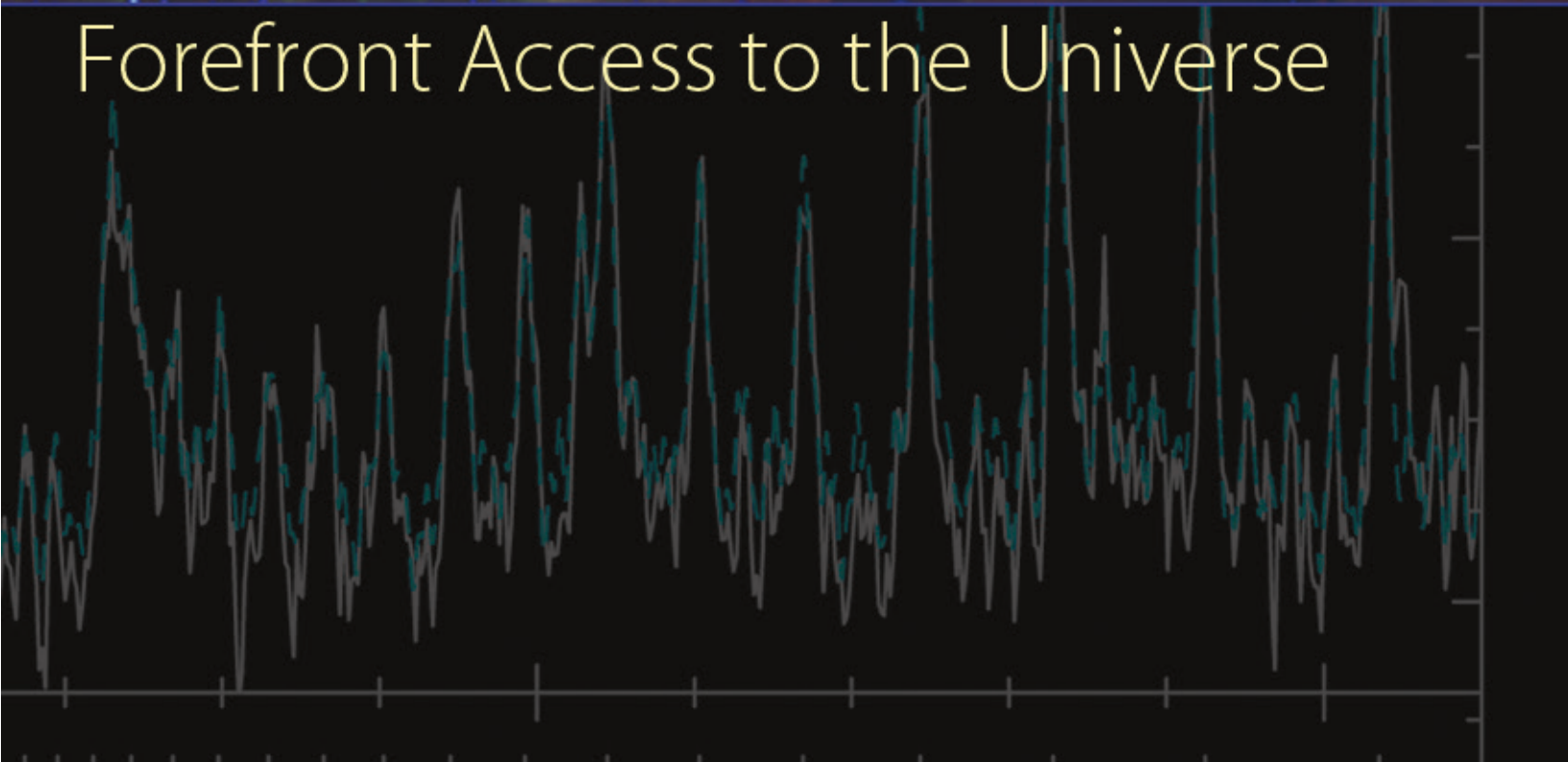




Gemini Observatory: Forefront Access to the Universe



Gemini Observatory

A Unique Facility for Exploring the Universe

THE GEMINI OBSERVATORY MISSION

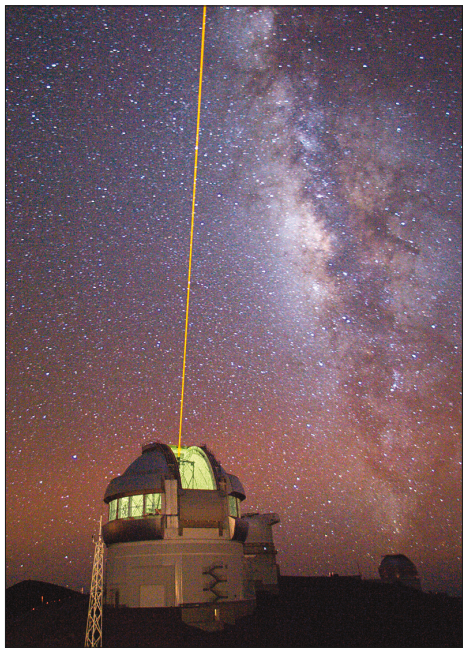
To advance our knowledge of the Universe by providing the international Gemini community with forefront access to the entire sky.

The Gemini North telescope on Hawaii's 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.



Above: Long-duration image of stars trailing around the south celestial pole over the Gemini South telescope.



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 participating countries engage in governance of the Observatory. Observing time is open to all astronomers from participating countries, and scientists guide Gemini in the innovations that 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.



“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



Both Gemini telescopes operate remotely from the base facilities in Hilo, Hawai'i and La Serena, Chile. Benefits of remote operations include major operational efficiencies as well as significantly reduced environmental impact on our observing sites and a dramatically improved work environment for observing staff and visitors.

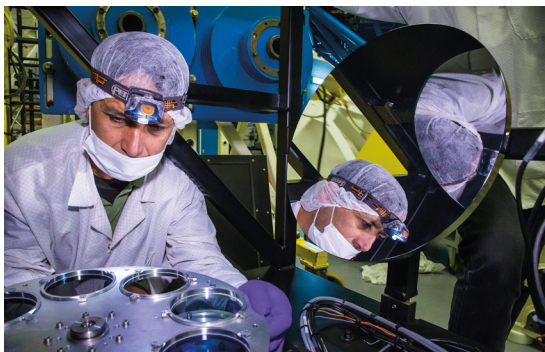


Below: Photovoltaic (PV) systems are installed at both Gemini summit facilities and at the Hilo Base Facility in Hawai'i. These systems reduce the observatory's carbon footprint and lower operating

expenses considerably. This view shows part of the Gemini North PV system at sunset.



Claudio Araya, Optical Technician, works on the Gemini Facility Calibration Unit (GCAL), during an operations shutdown at Gemini South.



INSTRUMENTATION

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

Gemini's instrument suite spans a broad range of capabilities, allowing forefront research in essentially all domains of modern astronomy. Each telescope is equipped with four instruments, with several fed by advanced adaptive optics systems. On a typical night we switch between multiple instruments for optimal flexibility in scheduling and adapting to changing conditions.

Gemini Welcomes Visitor Instruments

The Gemini telescopes frequently host visitor instruments from our user community. These specialized instruments allow astronomers to conduct experiments that aren't possible with facility instruments on the Gemini telescopes.

New Instrument Procurement

Gemini's international participants collaborate to regularly deliver new facility-class instruments that augment the observatory's capabilities. The Gemini scientific community brings their best ideas and instruments to Gemini, for the benefit of all of our science users. Our science community can also propose for funding to upgrade our facility instruments to better match research needs.

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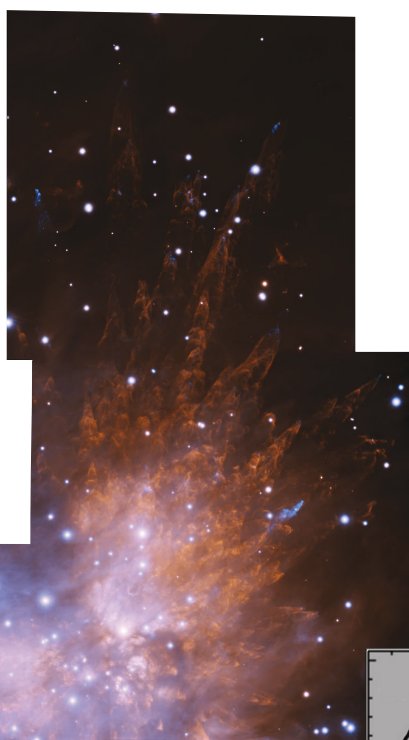
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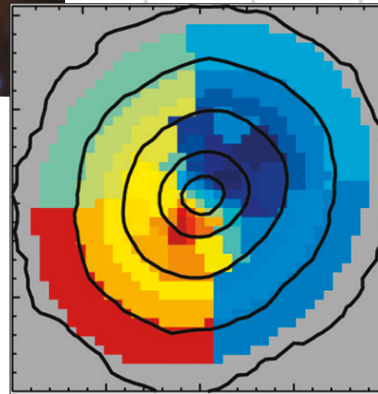
OPERATIONS

Using Gemini, astronomers can much more rapidly measure the motion of individual knots in this explosive outflow in the Orion Nebula. This is due to the wide field of view and exceptional image sharpness that the Gemini South Adaptive Optics Imager (GSAOI) and the Gemini Multi-conjugate adaptive optics System (GeMS) provide.



Flexibility in Operations

Our users' science drives operational priorities. Gemini has opened 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 far beyond what other observatories offer.



Using the Near-Infrared Integral Field Spectrometer and the Altair adaptive optics facility at Gemini North these observations identify the smallest galaxy known 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.

“The way this has been going has surpassed all of my expectations... Can't wait to publish all these data and make everyone jealous!”

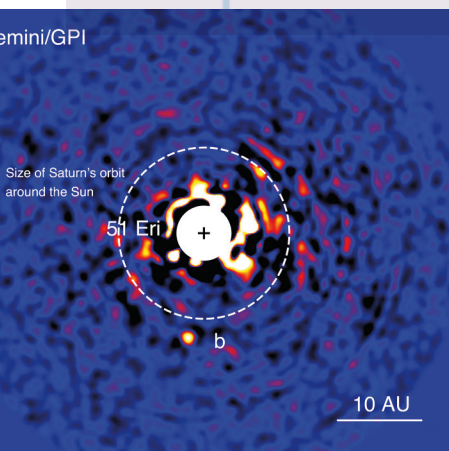
— Wesley Fraser,
ColOSSOS Project PI

Engaging Participants in Operations

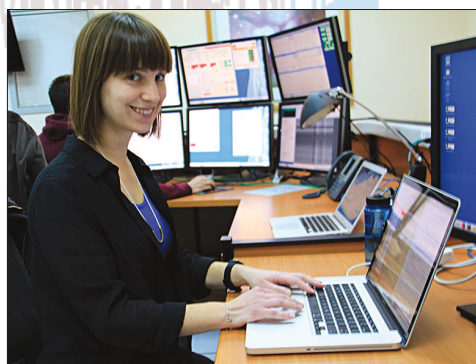
The key to successfully serving users is to understand the varied needs of the scientific communities of our multi-national participants. Gemini attracts users to the observatory through its novel “Priority Visitor” program and initiatives such as “Bring-One, Get-One” which subsidizes young researchers so they can visit and participate in observations.

End-to-End User Support

The Gemini staff, together with the National Gemini Offices (NGOs), support our science users – from proposal preparations, during observations, through data reduction. From start to finish, we work to continuously maximize the efficiency of the observatory and its scientific return.



Discovery image of 51 Eri b with the Gemini Planet Imager taken, in the near-infrared, on December 18, 2014. The bright central star has been mostly removed by a hardware and software mask to enable the detection of the exoplanet which is one million times fainter.



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 during Laser Guide Star operations.

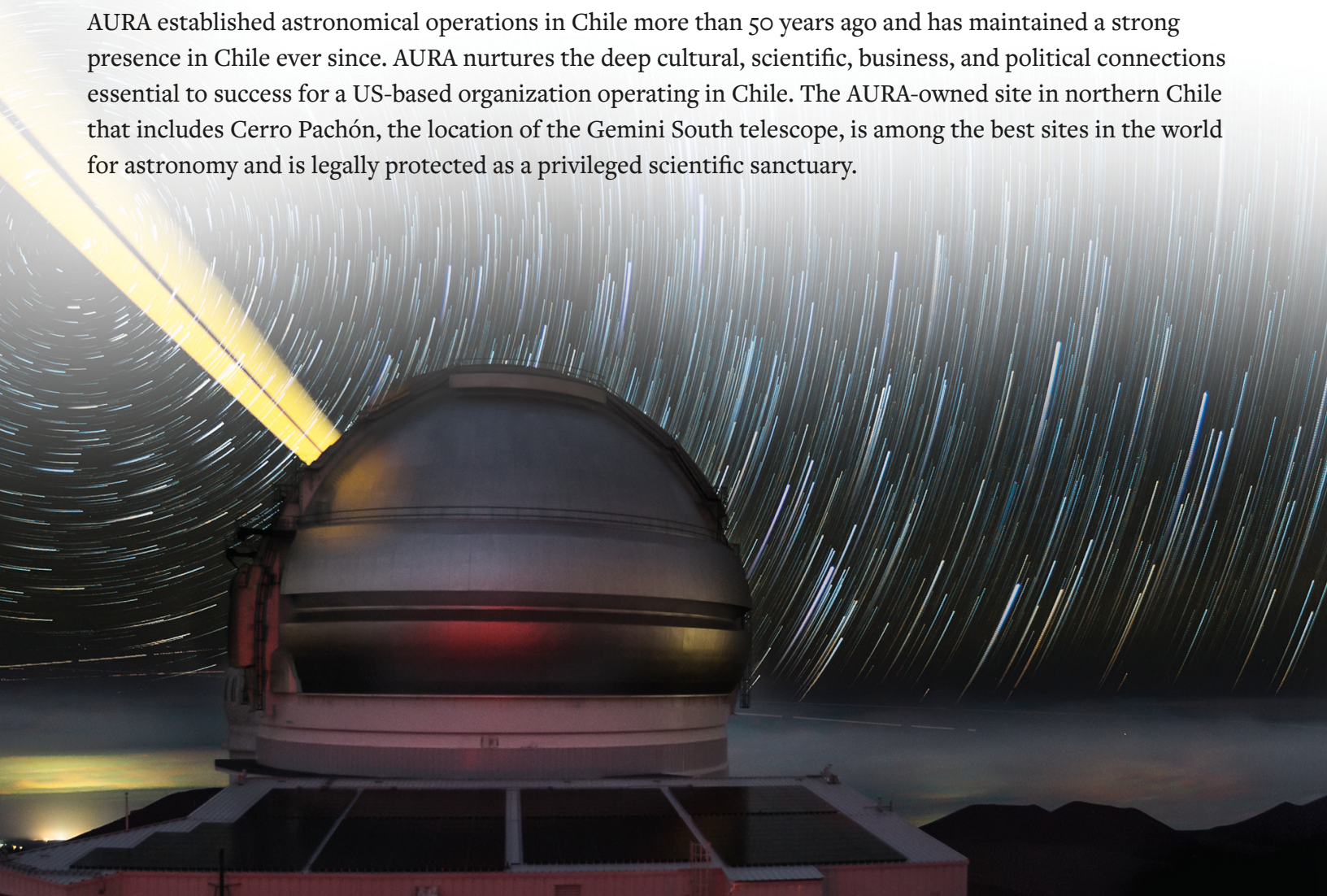


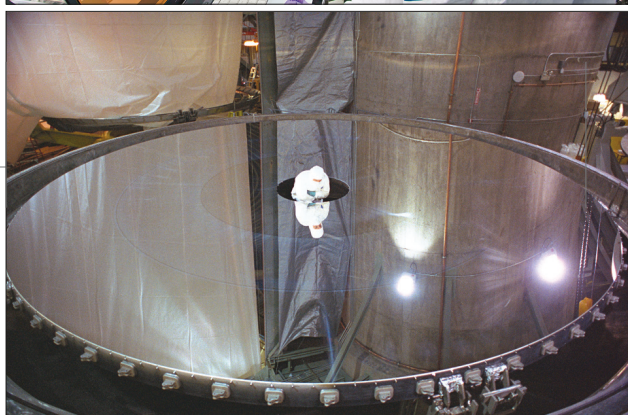
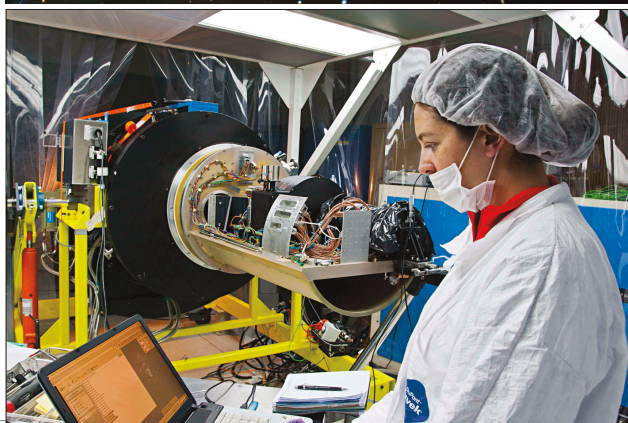
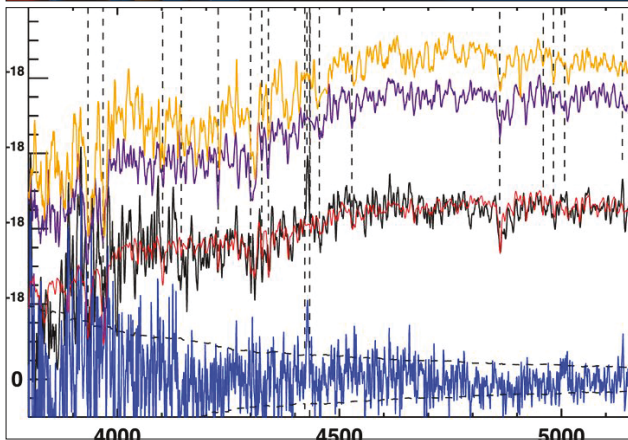
AURA/GEMINI IN HAWAI'I

Maunakea, on the Big Island of Hawai'i, is the premier astronomical observing site in the Northern Hemisphere due to the 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 thermal infrared to the near-ultraviolet. Gemini's Northern Operations Center, located within the University of Hawai'i at Hilo's Science and Technology Park, assures 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 among the best sites in the world for astronomy and is legally protected as a privileged scientific sanctuary.





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 observatory facilities 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 astronomers in participating countries, offering them 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



Chile



Brazil



Argentina



Korea



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