



# ***AstroData2020s Science Workshop***

***Dec 4th - 7th 2018  
Pasadena, Ca.***

***Science Opportunities  
with Astrophysics  
Archives of the Next Decade***

***meeting.ipac.caltech.edu/astrodata2020s***

## Goals of this Meeting

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Caltech/IPAC-IRSA







# Welcome to IPAC

A photograph of server racks in a data center, with the text 'Archives & Data Science' overlaid in white.

Archives & Data Science

A photograph of a control room with multiple computer monitors displaying data, with the text 'Missions & Centers' overlaid in white.

Missions & Centers

A photograph of a complex spacecraft component, possibly a camera or sensor, with the text 'In Development' overlaid in white.

In Development

A photograph of an open book or document with a yellow starburst graphic on the page, with the text 'Mission Studies & Proposals' overlaid in white.

Mission Studies & Proposals



# Welcome to IPAC

NASA/IPAC Infrared Science Archive (IRSA)  
Keck Observatory Archive (KOA)  
NASA Exoplanet Archive  
NASA/IPAC Extragalactic Database (NED)

## Archives & Data Science

NASA Exoplanet Science Institute  
NEOWISE  
SOFIA  
Spitzer  
ZTF

## Missions & Centers

Euclid  
LSST  
NEOCam  
Thirty Meter Telescope  
WFIRST

## In Development

Origins Space Telescope

Space Infrared Telescope for Cosmology  
& Astrophysics (SPICA)

## Mission Studies & Proposals



# Ultimate Goal for this Meeting

Make sure the Decadal Survey Committee understands which science opportunities of the 2020s will require advanced “Data Facilities”.



# Decadal White Papers

[http://sites.nationalacademies.org/SSB/CurrentProjects/SSB\\_185159](http://sites.nationalacademies.org/SSB/CurrentProjects/SSB_185159)

First Call:

Science white  
papers due  
Feb 19.

Additional  
call(s):

*...we anticipate that there will be one or more additional call(s) for white papers on other essential topics, such as issues related to the state of the profession and to missions, projects, and technology development, once the survey begins.*



# The Case for Advanced Data Facilities

Not enough:  
Expect the unexpected.  
If you build it, they will come.  
Trust us.



## One Sceptic's View Point

*“Without science white papers to make the case, why should that technology be seen as anything more than geeks playing in a sandbox?”*



# Approach to White Papers

1. Identify the science opportunities that are at risk if we do not make advancements.

2. Identify the most compelling advancements.

3. Identify science white papers that should carry messages about Data Facilities.

4. Respond to future calls by referring back to the science white papers.





# Complementary Efforts

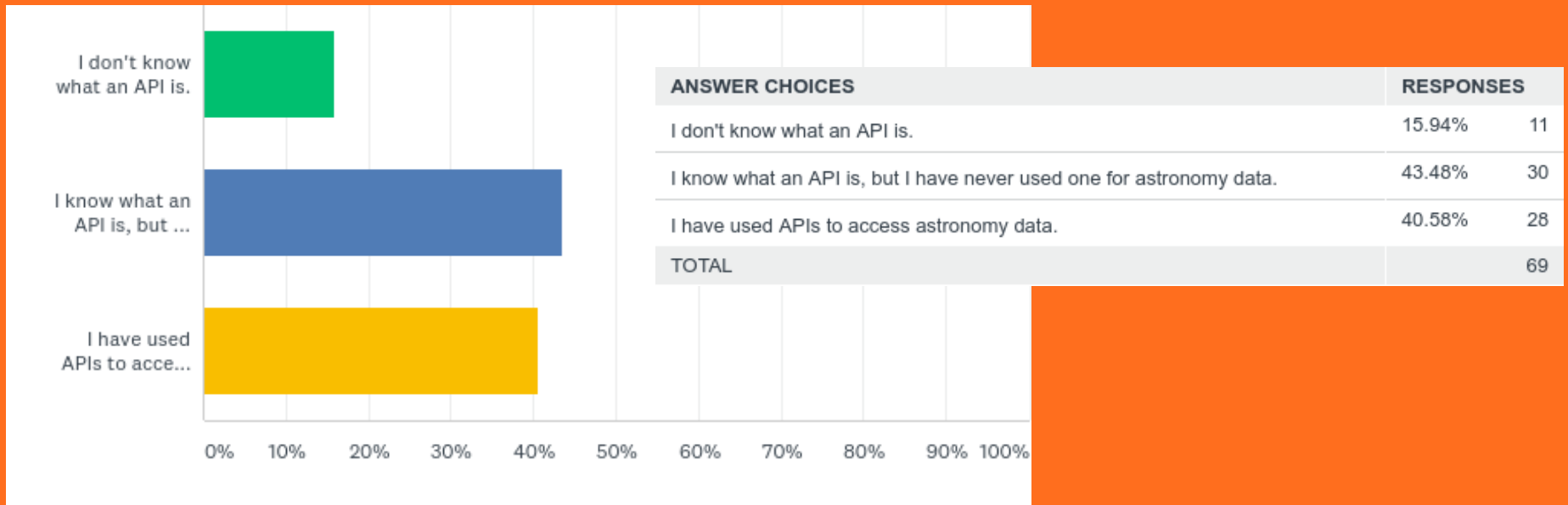
- SnowPAC meeting last March  
<http://www.physics.utah.edu/snowpac/>
- AstroSlack2020s
- Winter 2018 Astropy coordination meeting  
<https://github.com/astropy/astropy/wiki/TucsonMeeting2018>



# Users' View Points

Q10: What is your experience with Application Program Interfaces (APIs)? Check all that apply.

• Answered: 69 Skipped: 3

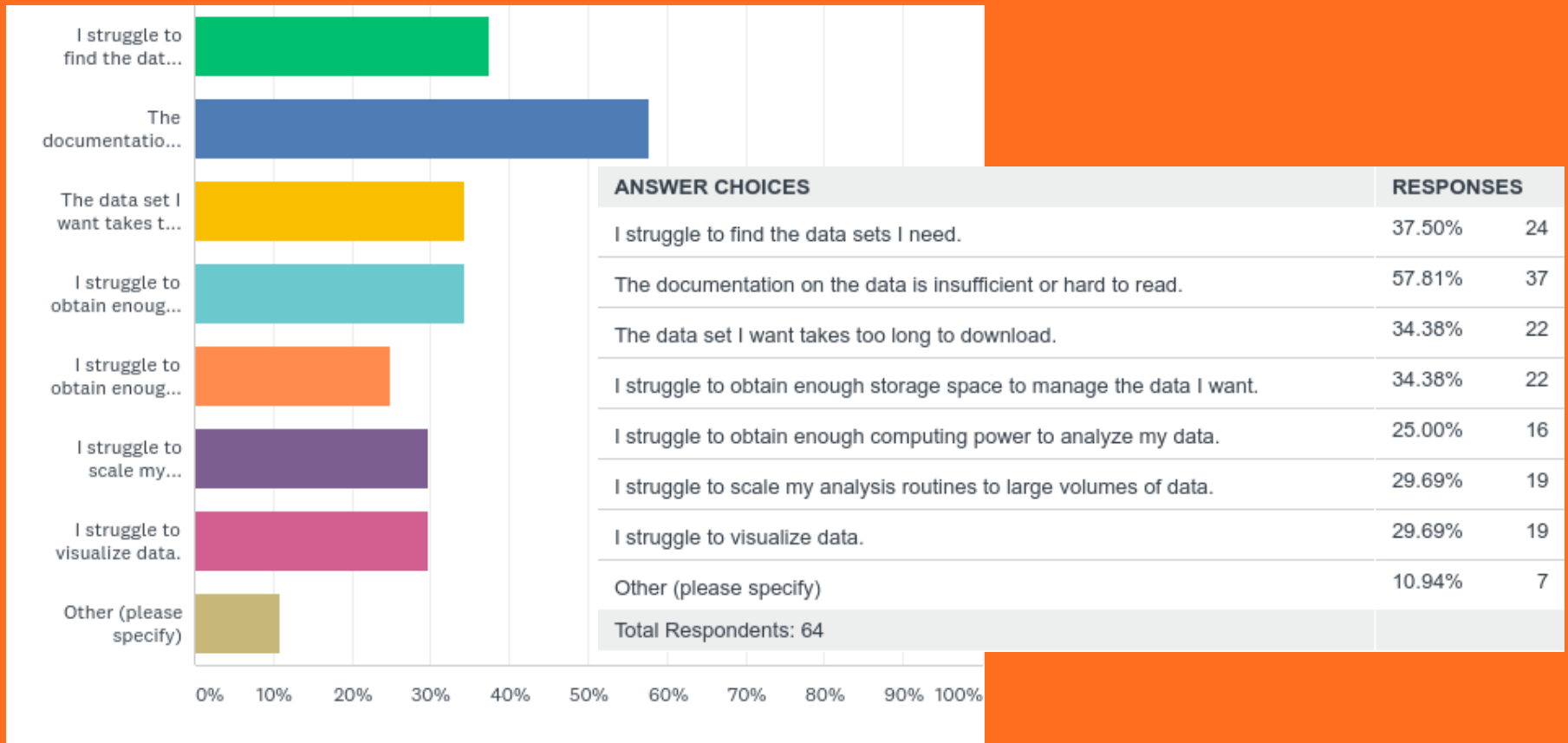




# Users' View Points

Q14: Which of the following problems have you encountered when dealing with astronomical data sets?

Answered: 64 Skipped: 8

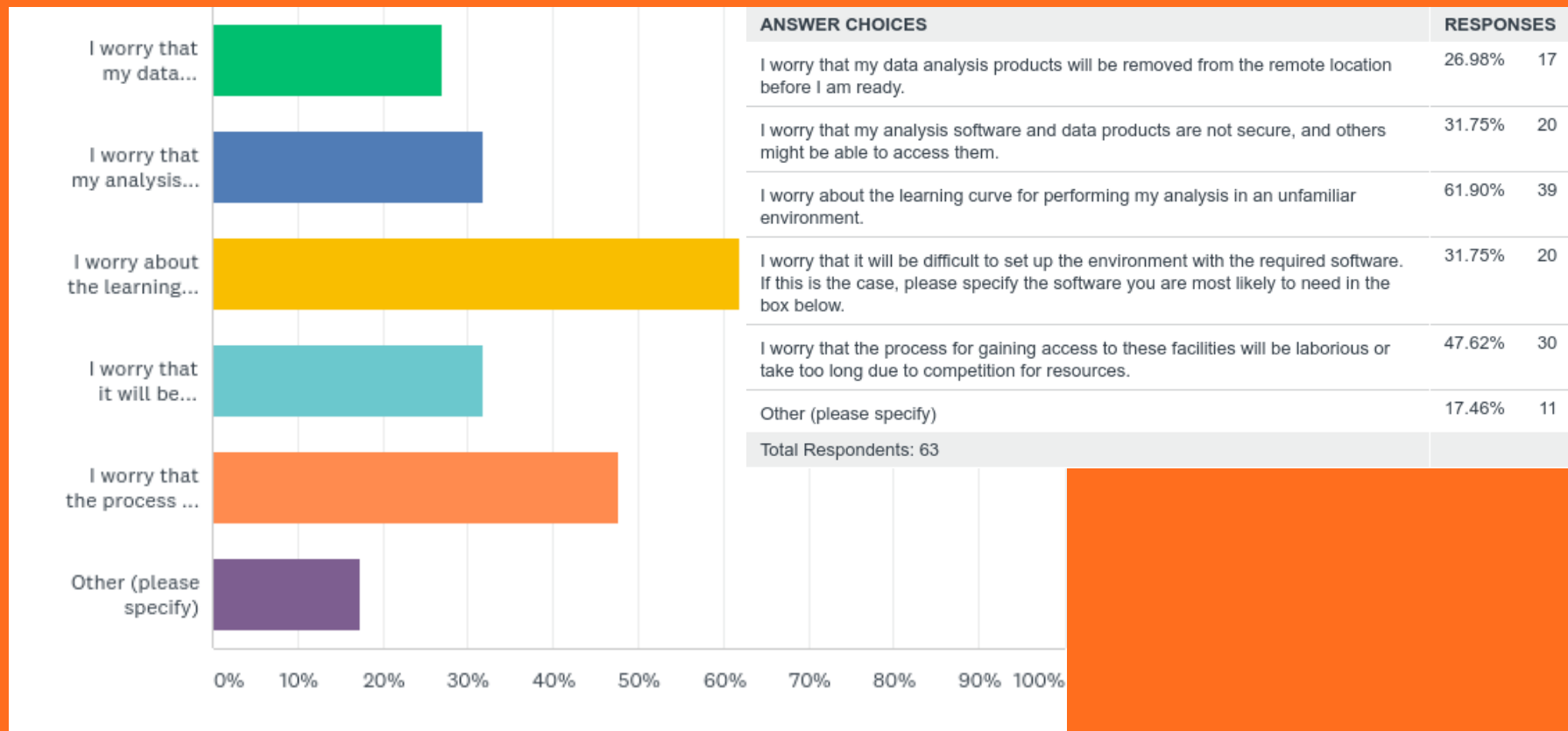




# Users' View Points

Q16: What concerns do you have uploading analysis software to a remote location and running it close to large datasets of interest ?

Answered: 63 Skipped: 9





# Archive / Data / Software Concepts

Science Platforms

Thematic Archives

Cloud Computing

Machine Learning

Software Support,  
Sustainability & Open  
Source

Interoperability



# Archive / Data / Software Concepts

## Science Platforms

Shift from data warehouses to  
user-focused data & computing  
facilities

Source

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ng

ty



Let's make sure these  
concepts are strongly tied to  
science.



# Agenda

Tuesday, December 4	Wednesday, December 5	Thursday, December 6	Friday, December 7
	8:30 <i>Coffee &amp; pastries</i>	8:30 <i>Coffee &amp; pastries</i>	8:30 <i>Coffee &amp; pastries</i>
	9:00 <b>PLENARY - Room KS-410</b>	9:00 <b>PLENARY - Room KS-410</b>	9:00 <b>PLENARY - Room KS-410</b>
	40 Planetary Systems - A. Wolfgang	40 Reports from parallel sessions	60 Reports from parallel sessions
	40 Stellar Astronomy - L. Hillenbrand	40 How to observe millions of targets every few weeks with thousands of fibers - N. Flagey	30 Science Platforms and Interoperability - G. Dubois-Felsmann
		30 MAST Science Platform Demo - J. Hargis	
	10:20 <i>Break</i>	10:50 <i>Break</i>	10:30 <i>Break</i>
	10:40 <b>PLENARY - Room KS-410</b>	11:10 <b>PARALLEL</b>	10:50 <b>PARALLEL</b>
	40 Star Search: Resolved Stars in the Next Decade - K. Olsen	<i>Room</i> KS-410	<i>Room</i> KS-300
	40 Developing a Standard Model of Galaxies for Cosmology - P. Capak	<i>Session C</i> Galaxies & Cosmology <i>Time Domain</i>	<i>Session F</i> Star Formation Galaxies & Cosmology <i>Time Domain</i>
		KS-415 Science Platforms & Archives	KS-415 <i>Time Domain</i>
			12:20 <b>PLENARY - Room KS-410</b>
			20 Conference Summary - TBC
12:30 <i>Welcoming Coffee</i>	12:00 <i>Lunch (on your own)</i>	12:40 <i>Lunch (on your own)</i>	12:40 <i>Adjourn</i>
1:00 <b>PLENARY - Room KS-410</b>	1:30 <b>PLENARY - Room KS-410</b>	2:00 <b>PARALLEL</b>	
20 Introduction and Logistics - V. Desai	40 Convergence of Large Scale Computing and the Big Data Revolution to realize Multi-Messenger Astrophysics - E. Huerta	<i>Room</i> KS-300	<i>Session D</i> Star Formation
40 Overview of the Decadal Process and "How not to Write a White Paper" - L. Hillenbrand	15 Parallel Session Work Plan - V. Desai	KS-415 Science Platforms & Archives KS-410 <i>Time Domain</i>	
10 Welcome - G. Helou	2:25 <b>PARALLEL</b>		
30 Challenges Facing Current Archives - S. Groom	<i>Room</i> KS-300	<i>Session A</i> Star Formation	
	KS-410 Galaxies & Cosmology KS-415 <i>Time Domain</i>		
2:40 <i>Break</i>	3:10 <i>Break</i>	3:30 <i>Break</i>	
3:00 <b>PLENARY - Room KS-410</b>	3:30 <b>PARALLEL</b>	3:50 <b>PARALLEL</b>	<b>Remote Participation Instructions</b>
40 Science Platforms and Astronomy Data Access in the Era of Cloud Computing - M. Carrasco Kind	<i>Room</i> KS-300	<i>Room</i> KS-300	<i>Plenaries &amp; KS-410 parallels:</i> <a href="https://zoom.us/j/590113905">https://zoom.us/j/590113905</a>
40 Science Impact and Opportunities with Thematic Archives - J. Mazzarella, D. Ciardi	KS-410 Galaxies & Cosmology KS-415 Science Platforms & Archives	KS-410 Galaxies & Cosmology KS-415 <i>Time Domain</i>	KS-300 parallels: <a href="https://zoom.us/j/582605547">https://zoom.us/j/582605547</a> KS-415 parallels: <a href="https://zoom.us/j/586642720">https://zoom.us/j/586642720</a>
40 State-of-the-Art Software and Cyber-infrastructure - B. Galewsky			
5:00 <i>Adjourn</i>	5:00 <i>Adjourn</i>	5:20 <i>Adjourn</i>	
	5:15 <b>RECEPTION</b> -7:00 <b>Avery Courtyard</b>		