

Final Report on SAG 20: Strategies for Mitigating the Impact of the JWST Delay on Exoplanet Science

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The scope of this SAG was very limited: Gather and summarize input from the exoplanet community regarding how the JWST launch delay will affect their science, and the overall scientific return of JWST, and what actions (funded or unfunded) taken by NASA between now and the JWST launch could mitigate the impact on the community's JWST science return. We gathered this information via a GoogleForms Survey, distributed to the ExoPAG community through the ExoPAG mailing list and social media.

The survey gathered 34 responses in total, although not every person answered every question. Below is a brief summary of the survey responses.

- Most respondents (28/33) felt that the JWST delay impacted their immediate (< 3 year) science plan in a **negative or neutral way**.
- The impact on the JWST delay on respondents' longer-term (> 3 year) science plans was also negative -- on a scale of 1 to 5, with 1 being the most negative, 19/33 respondents rated the impact at 1 or 2.
- Respondents suggested that the JWST delay made the following types of science programs were made **more difficult or costly**: mid-IR spectra of white dwarf debris disks, follow-up of recently-discovered transiting exoplanets (either to refine the ephemeris or combine JWST with HST), and WFIRST's Coronagraphic Instrument (CGI) (e.g., funding would have to be redirected to JWST).
- Respondents suggested that the JWST delay provided **more time to prepare for/work on** the following types of science programs: the best transiting exoplanets for JWST atmospheric studies (especially from TESS, this was mentioned about a dozen times), Spitzer observations and analysis, in general developing theory and data analysis techniques, non-exoplanet projects, ground-based high resolution exoplanet atmosphere measurements, exoplanet emission and transmission spectrum modeling, and ALMA observations.
- Respondents suggested that the following **programs could help mitigate the impact/take advantage of** the JWST delay on their science: Spitzer extension, TESS extension, SOFIA/HIRMES time, IRTF time, ground-based (NIR) observations at high spectroscopic resolution, and generally more time being awarded on existing facilities for exoplanet observations.
- Respondents suggested that the following **additional efforts/resources could help mitigate the impact/take advantage of** the JWST delay: community organizing efforts for building compelling large-scale programs for when JWST is operation, increased education and training in modern statistical and machine learning methodology, and

more readily available atomic and molecular absorption cross-sections as a function of wavelength, temperature, and pressure.

- Respondents wrote that they were **adjusting their science programs** to help mitigate/take advantage of the JWST delay by: working on other things, collecting more JWST-worthy targets, shifting effort to other platforms (HST, IRTF, SOFIA, ALMA, Gaia, ground-based facilities), shifting effort to non-exoplanet projects, and shifting effort to theory investigations.
- Most respondents said that both **immediate (< 3 year) and long term (> 3 year) funding** for themselves, their postdoc, or their graduate students was impacted by the JWST delay. The most common magnitude of funding impact was a few tens of thousands of dollars.
- Respondents wrote that they were **adjusting their funding programs** to help mitigate/take advantage of the JWST delay by: not taking graduate students and/or postdocs, and seeking funding for other projects/using other facilities (e.g., HST, ADAP).
- Respondents suggested the following other sources of NASA funding that could help mitigate the financial impact of JWST on their work: expanding XRP, ADAP, HST, and Spitzer.

Topics that respondents added that they thought we forgot/did not cover included:

- specific actions that the JWST project could take,
- the limited amount of data that JWST would provide to the full exoplanet community, even when it launches, and
- funding for purpose-built, ground-based, exoplanet characterization instruments to take pressure off of JWST.

These results were presented by Drake Deming to the ExoPAG on June 23, 2019, and also summarized by Michael Meyer in his APAC presentation on October 28, 2019. No strong criticism was recorded.