Maui Astronomy Research Seminar

Six Wednesday evening Zoom sessions, 14 Jan-18 Feb, 6:00-7:00 PM PST
Maui three-day in-person session Sat-Mon, Feb 21-23, 2026
Gila Community College, Maui College, and Snow College

Short Summary The three-school Maui Astronomy Research Seminar will immerse young community college students, amateur astronomers, professional astronomy instructors in a published astronomical research project. The seminar combines six structured, one-hour Zoom sessions with an intensive three-day, in-person research workshop at the University of Hawaii's Institute for Astronomy, Maui. Participants will reduce and analyze speckle interferometry observations of Gaia two-parameter (G2P) stars obtained with the 1.5-meter telescope at Mt. Wilson Observatory this past June and produce a near final draft a paper describing the discovery of new binary stars. The seminar is conducted within a larger community of practice and follows the normal rules of scientific research. The Maui in-person session will culminate in near-finalization of the research paper and an insider's technical tour of Haleakalā summit telescopes.

Astronomy Research Seminars Over the past decade and a half, the Astronomy Research Seminars have produced more than 200 published papers coauthored by some 700 students and amateur astronomers. Each team manages their own research, analyzes original data, writes a team paper, obtains an external review, and submits their paper for publication.

Consortium Research Seminars For the past couple of years, a consortium of community colleges in the southwestern United States has extended the Astronomy Research Seminars by organizing several seminars across several community colleges (National Science Foundation Grant # 2428684)**.** Some of these seminars have been totally online, while others have been hybrid online/in-person with the in-person segment held at a major observatory.

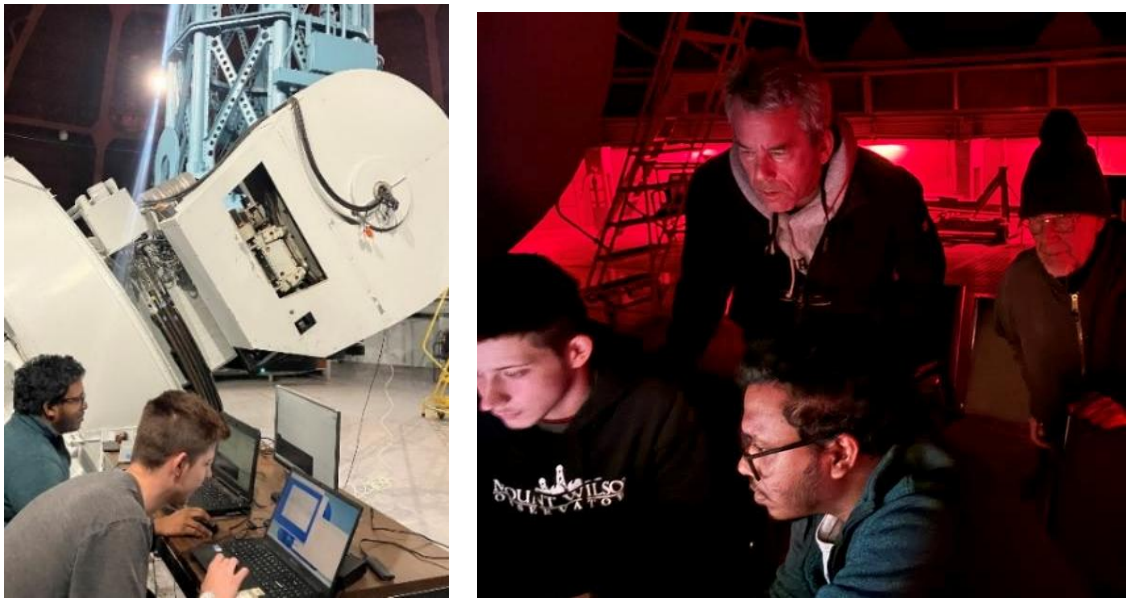
Participants in the Fall 2025 Consortium Research Seminar pose in front of the famous 100-inch telescope at Mt. Wilson Observatory that Edwin Hubble used to discover the size and expansion of the universe. Consortium seminars employ speckle interferometry on the 60- and 100-inch telescopes to discover new binary stars. The seminars are a mix of young community college students, older amateur astronomers, and professional astronomer supervisors.

Following the Rules Active participation in scientific research is essential to truly understand science, much as playing actual games is essential to learning sports. Seminar participants form a research team that is embedded within a larger community of practice and follow the traditional rules of scientific research. Research must be original and published in a journal read by the community of practice. Team members are ***not*** expected to contribute equally. Author order provides justice to variations and allows each member to contribute as their time, talents, knowledge, and experience dictate.

Maui Research Seminar The hybrid Maui Research Seminar consists of six weekly one-hour Zoom sessions followed by a three-day in-person session at Maui College. All researchers will work together as a team on a Gaia Follow-Up Project. Each participating school contributes an instructor and students.

Gaia Follow-Up Project With Data Release 3, Gaia, the European Space Agency's 1.5-meter space telescope had obtained and reduced astrometric and photometric observations of almost two billion stars over its 10-year, recently completed life. Some 1.5 billion stars had solutions that provided five key astrometric parameters: RA, Dec, parallax, and proper motions in RA and Dec. However, the astrometric solutions of 334 million stars were still so uncertain that Gaia only reported mean RA and Dec values and no parallax or proper motions for these Gaia two-parameter (G2P) stars.

The primary (but not exclusive) reason only two parameters were provided is that Gaia was confused by a nearby second star. Ground-based speckle interferometry observations can determine if there are second stars and provide the separations and position angles between the two stars. Multi-color (Sloan gri) speckle photometric observations can help characterize the pairs, helping to confirm that they are indeed new binary discoveries.



Consortium members used the 60-inch telescope in June 2025 to obtain speckle interferometry observations for the Maui seminar. Left: Gihan Gamage and Malachi Syfrett check on the Gaia two-parameter (G2P) target list. Right: Malachi and Gihan use SpeckleCap for observing Gaia G2P stars, while Paul McCudden and Russ Genet look on. Newly discovered binaries were immediately obvious when real-time fringe patterns appeared.

The primary objective of the Maui research seminar is to reduce the June 2025 Mt. Wilson Observatory observations, analyze the results to see how many new companions were discovered, determine if the new discoveries are likely new binaries, and write a paper describing the results. The results will be published in a peer-reviewed journal, probably *Open Astronomy*

Six Zoom Sessions The six, once a week, on-line Zoom (334 831 9994 pw 1234) sessions in January and February (Wednesday 14 January – Wednesday 18 February, 6:00-7:00 PM PST) will reduce and analyze the previously gathered Gaia G2P observations and produce a rough draft of the paper. There will be work assignments to complete between the online Zoom sessions. The one-hour Zoom sessions will typically include a short lecture, team reports, and discussion. A Zoom AI summary that includes action items, and a YouTube recording will be distributed after each Zoom session.

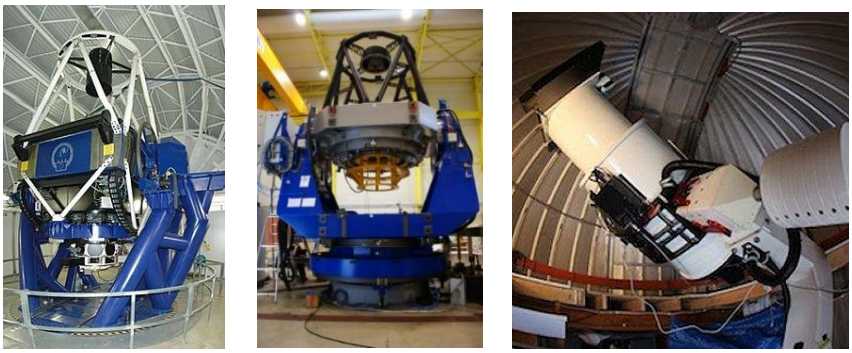
Three-Day Maui In-Person Session The first two days of the three day, in-person session will be Saturday-and Sunday, February 21-22, 2026, at Maui College, 301 W. Ka'ahumana Ave., Kahului, HI 96732. The first two days of the in-person session, Saturday 21 February and Sunday 22 February, will be devoted to bringing the Gaia G2P paper to near final status (albeit still requiring external review, final editing, and submission after the seminar). The last day of the seminar, Monday 23 February, will be a technical description and insider's tour of several research telescopes on the 10,023-foot summit of Haleakala led by Dr. James (JD) Armstrong. The last day will begin and end at University of Hawaii, Institute for Astronomy, Maui, 34 ʻŌhiʻa Kū Street, Pukalani, HI 96768-8288.

Transportation and Meals Participants provide their own transportation and meals. The seminar begins and ends at the Institute for Astronomy, Maui. Off-island participants must be 18 or older or accompanied by an adult. Accompanying significant others or family members are *most* welcome to join in lunches, dinners, and the tour of the summit telescopes.

Maui Lodging Most off-island seminar participants will fly into Kahului. Some will rent a car and are encouraged to share with others. There are several good hotels on the beach in Kahului not far from the airport, as well as numerous luxury hotels on the beach in Wailea. Several attendees will be staying at the Maui Beach Hotel, 808 877 0051, https://www.mauibeachhotel.com/. There are direct roads to the Institute for Astronomy located in Pukalani from both Kahului and Wailea. Somewhat Spartan lodging, for participants only (not families), is available at Hale Wiakoa, the Institute for Astronomy's quarters for visiting astronomers at $90/night.

Haleakala Tour Monday, February 23**,** will be devoted to a Haleakala Observatory insider's tour, including visits to the 2.0-meter Faulks Telescope North (part of the Las Cumbres Observatory's global network), the Pan-STARRS telescopes that survey the sky every clear night, and the Atlas wide-field telescope that searches for potential Earth-impact astroids. The telescope descriptions and insider's tour are being organized by Dr. James D. Armstrong, University of Hawaii Institute for Astronomy, Maui. We will depart from the Institute, 34 ʻŌhiʻa Kū Street, Pukalani, HI 96768-8288, at 1:00 PM. After the tour there will be time for a bring-you-own picnic dinner while we watch the sun set and optional observing with telescopes set up by the Maui Amateur Astronomers.

Telescopes on the summit of Haleakalā.



Left to right: LCO Faulkes Telescope North, Pan-STARRS telescope, and ATLAS telescope.

Gila Community College Research Supervisor Russell M. Genet is an Astronomy Instructor at Gila Community College. He has a BS in electrical engineering and a PhD in astronomy. Russ pioneered the development of robotic telescopes in the 1980s, was President of the Astronomical Society of the Pacific (1993-1995) and initiated the Astronomy Research Seminars in 2007. Russ is the author or coauthor of many books and papers, see https://orcid.org/0009-0002-8020-3459 or https://en.wikipedia.org/wiki/Russell_Merle_Genet.

Snow College Research Supervisor Jonathan Pugmire is an Assistant Professor of Physics at Snow College where he has taught astronomy, physics, and engineering since 2018. He serves as Assistant Director of the Snow Planetarium, helping develop programs and oversee science exhibits. He is active in STEM outreach through planetarium shows, star parties, and service-learning. Jonathan earned his PhD in Physics from Utah State University as a NASA Space Grant Fellow. His research focused on atmospheric gravity waves and mesospheric temperature variability using ground-based imaging and satellite data, including observations from Chile and Antarctica.

Registration for the Conference Each participating school registers its own students for the conference. Gila Community College (GCC) has an open registration policy, so anyone from anywhere that is 18 or over can register for classes. GCC features low tuition rates. Tuition for this two-credit class for Arizona residents is $196 for < 55, and $0 for 55+. For nonresidents, tuition is $298 for < 55, and $98 for 55+. GCC welcomes amateur astronomers as their wealth of knowledge and experience provides a nice balance to younger students. Register for *AST 231, Section 80188, Advanced Astronomy Research Seminar* (Spring 2025, first half of the semester). Registration opened on December 31, 2025. *First come first served with a limit of 10 researchers*. Register at https://gilacc.org/. If you encounter any difficulties with registration, please contact the GCC Registrar, Veronica Peterson Veronica.Peterson@gilacc.org 928-468-8039. *Email russmgenet@aol.com and let him know that you are interested in coming, and he will have the GCC Registrar place you on the instructor-approved list*.