

George R. Wallace, Jr. Astrophysical Observatory

Located in Westford, Massachusetts, the George R. Wallace, Jr. Astrophysical Observatory is MIT's local astronomical observatory for both research and teaching. Mr. Alan Midkiff, MEng '92, resigned as site manager in May 2009, and Mr. Timothy Brothers was hired to replace him. Ms. Sharon Rapoport '09 was hired as a general observer for summer 2009. Observatory manager, Dr. Michael Person '92, SM '01, PhD '06, received MIT's Unsung Hero award in 2009.

Facilities

The primary research instrument at Wallace Astrophysical Observatory is a 24-inch Cassegrain reflecting telescope housed in the main dome. The current instrumentation for this telescope is a Portable Occultation, Eclipse, and Transit System (POETS) camera—a high-speed charge-coupled device (CCD) camera with photon-counting capability built by Professor James Elliot's group. This camera is used for occultation work and extrasolar planet transits. The telescope also has a Santa Barbara Research Group STL-1001E camera. A subsidiary dome houses a 16-inch reflecting telescope, and a four-bay shed with a roll-off roof houses three Celestron 14-inch reflecting telescopes and a Celestron 11-inch telescope. Each of the four telescopes in the shed has a Santa Barbara Research Group STL-1001E camera, and the 16-inch telescope is outfitted with a LHIRES-III spectrograph that was constructed this year. Several additional portable telescopes are available for special use, including a classic Alvin Clark 5-inch refractor. Further infrastructure on site includes an electronics shop, machine shop, computer facilities for data analysis and storage with high-speed internet service, an office, and a service area for use by observers. Two large storage sheds were added this year, and we had a full network upgrade: all coax network cabling was replaced with new Cat-5, new routers and switches were installed, and all computers were assigned permanent addresses.

Two improvements were made to the 24-inch telescope: the primary and secondary mirrors were recoated, and the drive was upgraded for better stability and pointing.

In the four-bay shed, both Telescopes 3 and 4 have Software Bisque Paramount ME robotic telescope mounts. Hence, both Telescopes 3 and 4 can be controlled from campus, and observations are now routinely carried out using this capability. Remote operation of the telescopes by students on campus facilitates the collection of a greater volume of data by students in astronomy classes, using a mix of campus and observatory laboratory sessions.

Research and Academic Work

Graduate student Amanda Zangari led a team of undergraduate observers—Rachel Bowens-Rubin '11, Vicki Crosson '12, Katheryn French '11, Christina Jaworsky '11, Rebecca Jensen-Clem '12, and David Somach '11—in a project to measure the rotational light curve of the Kuiper belt object (136108) Haumea during the Independent Activities Period (IAP) and the spring term. Rachel Bowens-Rubin, Katheryn French, Dora Gao '11, and Christina Jaworsky performed astrometry on the Kuiper belt object (136472)

Makemake and presented the results at the June 2009 meeting of the American Astronomical Society. Transit observations of extrasolar planets were carried out by Caroline Morley '10, Elisabeth Adams G, Matthew Lockhart '01, SM '09, Rachel Bowens-Rubin, and Katheryn French. These observations were the basis for Matthew Lockhart's master's thesis, "A Transit-Timing Variation Study of the Extrasolar Planet TrES-3," which he submitted to the Department of Earth, Atmospheric, and Planetary Sciences in June 2009. Astrometry of stellar occultation candidates for Kuiper belt objects was done by Robert Arlt '12 and Jessica Perez '12. Except for the Haumea light curve, the undergraduate projects were supervised by Dr. Michael Person.

The observatory was used by 11 students in the fall 2008 subject 8.287J/12.410J Observational Techniques of Optical Astronomy under the supervision of Professor James Elliot '65, SM '65, Alessondra Springmann G, and Thomas Beatty G. Twenty MIT students in the spring 2009 subject 12.409 Hands-on Astronomy: Observing Stars and Planets—taught by Dr. Stephen Slivan '86, SM '86, '89, PhD '95, and Matthew Lockhart—used both the 24-inch and the shed telescopes. Several Wellesley College astronomy classes used the observatory as well. In addition, the observatory staff offered a tour during IAP, which 40 members of the MIT community attended.

James L. Elliot

Director

Professor of Planetary Astronomy

More information about the George R. Wallace, Jr. Astrophysical Observatory can be found at <http://web.mit.edu/wallace/>.