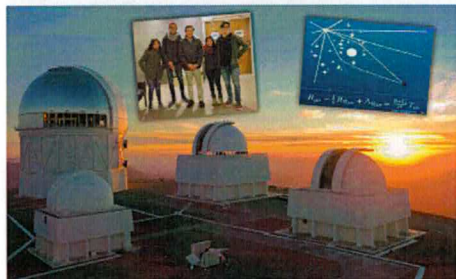


## NOAO IN THE NEWS



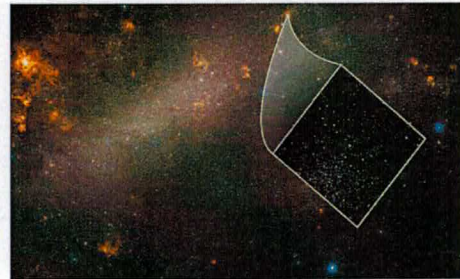
### Commemorating 100 years of General Relativity

On May 29, 1919, Arthur Eddington performed an experiment during a total solar eclipse that confirmed Einstein's Theory of General Relativity, expanding our understanding of space, time, and mass. On July 2, another solar eclipse will pass over the telescopes at Cerro Tololo Inter-American Observatory (CTIO) in Chile. A team of students from the University of La Serena, along with Juan Seguel (CTIO) and Rob Sparks (NOAO), will perform a commemorative experiment and attempt to replicate Eddington's results.



### LSST Mirror Arrives at Cerro Pachón

The 8.4m-diameter primary mirror of the Large Synoptic Survey Telescope (LSST) has reached its home at Cerro Pachón in Chile. Earlier this month, the mirror reached the port at Coquimbo, where it was loaded onto a 72-wheeled transport vehicle for the trip to the summit. The trip included passage through the tunnel at Puclaro Dam, with just inches to spare on either side. In a survey set to begin in 2022, LSST will scan the entire visible sky every few nights for 10 years, opening a new window on the changing Universe.



### Mystery of the Universe's Expansion: the Plot Thickens

New results from the Hubble Space Telescope confirm that the Universe today is expanding faster than expected, based on how the Universe appeared 13 billion years ago. Possible explanations for the discrepancy include a surprise appearance of dark energy in the young Universe ("early dark energy") or that the Universe contains a new subatomic particle that travels close to the speed of light ("dark radiation"). The development relies on an earlier study of Cepheid variable stars carried out with the SMARTS 1.5m telescope at CTIO.

## BACKYARD WORLDS: PLANET 9



Amateur astronomy has time and again played a key role in catalyzing scientific progress. Here in Arizona, for example, a recreational observer co-discovered Comet Hale-Bopp. Backyard observatories continue to monitor the sky, but nowadays the ability to rig up a personal telescope is not a prerequisite for taking part in cutting edge astronomical research. Thanks to the internet and vast archives of publicly accessible data, anyone with a computer, tablet or smartphone can join the quest for new celestial discoveries.

A timeless pursuit throughout the course of astronomy has been hunting for celestial objects that move across the sky. In order to shift position relative to more distant background stars and galaxies, an object must be nearby to us. So astronomical motion searches provide a way to

discover asteroids, comets, planets orbiting the Sun, and stars in the solar system's local cosmic neighborhood. And even with today's high-powered computers, there's still no substitute for the human eye when it comes to recognizing subtle motions in astronomical images

Astronomers still believe there is much yet undiscovered close to home, including hypothetical planets in the outer solar system referred to as "Planet 9" and "Planet X". Two years ago, I co-founded Backyard Worlds: Planet 9, a citizen science project to search for additional planets orbiting the Sun and new close-by neighbors to the solar system. Through an online, crowdsourced, visual inspection process, our team of volunteers has discovered over a thousand new neighbors to the Sun, and followed these up with premier observatories including the Hubble Space Telescope. Our contributors have diverse backgrounds -- from techies, to high school students, to medical professionals and retired engineers -- and their creativity has led to our project's most intriguing discoveries. Now, Backyard Worlds has rebooted its website with a doubly large data set of astronomical images, and we're seeking additional participants to fuel our next wave of discoveries. All are invited to join in the fun of scouring the astronomical data archives!

Dr. Aaron Meisner is a scientist at NOAO working on projects associated with KPNO's Mayall 4-meter telescope. The Backyard Worlds: Planet 9 project is accessible online at <http://backyardworlds.org>.



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