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Currents

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Winter AAS Meeting Events: Please join us at the January AAS meeting for special sessions on NOIRLab data services, DESI, the Gemini Large and Long Program, LSST Dark Energy Science Collaboration, dark skies, engagement with indigenous communities, and much more! This article lists the NOIRLab-related special sessions, open houses, town halls, and booth events. Read more…

NOIRLab COVID-19 Update: NOIRLab Director Pat McCarthy looks back at the challenges we faced in 2020 and forward to a brighter 2021. Read more…

WIYN/NEID Update: WIYN is back on sky with commissioning activities and regular observing, mostly following the planned restart schedule described in the October issue of *Currents*. Several "extreme shared risk" science nights have been scheduled with NEID, and the NEID team received a NASA Group Achievement Award for delivering the NEID spectrograph and port adapter to the WIYN 3.5m telescope. Read more…

NOIRLab Data Services at AAS237: The Community Science and Data Center (CSDC) will offer "A Practical Demo Built on Science with the Dark Energy Survey" in a splinter session at the AAS meeting. Following a specific science use case drawn from analysis of the Dark Energy Survey DR2 data release, presentations will demonstrate how to employ NOIRLab data services for practical scientific discovery. Read more…

US ELT Program at AAS237: This article describes the US Extremely Large Telescope Program's splinter session and booth activities at the January AAS meeting. Read more…

DESI at AAS237: A special session on "Dark Energy Spectroscopic Instrument (DESI): On Sky" will present the status of the instrument, performance during commissioning and survey validation, and early science results. Speakers will report on DESI's legacy imaging surveys, with Data Release 9 occurring at the AAS meeting, as well as on early science from DESI's Milky Way Survey, Bright Galaxy Survey, and the large scale structure survey. Read more…

News from the US National Gemini Office: The US NGO now has a Twitter account (@usngo), with posts about program completion, upcoming deadlines, publications, and much more. In addition, tutorials for the Gemini DRAGONS (Jupyter notebooks) and IRAF data reduction packages are now available at a github repository. Read more…

In this Issue

Rubin Observatory's New Logo: Vera C. Rubin Observatory recently announced its official logo, which visually represents Rubin Observatory's central purpose: to collect light from celestial objects and transform it into data for scientific discovery. Read more…

From the Gemini e-Newscast:

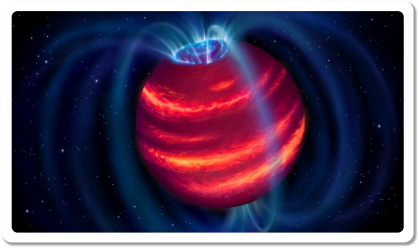
- Proposals Solicited for Gemini North and South. The next Fast Turnaround proposal deadline is 31 December 2020. For further details see https://www.gemini.edu/observing/phase-i/ft/ft-cfp.
- IGRINS Critical Design Review Completed on Schedule.

Read more in the Gemini e-Newscast

NOIRLab in the News:

- **New Horizons Finds the Universe a Shade Too Bright:** Observations of the cosmic optical background made with the LORRI camera on NASA's New Horizons probe detect a diffuse flux component of unknown origin. NOIRLab Astronomer Tod Lauer led the study. Read more on arXiv and at the New York Times
- **SMASH Observes Magellanic Clouds in Exquisite Detail:** Covering an area 2,400 times greater than the full Moon, the second data release of the Survey of the MAgellanic Stellar History (SMASH) contains new data from DECam on the central and most complex regions of the Magellanic Clouds and includes roughly 4 billion measurements of 360 million objects. Read the press release here.

- **First Brown Dwarf Discovered in Radio:** Observations with the LOFAR radio telescope, Gemini Observatory, and the NASA IRTF led to the discovery and characterization of BDR J1750+3809, the first substellar object discovered through radio observations. The Gemini observations, which reveal methane in the object's atmosphere, also show that it is a close cousin of Solar System planets like Jupiter. Read the press release here.



- **DECam Explores the Galactic Bulge:** Over 250 million stars in the heart of the Galaxy have been surveyed with DECam on CTIO's 4m Blanco Telescope, opening the door to a reexamination of key questions about the Galaxy's formation and history. From spectacular images such as this, the investigating team measured the chemical composition of tens of thousands of stars. Read the press release here.

If you have a NOIRLab-related result that we can help publicize, please let us know! Contact NOIRLab Press Officer Amanda Kocz (akocz@aura-astronomy.org) or *Currents* editor Joan Najita (najita@noao.edu).

Winter AAS Meeting Events

Mark your calendars and please join us at the following NOIRLab-related events at the January AAS meeting.

Monday 11 January 2021

Scientific and Cultural Engagement with Arizona Indigenous Communities
Special Session 103, 12-1:30 PM ET

Tuesday 12 January 2021

Rubin Observatory Open House
12:00-1:30 PM ET

The Data Lab Science Platform and Open-Data Ecosystem at NSF's NOIRLab
Special Session 224, 4:10-5:40PM ET

Collaboration with Integrity: Partnerships with Indigenous Communities in the Americas and Polynesia
Special Session 225, 4:10-5:40 PM ET

Meet the Maunakea Observatories
6:50-8:20 PM ET

Wednesday 13 January 2021

The Rubin Observatory LSST Dark Energy Science Collaboration (DESC)
Special Session 305, 12-1:30 PM ET

Extragalactic Astronomy with Gemini Large and Long Programs (LPs)
Splinter Meeting, 12-1:30 PM ET

Dark Energy Spectroscopic Instrument (DESI): On Sky
Special Session 303, 12-1:30 PM ET

Thursday 14 January 2021

NOIRLab Town Hall
1:40-2:40 PM

The US Extremely Large Telescope Program
Splinter Session, 4:10-5:40 PM ET

NOIRLab's Data Services: A Practical Demo Built on Science with DES DR2 *Splinter Session, 4:10-5:40 PM ET*

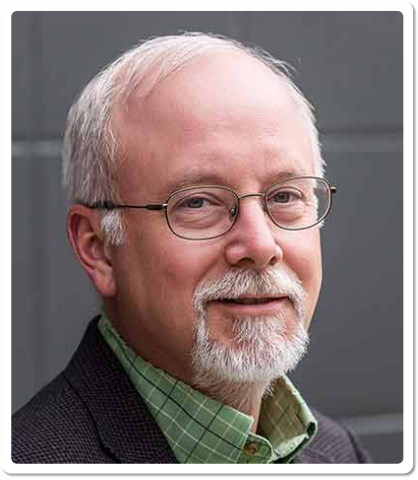
Astronomy and Satellite Constellations
Special Session, 4:10-5:40 PM ET

Visit the NOIRLab booth for

- Webinar on "Gemini Program Platform Overview: Next Generation Gemini Operations Software" by Bryan Miller and Andrew Stephens
  Monday 11 January 2021, 4-4:30 PM ET
- Live from NOIRLab presentation: "The La Serena Data School" by Guillermo Damke
  Tuesday 12 January 2021, 2:40-3:10 PM ET
- Daily live demo of the DRAGONS data reduction pipeline for Gemini

NOIRLab COVID-19 Update

Pat McCarthy (NOIRLab Director)



As we approach the end of 2020 it's a good time to take stock of what we have learned from our experience with the COVID-19 pandemic and to consider what 2021 may bring. It has been a tumultuous year for all of us. Each of our observatory locations has had its own unique experience with the coronavirus. The chart below shows the development of the pandemic in Arizona, Chile, and Hawaii with the overall US infection rates shown for reference. In mid-March we halted operations at all of our sites, as did much of the world, in response to local conditions and government decrees. At that time, we knew we were in for a difficult time; few realized just how long and difficult it would be.

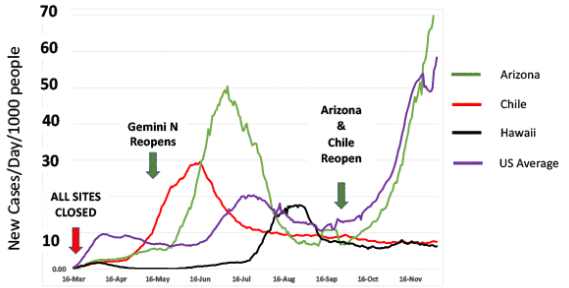


Figure 1. Daily COVID-19 infection rates per 100,000 people at each of our sites, smoothed with a 14-day running average.

Fortunately, we were able to reopen the Gemini North telescope in Hawaii fairly quickly and the telescope has been in uninterrupted operation since mid-May. Chile, Arizona, and Hawaii each experienced their own local outbreaks in turn. In late September, we were able to bring the Kitt Peak and Chile telescopes back on line. Careful preparations, extensive training, and modifications to workspaces allowed us to operate safely with a high degree of confidence. Despite the recent rise in cases in the continental US, we continue to operate on Kitt Peak by employing best practices in health and safety grounded in the most up-to-date science regarding the novel coronavirus. Further details on the status of our facilities are available in a recent announcement.

Like most of our user community, we have had to improvise and adapt to changing conditions. The telescope Time Allocation Committee has met remotely twice and the meetings have been a great success. Our TAC members are juggling teaching and family life, yet they were able to come together to select the best proposals from an impressive response to the proposal deadlines. The scheduling team has balanced carryover of top ranked proposals from the time when we were off sky with new highly ranked proposals to ensure that every clear night is used to its best purpose.

In addition to conducting a busy observing program, the NOIRLab team is engaging with the community through remote meetings, weekly colloquia, and other interactions. We are learning that there are benefits to remote meetings – no travel! – as well as challenges. When we have to be on a 6AM Zoom call, it's worth remembering that we don't have to get to the airport!

As we look to 2021, we can see a time when we can be together again. We look forward to seeing many observers at the telescope again, to seeing our TAC members and user committee members in person, and to hosting community workshops where we can mix over food and drink, discuss the latest results, and plan our future together. We may never forget 2020, but it will be good to see it in the rear-view mirror!

Update from WIYN/NEID

Jayadev Rajagopal

WIYN is back on sky with commissioning activities and regular observing, mostly following the planned restart schedule described in the October issue of *Currents*. NEID had a "shakedown" night on 30 November, which demonstrated that the system is ready for regular commissioning in early December.

Beginning in December, we have scheduled for NEID some "extreme shared risk" nights—a term coined by the team for these extraordinary circumstances—for a limited set of carefully selected PI programs. These programs will be carried out in parallel with commissioning and offer a chance for some exciting early science.

In other welcome news, the NEID team received a NASA Group Achievement Award, which was presented (virtually) on 1 December. The award is given by NASA to groups of government or non-government personnel in recognition of group accomplishments that contribute to NASA's mission. The citation reads: "For the development and delivery of the state-of-the-art NEID radial velocity spectrograph and port adapter to the WIYN 3.5-meter telescope on Kitt Peak." Congratulations to the team!

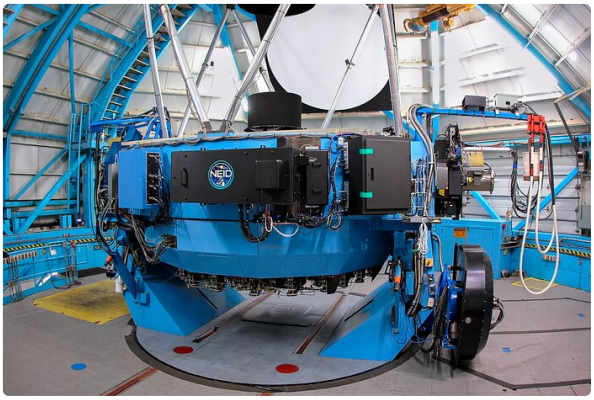
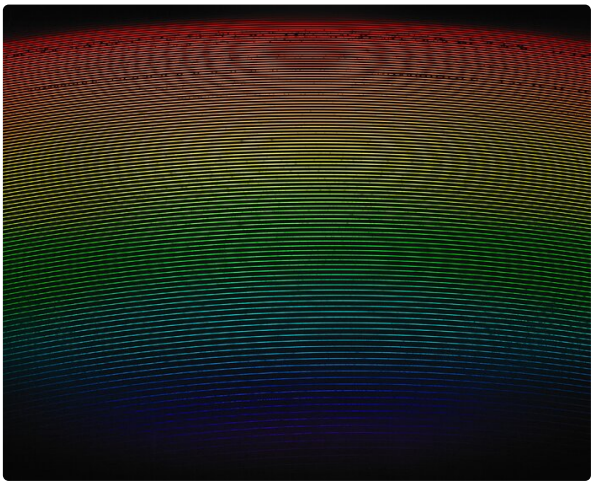


Image of the NEID fiber feed on the WIYN telescope.



NEID first light spectrum of 51 Pegasi.

AAS 237 Splinter Session on NOIRLab's Data Services: A Practical Demo Built on Science with the Dark Energy Survey

Knut Olsen

At AAS 237, on Thursday 14 January 2021 at 4:10-5:40 pm EST, the NOIRLab Community Science and Data Center (CSDC) will hold a session demonstrating how to employ NOIRLab's data services for practical scientific discovery. We will follow a particular science use case drawn from analysis of the Dark Energy Survey DR2 data release (see the DES DR2 Special Session at AAS 237). With the goal of identifying Milky Way dwarf companion galaxies and stellar streams, we will demonstrate how to use:

- Astro Data Archive to construct a high-resolution depth map of DES DR2 from tens of thousands of DECam images,
- Astro Data Lab to query the DES DR2 catalog, create a depth-corrected map of structure, and identify candidate dwarf galaxies and streams,

- ANTARES transient broker to identify variables and to set up watch lists for new time variable objects in the vicinity of those dwarf galaxies and streams,
- TOM Toolkit and AEON network to schedule follow-up observations of select candidate transients and variables with the Gemini telescopes.

Along with these specific demos, we will discuss how the wide array of features of NOIRLab's data services enable anyone with a good idea to explore, analyze, and follow up massive datasets. Join us!

The US Extremely Large Telescope Program at AAS 237

Mark Dickinson and Sidney Wolff

At AAS 237, on Thursday 14 January 2021 at 4:10-5:40 pm EST, the US Extremely Large Telescope Program will host a session featuring an overview of the US-ELTP and updates on the status of the construction planning for the Giant Magellan Telescope (GMT) and the Thirty Meter Telescope (TMT). We will describe NOIRLab's plans to provide user support services and tools for all stages of research using TMT and GMT, from proposal preparation to observation planning to data reduction, data analysis, and archival research. NOIRLab will develop these services with particular emphasis on enabling research by a broad, diverse scientific community, including scientists and students at under-resourced undergraduate institutions. This session will be an early opportunity to give your input on these plans for US-ELTP user support.

Please also visit the US ELT Program booth in the AAS virtual exhibit hall. There you can meet staff members from NOIRLab, GMT, and TMT to learn more about the observatories and about our plans for US-ELTP user support.

The US ELT Program is a joint endeavor of NSF's NOIRLab, the TMT International Observatory, and the GMTO Corporation. Our goal is to complete both observatories and to ensure that all US scientists may use them to carry out transformational research enabled by the unprecedented sensitivity and angular resolution that GMT and TMT will provide. We seek to secure 25% or greater shares of open access observing time on both telescopes for US astronomers regardless of their institutional affiliations. The bi-hemispheric US ELT Program will uniquely enable US investigators to observe objects anywhere on the sky, using a broader suite of instruments than a single ELT could likely provide.

AAS 237 Special Session on Dark Energy Spectroscopic Instrument (DESI)

Join us on Wednesday 13 January 2021 at 12-1:30pm EST for a Special Session on "Dark Energy Spectroscopic Instrument (DESI): On Sky." DESI is the first Stage 4 dark energy experiment to begin observing. The session will present the status of the instrument, performance during commissioning and survey validation, and early results. With Data Release 9 of DESI's legacy imaging surveys occurring at the AAS

meeting, speakers will report on early science from DESI's Milky Way Survey, Bright Galaxy Survey, and the large scale structure survey.

Presenters include:

- Satya Gontcho A Gontcho (LBNL/Rochester) DESI Commissioning
- Alex Krolewski (Waterloo/Perimeter) Testing gravity and cosmology with DESI plus weak lensing
- Pauline Zarrouk (LPNHE) The DESI Bright Galaxy Survey: from target selection to preliminary clustering properties
- Kevin Fanning (OSU) Instrument
- Anthony Kremin (LBNL) Preliminary Spectroscopic Performance of the DESI Data Pipeline
- Andrew Cooper (NTHU Taiwan) DESI Milky Way Survey

An associated poster session will feature additional results.

News from the US National Gemini Office

Vinicius Placco (vinicius.placco@noirlab.edu) and Letizia Stanghellini (letizia.stanghellini@noirlab.edu)

A new communication channel and data reduction tutorials are now available from the US NGO to support Gemini users:

Twitter: Scheduled posts on Twitter include information about US program completion (daily for Gemini North and South), refereed publications with Gemini data and US involvement (weekly), instrument line-up (weekly for Gemini North and South), upcoming deadlines (monthly/semesterly), as well as software/instrument updates and other relevant news. Follow the US NGO at @usngo.

Github: The US NGO is developing data reduction tutorials for the Gemini DRAGONS and IRAF packages. The new github repository for DRAGONS contains Jupyter notebooks, written using the DRAGONS Python API, with data reduction examples for imaging modes using Flamingos2, GMOS, GSAOI, and NIRI. There are also extended help files with detailed instructions on how to download the notebooks, install the necessary Python packages, download the raw data from the Gemini Observatory Archive, and run the procedures. The Gemini/IRAF repository contains examples of data reduction scripts of GMOS long-slit spectroscopy with the Hamamatsu and e2v CCDs. New notebooks will become available as new data reduction modes are included in the next DRAGONS software updates. Further information is available at the Portal (http://ast.noao.edu/csdc/usngo), and within the repository at https://github.com/usngo.

New Logo for Rubin Observatory

Kristen Metzger

Vera C. Rubin Observatory recently announced its official logo following the organization's renaming in December 2019. Formerly known as the Large Synoptic Survey Telescope, Rubin Observatory was renamed, by an Act of Congress, to honor American astronomer Vera C. Rubin, a pioneer in the study of dark matter and an advocate for women in science.

The official logo is a visual representation of Rubin Observatory's central purpose: to collect light from celestial objects and transform it into data for scientific discovery. It is aligned with Rubin Observatory's mission for operations: To create a vast astronomical dataset and web-based analysis environment for unprecedented discovery of the deep and dynamic Universe.

The logo is made up of elements that reflect Rubin Observatory's priorities and core values. The variety of celestial objects, each one a unique shape or size, symbolize Rubin Observatory's commitment to diversity. The curved lines invoke the transformation of light from these objects into data, which are represented as traces on electronic readout boards: line segments with dots. The arc of the lines suggests time-lapse photography, in which stars appear as curved streaks in the sky, because Rubin Observatory data from the Legacy Survey of Space and Time (LSST) will provide the first time-lapse view of the Southern hemisphere sky. Finally, the foundational position of Vera C. Rubin's name in the logo honors her legacy and reflects our pride at being the first major US national scientific facility to be named after a woman scientist.

Contact Us

We welcome your input on this issue of *Currents*. Please contact us at currents@noao.edu. We look forward to hearing from you!