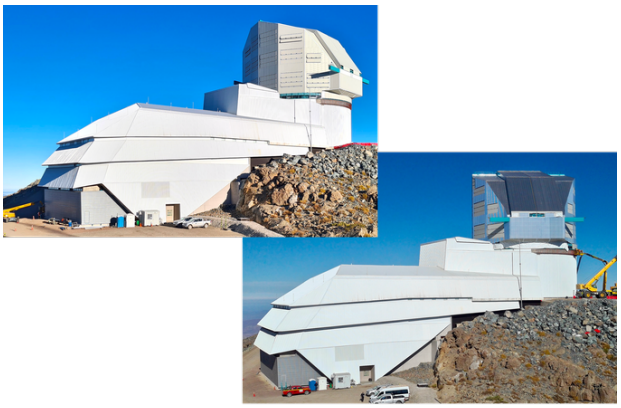
LSST:UK Newsletter 21 (April 2022)

Introduction

One visible piece of recent construction work on the summit of Cerro Pachón has been the coating of the dome with a reflective material (before and after shots to the right) to reduce air turbulence above it as it cools at dusk. Meanwhile, work within the dome includes progress on its control system, in preparation for the verification of the Telescope Mount Assembly.

The Observatory has recently released on YouTube the 2022 incarnation of its annual "*A day in the life of the Rubin Observatory*" video, showcasing a variety of Rubin staff at work - mainly just standing around or sitting, if truth be told, with some clearly staged pointing at screens - on 11 January 2022.



(Credit: Rubin Obs/NSF/AURA)

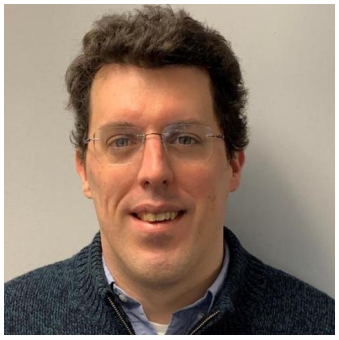
Those with ideas for future newsletter items should contact the LSST:UK Project Managers (@ George Beckett and @ Terry Sloan lusc_pm @mlist.is.ed.ac.uk), while everyone is encouraged to subscribe to the Rubin Observatory Digest for more general news from the US observatory team.

@ Bob Mann

Will Clarkson is the new Science Collaboration Coordinator

With Federica Bianco's appointment as Deputy Project Scientist for Rubin Construction, a vacancy arose for the Science Collaboration Coordinator. The SC Coordinator is appointed by the Science Collaborations, and, as the name suggests, coordinates their collective activities, including their interaction with the Observatory. As part of that role, the SC Coordinator sits on the Science Advisory Committee.

Two candidates stood in the election to be the new SC Coordinator - Will Clarkson (U. Michigan-Dearborn) and Matthew Graham (Caltech) - with the electorate being the membership of the Science Collaborations, voting through the SCs. A total of 580 votes were cast (representing a 28% turnout), resulting in both candidates having the majority vote from four of the eight Science Collaborations. The tie was broken by considering the fraction of total votes cast, leading to a narrow victory for Will Clarkson by 52% to 48%. Will starts a one-month handover period with Fed on 1 May, and will take over the role completely on 1 June.



@ Bob Mann

Phase C proposal progress update

The LSST:UK Science Centre (LUSC) Phase C proposal has been submitted to STFC: a version of the science case, with finance tables removed, is available to Consortium members through the Science Working Group space on the LSST:UK wiki. The proposal has now been sent out for review, and we expect to receive the reviewers' comments in mid-May. We will then appear before PPRP in Swindon on 15 June, to be followed by a Visiting Panel meeting in August or September. PPRP will then make a recommendation to be considered by STFC Science Board at its December meeting.

The proposal is seeking funding for the portion of the UK's agreed in-kind contribution to Rubin operations that falls within the period 1 April 2023 to 31 March 2027. The three main components of that are: (i) the continuation of the LUSC-DEV programme, providing user-generated data products and software to produce them; (ii) the transition of the LUSC-DAC activity from prototyping into operation of an LSST Data

Access Centre in the UK; and (iii) the start of LUSC-DRP, which comprises our 25% share of the annual Data Release Processing workload. Additional contributions will cover some specific staffing roles that will aid our integration into the Rubin operations consortium and our exploitation of the data rights we will be earn through our in-kind package, as well as covering our contribution to Rubin Commissioning.

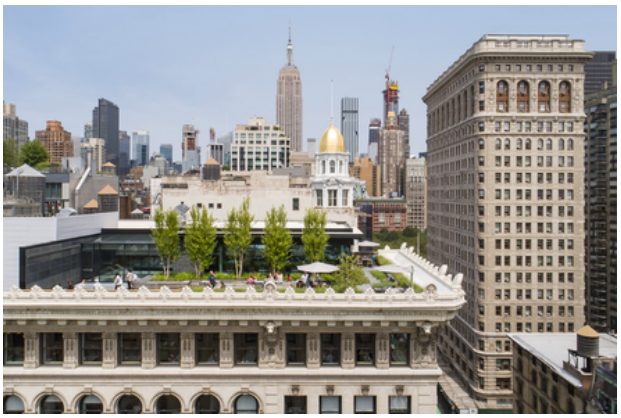
Taken together this represents a very exciting and diverse programme of work, which will set the UK up very well for a generation's scientific exploitation of the data from the ten-year Legacy Survey of Space and Time.

@ Bob Mann

From Data to Software to Science

Report on the recent workshop at the Center for Computational Astrophysics of the Flatiron Institute organised by LSST Interdisciplinary Network for Collaboration and Computing (LINCC) Frameworks team.

Fifth Avenue in New York City is an uncharacteristically glamorous location for an astronomy conference. I was therefore very happy to attend my first in person meeting since the start of the pandemic at The Flatiron Institute. The conference , which was titled *From Data to Software to Science with the Rubin Observatory LSST*, was held at the end of March and involved three days of talks and brainstorming sessions. It was a great opportunity to talk with people from an extremely wide range of institutions, science areas, and career stages.



(Credit: Perkins Eastman)

In my own work over the last two years we have been building a pipeline for joint processing of LSST and VISTA near infrared imaging as part of the UK's in kind contribution. We have been iterating on the data to software to science cycle and it was exciting to see how the world astronomy community has been approaching these interacting elements from different perspectives. The real consensus that I took away from the conference is that we are all anticipating and hoping that the Rubin data will lead to a step change in the way we all do science. One senior astronomer recalled how before the Sloan Digital Sky Survey many astronomers were completely unfamiliar with using structured query language to generate lists of astronomical objects and that they fully expected equally disruptive technologies to emerge from LSST.

The bulk of the workshop was spent developing a series of science cases. These all came out of open discussions starting with science aims and then trying to specify concrete technical requirements to allow them. I mainly attended discussions on photometric redshifts and spectral energy distribution fitting for extragalactic science cases. We are working under the assumption that there will be a single default photometric redshift product. It is a real challenge to satisfy requirements from all of the science collaborations and more bespoke solutions will be required by many teams. A focus was therefore on providing tools to run and test competing algorithms against an array of metrics.

My day to day work is focused on low level technical details. Anyone who has followed the LSST near infrared fusion project will know that the Butler middleware is a key part of our development focus. The conference was a further reminder that many scientists have no experience with the actual LSST Science Pipeline code and we have to make sure that all our work will be accessible to the full range of users. The focus for a lot of us now is therefore ensuring that all our work fits into the wider environment of data access services being provided. In particular, the Rubin Science Platform is of course at the center of all this work. Using this, accessing the Butler, and handling small samples in addition to running large area algorithms at scale is a major challenge.

The next two years will see an immense amount of activity as we expect to see actual on sky data. I feel like we are preparing for a hundred meter sprint and working to have everything in place for the starting gun. We don't know exactly when it will occur, there may be false starts and we can't prepare for every eventuality, but this is an incredible opportunity. We are present at the start of a huge scientific project and when the data starts rolling in we can realistically hope to see a vast array of discoveries. This will involve the full spectrum from software developers to scientists working together and learning from each other. I look forward to seeing the final document summarizing all the collaborative work that was started in New York a few weeks ago. There is a lot of work to be done building all the infrastructure to serve all the varied science cases but there is already an incredible technological base and the final stages are starting to fit into place.

@ Raphael Shirley

Forthcoming meetings of interest

Several meetings of potential interest have been scheduled for the coming months:

- 8-12 August 2022 – **2022 Project and Community Workshop**, Ritz-Carlton Dove Mountain Resort, Tucson. This is primarily an in-person event, though some sessions (plenaries and general-interest sessions) will be virtually accessible for those who cannot attend in person.
- 1–5 August 2022 – the next **DESC Collaboration Meeting** will be held during 1st–5th August at the Kavli Institute for Cosmological Physics at the University of Chicago. More details will be available soon on the DESC Confluence site (login required).
- 11–15 July 2022 – **National Astronomy Meeting** is being held at Warwick University. In particular, two parallel sessions may be of interest: Preparing for the Rubin Observatory's Legacy Survey of Space and Time organised by LSST:UK; and Discovery in Astronomy and Space Physics enabled by large-scale Digital Research Infrastructures (ASTROCOMP) organised by the IRIS programme.

Members of the Consortium (not in receipt of travel funding through one of the Science Centre grants) may apply for travel support for meetings of this kind via the the LSST:UK Pool Travel Fund. Details are available at https://lsst-uk.atlassian.net/wiki/spaces/HOME/pages/25853997/LSST+UK+Pool+Travel+Fund .

Note that the current list of forthcoming meeting is always available on the Relevant Meetings page. You may also wish to check information held on the LSST organisation website LSST-organised events and the LSST Corporation website.

@ George Beckett

Announcements

If you have significant announcements that are directly relevant to LSST:UK and would like to share the announcement in a future newsletter, please contact the LSST:UK project managers.

The Wide-Field Astronomy Unit at the Institute for Astronomy, University of Edinburgh is advertising two positions related to the UK's LSST Data Access Centre. Both appointments - a Research Software Engineer position working full-time on LSST and a Senior Research Software Engineer position to be shared 50/50 between LSST and Gaia - will be for two years, in the first instance, with the possibility of extension contingent on future funding, and both will suit applicants with strong Python skills and experience of data-intensive research projects and technical software development. The RSE position will join the DAC team working on the operation and optimisation of data handling systems such as the Rubin Data Butler, the Qserv distributed database, and RSP data interfaces. In LSST, the Senior RSE will develop expertise in using the Rubin Science Platform, guide UK customisations to the platform, and work with science groups to develop and optimise their analysis workflows.

The positions are advertised through the University of Edinburgh jobs site with a closing date of **17.00 on 9 May 2022**, and those interested are strongly encouraged to contact Bob Mann or George Beckett informally first.