New to all this?

LSST:UK wiki introduction

Adam Amara and Bob Mann

Vera C. Rubin Observatory

Cerro Pachón in Chile

8.4 m Survey Telescope

3.2-gigapixel LSST Camera

Novel, compact design

3.5-degree field of view

Short (~30 s) exposures

The Legacy Survey of Space and Time

First decade: ***Legacy Survey of Space and Time*** **(LSST)**.

The survey has four main science themes:

- Probing data energy and dark matter
- Taking an inventory of the solar system
- Exploring the transient optical sky
- Mapping the Milky Way

~90%: **Wide-Fast-Deep** (WFD) Survey, covering **~18,000 square degrees** of the southern sky, with each field receiving ~800 visits (back-to-back pairs of 15 second exposures):

- single visit depth: u = 23.9, g = 25.0, r = 24.7, i = 24.0, z = 23.3 and y = 22.1
- 10-year stacked depth: u = 26.1, g = 27.4, r = 27.5, i = 26.8, z = 26.1 and y = 24.9

~10%: **Deep Drilling Field** (DDF) where selected fields will be observed much more frequently than in the WFD survey.

Survey Cadence Optimisation Committee optimising observing strategy , with input from Rubin Observatory staff and the scientific community.

LSST Data Products

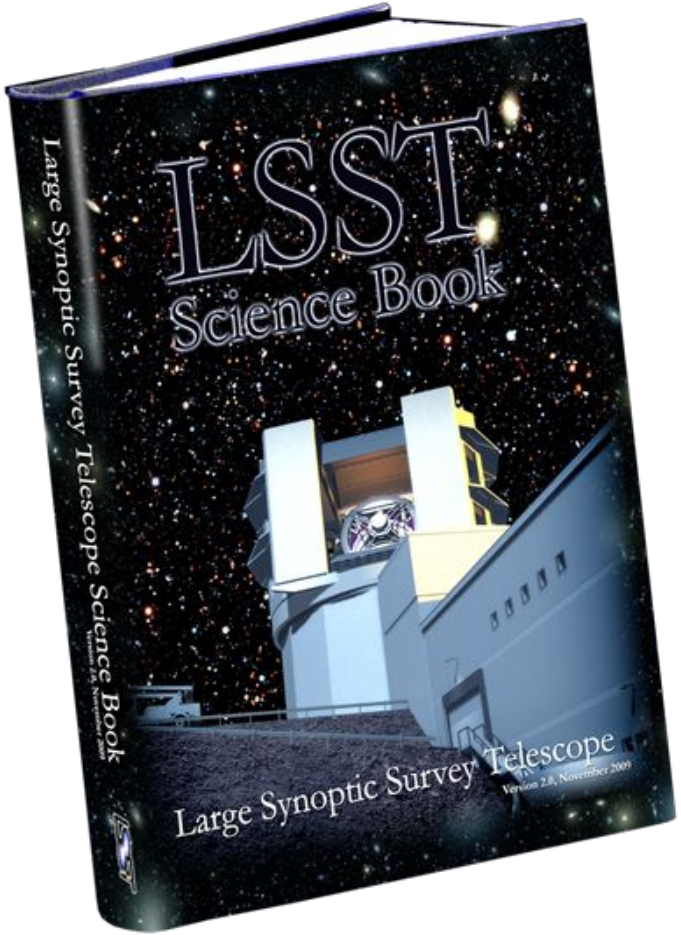
- **Prompt products**. Generated by a Difference Image Analysis pipeline that is run as soon as the images from each visit. Image is compared with a reference image of that field in the same band, and alerts are issued to record all celestial objects in that field that are significantly detected to have moved or changed brightness. Alerts will be issued within a minute of the closing of the shutter in Chile at the end of the exposure from which they originate, allowing rapid follow-up of transient phenomena.

- **Data Release products.** A range of static-sky data products - e.g. calibrated single visit and stacked images, together with object catalogues derived from them - will be released in a series of Data Releases. Two data releases are planned from the first year of survey operations, with annual releases thereafter. Each data release will reduce all extant data with the same set of software, so that each comprises a homogeneous dataset.

- **User-Generated products**. The data release products will not be optimal for all possible science analyses, so the Observatory will accept, and publish alongside the data releases, some additional datasets generated by the community. These may include data from other instruments, as well as bespoke products generated by optimised re-reduction, or further analysis, of LSST data and intended for particular science analyses.

Rubin LSST Science

The outline science case described in the Ivezic et al. LSST overview paper is expanded upon hugely in the LSST Science Book, version 2.0 of which was published in 2009 as arxiv:0912.0201. Across almost 600 pages, the Science Book shows how the Rubin LSST will revolutionise most areas of astrophysics, from the Near Earth Objects to the farthest quasars, and the properties of the Universe as a whole.

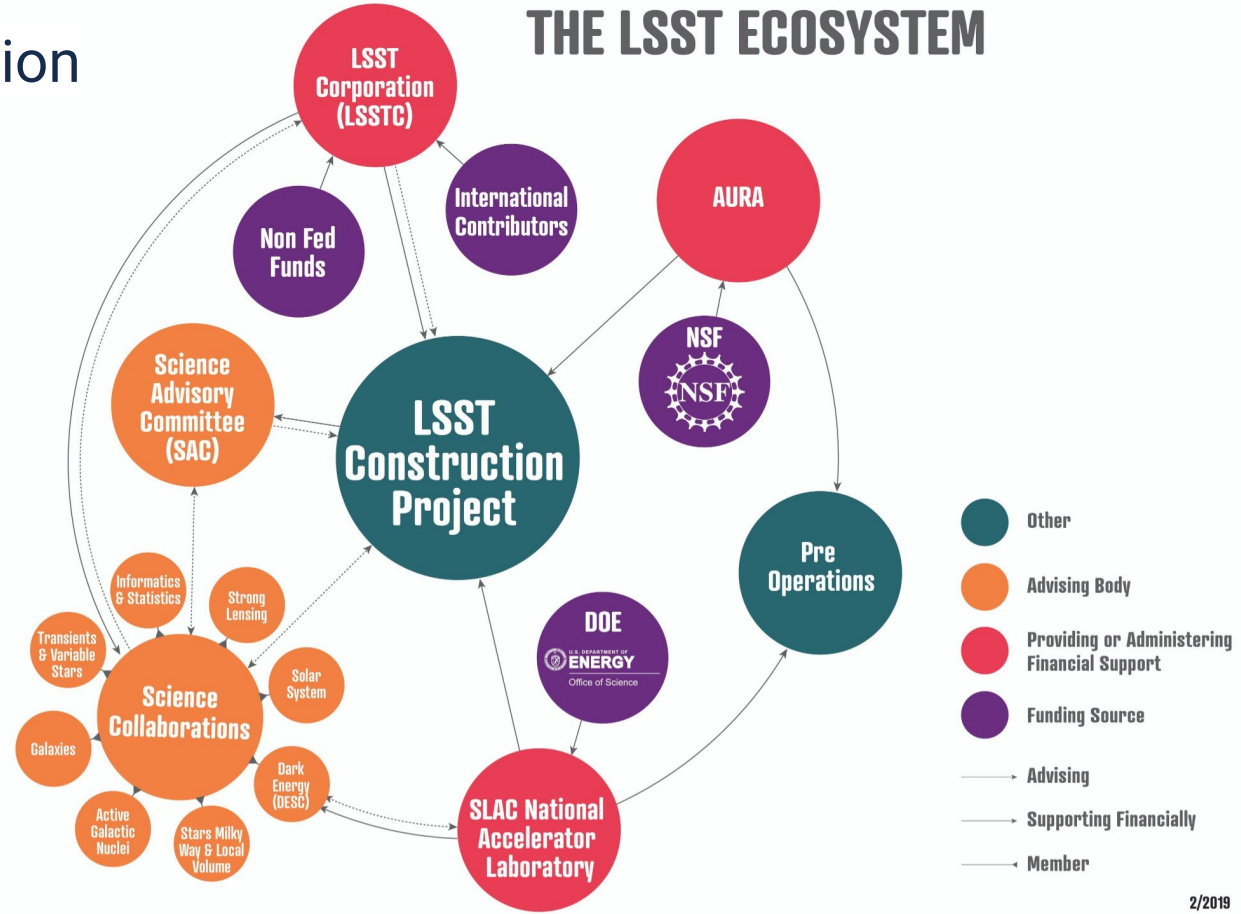


Rubin LSST Organisation

LSST Science Collaborations

More detailed planning for the scientific exploitation of the Rubin LSST data is being coordinated by the eight Science Collaborations, covering the following areas:

- Galaxies
- Stars, Milky Way and Local Volume
- Solar System
- Dark Energy
- Active Galactic Nuclei
- Transients and Variable Stars
- Strong Lensing
- Informatics and Statistics



LSST:UK

The LSST:UK Consortium exists to coordinate and support UK involvement in the Rubin LSST. Currently, it is a consortium of institutions - essentially, all astronomy groups in the UK

Data rights: MoA secured data rights for 100 Affiliate PIs (i.e. faculty members) and 400 Junior Associates (postdocs and PhD students), and, following the policy set by the Board, these slots are awarded through a competitive process, with one round per years for Affiliate PIs (APs) and two for Junior Associates (JAs). **JA selection round open, with closing date of 4pm BST on Friday 21st May 2021**

Governance:

- **Board:** Representative of each member institution. Mike Watson is currently the Consortium Board Chair and Alastair Edge the Deputy Chair. Typically meets twice a year.
- **Executive group:** Meets monthly. Chaired by the LSST:UK Project Leader (Bob Mann), the LSST:UK Project Scientist (Stephen Smartt), Adam Amara, Catherine Heymans, Richard McMahon, John Stott and Aprajita Verma, LUSC Project Managers (George Beckett and Terry Sloan), the Consortium Board Chair (Mike Watson) and the Commissioning Coordinator (Graham Smith).

LSST:UK Science Centre:

July 2015: funded development of a UK LSST Data Access Centre (DAC) and a series of ("DEV") projects

Continuation LUSC Phase B (July 2019 to March 2023)

LSST:UK

LSST:UK Science Working Group:

- Galaxies: Brooke Simmons
- Stars, Milky Way and Local Volume: Phil Lucas (Milky Way stars) and Annette Ferguson (Local Group and near-field cosmology)
- Solar System Science: Meg Schwamb
- Dark Energy: Benjamin Joachimi and Catherine Heymans
- Active Galactic Nuclei: Sebastian Hoenig
- Transients and Variable Stars: Sarah Casewell (variable stars) and Cosimo Inserra (transients)
- Strong Lensing: Aprajita Verma
- Informatics and Statistics: Jason McEwen

together with additional Science Liaisons contributing expertise in specific areas or relating to complementary facilities

- Square Kilometre Array: David Bacon
- Euclid: Bob Nichol
- Stars, Milky Way, Astrometry: Tim Naylor

Getting involved in LSST:UK

There is currently a JA selection round open, with closing date of **4pm BST on Friday 21st May 2021.**

Questions about getting involved: LSST:UK Project Leader (Bob Mann, for organisational issues) or the LSST:UK Project Scientist (Stephen Smartt, for scientific matters).

- Subscribe to the lusc-announce email list: this is a low-traffic list, used to provide the LSST:UK community
- Apply for an account for the LSST:UK wiki
- Sign up to the LSST:UK Code of Conduct
- Talk to the Point of Contact in your science area
- Look at the Lasair alert broker and test its capabilities on the alert stream from the Zwicky Transient Facility.
- Keep an eye out for relevant meetings and, if necessary, apply for financial support from the LSST:UK Pool Travel Fund to enable attendance.

More Questions

1. Ask question on slack (#new-to-all-this)
2. Q&A session in **Gather Town Wednesday at 2pm next to kiosks**
3. Kiosks have been set up in Gather Town to meet people in science collaborations to ask questions

Bob Blum is giving a Rubin Observatory Status Update this afternoon (3:45 pm)