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Gemini's Fourth Science and User Meeting: A Glimpse of the Past, Present, and Future

Weren't able to attend the Gemini Science and User Meeting held in San Francisco this past July? This article reviews the science presented from the Solar System to Gamma-ray Bursts, to engaging discussions about the future priorities at Gemini from our user community's perspective. It's a must-read for anyone interested in the future of Gemini.

The 2012 Gemini Science and User Meeting, held July 17-20 in San Francisco, California, brought together over 100 participants representing all of Gemini's partner countries. Large contingents from both Brazil and Australia made the long trip to enjoy the typically chilly weather; the familiar quote (often incorrectly attributed to Mark Twain) that "the coldest winter I ever spent was a summer in San Francisco" was heard numerous times.

In addition to members of the Gemini staff and National Gemini Offices, participants from other observatories (the Canada-France-Hawaii Telescope (CFHT), the National Astronomical Observatory of Japan (NAOJ), and the Stratospheric Observatory for Infrared Astronomy (SOFIA)) provided a wider perspective. While the meeting wasn't the press-release-filled American Astronomical Society, it did have its own Twitter hashtag (#gsm12) with social media coverage by Gemini's Emma Hogan (@gemini_ehogan), Anglo-Australian's Amanda Bauer (@astropixie), and the author (@PBarmby)

Before the official meeting began, almost a dozen participants visited the optical labs of the Center for Adaptive Optics at the University of California Santa Cruz, where they had the opportunity to witness the current advanced status of the Gemini Planet Imager (GPI), a next-generation exoplanet-finding instrument.

Meeting Highlights:

Gemini's Incoming Director, Markus Kissler-Patig opened the meeting by sharing some of his ideas for the future of Gemini, including both "tactical" and "strategic" plans for instrumentation, as well as his visions for expanded flexibility in operations.

"In the next decade during which Atacama Large Millimeter Array, James Webb Space Telescope, and large surveys will play a dominant role, we intend to fully capitalize on Gemini's strengths," said Kissler-Patig. "We will make Gemini a very flexible and nimble observatory, responding quickly to our users' needs." Many participants were particularly interested in his proposal for a new observing time allocation model via a fast peer review, rather than the comparatively slow Time Allocation Committee, process.

Day 1: Science

As the link below illustrates, the science content at this meeting was as varied as the participants. The Scientific Organizing Committee (SOC) carefully considered how to craft a program with enough depth to attract specialists in particular areas and enough breadth to interest a majority of Gemini users. With some schedule juggling, the meeting's organizers accommodated all requests for contributed talks. (A full list of talks presented in the three-day event can be reviewed at <http://www.gemini.edu/program>.)

The first session of day one focused on exoplanets and stars, with invited talks by Christian Marois (National Research Council of Canada) and Michael Liu (University of Hawai'i) discussing Gemini's past highlights in direct imaging and surveys for extrasolar planets.

Bruce MacIntosh (Lawrence Livermore National Laboratory) also gave an invited talk about upcoming work with GPI, which will soon enable Gemini users to take advantage of its advanced coronagraph, very-high-order adaptive optics, precision wavefront sensing, and near-infrared integral-field spectrograph, for exoplanet research. Contributed talks on this first day covered topics from young-star disks to final flash stars and diffuse interstellar bands. Mid-infrared observations were a recurring theme in many of these talks. Gemini staff member Sandra Leggett's invited talk on brown dwarfs with "nano-solar-luminosities," completed the packed day.

Day 2: Science, Instruments, and Looking Ahead

Gemini's own Chad Trujillo kicked off day two with an invited talk on Gemini observations of ices on small Solar System bodies. Chad shared that both Kuiper Belt Objects and Main Belt Comets may have retained ices from the planet-forming epoch of our Solar System, despite their very different thermal histories, dynamical histories, and heliocentric distances.

Additional science topics on day two focused on high-resolution spectroscopy at Gemini — a good match for the discussions of instrumentation which filled the middle of the day's agenda.

Of particular note, Nobuo Arimoto and Masahiro Takada (Subaru Observatory) discussed their observatory's plans for future instrumentation, and Eder Martioli, Ricardo

Schiavon, and Steve Margheim previewed Gemini's near-term partnership with CFHT for remote access to GRACES and Gemini's planned GHOS spectrograph.

The User Meeting followed the day's science talks and featured updates on Gemini science operations, software, and current instruments — including the Gemini Multi-Object Spectrograph's (GMOS) new detectors, Gemini South's Adaptive Optics Imager (GSAOI) and FLAMINGOS-2 (see article, pages 29-33). Further discussion of Kissler-Patig's idea on "peer review time allocation" had the meeting participants asking the new User's Committee for Gemini to further consider the notion.

The second day ended with the first Long Range Planning session led by the Science and Technology Advisory Committee (STAC). Key discussions concentrated on Future Gemini instrumentation under the "4+AO" model, and in particular where to place (north or south) Gemini's High-resolution

Optical Spectrograph (GHOS). The Committee challenged participants to articulate what they wanted Gemini to be and what capabilities are needed to make that happen.

Day Three: The Deep Universe

The focus of the meeting expanded to extragalactic distances on day three with invited talks on supermassive black holes by Chung-Pei Ma (University of California Berkeley), gamma-ray bursts by Elena Pian (INAF, Trieste Astronomical Observatory, Italy), and gas flows in nearby active galactic nuclei by Thasia Storchi-Bergmann (Instituto de Física - UFRGS).

Filling in the rest of the day's contributed talks topics ranged from the resolving of stars in Local Group star clusters to high-redshift supernovae. A common thread heard in many of the presentations on day three was the importance of high-resolution (spatial and/or spectral) capabilities. This day also featured a discussion on the future of adaptive optics (AO) at Gemini North along with

Figure 1.
Participants at the Gemini Science Meeting in San Francisco.



a recap of the June 2012 AO workshop at the Herzberg Institute of Astrophysics (HIA). David Crampton (HIA) reviewed the future of Mauna Kea with a talk on the 'Mauna Kea Observatories' concept.

The STAC closed the session with an open discussion on the Gemini Infrared Optical Spectrograph (GIROS), a new instrument concept under consideration. The science case for, and specific performance requirements of, such an instrument are still being debated. The fundamental goal of GIROS is to provide efficient spectroscopy over a broad wavelength range.

Day three closed on a high note with a dinner cruise. Despite the cool weather, everyone I talked to agreed that the evening "Supper Cruise" on San Francisco Bay was wonderful; everyone enjoyed the close-up view of Alcatraz, dolphins, and a Coast Guard helicopter passing under the Golden Gate Bridge.

Day Four: Wrapping Up

The final day of the meeting, like the first, was science-focused. Invited talks by Gillian Wilson (University of California Riverside), Mariska Kriek (University of California Berkeley) and Mark Dickinson (NOAO) covered high-redshift galaxies and galaxy clusters. Wilson made a point of explaining why GMOS is the most efficient instrument on any 8- to 10-meter-class telescope for carrying out the Gemini CLuster Astrophysics Spectroscopic Survey (GCLASS) of 10 massive galaxy clusters at $z \sim 1$.

Contributed talks ranged from microlensed quasars and $z \sim 1$ groups to chemical evolution in Local Group galaxies.

Lee Spitler (Swinburne University) had the unenviable position of giving the final scientific talk and did an excellent job reviving the participants with a progress report on extended disks in high-redshift galaxies.

Nancy Levenson closed the meeting with a summary, noting that Gemini users were happy with the data they had obtained and the science it enabled, but still want more: more spectral resolution, more Multi-Object Spectrograph slits, and an even more responsive Observatory.

As Gemini users, we know that the staff works hard, and this was certainly in evidence in the extremely smooth execution of this meeting. On behalf of the Scientific Organizing Committee, the author would like to thank the Local Organizing Committee for their outstanding work in enabling a wonderful meeting. Finally, all of the participants deserve recognition for attending and contributing to the many lively discussions.

The arrival of a new director and several new instruments no doubt means that we can look forward to even bigger and better things at the next Gemini Science and User Meeting!

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