

U.S. Leadership in Astronomy



Pillars of Creation - Hubble Space Telescope Credit: NASA, ESA and the Hubble Heritage Team (STScI/AURA)

Our planet is a small blue sphere traveling through inky blackness. Enveloping that sphere is a wispy layer of gases we call our atmosphere. The study of everything outside of that atmosphere – the Moon, Sun, solar system, stars and galaxies beyond – is astronomy.



Hubble drifts over Earth Credit: NASA

U.S. Legacy

For more than a century, the United States has been the world leader in the study of astronomy. From the development of cutting-edge technology and research techniques, to breakthrough science and Nobel prizes, astronomy in the US has been the world's gold standard.

First image of a black hole, using Event Horizon Telescope Credit: Event Horizon Telescope Collaboration

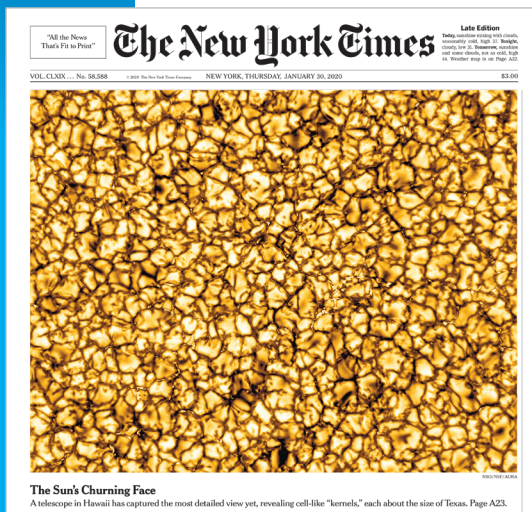


NASA's Hubble space telescope is a household name, its images are famous around the world, and it has produced a wealth of pioneering discoveries. NASA missions such as Voyager and New Horizons were the first to explore our outer Solar System and beyond.

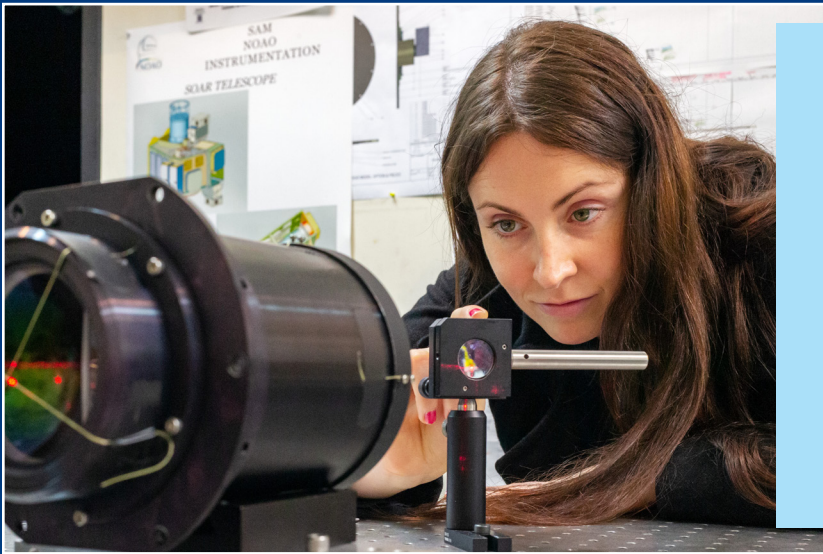
NSF collaborations yield unprecedented science – like the advanced radio telescope ALMA (the first to image a new planet forming) and the Event Horizon Telescope (that captured our only image of a black hole). The investigations by American astronomers of thousands of newly discovered planets outside of our Solar System use NSF funded ground-based telescopes.

New NSF facilities like the Daniel K. Inouye Solar Telescope, the world's largest solar telescope, and the Vera C. Rubin Observatory that will survey the sky with an enormous digital camera, will set the standards for the future.

Front page of the New York Times with the first image of the sun taken by NSF's Daniel K. Inouye Solar Telescope Credit: NSO/NSF/AURA



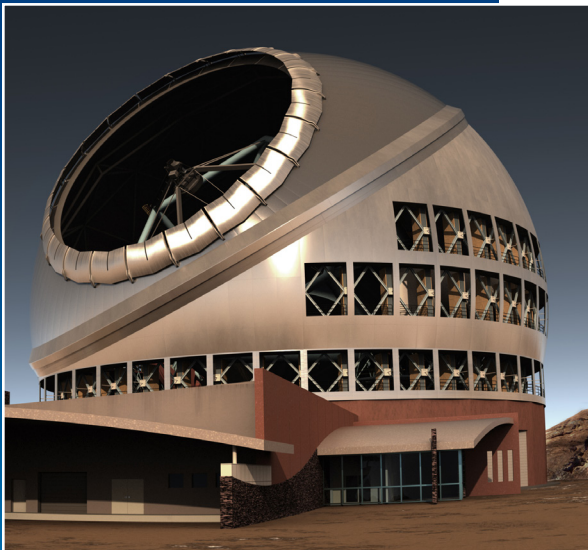
The Sun's Churning Face
A telescope in Hawaii has captured the most detailed view yet, revealing cell-like "kernels," each about the size of Texas. Page A23.



Astronomy Leadership:

- Provides opportunities for the best and brightest scientists and engineers in the US
- Creates opportunities for US aerospace industry to develop prestigious projects
- Attracts top students to US universities
- Develops US scientists that lead the world in research
- Promotes public pride and national prestige

Nicole David, Engineer NOIRLab. Credit: NOIR-Lab/NSF/AURA/M. Paredes



Uncertain Future

The European Union and China are now challenging American leadership

The European Southern Observatory is currently building the world's largest ground-based telescope. With a 39-meter mirror it will be almost four times larger than any telescope now in operation and is fully funded both for construction and operation beginning in 2025. China has built the world's largest radio telescope while at the same time the Arecibo radio telescope in Puerto Rico experienced a catastrophic collapse. US researchers risk falling behind because of lack of access to best-in-class facilities.



A Path Forward

Continued investment in the latest advanced technology in both ground- and space-based telescopes will ensure US leadership in astronomy and keep us from falling behind competing countries. US missions to study the cosmos will continue to position us as a global leader in space exploration. Our continued leadership will mean our universities will attract the top students and researchers, and our aerospace industry will build the next generation of technology. American engineers and scientists will still be recognized as the best in the world.

Artist renderings of two US led planned advanced extremely large telescope projects: top the Thirty Meter Telescope, bottom the Giant Magellan Telescope. Credits: Courtesy TMT International Observatory, GMT Corporation/IM3 Engineering

To maintain the US leading role in astronomy, we must continue to fund state-of-the-art facilities and missions. These investments will ensure American leadership in astronomy, and all the benefits that brings, for decades to come.



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