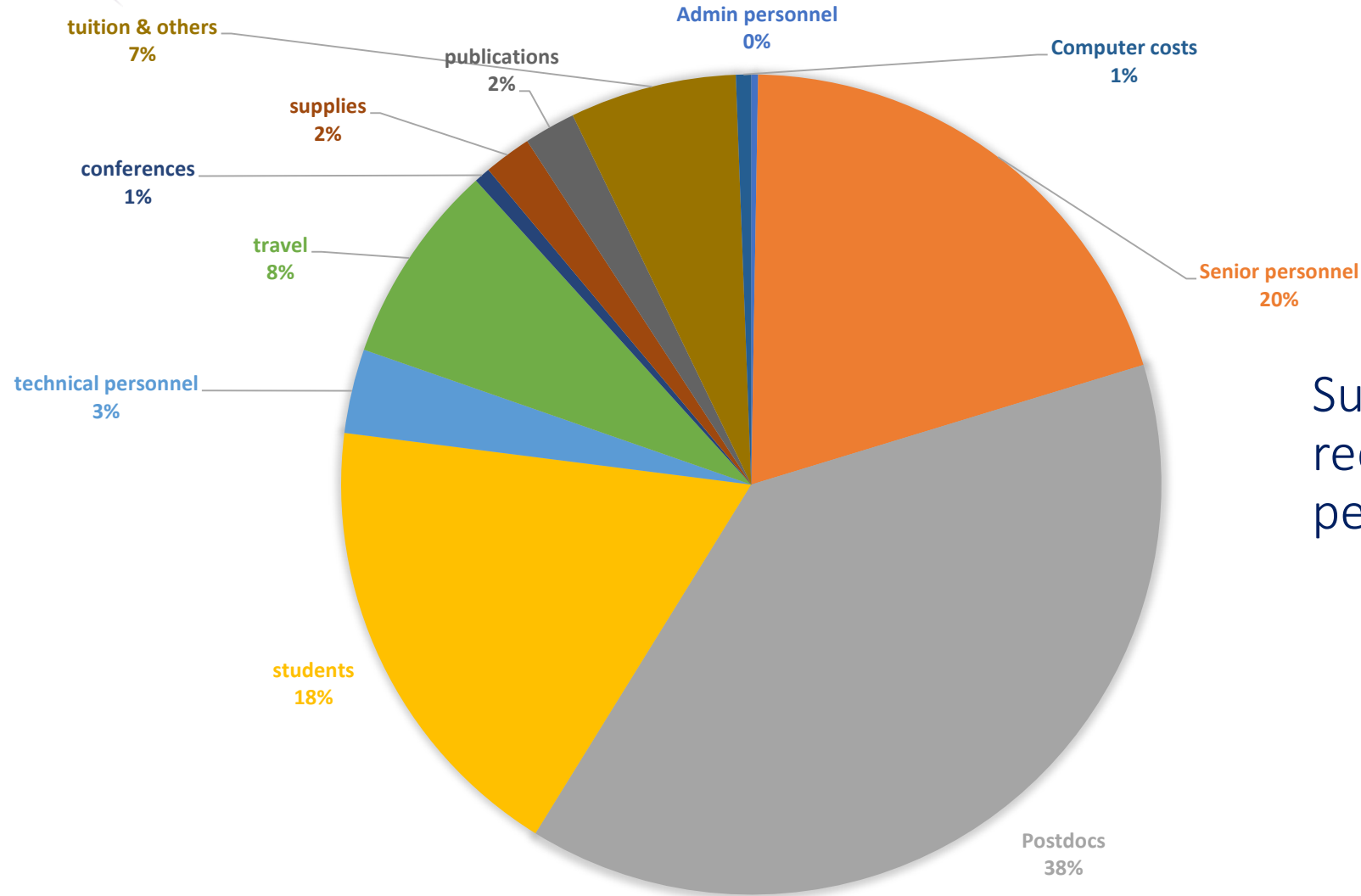
- We are exploring the potential for joint ALMA/JWST proposals
 - This would be a reciprocal arrangement to avoid double jeopardy comparable with HST/Chandra or HST/NRAO joint programs
 - JWST TAC can allocate from a pool of ALMA time
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 - Currently working on developing appropriate protocols with ALMA Observatory
- We are also exploring the potential for the JWST TAC awarding Keck time
 - This would be a one-sided arrangement – no JWST time awarded by Keck TAC, as with HST/NOIRLab joint programs
 - Keck time would be drawn from the NASA Keck allocation
 - Currently developing appropriate protocols with NEXSci

A deep space photograph featuring a vast field of stars, many with prominent diffraction spikes. A large, intricate nebula with blue and brownish hues is visible on the left side. The word "Backup" is centered in a white, sans-serif font. A thin orange horizontal line spans the width of the image just below the text.

Backup



JWST Cycle 1 funding requests by category



Substantial majority of requested funding is for personnel support (>80%)



Task Force Recommendations for Cycle 2

- Provide budget preparation guidelines for Cycle 2 investigators; those should include recommendations to
 - Provide well-defined science goals and a clear work-plan in the TAC proposal;
 - Map all activities proposed for funding against the work-plan and specific science goals in the TAC-approved proposal;
 - Define clear roles and responsibilities for all investigators, notably including foreign co-I contributions – avoid or strongly justify apparently-redundant effort;
 - Clarify the period of performance – the expectation is 2 years of work effort that can be spread over 3 calendar years.
- Simplify how the budget handles travel and publications – these could be given as fixed costs, or as a fraction of total budget
- Low priority for support of ancillary observations
- Provide the community with an expectation for the average funding rate (e.g. <\$>/hour>). Proposers should be required to justify going above that level



GO program funding rate

