



# The Rubin Science Platform and data access - early data previews and releases

Melissa Graham  
Lead Community Scientist for Rubin Observatory

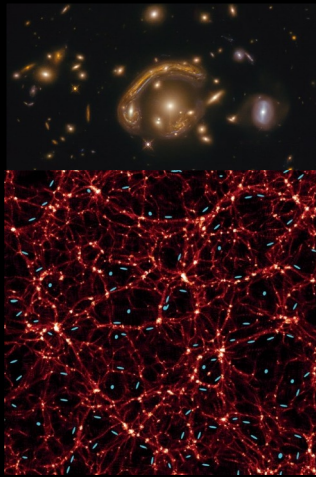
NAM 2022



# Open Astrophysical Questions

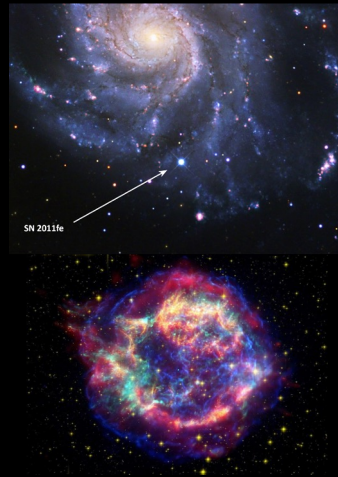
## Cosmology

Understand dark energy and dark matter, and the origin and fate of the universe, by studying gravitational lensing and large-scale structures across cosmic time.



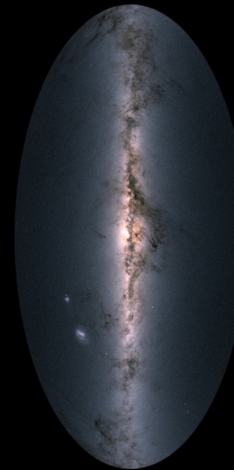
## Transient Phenomena

Understand evolutionary processes by studying how stars and compact objects (e.g., black holes) change brightness, interact, merge, and explode.



## The Milky Way

Understand the structure and evolution of our Galaxy's bulge, disk, and halo – and its satellites and tidal streams – by mapping the stars of the Milky Way.

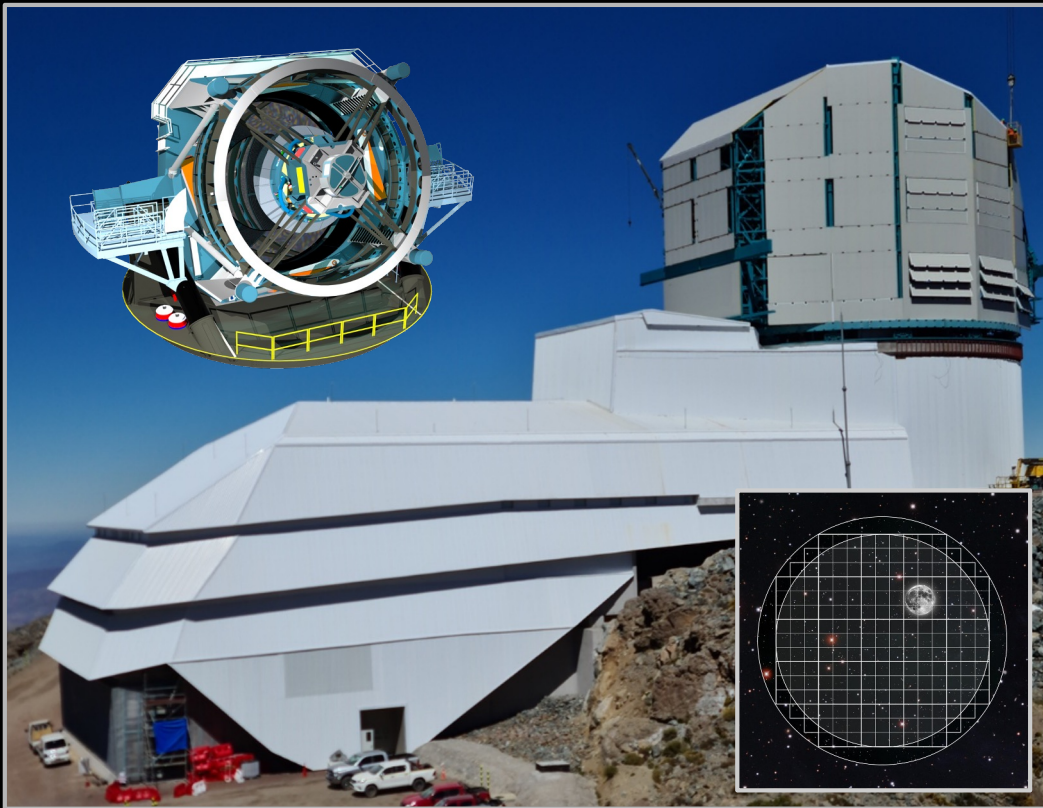


## The Solar System

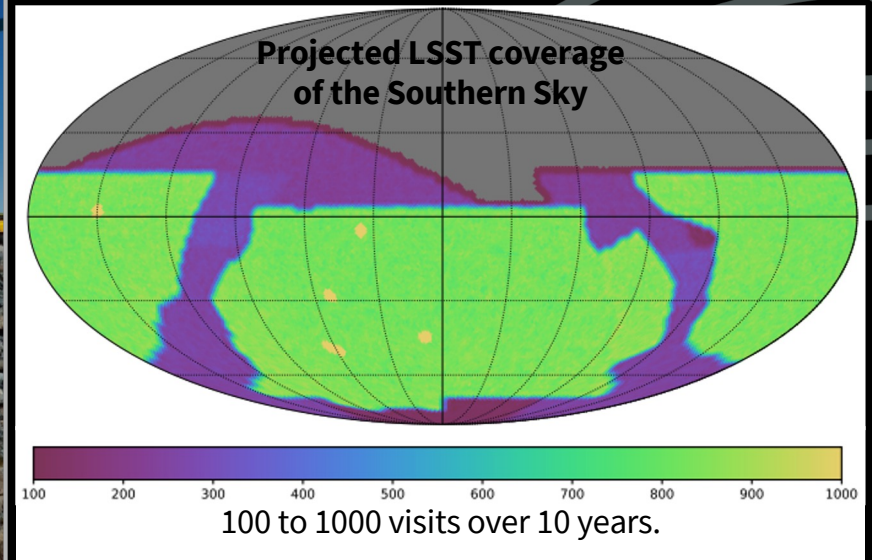
Understand the formation and evolution of our Solar System, and the risk of potentially hazardous asteroids, by making a full inventory of objects down to ~100 m scales.



# Legacy Survey of Space and Time (LSST)



The Vera C. Rubin Observatory, currently under construction in Chile, will reach these next-generation science goals by using its 8.4 m primary mirror, 9.6 deg<sup>2</sup> field-of-view camera, and six optical-NIR filters to execute the 10-year LSST.







# Legacy Survey of Space and Time (LSST)

Billions of stars and galaxies.

Millions of transients, variables, and moving objects.

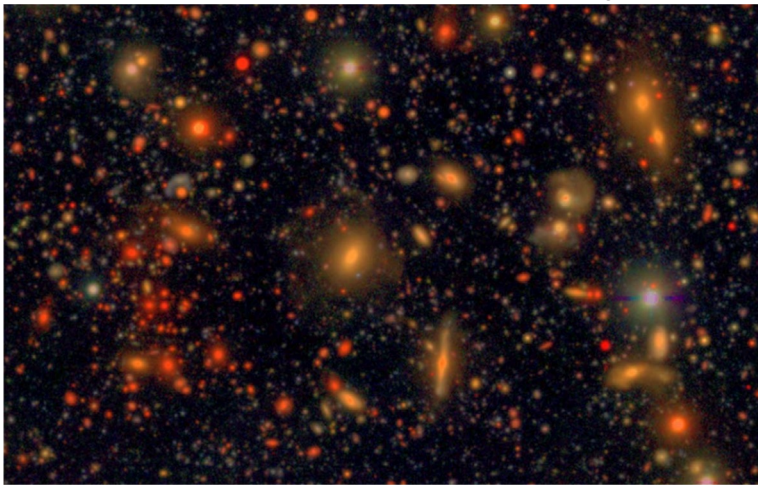
***A data set of unprecedented volume and complexity.***





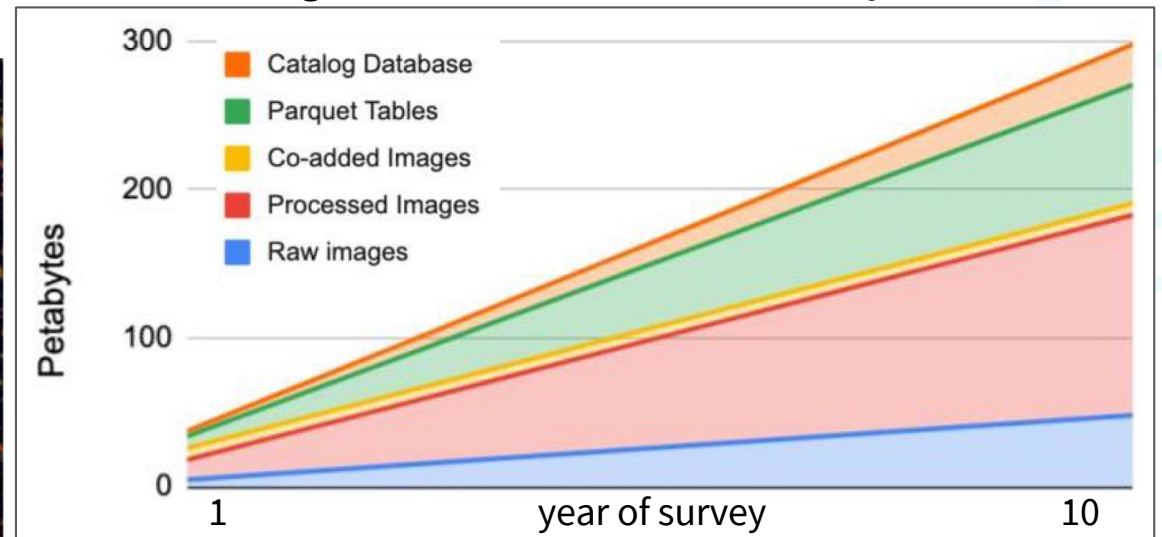
# Legacy Survey of Space and Time (LSST)

The final LSST 10-year sky map will be like having ~3 million of these, tiled over the entire southern sky.



Ivezić et al. 2019

The Rubin Observatory's total data holdings will start at ~40 PB and grow to ~300 PB over the 10-year LSST.



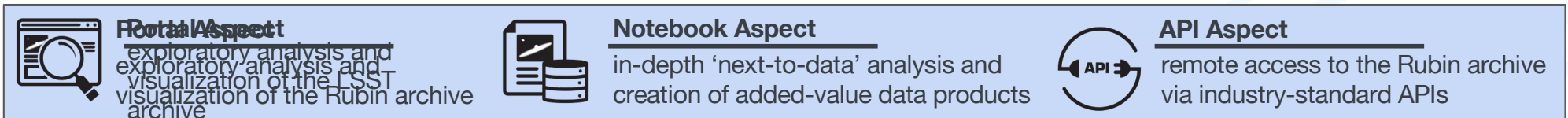
O'Mullane et al. 2021 (RTN-003.lsst.io)



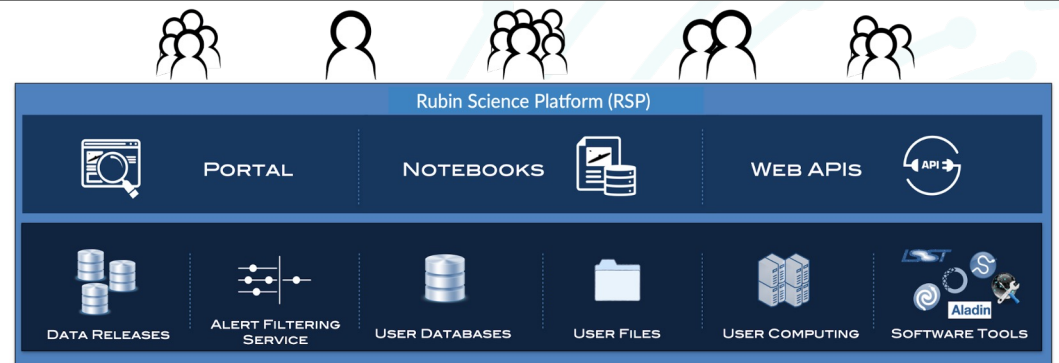
# Rubin Science Platform (RSP)

It will not be possible to download the entire LSST data set, and scientists will need a venue for “**next-to-the-data analysis**”.

The **Rubin Science Platform (RSP)** is a set of integrated web-based applications and services running at the Rubin Observatory Data Access Centers (DACs).



The RSP will include tools to query, visualize, subset, and analyze the full LSST data archives in a stable software environment located “next-to-the-data”, along with storage space, compute resources, and remote access options.





# Rubin Data Policy

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Rubin Data Policy: [ls.st/rdo-013](https://ls.st/rdo-013)

List of international data rights holders: [lsst.org/scientists/international-drh-list](https://lsst.org/scientists/international-drh-list)

**Data rights holders:** scientists (and students) working (or enrolled) at US or Chilean institutes, and named members of the international in-kind contribution teams.

**Proprietary:** data products (images and catalogs) for the first 2 years after release, and access to the Rubin Science Platform.

**Public:** alert packets, post-proprietary data products, and the documentation and support resources such as the Rubin Community Forum ([Community.lsst.org](https://community.lsst.org)).





# The RSP User Experience

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**Goal:** Democratize science by removing barriers to participation in LSST.

- abundant, discoverable documentation of the end-to-end system
- clear entry points and tutorials from beginner through advanced levels
- asynchronous, distributed, friendly support
- a stable software environment with compute resources
- prioritize research inclusion and seed expertise across the community
- enable anyone to become power user and push the cutting edge with LSST



# Rubin Science Platform User Experience

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**Status:** In regular use by hundreds of Rubin staff and community scientists and students participating in Data Preview 0.

- deployed at 12 sites globally (e.g., data facilities, the summit)
- primary community site is the Interim Data Facility (Google Cloud)
  - ~300 users from the science community since June 2021
  - ~300 more new users are joining now (summer 2022)
  - Chile/USA/International ~ 15/45/40
- *thousands* of users by the start of Rubin Operations

*The Rubin Science Platform was deployed at the Interim Data Facility (Google Cloud) primarily to enable Data Preview 0, which serves simulated LSST-like data. It has been terrific for development, integration, and community engagement.*

# Data Previews 0, 1, and 2

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## Goals of the Data Previews

- enable the community to prepare for early LSST science with the RSP
- test integration of the LSST Science Pipelines and the RSP
- use feedback on data products and RSP functionality to inform future development

## Data Previews' Data Sets

- DP0: simulated LSST-like images from the DESC's Data Challenge 2 (DC2)
  - DP0.1: *DC2 as processed by the DESC available in the RSP (June 2021)*
  - DP0.2: *DC2 as reprocessed by Rubin Data Production available in the RSP (June 2022)*
- DP1: data from the commissioning camera ("comcam", single-raft; May 2024)
- DP2: commissioning data from the LSST Science Camera (March 2025)

The exact commissioning surveys remain To Be Confirmed.

Operations start expected October 2024 (first data release, DR1, would be late 2025).



DP0.2 HiPS Coverage Maps now available in the Portal 🚀

[Show more](#)

# Rubin Science Platform

## Portal

Discover data in the browser



[Learn more about the portal.](#)

## Notebooks

Process and analyze LSST data with Jupyter notebooks in the cloud



[Learn more about notebooks.](#)

## APIs

Learn how to programmatically access data with Virtual Observatory interfaces



## TAP Searches

### 1. Select TAP Service ?

LSST RSP <https://data-int.lsst.cloud/api/tap>

### 2. Select Query Type ?

Single Table (UI assisted)
  Edit ADQL (advanced)
  Image Search (ObsTAP)

### 3. Select Table ?

Table Collection (Schema): **dp02\_dc2\_catalogs**  
 Data Preview 0.2 contains the image and catalog products of the Rubin Science Pipelines v23 processing of the DESC Data Challenge 2 simul...

Table: **dp02\_dc2\_catalogs.Object**  
 Properties of the astronomical objects detected and measured on the deep coadded images.

### 4. Enter Constraints ?

Remove 1 filter | 5 of 991 columns selected | Reset Column Selections & Constraints

#### ▼ Spatial ?

Longitude Column:

Latitude Column:

Shape Type:

Coordinates or Object Name:

62.00000, -37.00000 Equ J2000 or 4h08m00.00s, -37d00m00.0s Equ J2000

Radius:

Valid range between: 0.000278 deg and 100 deg

#### Output Column Selection and Constraints

<input type="checkbox"/>	column_name <i>char</i>	constraints <i>char</i>	unit <i>char</i>	ucd <i>char</i>	description <i>char</i>	datatype <i>char</i>	
<input type="checkbox"/>							
<input checked="" type="checkbox"/>	coord_dec		deg		Fiducial ICRS Declination of centroid used for	double	
<input checked="" type="checkbox"/>	coord_ra		deg		Fiducial ICRS Right Ascension of centroid use	double	
<input type="checkbox"/>	detect_isPrimary	=1			True if source has no children and is in the in	boolean	
<input checked="" type="checkbox"/>	g_calibFlux	>360	nanojansky		Flux within 12.0-pixel aperture. Measured on	double	
<input type="checkbox"/>	g_extendedness	=0			Set to 1 for extended sources, 0 for point sou	double	
<input checked="" type="checkbox"/>	i_calibFlux	>360	nanojansky		Flux within 12.0-pixel aperture. Measured on	double	
<input type="checkbox"/>	i_extendedness	=0			Set to 1 for extended sources, 0 for point sou	double	
<input checked="" type="checkbox"/>	r_calibFlux	>360	nanojansky		Flux within 12.0-pixel aperture. Measured on	double	
<input type="checkbox"/>	r_extendedness	=0			Set to 1 for extended sources, 0 for point sou	double	

Search

Cancel

Row Limit:

Populate and edit ADQL



## TAP Searches

### 1. Select TAP Service ?

Using LSST RSP <https://data.lsst.cloud/api/tap> - Replace...

### 2. Select Query Type ?

Single Table (UI assisted)  Edit ADQL (advanced)  Image Search (ObsTAP)

### 3. Advanced ADQL ?

ADQL edits below will not be reflected in **Single Table** view

#### Schema Browser

Schema -> Table -> Column

- + dp02\_dc2\_catalogs
- + ivoa
- + dp01\_dc2\_catalogs
- + tap\_schema
- + uws

#### ADQL Query:

```
SELECT coord_dec, coord_ra, g_calibFlux, i_calibFlux, r_calibFlux
FROM dp02_dc2_catalogs.Object
WHERE CONTAINS(POINT('ICRS', coord_ra, coord_dec), CIRCLE('ICRS', 62, -37, 1))=1
AND (detect_isPrimary =1
AND g_calibFlux >360 AND g_extendedness =0
AND i_calibFlux >360 AND i_extendedness =0
AND r_calibFlux >360 AND r_extendedness =0)
```

Type ADQL text; you can use the Schema Browser on the left to insert table and column names.

Insert fully-qualified column names (recommended for table joins)

#### Popular Functions

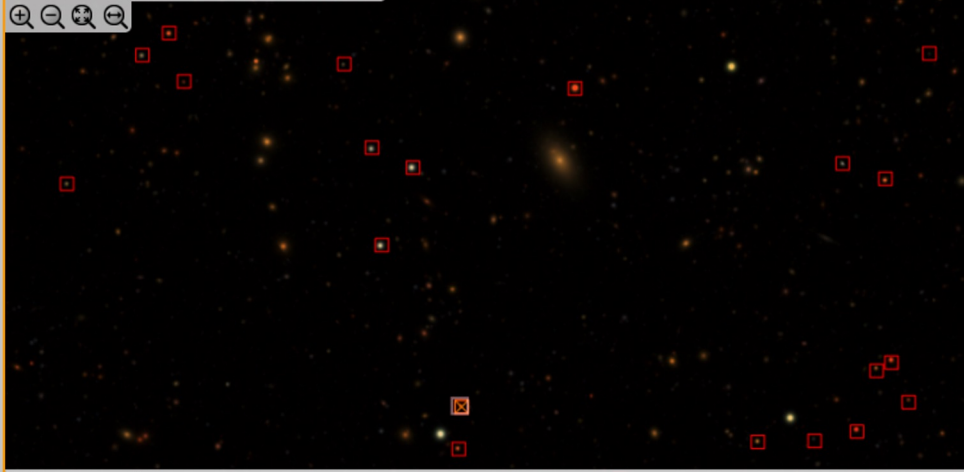
```
TOP n -- Limit the results to n number of records
ORDER BY [ASC/DESC] -- Used for sorting
POINT('<coordinate system>', RIGHT_ASCENSION, DECLINATION)
CIRCLE('<coordinate system>', RIGHT_ASCENSION_CENTER, DECLINATION_CENTER, RADIUS)
BOX('<coordinate system>', RIGHT_ASCENSION_CENTER, DECLINATION_CENTER, WIDTH, HEIGHT)
POLYGON('<coordinate system>', POINT1, POINT2, POINT3, ...)
```



Coverage

Options: FITS HiPS HiPS/Aitoff  Auto Eq J2000  HiPS / MOC

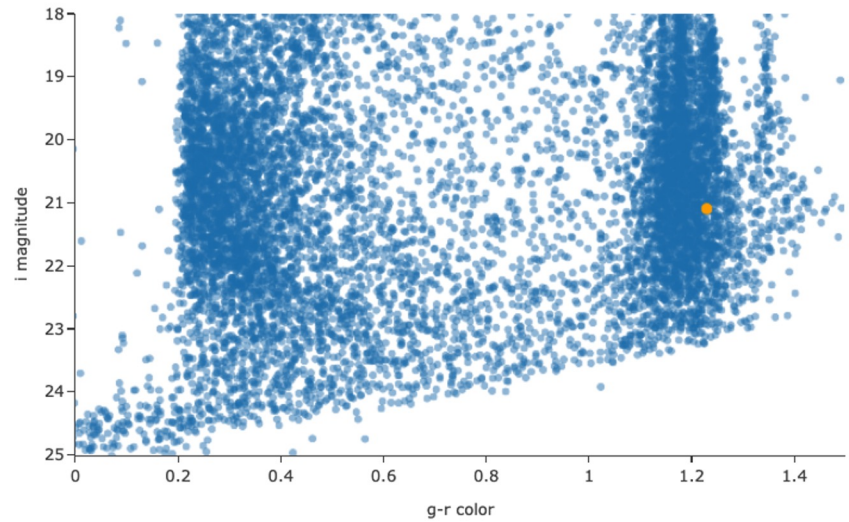
DP0.2 HiPS from DESC DC2 sim: gri color... FOV: 6.5'



EQ-J2000: 4h08m17.47s, -36d29m02.9s

Lock by click

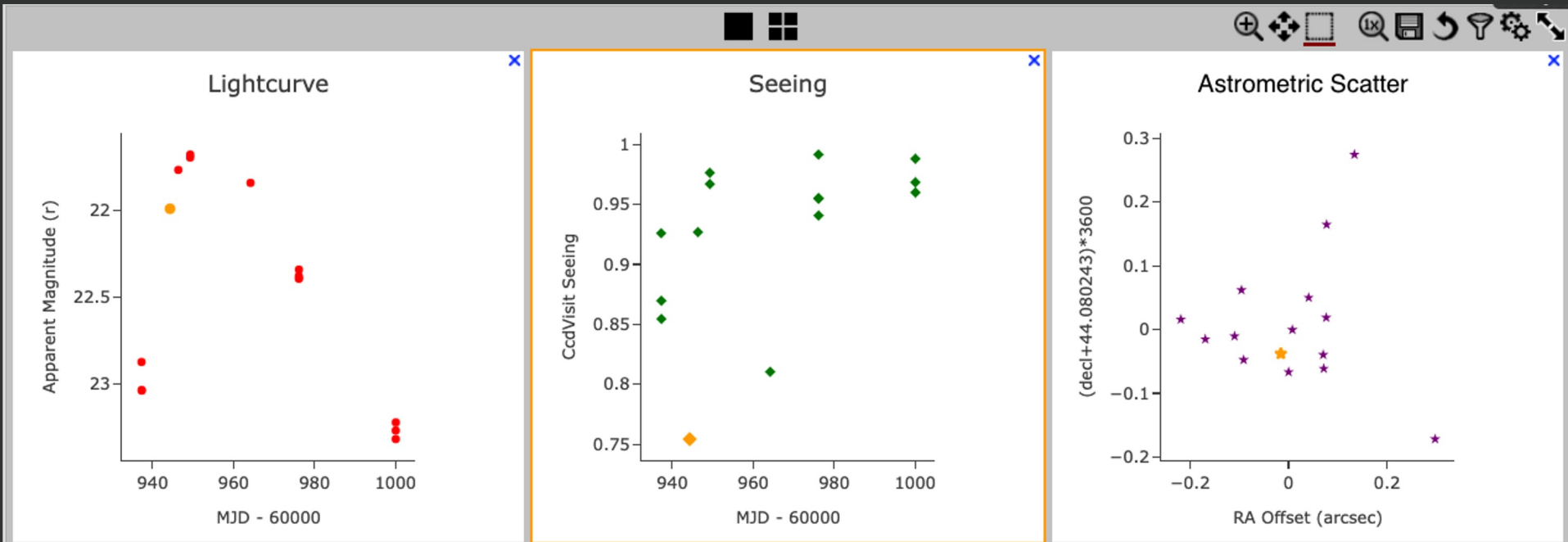
Color-Magnitude Diagram (Simulated Data)



dp02\_dc2\_catalogs.Object - ...

1 of 100 (1 - 100 of 10,000)

<input type="checkbox"/>	coord_dec (deg) double	coord_ra (deg) double	q_calibFlux (nJy) double	i_calibFlux (nJy) double	r_calibFlux (nJy) double
<input type="checkbox"/>	-36.3455887	62.066482	1859.6991522	8603.6129194	5333.0741857
<input type="checkbox"/>	-36.4775092	62.2014493	489.9714312	902.7566335	787.1998762
<input type="checkbox"/>	-36.4835802	62.0102352	888.7570876	8218.1745813	2622.5679973
<input checked="" type="checkbox"/>	-36.4841141	62.0727205	1423.5578306	13278.2124563	4426.8792117
<input type="checkbox"/>	-36.4868793	62.0174675	5662.5951209	69568.953394	15725.668196
<input type="checkbox"/>	-36.4855335	62.1559348	3212.5835923	4914.4700802	4402.1800574
<input type="checkbox"/>	-36.4888531	62.0731141	3844.3792999	30593.7257725	11349.7976395
<input type="checkbox"/>	-36.4800502	62.0147349	2450.3010661	15260.7521336	7719.014504
<input type="checkbox"/>	-36.4791306	62.0126437	6081.5381543	63390.6728246	17142.4502116
<input type="checkbox"/>	-36.4645976	62.1928084	573.2934303	2818.6617385	1670.6334463



dp02\_dc2\_catalogs.DiaSource... x

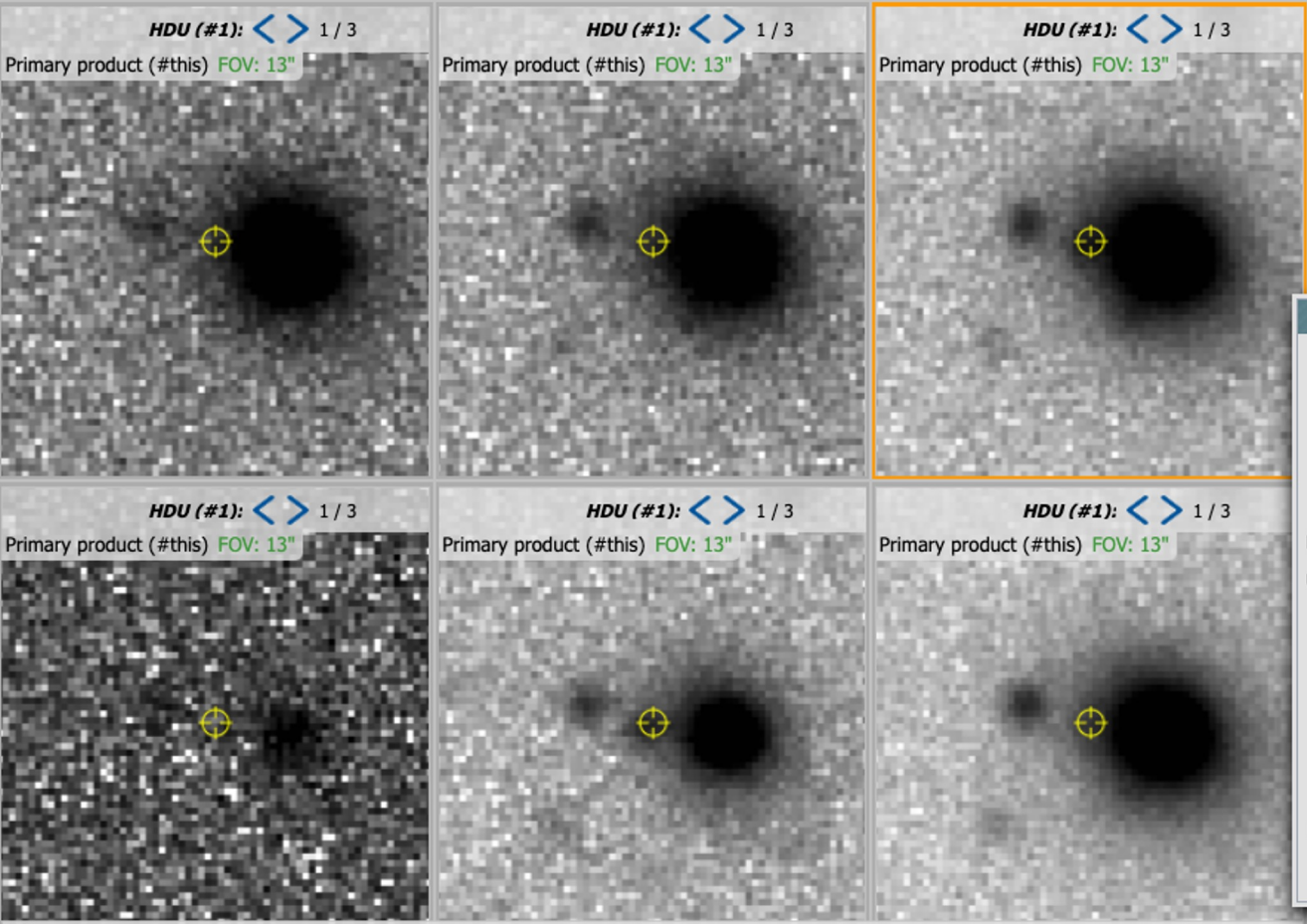
1 of 1 (1 - 15 of 15)

<input type="checkbox"/>	ra	decl	diaObjectId	diaSourceId	filterName	midPointTai	psAbMag	seeing	
	double	double	long	long	char	double	double	double	
<input type="checkbox"/>	67.4579381	-44.0802562	1252220598734556212	511975735901028500	i	60976.1567102	22.392417858291793	0.9553669	
<input type="checkbox"/>	67.4579369	-44.0802258	1252220598734556212	501461614621360343	i	60949.2881232	21.674331240075027	0.9670317	
<input type="checkbox"/>	67.4579833	-44.08026	1252220598734556212	501444454079529119	i	60949.2736532	21.691759235339195	0.9764174	
<input type="checkbox"/>	67.4579591	-44.0802535	1252220598734556212	499576143305769056	i	60944.2932122	21.98789262711926	0.7543274	
<input type="checkbox"/>	67.4579748	-44.0802291	1252220598734556212	500585448809169080	i	60946.3465532	21.763286552642114	0.9269225	
<input type="checkbox"/>	67.457933	-44.0802459	1252220598734556212	496157923790028988	i	60937.3005682	23.036911804464182	0.8696953	
<input type="checkbox"/>	67.4579635	-44.0802615	1252220598734556212	496105775907733582	i	60937.2561262	22.874525862435785	0.9260141	
<input type="checkbox"/>	67.4579165	-44.0802472	1252220598734556212	507716186515964058	i	60964.1956072	21.838204830906832	0.8104032	

Data Product: ivoa.ObsCore - data...

Coverage

1 of 1 (1 - 6 of 6)



EQ-J2000:

Lock by click

ivoa.ObsCore - data-int.Iss... 1 of 1 (1 - 6 of 6)

	Isst_band	Isst_detector	Isst_filter	Isst
	char	long	char	
<input type="checkbox"/>				
<input type="checkbox"/>	y			
<input type="checkbox"/>	z			
<input checked="" type="checkbox"/>	i			
<input type="checkbox"/>	u			
<input type="checkbox"/>	g			
<input type="checkbox"/>	r			

### Modify Color Stretch

Move mouse over graph to see values

Stretch Type:

Lower range:  %

Upper range:  %

Data Min: 0.000000      Data Max: 1476.604492

Use ZScale for bounds



DP0.2 HiPS Coverage Maps now available in the Portal 🚀

[Show more](#)

# Rubin Science Platform

## Portal

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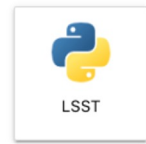
Filter files by name 🔍

/ notebooks / tutorial-notebooks /

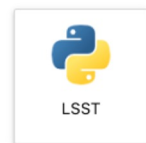
Name	Last Modified
data	7 months ago
01_Intro_to_DP0_Notebooks.ipynb	6 hours ago
02_Intermediate_TAP_Query.ipynb	6 hours ago
03_Image_Display_and_Manipulation....	6 hours ago
03b_Image_Display_with_Firefly.ipynb	22 days ago
04_Intro_to_Butler.ipynb	2 days ago
05_Intro_to_Source_Detection.ipynb	22 days ago
06_Comparing_Object_and_Truth-Ta...	22 days ago
08a_Interactive_Image_Visualization.i...	6 hours ago
08b_Interactive_Catalog_Visualizatio...	2 hours ago
09_Single_Star_Lightcurve_with_Butl...	6 hours ago
README.md	22 days ago

### notebooks/tutorial-notebooks

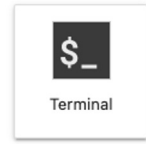
#### Notebook



#### Console



#### Other



File Edit View Run Kernel RSP Tabs Settings Help


Launcher melissagraham@nb-melis x 01\_Intro\_to\_DP0\_Notebo 08b\_Interactive\_Catalog\_x

Filter files by name

/ notebooks / tutorial-notebooks /

Name

- data
- 01\_Intro\_to\_DP0\_Notebooks....
- 02\_Intermediate\_TAP\_Query.i...
- 03\_Image\_Display\_and\_Mani...
- 03b\_Image\_Display\_with\_Fir...
- 04\_Intro\_to\_Butler.ipynb
- 05\_Intro\_to\_Source\_Detectio...
- 06\_Comparing\_Object\_and\_...
- 08a\_Interactive\_Image\_Visua...
- 08b\_Interactive\_Catalog\_Vis...
- 09\_Single\_Star\_Lightcurve\_...
- README.md



### Introduction to Jupyter Notebooks for Data Preview 0

Last verified to run on 2022-04-18 with LSST Science Pipelines release w\_2022\_12

Contact author: Melissa Graham

Target audience: All DP0 delegates, especially those new to Notebooks.

Container Size: medium

Questions welcome at [community.lsst.org/c/support/dp0](https://community.lsst.org/c/support/dp0)

Find DP0 documentation and resources at [dp0-1.lsst.io](https://dp0-1.lsst.io)

**Credit:** Originally developed by Melissa Graham in the context of the Rubin DP0.1. Please consider acknowledging Melissa Graham if this notebook is used for the preparation of journal articles or software releases.

## 1.0 Introduction

This Jupyter Notebook will illustrate how notebooks work, introduce you to a few Python packages, and show off a bit of the functionality of the Rubin Science Platform (RSP) and the DESC's Data Challenge 2 (DC2) simulated data set for Data Preview 0 (DP0).

This notebook will teach you how to execute a Jupyter Notebook (including importing and using Python packages), query a DP0.1 catalog and retrieve desired columns of data (Section 2), and retrieve a DP0.1 image at a given coordinate (Section 3). **This notebook does not go into much detail - it's more of an appetizer than an entree!**

### Table of Contents

If you want to see a ToC for this notebook, click on the icon of a bullet list in the leftmost vertical menu bar, and an automatically-generated ToC will appear at left. Click on the icon of the file folder at the top of the leftmost verticle menu bar to return to a directory view.

## 1.1 What is a Jupyter Notebook?

1 2 LSST | Idle Recommended (Weekly 2022\_12) [16ba239d...] (sciplat-lab:recommended) data.lsst.cloud Mode: Command Ln 1, Col 1 01\_Intro\_to\_DP0\_Notebooks\_NSF\_Site\_Visit.ipynb

Filter files by name 🔍

/ notebooks / tutorial-  
notebooks /

Name

data

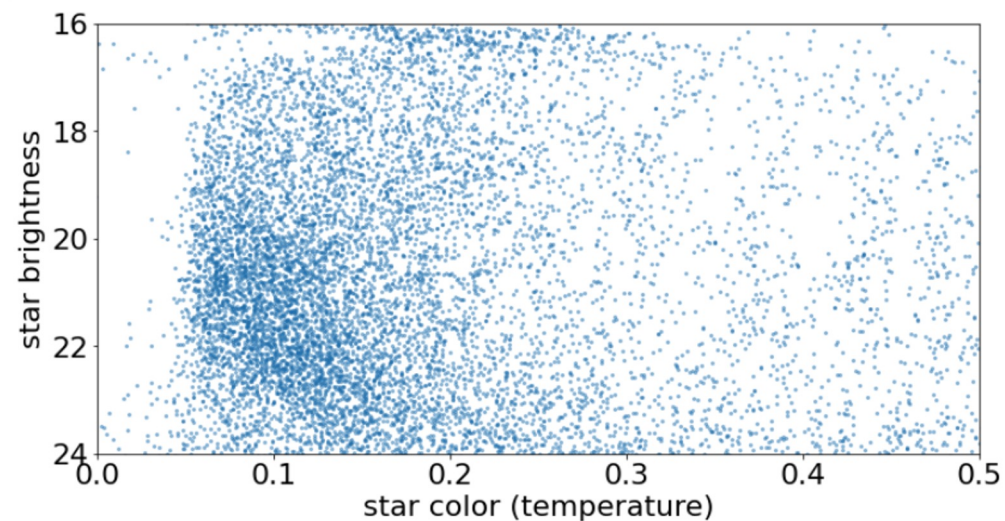
- 01\_Intro\_to\_DP0\_Notebooks....
- 02\_Intermediate\_TAP\_Query.i...
- 03\_Image\_Display\_and\_Mani...
- 03b\_Image\_Display\_with\_Fir...
- 04\_Intro\_to\_Butler.ipynb
- 05\_Intro\_to\_Source\_Detectio...
- 06\_Comparing\_Object\_and\_...
- 08a\_Interactive\_Image\_Visua...
- 08b\_Interactive\_Catalog\_Vis...
- 09\_Single\_Star\_Lightcurve\_...
- README.md

## 2.4 Making a color-magnitude diagram

```
[12]: results = service.search("SELECT ra, dec, mag_g, mag_r, mag_i, magerr_g, magerr_r, magerr_i "\
                                "FROM dp01_dc2_catalogs.object "\
                                "WHERE CONTAINS(POINT('ICRS', ra, dec), CIRCLE('ICRS', 62.0, -37.0, 1.0)) = 1 "\
                                "AND good = 1 AND clean = 1 AND extendedness = 0 "\
                                "AND magerr_g < 0.1 AND magerr_r < 0.1 AND magerr_i < 0.1", maxrec=50000)

data = results.to_table().to_pandas()

fig = plt.figure(figsize=(12,6))
plt.plot( data['mag_r'].values-data['mag_i'].values, data['mag_g'].values, 'o', ms=2, alpha=0.4 )
plt.xlabel( 'star color (temperature)' )
plt.ylabel( 'star brightness' )
plt.xlim([-0.0,0.5])
plt.ylim([24.0,16.0])
plt.show()
```





Filter files by name

/ notebooks / tutorial-notebooks /

Name

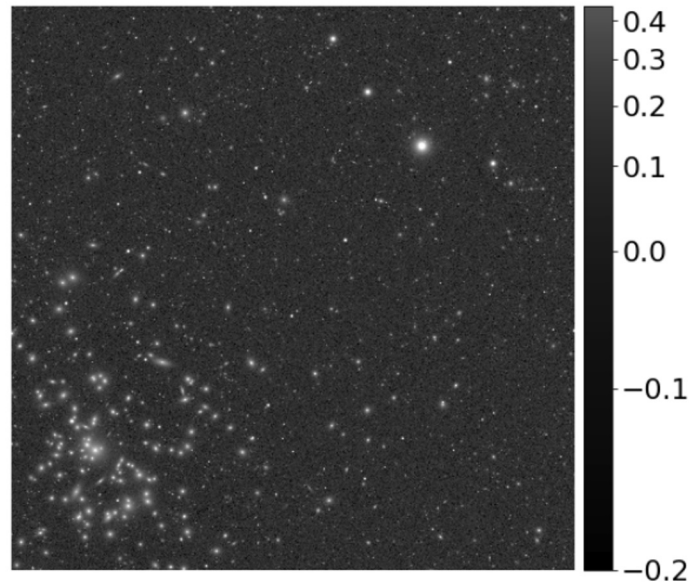
- data
- 01\_Intro\_to\_DP0\_Notebooks....
- 02\_Intermediate\_TAP\_Query.i...
- 03\_Image\_Display\_and\_Mani...
- 03b\_Image\_Display\_with\_Fir...
- 04\_Intro\_to\_Butler.ipynb
- 05\_Intro\_to\_Source\_Detectio...
- 06\_Comparing\_Object\_and\_...
- 08a\_Interactive\_Image\_Visua...
- 08b\_Interactive\_Catalog\_Vis...
- 09\_Single\_Star\_Lightcurve\_...
- README.md

### 3.1 Retrieve and display an image with the butler

```
[21]: dataId = {'band': 'i', 'tract': 4431, 'patch': 17}
my_deepCoadd = butler.get('deepCoadd', dataId=dataId)

fig = plt.figure(figsize=(10,8)) # create a matplotlib.pyplot figure
afw_display = afwDisplay.Display(1) # create an alias for the lsst.afw.display.Display() method
afw_display.scale('asinh', 'zscale') # set the algorithm and scale for the pixel shading
afw_display.mtv(my_deepCoadd.image) # display the image data you retrieved with the butler
plt.gca().axis('off') # turn off the x and y axes labels
```

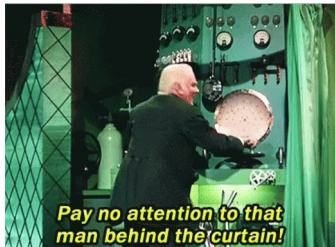
[21]: (11899.5, 16099.5, 7899.5, 12099.5)





# Rubin Science Platform User Experience

The butler: a powerful component of the LSST Science Pipelines.

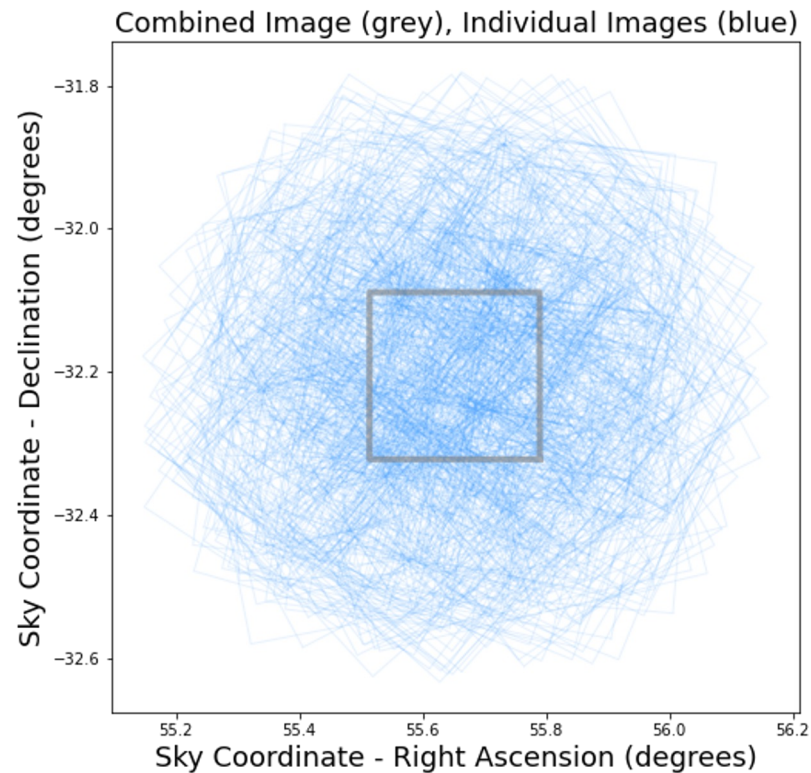


The butler allows users to ignore what is happening “behind the scenes” in terms of where and how the millions of images are stored (or compressed).

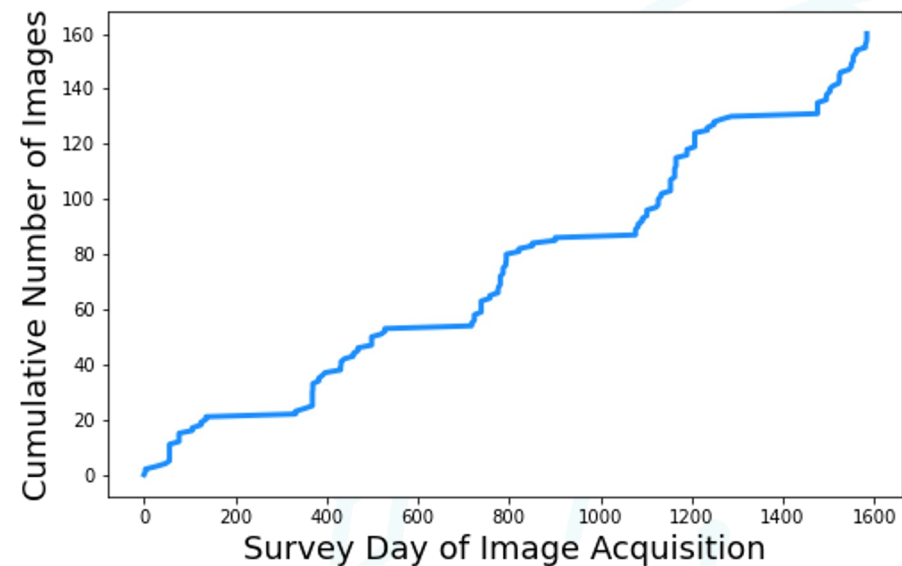


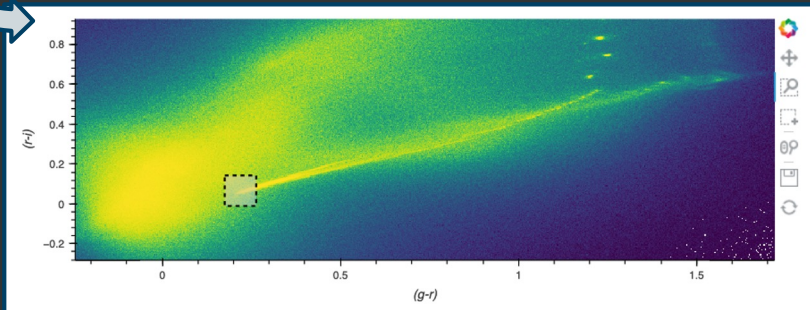
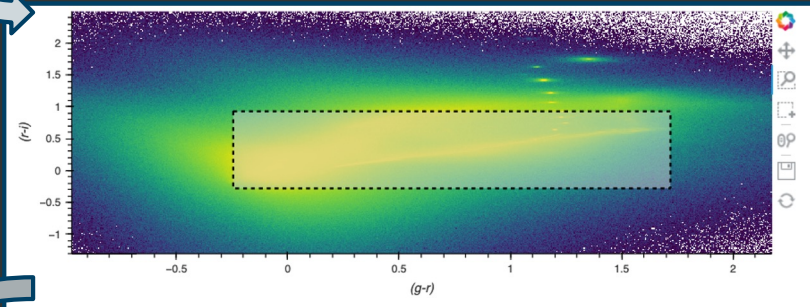
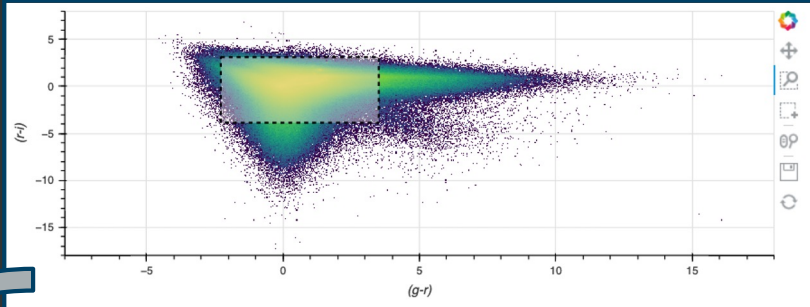
The butler enables users to flexibly query and retrieve *only the data they want* (e.g., full or cropped images, metadata).

# RSP Notebook Aspect

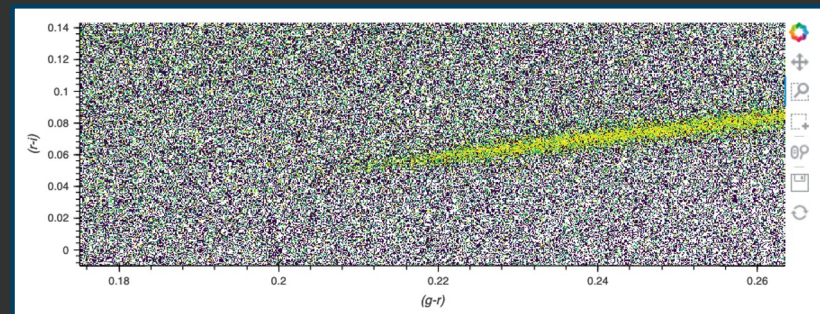


With a couple lines of code and a short wait, users can find all the individual images overlapping any region of sky (left) and metadata like acquisition date (below).



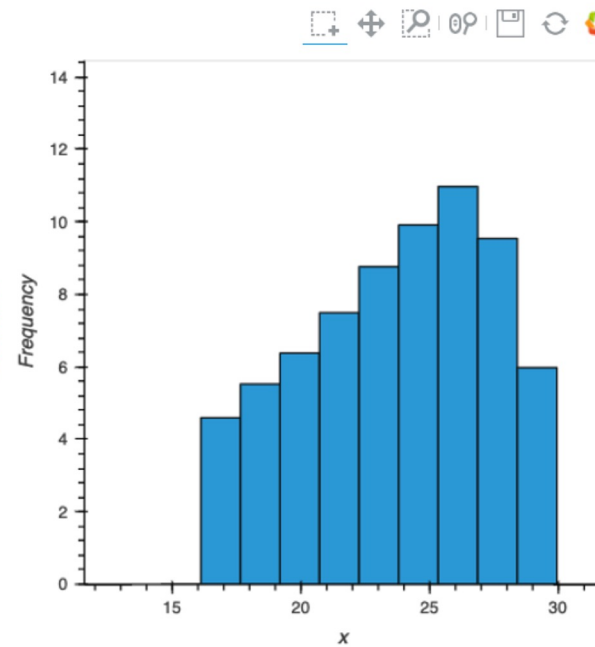
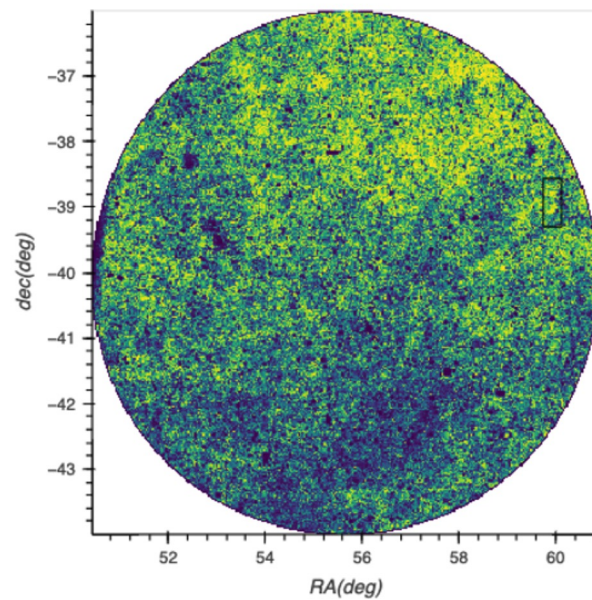


Users can interact with plots of millions to billions of objects using software that *automatically* rasterizes or aggregates datasets into regular grids, only plotting individual points where and when they can be distinguished.



```
[49]: dmap = hv.DynamicMap(update_histogram, streams=[box]).options(
      height=400, width=400)
      datashade(points,
                cmap=process_cmap("Viridis", provider="bokeh")) * \
      box_plot.options(height=400, width=400) + \
      dmap
```

[49]:

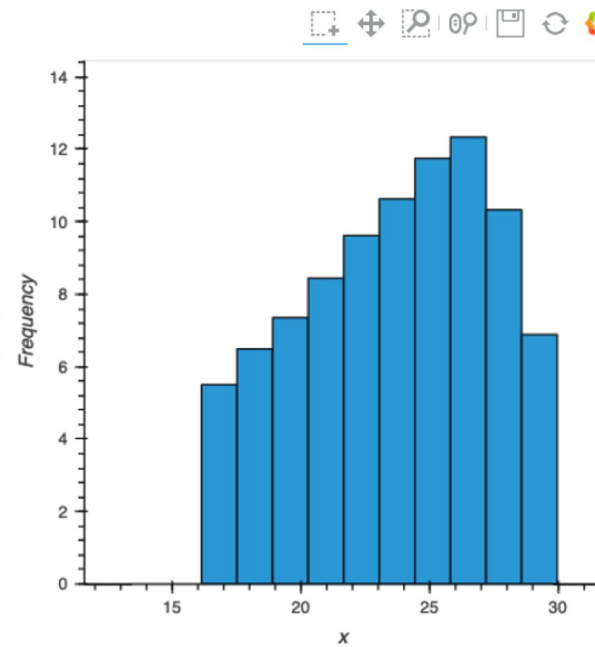
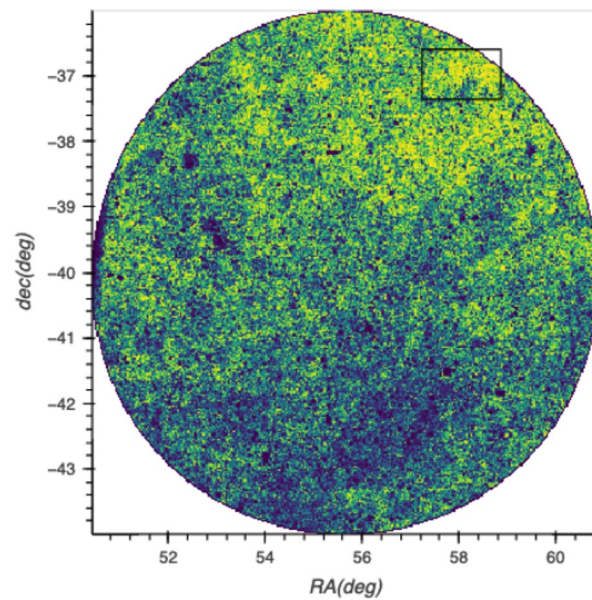


Try changing the box selection and watch as the histogram is recomputed and displayed.



```
[49]: dmap = hv.DynamicMap(update_histogram, streams=[box]).options(
      height=400, width=400)
      datashade(points,
                cmap=process_cmap("Viridis", provider="bokeh")) * \
      box_plot.options(height=400, width=400) + \
      dmap
```

[49]:

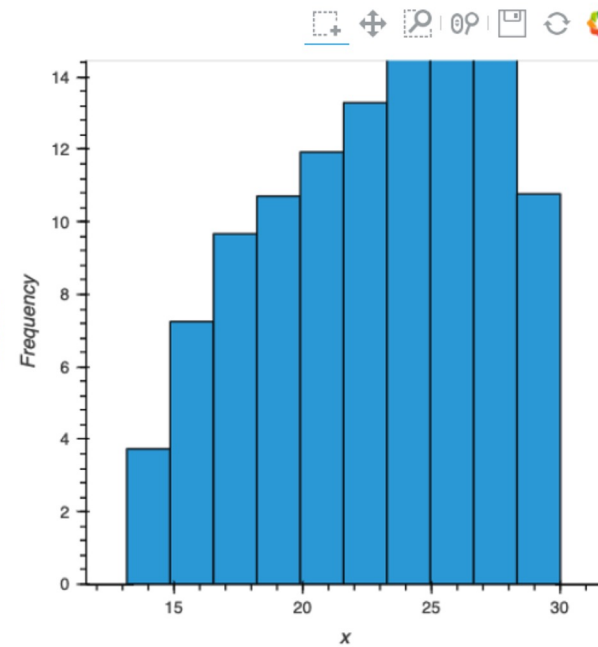
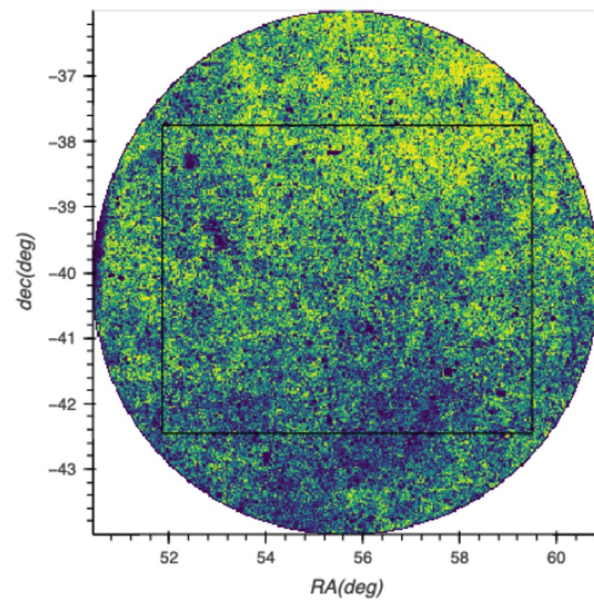


Try changing the box selection and watch as the histogram is recomputed and displayed.



```
[49]: dmap = hv.DynamicMap(update_histogram, streams=[box]).options(
      height=400, width=400)
      datashade(points,
                cmap=process_cmap("Viridis", provider="bokeh")) * \
      box_plot.options(height=400, width=400) + \
      dmap
```

[49]:



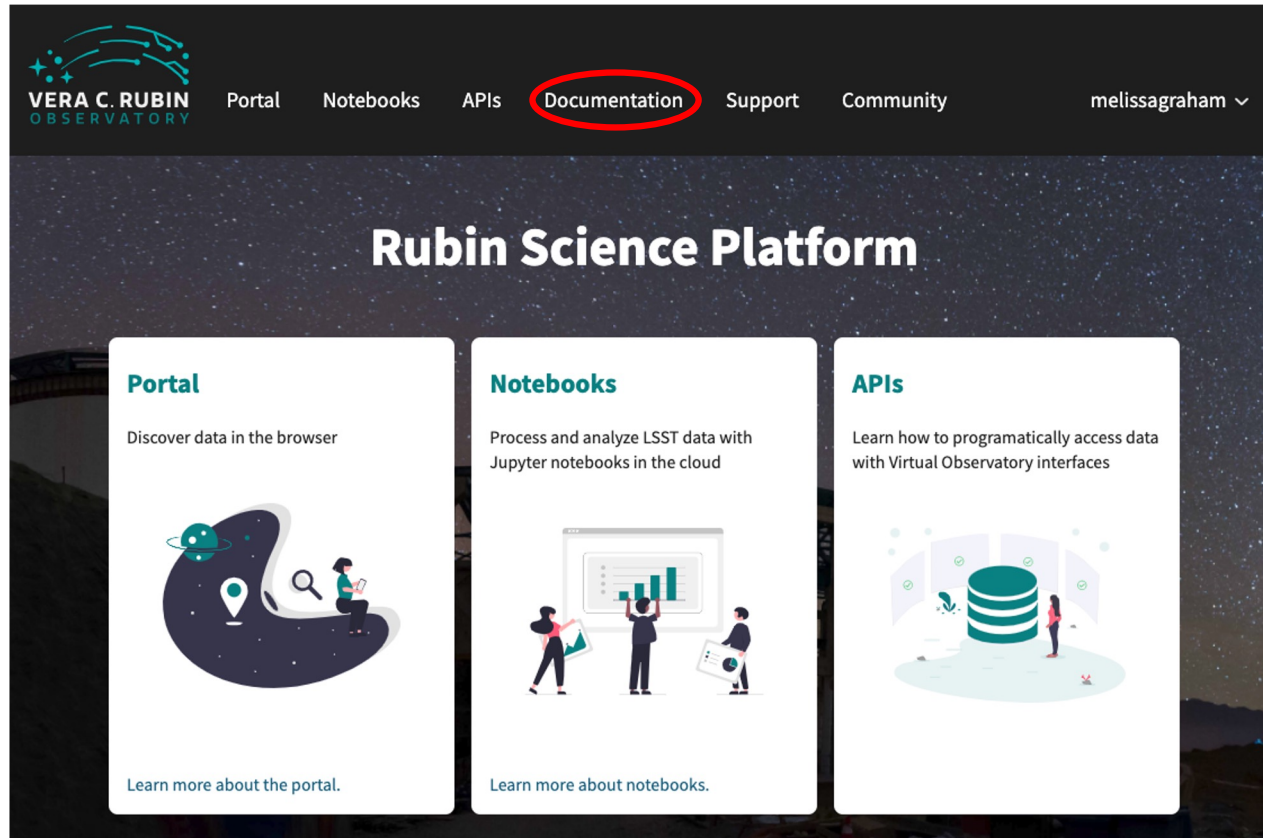
Try changing the box selection and watch as the histogram is recomputed and displayed.

# Rubin Science Platform User Experience

The RSP is an accessible powerful platform built specifically to support big data analysis in the LSST era.



# Rubin Science Platform User Experience





# Rubin Science Platform User Experience

## Documentation

Data Release documentation

- [dp0-2.lsst.io](https://dp0-2.lsst.io)
- high-level processing summaries
- data products descriptions & schema
- step-by-step tutorials

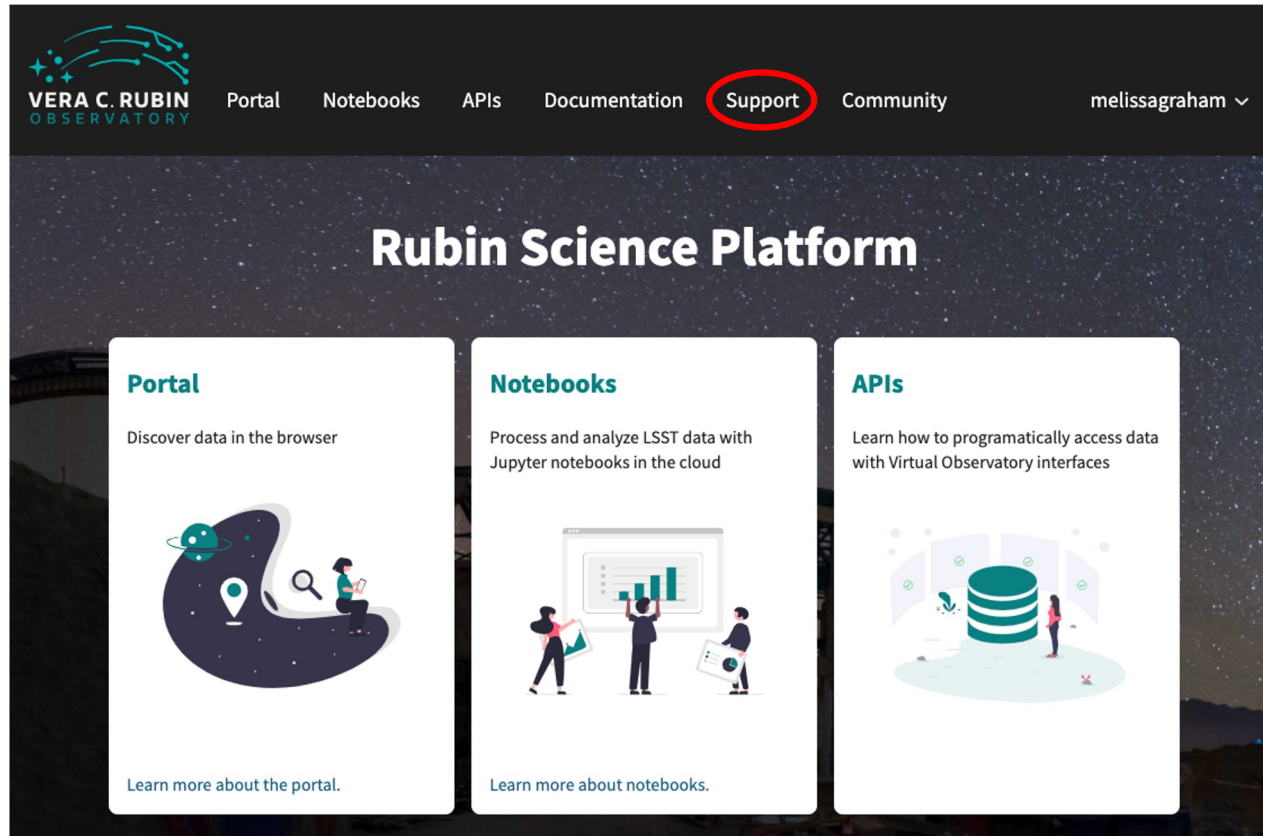
User Guides for the Rubin Science Platform

LSST Science Pipelines documentation

- [pipelines.lsst.io](https://pipelines.lsst.io)
- module descriptions
- use-case examples and FAQs
- software releases & version history

The screenshot shows the Rubin Science Platform documentation website. The header includes the Vera C. Rubin Observatory logo and navigation links: Portal, Notebooks, APIs, Documentation, Support, Community, and a user profile for melissagraham. The main content area is titled "Rubin Science Platform documentation" and includes a sub-header "Data documentation". Under "Data documentation", there is a section for "Data Preview 0.1 (DP0.1)" with a description: "DP0.1 is an early opportunity to explore the Rubin Science Platform with simulated LSST data. Learn about the DESC DC2 data and follow data analysis tutorials." Below this, there is a section for "Science platform documentation" which contains two sub-sections: "Portal" (describing the Portal as a browser-based interface for LSST data) and "Notebooks" (describing the Notebook aspect as a Jupyter environment). At the bottom, there is a section for "Software documentation" with a sub-section for "LSST Science Pipelines" (describing the Butler pipeline framework and the Python package).

# Rubin Science Platform User Experience





The screenshot shows the Rubin Science Platform website. The navigation bar includes links for Portal, Notebooks, APIs, Documentation, Support (circled in red), and Community. The user name 'melissagraham' is visible in the top right. The main content area features three cards: Portal (Discover data in the browser), Notebooks (Process and analyze LSST data with Jupyter notebooks in the cloud), and APIs (Learn how to programmatically access data with Virtual Observatory interfaces). Each card includes an illustration and a link to learn more.


VERA C. RUBIN  
OBSERVATORY

Portal Notebooks APIs Documentation **Support** Community melissagraham ▾

## Rubin Science Platform

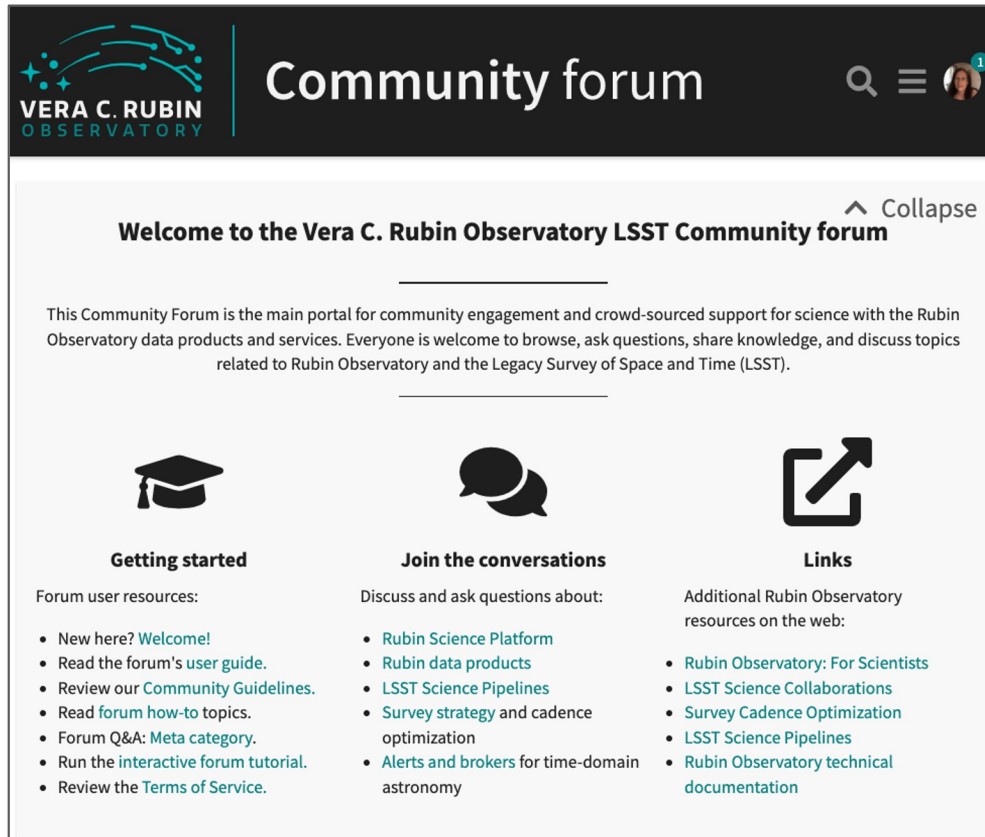
**Portal**  
Discover data in the browser  
  
Learn more about the portal.

**Notebooks**  
Process and analyze LSST data with Jupyter notebooks in the cloud  
  
Learn more about notebooks.

**APIs**  
Learn how to programmatically access data with Virtual Observatory interfaces  





# Rubin Science Platform User Experience



**Community forum**

Welcome to the Vera C. Rubin Observatory LSST Community forum


This Community Forum is the main portal for community engagement and crowd-sourced support for science with the Rubin Observatory data products and services. Everyone is welcome to browse, ask questions, share knowledge, and discuss topics related to Rubin Observatory and the Legacy Survey of Space and Time (LSST).



**Getting started**

Forum user resources:


- New here? [Welcome!](#)
- Read the forum's [user guide](#).
- Review our [Community Guidelines](#).
- Read [forum how-to](#) topics.
- Forum Q&A: [Meta category](#).
- Run the [interactive forum tutorial](#).
- Review the [Terms of Service](#).



**Join the conversations**

Discuss and ask questions about:

- [Rubin Science Platform](#)
- [Rubin data products](#)
- [LSST Science Pipelines](#)
- [Survey strategy and cadence optimization](#)
- [Alerts and brokers](#) for time-domain astronomy

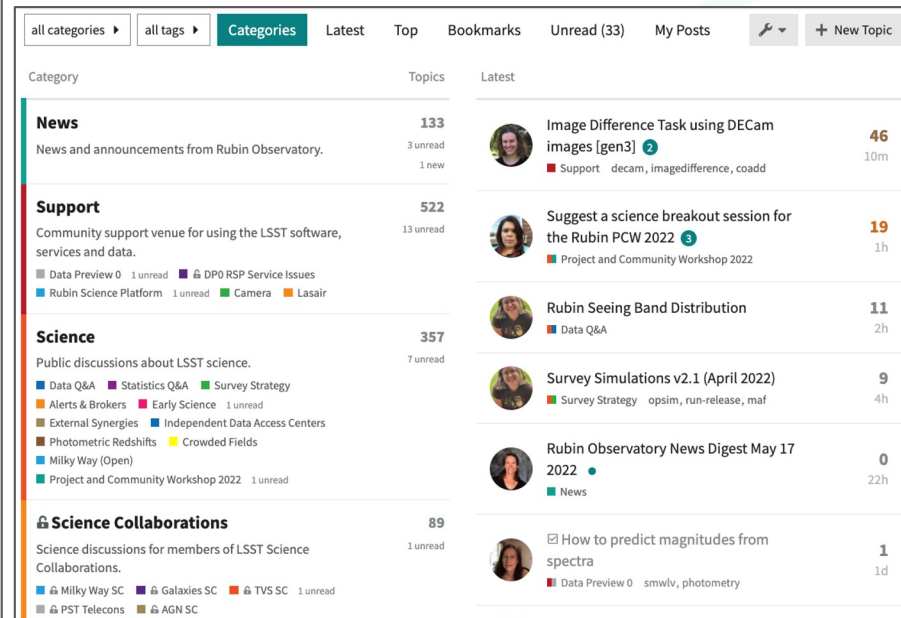


**Links**

Additional Rubin Observatory resources on the web:

- [Rubin Observatory: For Scientists](#)
- [LSST Science Collaborations](#)
- [Survey Cadence Optimization](#)
- [LSST Science Pipelines](#)
- [Rubin Observatory technical documentation](#)

With *thousands of users*, knowledge bottlenecks are a risk to science. Support must be accessible and timely. A crowd-source model is the only sustainable option.



all categories | all tags | **Categories** | Latest | Top | Bookmarks | Unread (33) | My Posts | |

Category	Topics	Latest
<b>News</b> News and announcements from Rubin Observatory.	133 3 unread 1 new	<b>Image Difference Task using DECam images [gen3]</b> 46 Support decam, imagedifference, coadd 10m
<b>Support</b> Community support venue for using the LSST software, services and data.	522 13 unread	<b>Suggest a science breakout session for the Rubin PCW 2022</b> 19 Project and Community Workshop 2022 1h
<b>Science</b> Public discussions about LSST science.	357 7 unread	<b>Rubin Seeing Band Distribution</b> 11 Data Q&A 2h
<b>Science Collaborations</b> Science discussions for members of LSST Science Collaborations.	89 1 unread	<b>Survey Simulations v2.1 (April 2022)</b> 9 Survey Strategy opsim, run-release, maf 4h
		<b>Rubin Observatory News Digest May 17 2022</b> 0 News 22h
		<b>How to predict magnitudes from spectra</b> 1 Data Preview 0 smwlv, photometry 1d