

# The 2014 STScI Calibration Workshop

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The *Hubble Space Telescope* has been operating with its final complement of instruments since 2009. In order to maintain the optimal performance of the observatory, and to develop procedures that maximize the quality and breadth of *Hubble's* scientific return, the Institute monitors the performance of these instruments, maintains up-to-date calibrations, develops state-of-the-art tools for processing and analyzing science products, and maintains the Mikulski Archive for Space Telescopes (MAST).

A critical responsibility of the Institute is to hold regular calibration workshops to convey progress and to interact directly with the science community. This two-way exchange has proven to be synergistic, and has contributed enormously to the success of the *Hubble* mission. In response to this need and contractual mandate from NASA, the Institute hosted the 7<sup>th</sup> STScI Calibration Workshop on August 11–13, 2014.

While the latest workshop focused on the current complement of instruments aboard *Hubble*, part of the workshop was devoted to the *James Webb Space Telescope*, for which *Hubble* provides many lessons learned, and many directly applicable solutions to problems that *Webb* will encounter. In addition, the calibration of astronomical instruments and observatories is a rapidly developing field beyond *Hubble* and *Webb*. Therefore the workshop also addressed topics that apply broadly to astronomical calibration in general.



The workshop had 108 registered guests, with 34 invited presentations and 29 contributed posters. Institute director Matt Mountain opened the workshop with a dedication to the late Bruce Woodgate, the PI for the Space Telescope Imaging Spectrograph (STIS), noting Dr. Woodgate's contribution to astronomy in general and to *Hubble* in particular.

Dr. Mountain framed the workshop within the emerging era of "precision astrophysics," such that our astronomical efforts are achieving precisions and accuracies that were not possible even a decade ago; and calibration has been the key to this advancement.

Invited talks varied in duration from 15 to 35 minutes, but all speakers were given an additional 10 minutes at the end to promote discussion, which further fostered a workshop environment. Some of the highlights of the workshop included: the keynote presentation from Elena Pancino (INAF) on calibration issues confronting the *Gaia* mission, as well as a status update; "Measurement Astrophysics" presented by John McGraw of the University of New Mexico; "Grism Spectroscopy," presented by Ivelina Momcheva (Yale); and strategies for observing transiting exoplanets, presented by Nikole Lewis (MIT).

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Status updates were presented for each active *Hubble* instrument (Advanced Camera for Surveys, Cosmic Origins Spectrograph, Fine Guidance Sensors, Wide Field Camera 3, and STIS—plus the Near Infrared Camera and Multi-Object Spectrometer (NICMOS), which is not currently available for use but could be revived to provide near-IR capabilities in the event of a failure of WFC3.

New or improved observing methods were discussed, including: use of post-flash to mitigate charge-transfer efficiency issues with the CCDs; spatial scanning with WFC3 for precision photometry and astrometry; COS “blue modes” providing far ultraviolet wavelengths blueward of the approximately 1150 Å lower limit achieved by previous *Hubble* spectroscopic observations; and commissioning of three additional STIS neutral density filters.

Presentations were also made on an eclectic variety of topics, including precision imaging polarimetry with ACS; elevated backgrounds in WFC3 imaging caused by the He 10860 Å emission line in the Earth’s upper atmosphere; coronagraphic imaging and spectroscopy with *Hubble*; observing solar system objects with *Hubble*; status of the *Hubble* Frontier Fields and the *Hubble* Source Catalog; mining archived NICMOS data; persistence in near-IR detectors; and the use of ASTRODRIZZLE for products for *Hubble* and *Webb*.

In lieu of a traditional banquet, a tapas feast featuring gourmet finger food was held in the Azafran Café.

Finally, two mini-workshops were held the day after the main workshop: an ASTRODRIZZLE mini-workshop that provided hands-on demonstrations and tutorials, and a COS mini-workshop that provided a forum for more in-depth discussion of COS-specific calibrations.

The full lists of abstracts for talks and the posters presented at the 2014 STScI Calibration Workshop are available on the workshop website:

<http://www.stsci.edu/institute/conference/cal14/talksList>

<http://www.stsci.edu/institute/conference/cal14/posterList>.

Archived webcasts of the talks can be viewed on the STScI Webcast Archive website:

<https://webcast.stsci.edu/webcast/searchresults.xhtml?searchtype=20&eventid=212&sortmode=2>

In addition, PDF versions of the posters will be linked to their abstracts.