# Gemini Observatory

## A Unique Facility for Exploring the Universe

## THE GEMINI OBSERVATORY MISSION

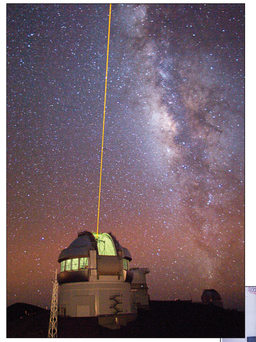
*To advance our knowledge of the universe by providing the international Gemini community with forefront access to the entire sky*

Left: Time-lapse image showing the stars surrounding the south celestial pole over the Gemini South telescope.

Below: Announcement for the 2015 Gemini Users' meeting in Toronto. This gathering is held every three years.

*"My team's high-resolution imaging camera (DSSI) is a regular visiting instrument on Gemini. We keep coming back because the telescope provides us with the best data available anywhere, it is always beyond spectacular."*

*— Steve Howell, Project Scientist, Kepler Mission/NASA*



The Gemini North telescope on Maunakea during laser propagation required for advanced adaptive optics systems.

Scientists around the world use Gemini to answer fundamental questions about the origin, structure, and evolution of the universe, from exoplanets to dark energy.

### One Observatory, Two Telescopes

We provide scientists with two of the world's premier observing sites, on mountains in Hawai'i and Chile. Gemini's twin telescopes can access the entire sky.

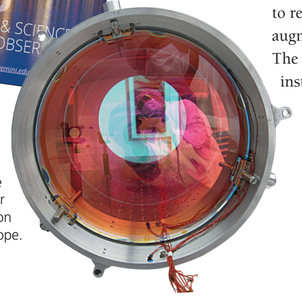
### A Multi-National Partnership of Engaged Users

Gemini's partner countries participate to govern the Observatory. Observing time is open to all astronomers in the Partnership, and scientists guide Gemini to innovate and open new opportunities for discovery.

### Exploring the Universe, Sharing Its Wonders

Gemini's active scientific and technical staff directly share our work with the public. We promote education and career awareness to broaden participation, and we foster partnerships to deepen and expand our reach in our local and global communities.

Gemini scientist André-Nicolas Chené engages local students in Gemini's host community in Hilo, Hawai'i. Local outreach is a critical element of Gemini's philosophy of sharing the universe with the public.

Entrance lens of the FLAMINGOS 2 infrared imager and spectrograph available on the Gemini South telescope.

The Gemini Planet Imager (GPI) team celebrating the 2014 commissioning of the world's most powerful planet-hunting camera on the Gemini South telescope in Chile.

## INSTRUMENTATION

### Gemini's State-of-the-Art Instrument Suite

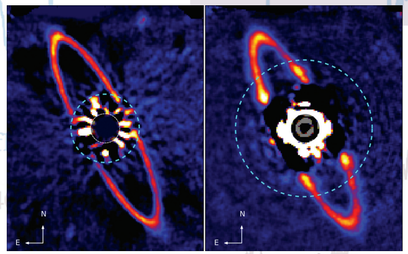
Gemini's instrument suite spans a broad range, allowing forefront research in all domains of astronomy. Each telescope is equipped with four instruments fed by advanced adaptive optics systems — three of which can be used in a single night.

### Gemini Welcomes Visitor Instruments

The Gemini telescopes frequently host visitor instruments from our user community. These specialized instruments allow astronomers to conduct dedicated experiments on some of the largest optical telescopes in the world.

### New Instrument Procurement

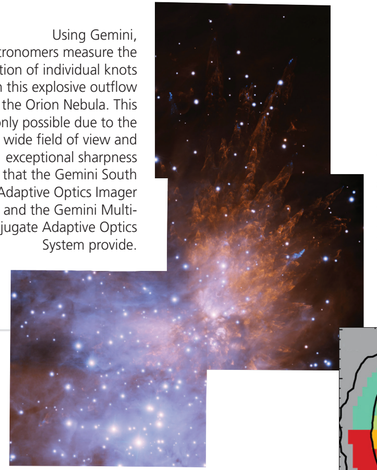
Gemini's international partners collaborate to regularly deliver new instruments that augment the observatory's capabilities. The community brings its best ideas and instruments to Gemini, for the benefit of all partner scientists.




GPI reveals the fine dusty disk around star HR 4796A, where planets can form. The instrument and data processing hide the central starlight on the left (within the dotted circle). The polarized light (right panel) reveals details hinting at unseen "shepherd" planet(s) that may sculpt the disk.

*"The way this [observing run] has been going has surpassed all of my expectations... Can't wait to publish all these data and make everyone jealous!"*

*— Wesley Fraser, ColOSSOS Project PI*

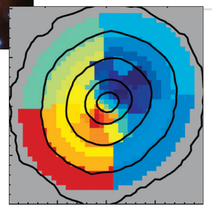


Using Gemini, astronomers measure the motion of individual knots in this explosive outflow in the Orion Nebula. This is only possible due to the wide field of view and exceptional sharpness that the Gemini South Adaptive Optics Imager and the Gemini Multi-conjugate Adaptive Optics System provide.

## OPERATIONS

### Flexibility in Operations

The users' science drives operations. Gemini is flexible and opens multiple paths for scientists to apply for observing time (through regular semester-based programs, large and long programs, or fast turnaround programs). We offer multiple observing modes, including visitor and queue observing, which opens the time domain in astronomy like no other observatory.



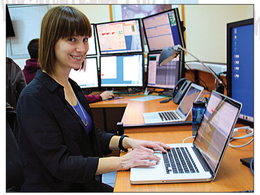
Using the Near-Infrared Integral Field Spectrometer, and the Altair adaptive optics facility at Gemini North, these observations identify the smallest known galaxy to contain a supermassive black hole. The colors here indicate motions of stars in the central region, which confirm the presence and mass of the black hole.

### Engaging Partners in Operations

The key to serving users well is to understand the varied needs of the scientific communities of our multi-national partnership. Gemini attracts users to the observatory through its novel priority visitor program and initiatives such as "Bring One, Get One," subsidizing young researchers to visit the observatory.

### End-to-End User Support

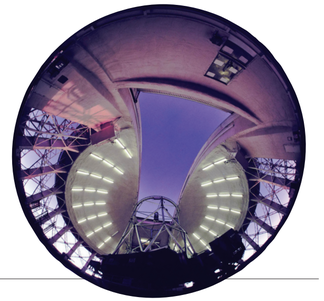
The Gemini staff, together with the National Gemini Offices (NGOs) supports the users from proposal preparations, through observations, all the way to the data reduction. We collaborate to maximize the efficiency of the observatory and its scientific return.



University of Toronto student Allison Noble during her "Bring One, Get One" Gemini-sponsored observing run.

Right: Interior of the Gemini South facility in Chile during preparations for nighttime observing.

Below: Exterior of the Gemini North telescope in Hawai'i at sunset.

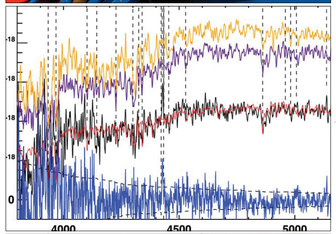


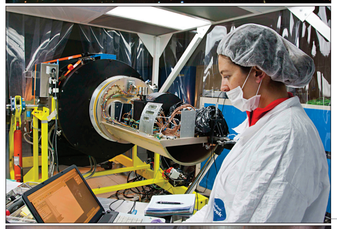
## AURA/GEMINI IN HAWAI'I

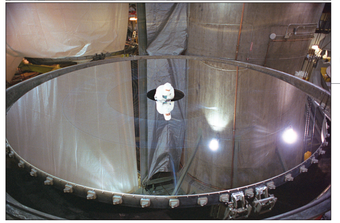
Maunakea, on the Big Island of Hawai'i, is the premier astronomical observing site in the northern hemisphere due to its proximity to the equator, and dry and stable atmosphere above the nearly 14,000' (4,200 meter) summit area. Gemini North provides astronomers with unparalleled access to the universe at a wide range of wavelengths — from mid-infrared to the near-ultraviolet. Gemini's international headquarters, located within the University of Hawai'i at Hilo's Science and Technology Park, assure quality logistics and infrastructure support.

## AURA/GEMINI IN CHILE

AURA established astronomical operations in Chile more than 50 years ago and has maintained a strong presence in Chile ever since. AURA nurtures the deep cultural, scientific, business, and political connections essential to success for a US-based organization operating in Chile. The AURA-owned site in Northern Chile that includes Cerro Pachón, the location of the Gemini South telescope, is one of the best sites in the world for astronomy and is legally protected as a privileged scientific sanctuary.



AURA

## AURA MISSION AND PRINCIPLES

AURA, Gemini's managing organization, was founded in 1957 with the encouragement of NSF, and has managed world-class astronomical observatories for over 50 years. AURA's mission is to promote excellence in astronomical research by providing access to state-of-the-art facilities, surveys, and archives. AURA supports the following principles for advancing scientific discovery in astronomy and astrophysics.

- Merit-based access to information about the universe maximizes scientific return on investments in astronomical facilities, surveys, and archives.
- Forefront innovations in facilities, technology, and data science drive discovery in astronomical sciences.

Under AURA's recent management, Gemini has entered the most stable and productive period in its history, and the Observatory continues to innovate. Gemini fills a critical position for partner astronomers, offering them all access to 8-meter aperture telescopes. Gemini also represents an important international collaboration, which is a model for the forefront astronomical facilities of the future.

United States | Canada | Brazil | Australia | Argentina | Chile

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# Gemini Observatory:

## Forefront Access to the Universe