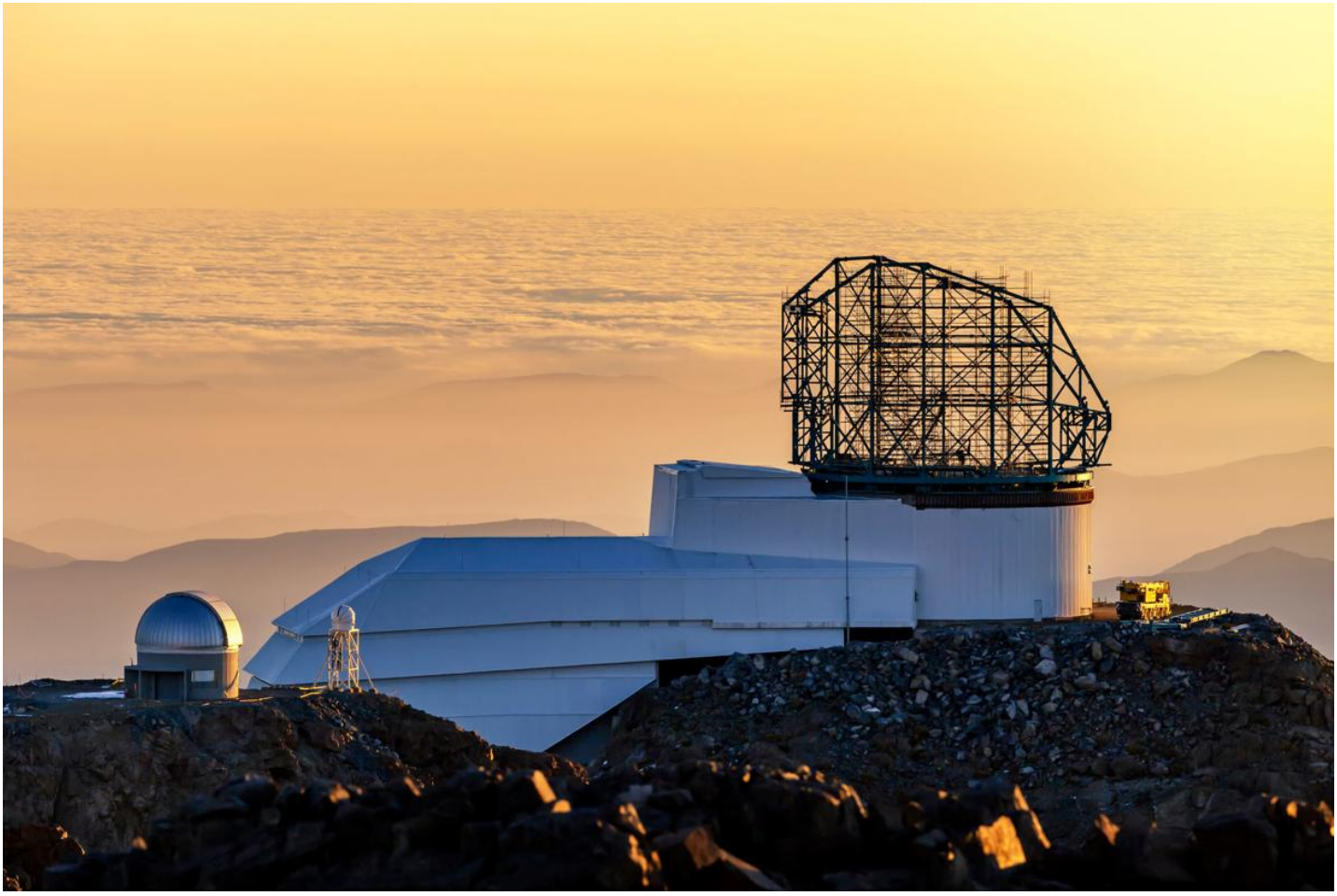
https://tucson.com/news/local/tucson-based-telescope-project-is-helping-transform-how-astronomers-do/article_a7dc5b1b-50a2-584d-888d-cfa26351b6e5.html

Tucson-based telescope project is helping transform how astronomers do their job

By Mikayla Mace Arizona Daily Star Aug 12, 2018



Large Synoptic Survey Telescope, or LSST on the Cerro Pachón ridge in the foothills of the Andes Mountains in north-central Chile.

Gianluca Lombardi / LSST

Astronomy for everyone is being transformed from right here in Tucson.

In about four years, a telescope with the power to scan the entire night sky every three nights for 10 years will be operational, creating a "movie" of the universe in the form of data that can be accessed from around the world.

The Large Synoptic Survey Telescope, or LSST, will peer simultaneously fast, wide and deep across and into the sky, capturing everything moving, changing or staying constant night by night.

“In the first week of operation, LSST will collect more data than Hubble (space telescope) ever has,” said Ardis Herrold, LSST education specialist.

“We believe the science will not be limited by the data, but by the people and skills working on the data,” said project scientist Zeljko Ivezic of the University of Washington.

The telescope is being constructed on the peak of the Cerro Pachón ridge in the foothills of the Andes Mountains in north-central Chile. And while construction is a global effort, operations are headquartered in Tucson.

The LSST is expected to begin operations in 2022.

On Thursday, Aug. 16, locals will have the opportunity to attend a free public lecture on the status of the next-generation telescope and learn how to get involved in the process of scientific discovery driven by LSST data. (*See box*.)

The lecture, “Exploring the Final Frontier with the Large Synoptic Survey Telescope,” will be presented by project manager Victor Krabbendam, cosmologist Phil Marshall and Herrold.

Attendees are invited to chat with LSST team members on topics ranging from astronomy to engineering, STEM careers, the telescope’s education and outreach programs, big data, Chile and more.

Representatives from the Kitt Peak Visitor Center, the UA Sky Center and the Richard F. Caris Mirror Lab will also be at the public talk to promote their astronomy-outreach programs at tables in the lobby before the lecture.

Applications for telescope time can be competitive and time is limited, as most other telescope can only look at a small area of the sky at a time. Also, many astronomers don't typically share their hard-won observations. "Instead, this telescope will be providing time for all astronomers. It's not linked to a special project at a time," Herrold said, "and it's not only for astronomers, but for all people."

Researchers and astronomy enthusiasts in Chile and the United States will have data rights for two years before it is released to the rest of the world, as the two countries are providing the most resources and talent to the project.

The telescope will be astronomy's Swiss army knife. It will be able to detect asteroids moving in our solar system and the deaths of stars in other galaxies and uncover secrets of dark matter and dark energy on a universal scale, for example.

A select amount of data garnered from the LSST will be available through the education and public outreach website, Herrold said. "There's going to be a lot to explore. The scale will make us able to make many new discoveries."

The data available for educators, students, citizen scientists and astronomy enthusiasts will be mix of images and numerical catalog data.

"It's not just simply images, some people will want the graphs, and that data will be available too," she said.

For formal education specifically, “Our audience is high school and college students and some advanced middle school students.” Her team has designed investigations for teachers to either use “off the shelf” or customize for their classrooms.

What makes the LSST data available for the public so special, however, is the fact that it comes with the tools needed to analyze it built into the online platform. For students, this is called the online notebook.

“You access data without having to download anything and all the tools are right there. Make measurements, make graphs all online without any special software, firewalls, or bandwidth worries,” Herrold said. “It’s an evolving technology.”

For students, this can remove the tedium of learning how to use new software or calculations, she said. “We’re removing barriers that prevent students from focusing on science.”

The LSST will also produce a deep-image sky viewer, similar to the sky map apps that can be downloaded to smartphones. However, it will be a “brand new sky for everyone,” Herrold said. The objects in it are all things that cannot be seen with the naked eye, because they are too faint and were not aggregated in any way before LSST.

“It’s going to be harder to escape the eye of LSST,” Herrold said.

Financial support for the LSST comes from the National Science Foundation, the Department of Energy Office of Science and private funding raised by the LSST Corp. The founding members of the LSST Corp. are the National Optical Astronomy Observatory, the UA, the Research Corp. for Science Advancement and the University of Washington.

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Lecture details

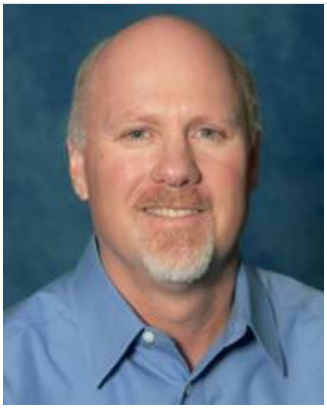
What: The free public lecture will be available for those who want to learn how citizen scientists, teachers, students and astronomy enthusiasts can participate in scientific discovery with the astronomical amounts of data produced by LSST.

Where: The 14th annual LSST Workshop at El Conquistador, 10000 N. Oracle Road, in the Turquoise Ballroom.

When: Thursday, Aug. 16, at 7 p.m.

For more information, visit www.lsst.org/about/epo

MORE INFORMATION



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- Chance of thunderstorms, temperatures below 100 in Tucson today
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- Ocean muck used by UA researchers to study ancient monsoons, help improve forecasting
- 25 years after first experiment ended, Biosphere poised for new efforts in science, outreach
- $4.5M science foundation grant latest in Kitt Peak telescope revitalization
- Tucson's monsoon this year was about average, yet dramatic
- Safely there: University of Arizona-led OSIRIS-REx arrives at asteroid Bennu
- UA College of Optical Sciences receives $20M pledge for endowed faculty positions
- OSIRIS-REx arrives at asteroid as UA scientists begin 18-month work to return sample

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