A Message about Survey Science with Rubin Observatory for the Incoming Grad Student Cohort of 2022

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Contemplating Our Cosmic Origins

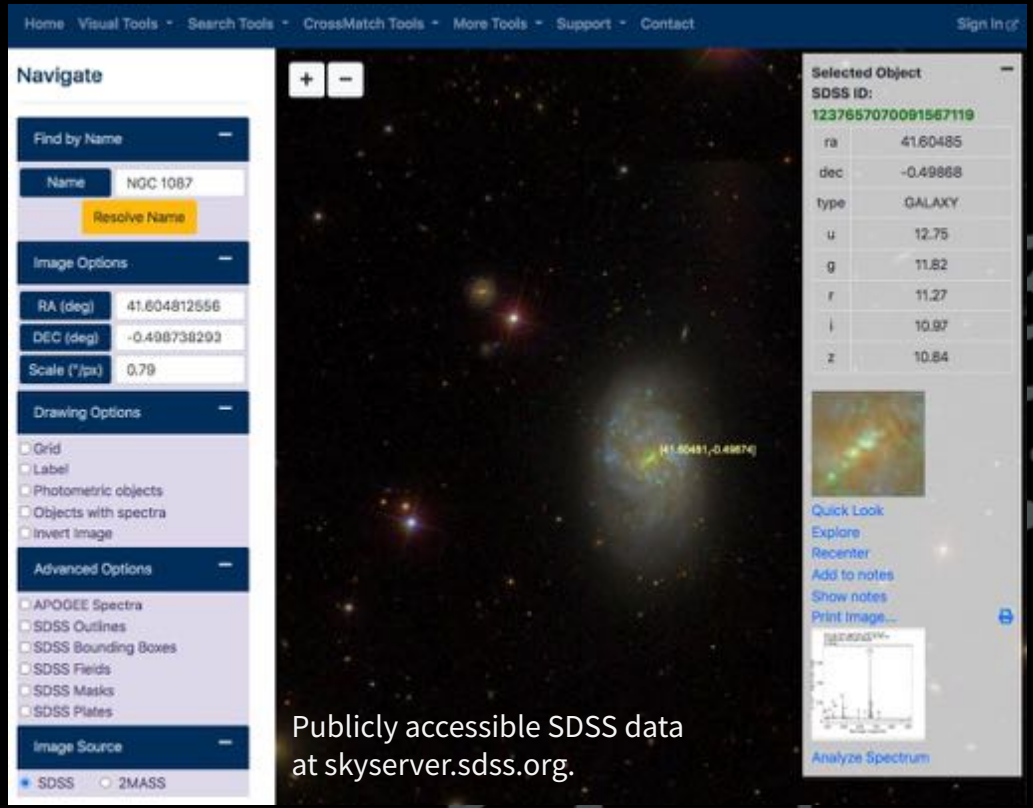
APOD 2021-11-06, Martin Lefranc

APOD 2019-10-22, Jheison Huerta

SDSS 2.5m Telescope, Apache Point

Science with Sky Surveys

SDSS's huge field of view, with the Moon for scale.

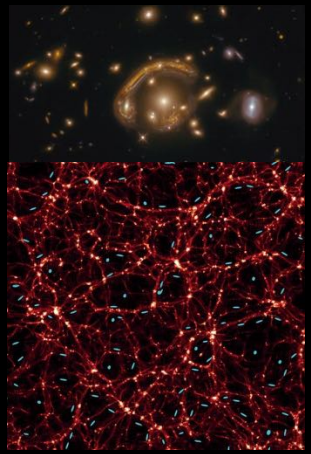


Publicly accessible SDSS data at skyserver.sdss.org.

Open Astrophysical Questions

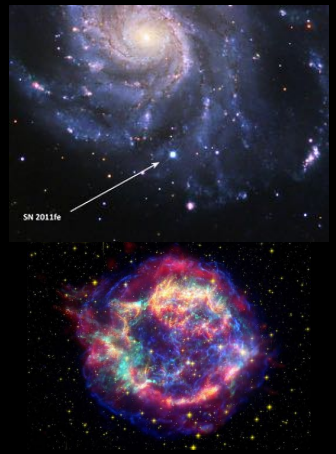
Cosmology

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

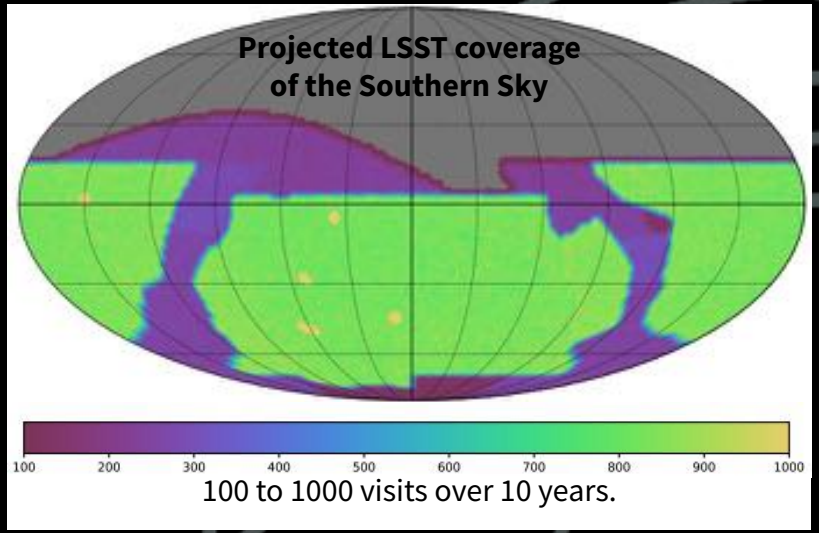
Understand the structure and evolution of our Galaxy's bulge, disk, and halo – and its satellites and tidal streams – by mapping the stars of the Milky Way.

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^2 field-of-view camera, and six optical-NIR filters to execute the 10-year LSST.



100 to 1000 visits over 10 years.

Ivezić et al. (2019), ApJ, 873, 111.

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.

Preparation and Collaboration for LSST

The 8 LSST Science Collaborations learn and prepare together.

Active Galactic Nuclei SC

Transients and Variable Stars SC

Dark Energy SC

Stars, Milky Way, and Local Volume SC

Galaxies SC

Strong Lensing SC

Informatics and Statistics SC

Solar System SC

LSST and your Graduate Career

June 2021	“Data Preview 0.1”, a very small, preliminary release of simulated LSST-like data
June 2022	“Data Preview 0.2”, a small release of reprocessed simulated LSST-like data
Sept 2022	***you start graduate school!***
mid-2023	“Data Preview 1”, a small release of data from the “commissioning camera”
mid-2024	“Data Preview 2”, a larger release of data from the LSST Science Camera
2024	the LSST begins
early-2025	“Data Release 1”, the first half-year of LSST
Sept 2025	***you start your fourth year of graduate school!***

Research Inclusion

Prioritize DP0 participation from individuals that are under-represented in astronomy.

- Seed expertise at small and underserved institutes.

Identify and remove barriers to learning and to LSST science, like knowledge bottlenecks.

- Create and maintain openly accessible documentation and tutorials.
- Build a self-sustaining and supportive community in which to do LSST science.

Ensure that potentially limited computational resources are equitably distributed.

Incorporate diversity, equity, and inclusion (DEI) training into workshops (e.g., anti-racism seminars).

Enforce the existing Code of Conduct and support those who report violations.

Create postdoctoral positions that have time dedicated to Research Inclusion work.

I can’t wait to find all the supernovae!

Explosions of carbon-oxygen white dwarf stars as Type Ia supernovae are what keep me up at night (in a good way!).