Introduction to the NSF NATIONAL OPTICAL/IR ASTRONOMY RESEARCH LABORATORY

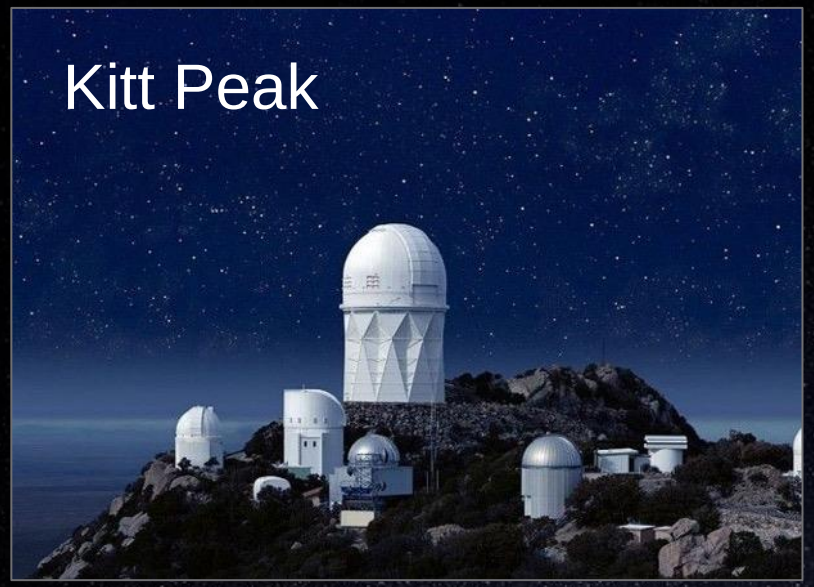
Patrick J. McCarthy
Director

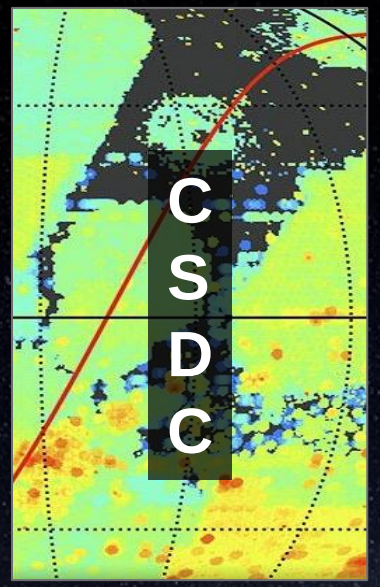
Discovering Our Universe Together

Welcome to Arizona

Astronomy Capital of the Continental US

NSF NOIRLab


Kitt Peak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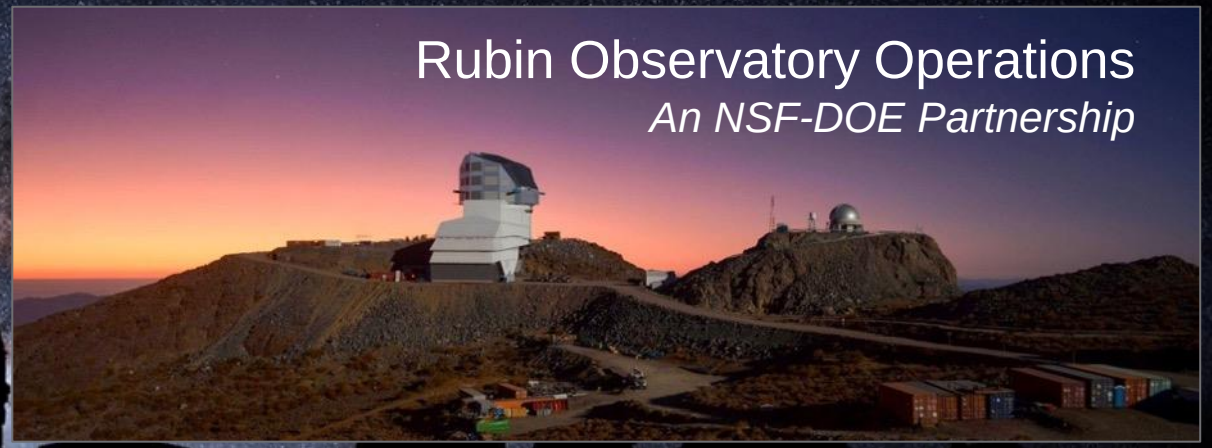
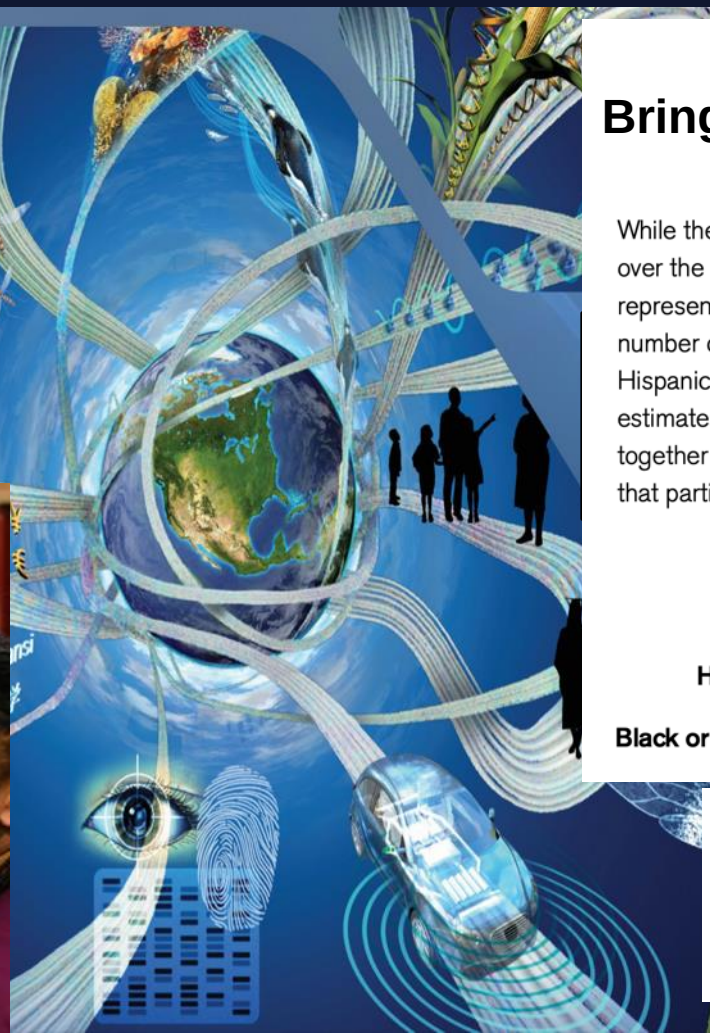
Gemini
With our international partners


Cerro Tololo


Rubin Observatory Operations
An NSF-DOE Partnership

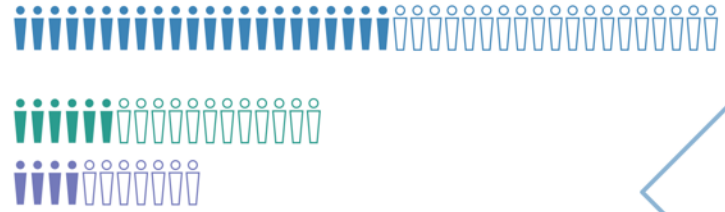
Our Mission: Enable breakthrough discoveries by any - and all - US scientists



NSB Vision 2030

Bringing the Missing Millions into the Science and Engineering Workforce

While the number of people from under-represented groups in the S&E workforce has grown over the past decade, much faster increases will be needed for the S&E workforce to be representative of the U.S. population in 2030. To achieve that goal, the NSB estimates that the number of women must nearly double, Black or African Americans must more than double, and Hispanic or Latinos must triple the number that are in the 2020 U.S. S&E workforce. These estimates are based on projections from the U.S. Census and Bureau of Labor Statistics, together with data from the National Center for Science and Engineering Statistics, and assume that participation of these groups in the S&E workforce increases at current rates.



Legend

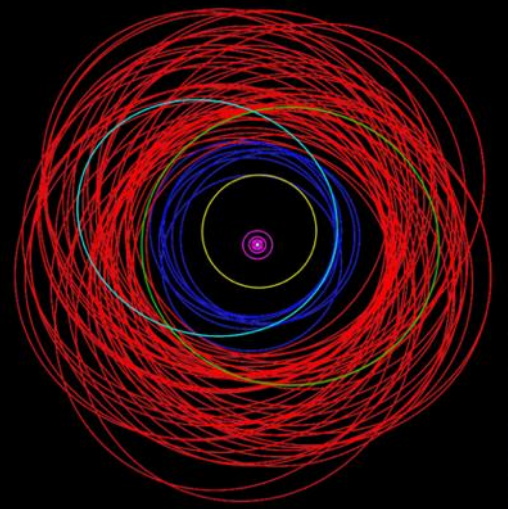
- x 100,000 people in 2020 S&E workforce
- x 100,000 additional people needed in 2030 for the S&E workforce to representative of the U.S. population

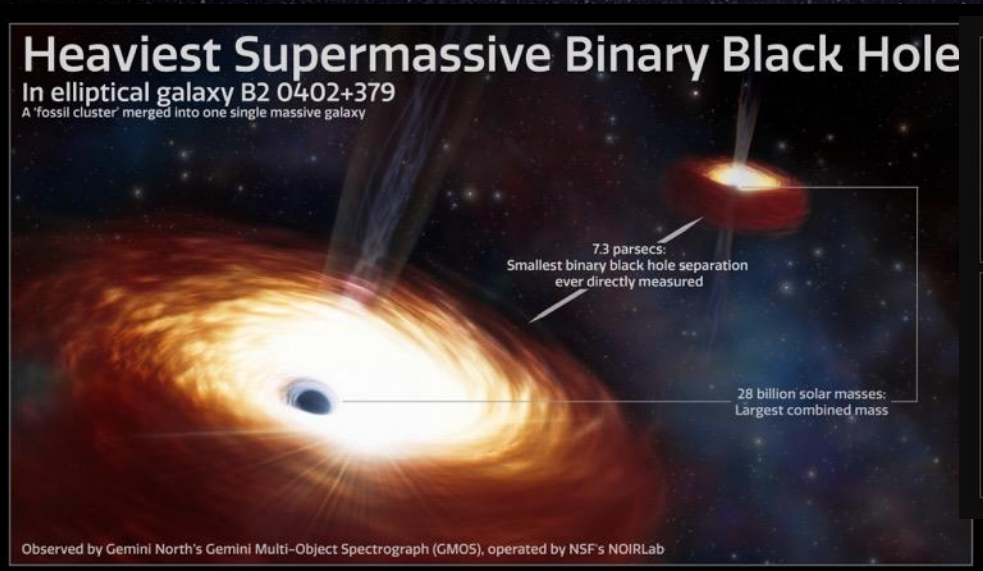
A Broad Range of Science

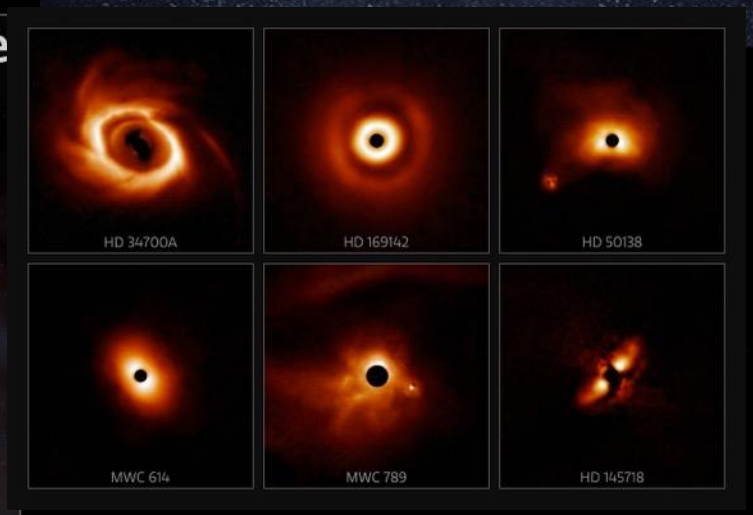
The Closest Black Hole!

Nearby Brown Dwarf Stars

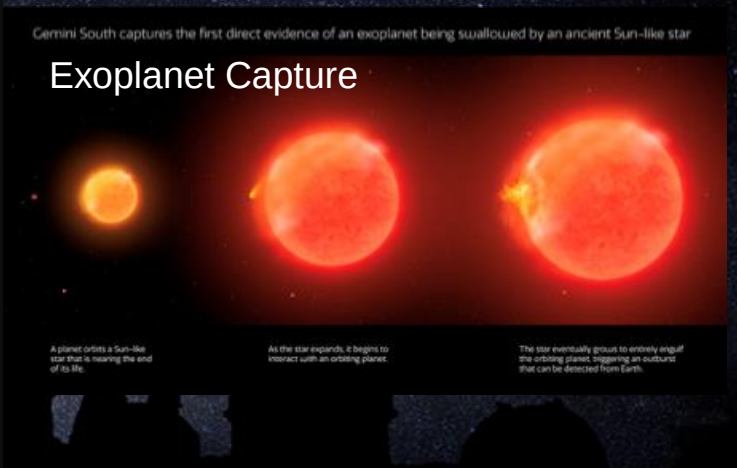
Jovian Satellites (Natural!)





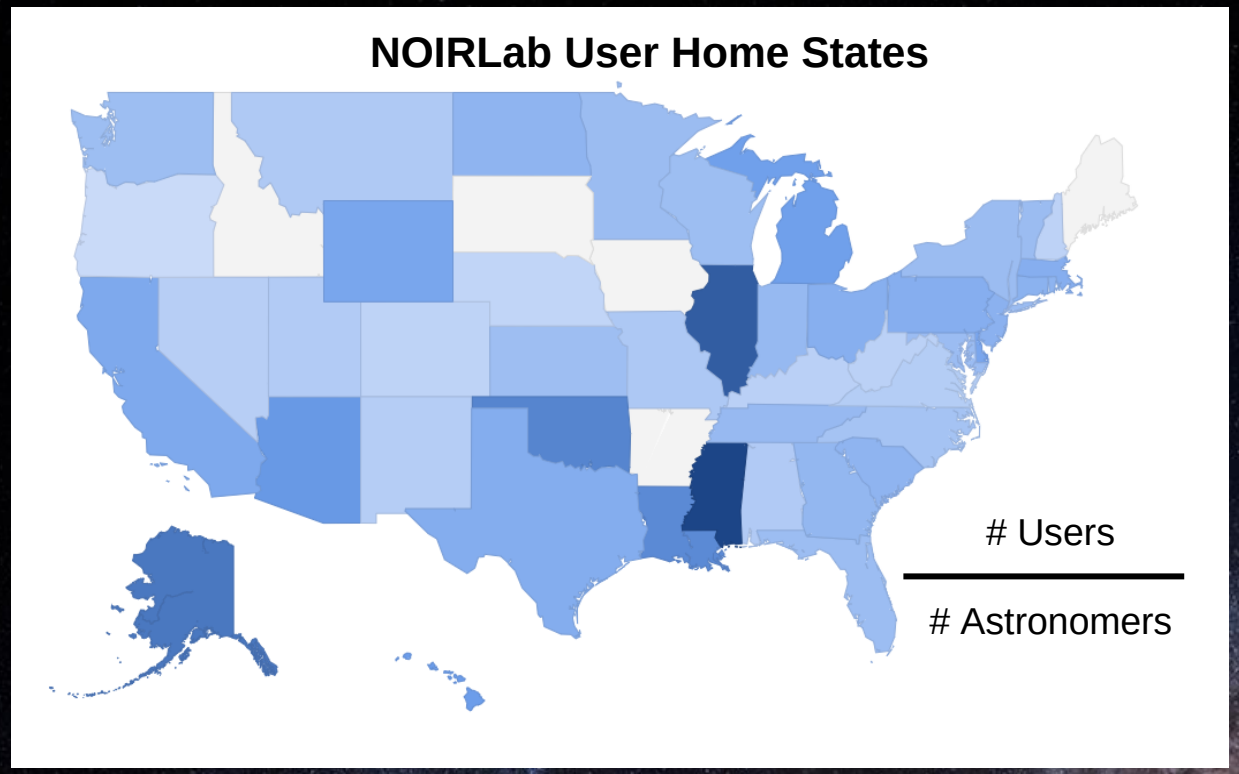


Planets Forming…



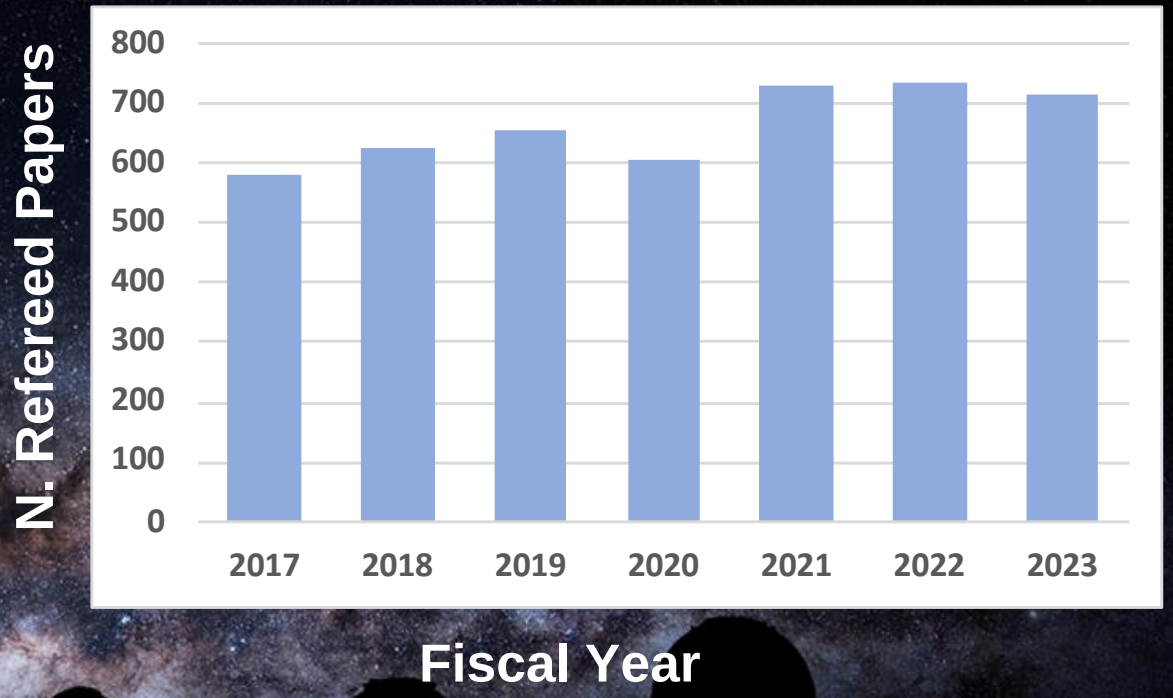
…Planets Dying

Breadth and Impact of NOIRLab



NOIRLab Facility Users in nearly every US state and many countries

700+ Refereed publications per year



Origin of the MREFC Account

The Gemini and LIGO Observatories were the impetus to create the ***Major Research Equipment and Facilities Construction*** account at NSF

[NAS: Setting Priorities for Large Research Facility Projects Supported by the National Science Foundation]

Before 1992	Gemini operated under directorship of NOAO [3].
Spring 1992	US Gemini involvement under AURA management independent of NOAO [3].
April 16, 1993	AURA board recommends creation of US Gemini Office in NOAO [4].
1993	UK and Canada join United States in providing funding for Gemini [6].
October 6, 1994	Groundbreaking ceremony for Gemini North [15].
October 22, 1994	Groundbreaking ceremony for Gemini South [15].
1995	Creation of MREFC account; Gemini receives $41 million [7].
October 11, 1995	Corning Inc., announces completion of Gemini North primary mirror blank [10].
February 8, 1996	Fred Gillett named International Gemini Project scientist [16].
May 1, 1997	Corning Inc., completes fabrication of Gemini South mirror blank [11].
June 24, 1997	Groundbreaking ceremonies at Hilo Base Facility for Gemini North [12].

International Gemini Observatory

Many Firsts for US Optical Astronomy

- International Partnership
- Systems Engineering design approach
- Modern Project Management
- Earned Value Management
- Queue-driven service observing
- Base Operations

No nighttime staff on the summits!

First Light
2000

Chile

Hawaii

INTERNATIONAL GEMINI OBSERVATORY

NRC·CNRC

Ministerio de Ciencia, Tecnología e Innovación Argentina

Korea Astronomy and Space Science Institute

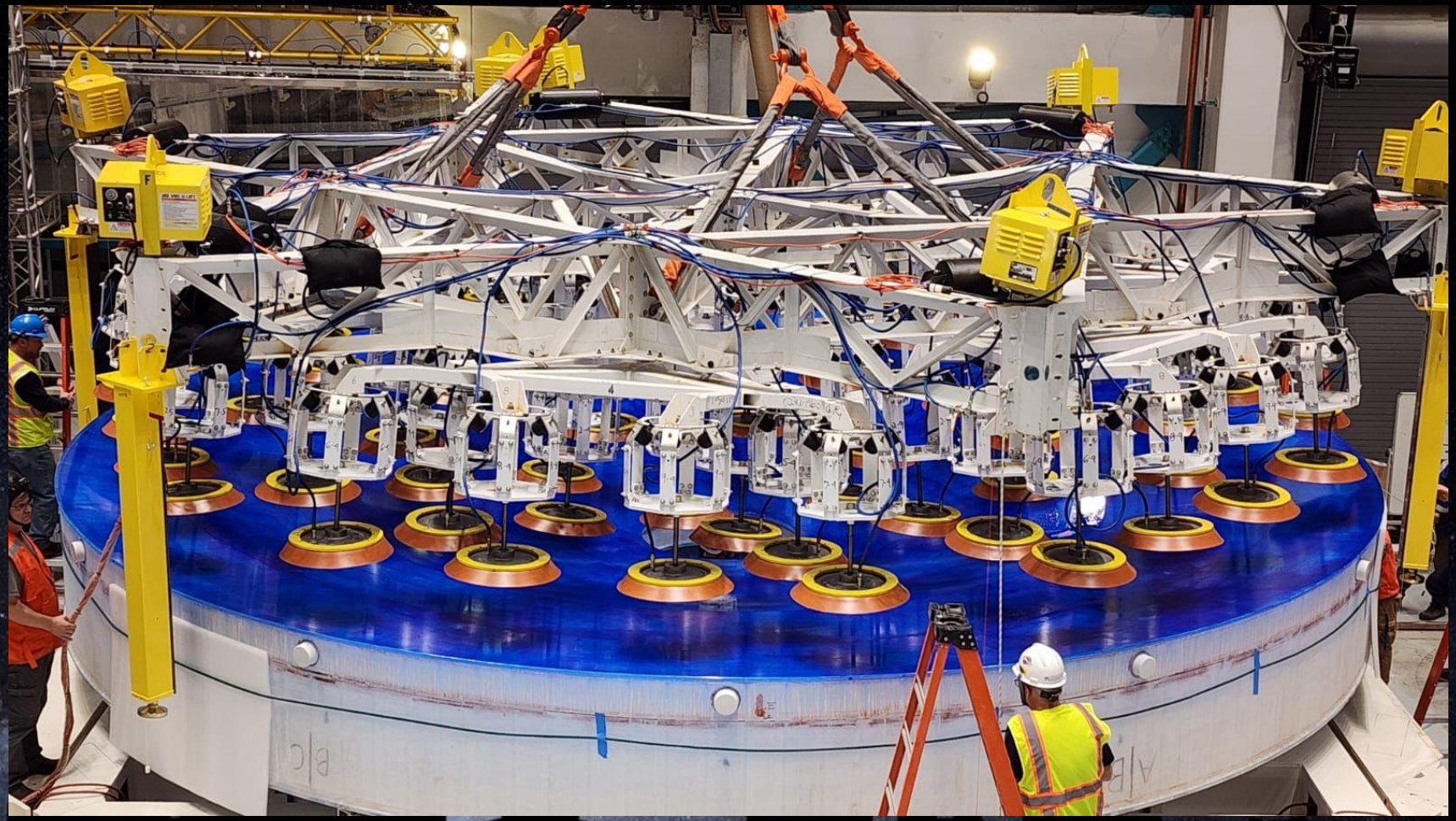
Vera C. Rubin Observatory
NSF's MREFC Project
Nearing Completion!

First Light 2025

Rubin Summit Facility in Chile shown with lift up and dome door open for Mirror installation

The Telescope Is Ready For Its Close Up!

U. Arizona team preparing to lift the Rubin mirror into its cell prior to receiving its reflective coating



The Next Generation: US ELT

These two next-generation international observatories are being developed using state of the art design and management techniques

Giant Magellan Telescope

First Light
2032

NOIRLab to provide end-to-end user support system

Thirty Meter Telescope

First Light
2035

These telescopes are *not* NSF construction projects at this time

Sustainable Observatory Operations

Inger Jorgensen
Chief Sustainability Officer

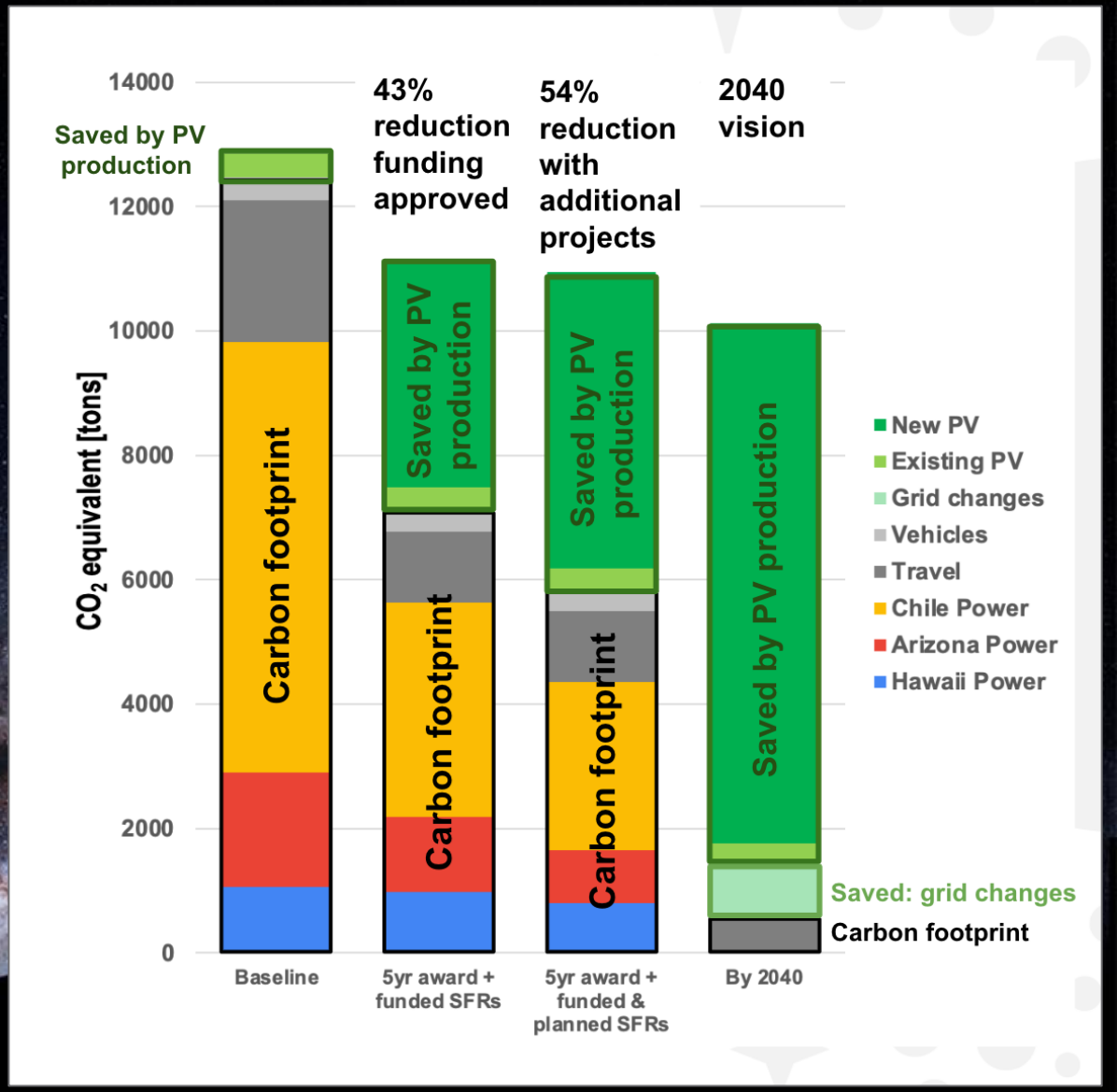
NOIRLab's goal: 50% reduction in carbon footprint

Gemini South – CO_2 neutral

Rubin Operations – 50% local energy

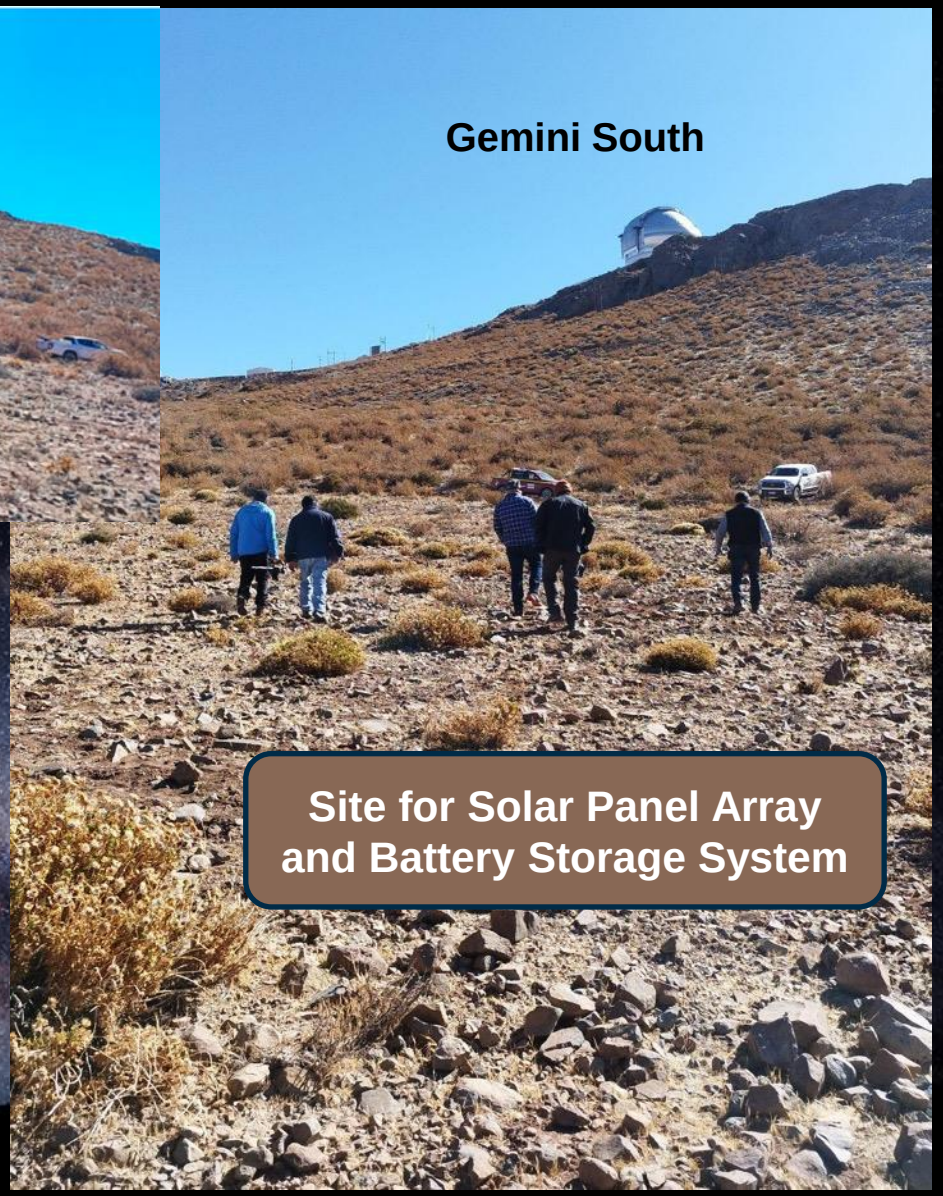
The reduction is equivalent to the consumption of ~1250 US homes.

Funding secured to reach a 43% reduction of our carbon footprint by late 2027.



Solar Power Plant Site Work Underway

Screws for pull-out test



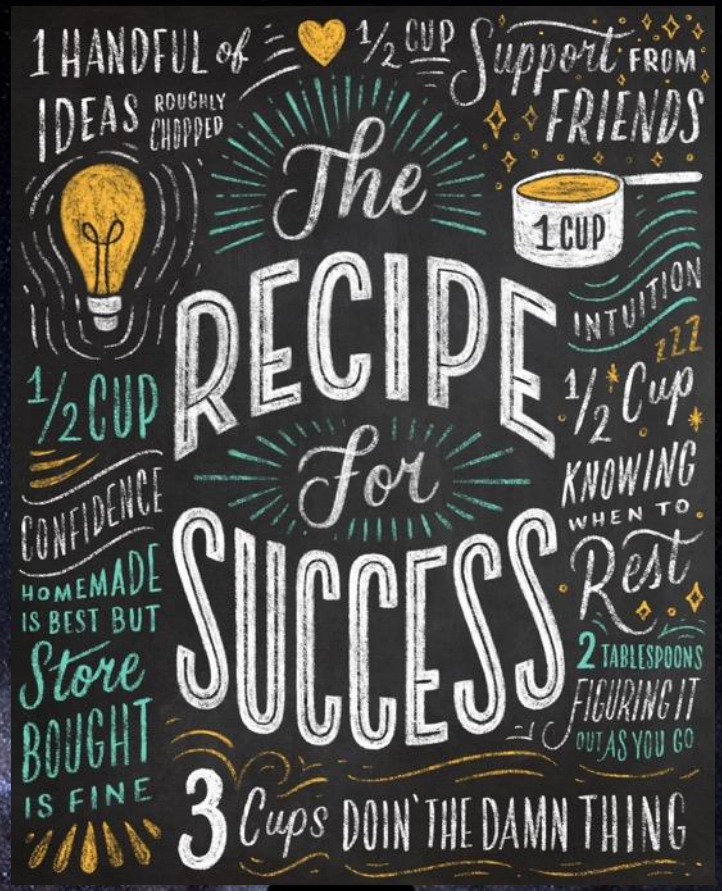
Gemini South

Site for Solar Panel Array and Battery Storage System

Being Good Stewards of the Land

Our Recipe for Successful User Facilities

1. A Bold Vision for the Future
2. Strong Partnerships
3. Sound Management
4. Harmony with Local Communities
5. End to End User Support



This recipe helps us attract and retain the talent needed to build and operate a state of the art national laboratory


GEMINI
AURA
NSF
CTIO
LSST
OPEN SCIENCE
WHERE
DISCOVERIES
BEGIN
AUI
VLA
DKIST
DATA DREAMS