

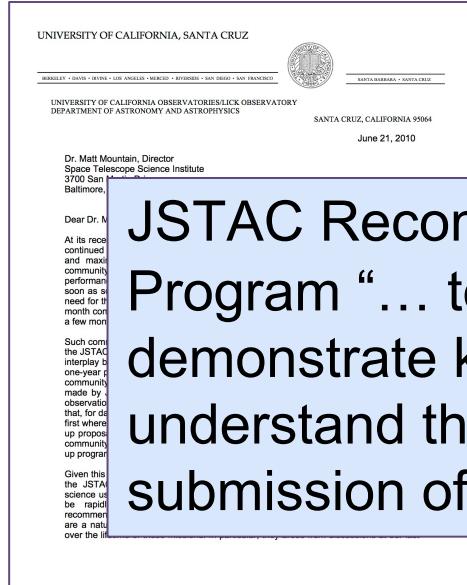
The Transiting Exoplanet
Community Early Release Science
(ERS) Program

**ERS Pre-Launch Data Hackathon
Welcome + Overview**



What is the
Early Release
Science
Program?

JWST Advisory Committee (JSTAC)



...with the Institute, and suggestions based on their experience. They have developed within the context of the previous JSTAC letter (mentioned above) and re 1 (see below).

June 21, 2010

JSTAC's recommendations are:

Dr. Matt Mountain, Director
Space Telescope Science Institute
3700 San Martin Drive
Baltimore,

Dear Dr. Mountain,
At its recent meeting, the JSTAC recommended that the first cycle of science proposals be submitted no later than January 1, 2011. This recommendation was made to allow the community to begin planning for the first cycle of observations. The JSTAC also recommended that, for the first cycle, the proposal deadline be set at the end of the month following the submission of the first proposals.

Such a recommendation is appropriate for one-year programs. In the case of a community-made proposal, it is recommended that, for the first cycle, the proposal deadline be set at the end of the month following the submission of the first proposals.

Given this recommendation, the JSTAC science users will be rapidly rewarded by the community. Such rewards are a natural part of the life of a program.

JSTAC Recommends an Early Release Science Program "... to obtain images and spectra...to demonstrate key modes...to enable the community to understand the performance of JWST prior to submission of...Cycle 2 proposals..." JSTAC 2010

JSTAC Large programs have zero proprietary period. The JSTAC extensively addressed the issue of proprietary time and recognizes that some classes of programs, even in Large programs, would benefit from a scientifically-justified proprietary period. To accommodate observational programs of this nature, the JSTAC recommends that the proposer request a proprietary period in their proposal and a very period in their proposal to the Time Assignment Committee (TAC). If so recommended by the TAC, the proposing team could be allocated a proprietary period by the Director, consistent with current procedures and policies.

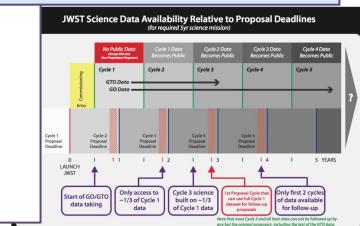
2

Programs have explicitly been non-proprietary, with full and open access. This broadens the success of the wholly non-proprietary HST Treasury, Chandra, and Legacy Science programs, and the value of unrestricted access to the datasets. These open datasets have also provided incentives for timely and increased competition.

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2

JWST Science Data Availability Relative to Proposal Deadlines
(for required for science mission)



4



What is the
ERS Program
for Transiting
Exoplanets?

Strategic Goals

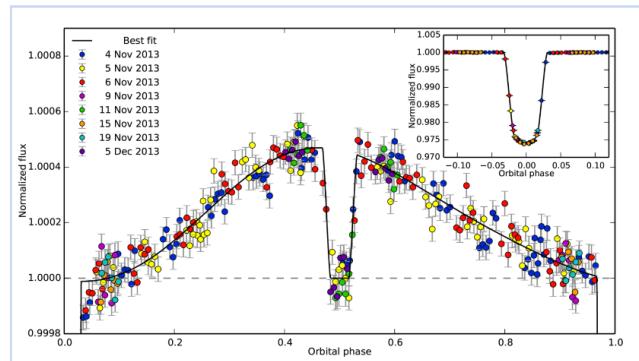
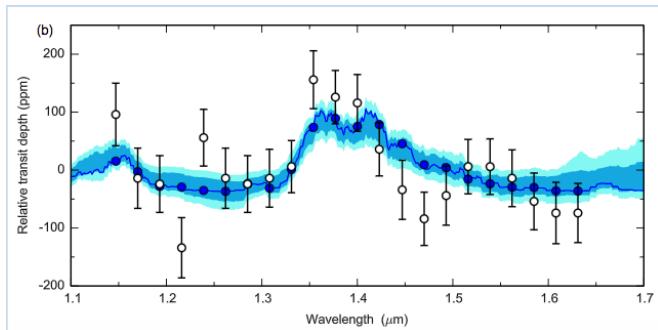
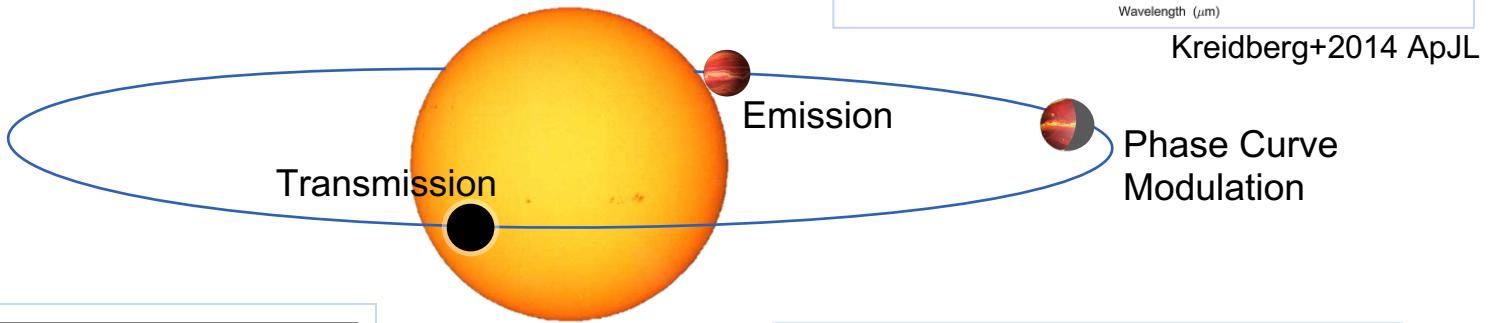
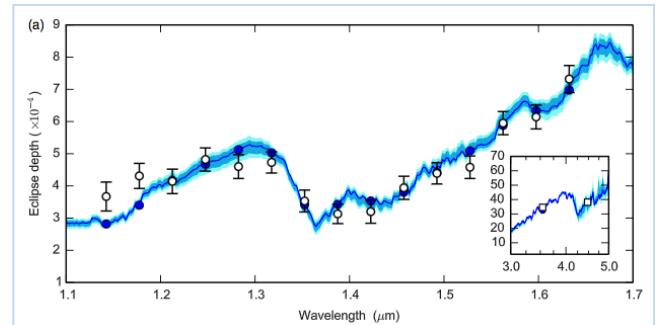
1. Observe All Transiting Planet Phenomena
2. Test All Observing Modes
3. Enable Diverse Science
4. Target Benchmark Exoplanets

Full Program Description:

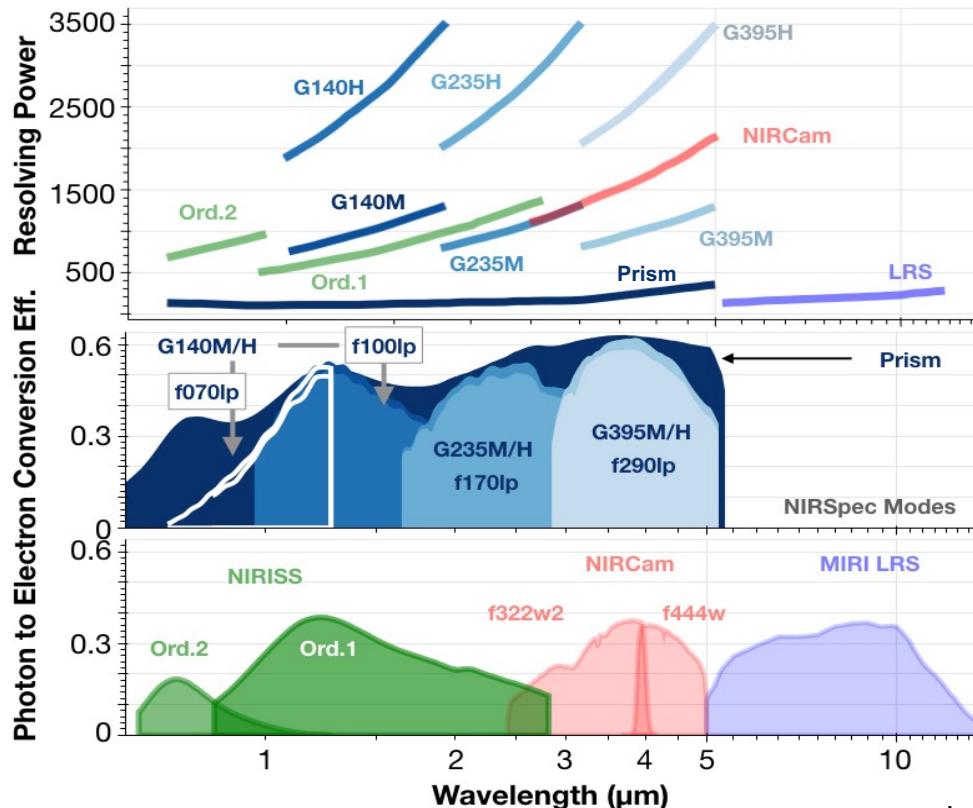
Bean et al. 2018

<https://ui.adsabs.harvard.edu/abs/2018PASP..130k4402B/abstract>

Diversity of Phenomena

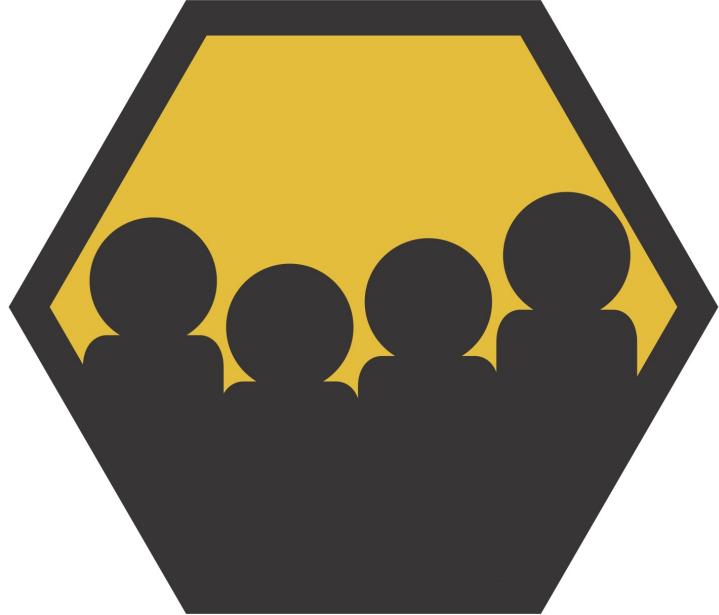


All Spectroscopic Observing Modes



	Mode	Approx. 2 group saturation
NIRSpec	Prism	$J > 10.5$
	Grisms	$J > 6$
NIRISS	Substrip 256	$J > 8$
	Substrip 96	$J > 7$
NIRCam	Grisms	$L > 3.7$
MIRI	LRS	$K > 4$

Image Credit: Natasha Batalha/Pandexo



What data
sets are we
gathering?

Three Programs

Panchromatic Transmission

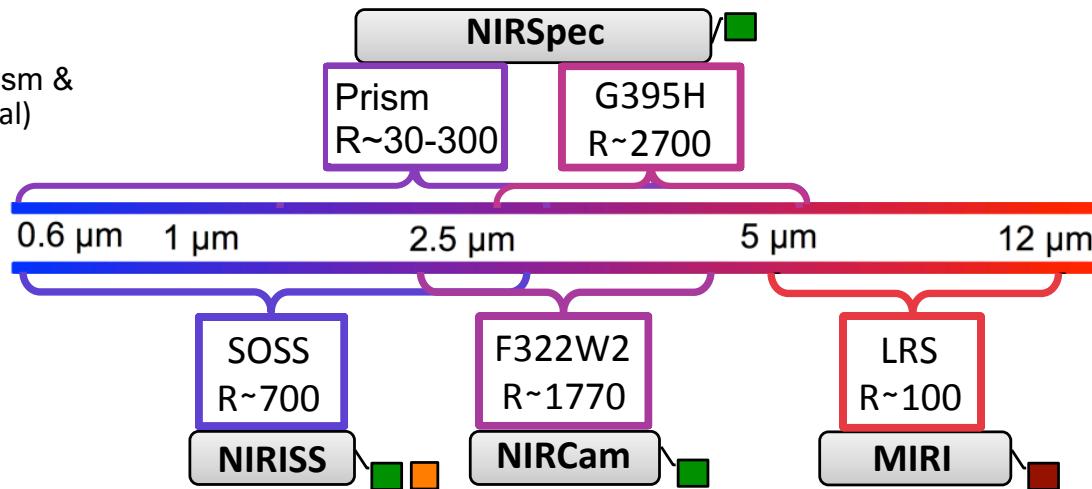
- nominal target **WASP-39b**
- transits with NIRISS/SOSS, NIRSpec/Prism & G395H, and NIRCam/F322W2 (four total)

MIRI Phase Curve

- nominal target: **WASP-43b**
- one continuous, full-orbit observation covering two secondary eclipses and one transit with MIRI/LRS

Bright Star's Planet Emission

- nominal target: **WASP-18b**
- one secondary eclipse using NIRISS/SOSS



ERS 1366

Tue Jun 22 13:11:21 GMT 2021

Principal Investigator: Natalie Batalha
PI Institution: University of California - Santa Cruz
Investigators ([xml](#))

Title: The Transiting Exoplanet Community Early Release Science Program

Cycle: 1

Allocation: 80.5 hours

Exclusive Access Period: 0 months

Program Status: [Implementation](#)

Program Coordinator: Weston Eck weck@stsci.edu 410-338-6858

MIRI Reviewer: Greg Sloan gcsloan@stsci.edu (667) 218-6455

NIRCAM Reviewer: Brian Brooks bbrooks@stsci.edu (410) 338-4504

NIRISS Reviewer: Arpita Roy aroy@stsci.edu 7172013267

NIRSPEC Reviewer: Stephan Birkmann birkmann@stsci.edu (410) 338-2609

Program Contents

- [APT File](#)
- [Public PDF](#)

[Visit Status Information](#) ([xml](#))

Requests

- Request an observing change.
- Report a duplication of an observation in this program by another JWST program.

Program Information:

Includes link to:

- [APT File](#)
- [Observing Summary](#)

<https://www.stsci.edu/jwst/science-execution/program-information?id=1366>

Visit Status Report for 1366

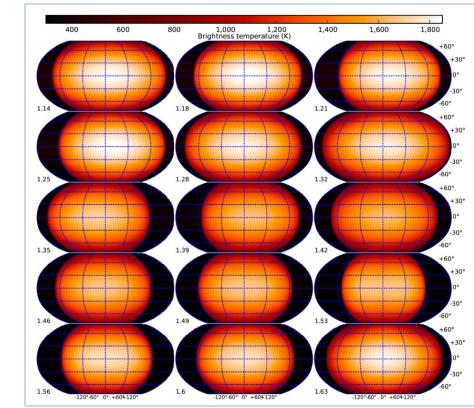
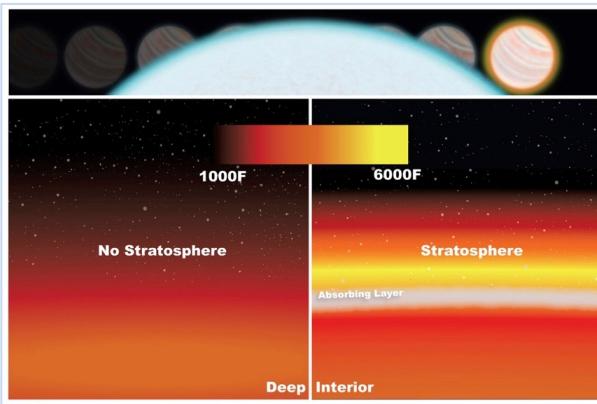
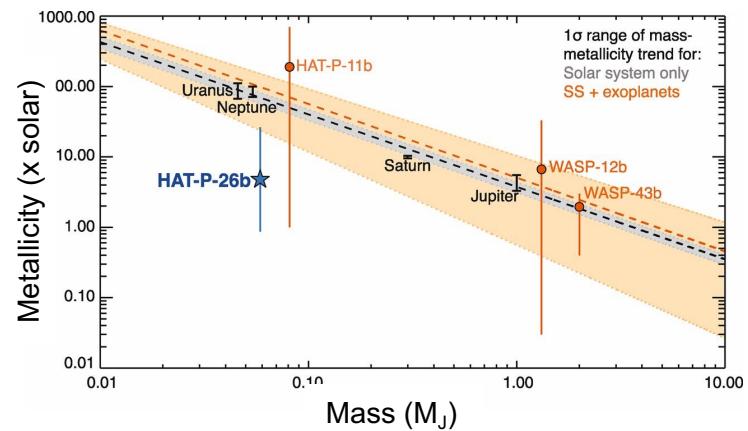
Tue Jun 22 13:10:35 GMT 2021

Observation	Visit	Status	Targets	Template	Hours	Plan Windows
1	1	Implementation	WASP-39	NIRISS Single-Object Slitless Spectroscopy	10.67	Ready for long range planning, plan window not yet assigned
2	1	Implementation	WASP-39	NIRCam Grism Time Series	10.44	Ready for long range planning, plan window not yet assigned
3	1	Implementation	WASP-39	NIRSpec Bright Object Time Series	10.50	Ready for long range planning, plan window not yet assigned
4	1	Implementation	WASP-39	NIRSpec Bright Object Time Series	10.50	Ready for long range planning, plan window not yet assigned
11	1	Implementation	WASP-43	MIRI Low Resolution Spectroscopy	29.60	Ready for long range planning, plan window not yet assigned
21	1	Implementation	WASP-18	NIRISS Single-Object Slitless Spectroscopy	8.74	Ready for long range planning, plan window not yet assigned



What science
does
ers-transit
enable?

Example Science Drivers

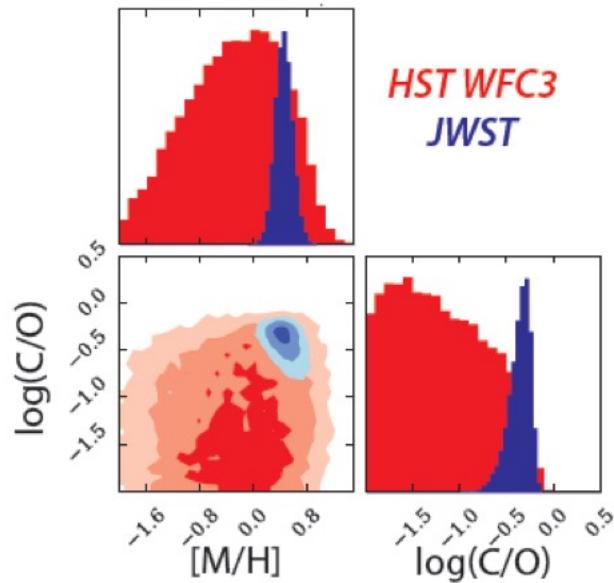
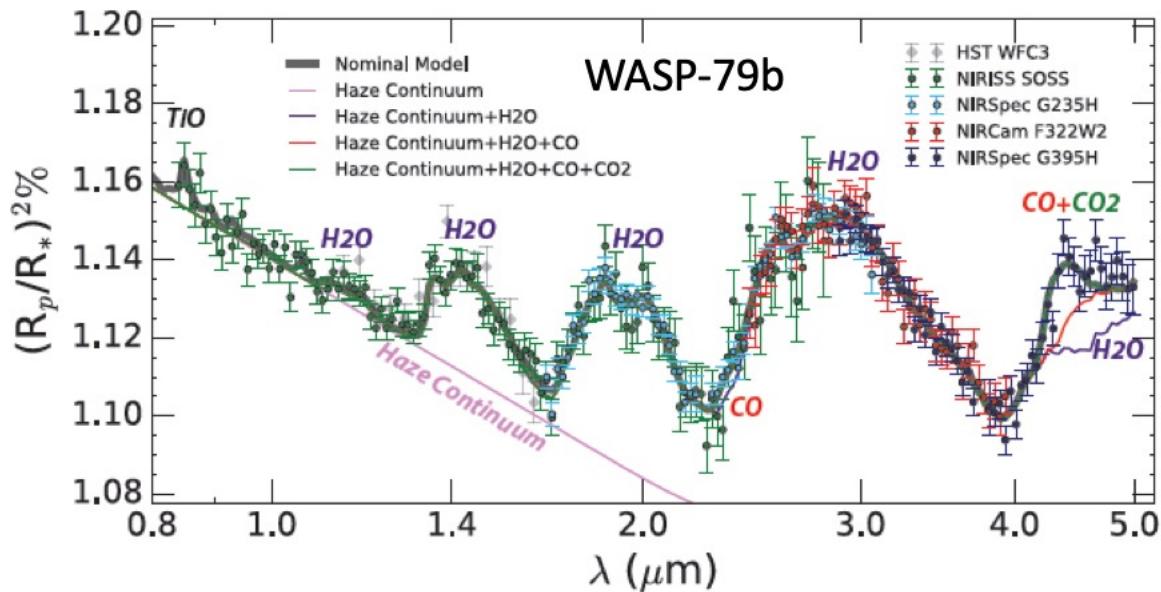


Molecular Abundances
C/O
Metallicity

Temperature-Pressure
Profiles

Longitudinal Maps
Climate

Transformational Capabilities

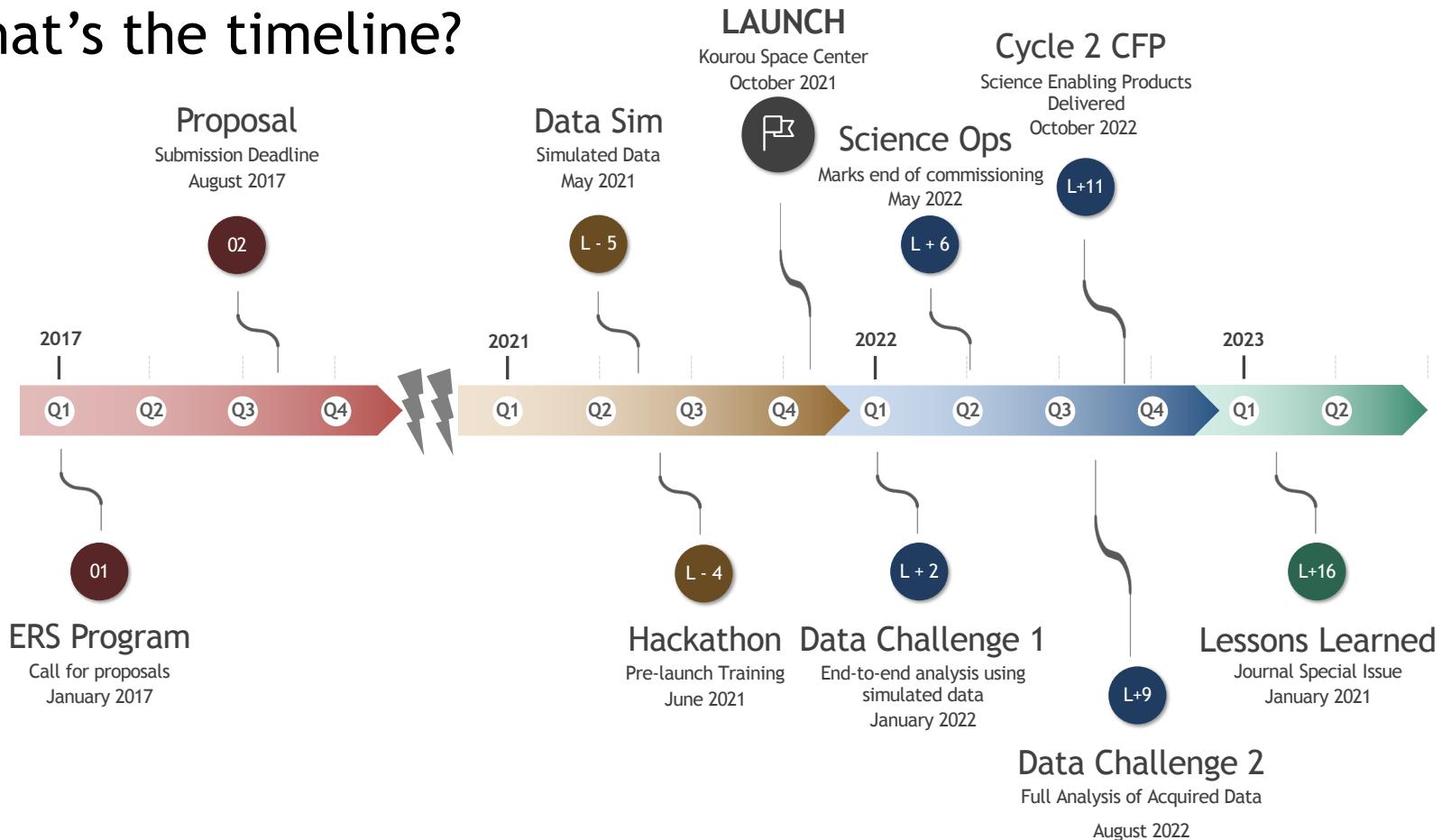


Bean+2018



Important
Milestones

What's the timeline?



Where do we want to be by early 2022?

High-fidelity simulated data products for all observing modes.

Multiple open-source pipelines at all stages of data analysis, from spectral extraction to retrieval.

Defined performance metrics for model intercomparison.

Lessons learned from Data Challenge #1 that lead to improvements in the analysis of the ERS data and the resulting deliverables in Data Challenge #2



In 1921, the best photometry had 10^{-2} relative precision.

In 2021, we're aiming for spectrophotometry at the 10^{-5} relative precision. It's going to take our community working together!



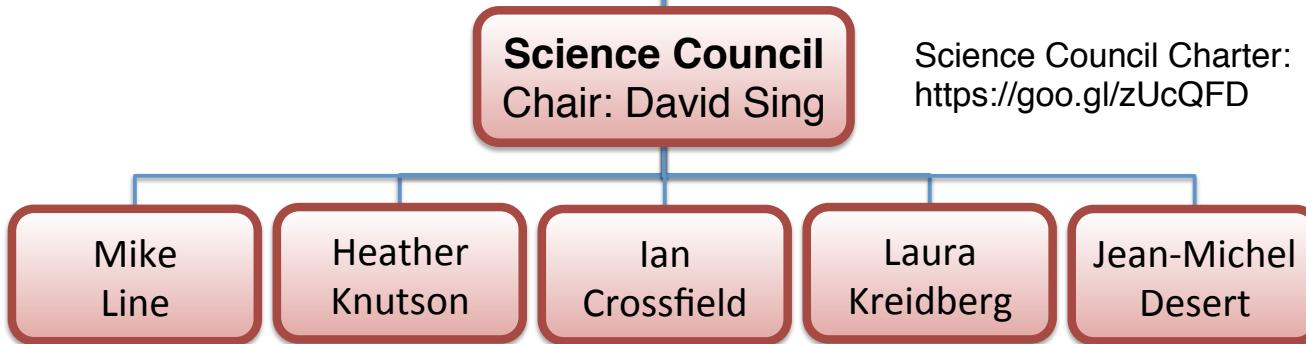
How to get
involved

What does it mean to be on the ERS team?

- Proposal effort was an open process that resulted in 61 co-I's and 43 collaborators; 54% US, 46% EU & CA; 58% observers, 33% theorists
- Continued commitment to open source, open science
- ERS data have zero proprietary period
- Anyone can join mailing list & slack channel & working groups
- Events are open to all
- Co-authorship on papers is open to those who articulate their specific contributions during any phase of the program (proposal, pre-launch, post-launch)



Science Council Charter:
<https://goo.gl/zUcQFD>



Transmission WG

Hannah Wakeford
David Sing
Kevin Stevenson
42 members

Bright Star WG

Björn Benneke
Jacob Bean
Eliza Kempton
14 members

MIRI WG

Laura Kreidberg
Nicolas Crouzet
Julie Moses
48 members

Data Challenge WG

Z. Berta-Thompson
Mike Line
M. Lopez-Morales
34 members



<https://ers-transit.github.io>



Supplemental Slides

UNDERSTANDING THE CAPABILITIES OF THE NEXT GENERATION TELESCOPE

