University Hawai‘i at Mānoa

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Certificates & Accreditations: Institutional Accreditation: Western Association of Schools and Colleges (WASC) Senior College and University Commission (WSCUC);

Programmatic Accreditations include:

- AACSB International (The Association to Advance Collegiate Schools of Business): The Shidler College of Business.
- Association for Advancing Quality in Educator Preparation (AAQEP): Sixteen of the College of Education's academic programs.
- Network of Schools of Public Policy, Affairs, and Administration (NASPAA), Commission on Peer Review and Accreditation: The Master of Public Administration program.
- Planning Accreditation Board (PAB): The Master of Urban and Regional Planning program.
- Council on Academic Accreditation in Audiology and Speech-Language Pathology (CAA), American Speech-Language-Hearing Association (ASHA): The Master's in Speech-Language Pathology (MS) program.
- Liaison Committee on Medical Education (LCME): Medical Education Programs Leading to the MD Degree.
- National Accrediting Agency for Clinical Laboratory Sciences (NAACLS): The Medical Laboratory Scientist program.
- Landscape Architectural Accreditation Board (LAAB), American Society of Landscape Architects (ASLA): The MLA Program.

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OVERVIEW

University Hawai‘i at Mānoa is a globally recognized research institution with exceptional capabilities highly relevant to NASA's mission, particularly in Earth and space sciences. As one of only three U.S. universities participating in all four land-grant, sea-grant, space-grant, and sun-grant consortia, UH Mānoa leverages its unique geographical location to lead in areas such as astronomy and astrophysics (ranked 15th nationally), ocean and earth sciences (ranked 7th and 13th, respectively), and atmospheric science (per NSF Higher Education Research and Development

(HERD) Survey data, FY 23). UH Mānoa is a minority-serving institution with about 20,000 undergraduate and 4,500 graduate students.

WORKFORCE TRAINING

UH Mānoa provides stackable credential pathways that allow individuals to build their expertise incrementally, from certificates to associate's, bachelor's, and graduate degrees. This flexibility enables rapid upskilling and reskilling, allowing individuals to enter or advance in the workforce with specialized knowledge in areas such as: Data Science and Analytics, Renewable Energy and Sustainability, and Aerospace and Mechanical Engineering. We actively collaborate with regional employers, including those in the defense, technology, and research sectors, to develop certificate programs directly aligned with industry needs. These programs ensure graduates possess the most current and in-demand skills. UH Mānoa places a strong emphasis on experiential learning, facilitating co-op programs and internships with various organizations, including federal agencies, research institutions, and private companies. These opportunities provide invaluable hands-on experience in real-world STEM environments, fostering practical application of theoretical knowledge. As an R1 campus, many students participate in research projects with faculty that have direct ties to NASA-funded initiatives. Recognizing the rapid evolution of AI and data science, UH Mānoa offers accelerated bootcamps and intensive training programs designed to quickly equip participants with practical skills. By combining rigorous academic programs with practical, industry-aligned training, UH Mānoa is uniquely positioned to contribute to NASA's workforce needs, delivering highly skilled and adaptable professionals ready to tackle complex challenges in space exploration and scientific discovery.

RESEARCH CAPABILITIES

Astronomy and Planetary Science:

- World-Class Observatories: Operating the NASA Infrared Telescope Facility (IRTF) on Mauna Kea, a primary asset in NASA's planetary defense system for identifying and characterizing near-Earth objects (NEOs). World-leading all sky surveys from Haleakala, Mauna Loa and elsewhere (Pan-STARRS and ATLAS) for discovering potentially hazardous objects, small solar system bodies and transients. The Institute for Astronomy (IfA) conducts research in planets, star formation, extrasolar planets, galaxies, cosmology, and stars.
- Detector and Instrument development laboratories: for developing ground- and space-based detectors, instrumentation and adaptive optics. This work supported the development of the first light facility instruments for the DKIST solar telescope on Maui, detectors for JWST and supports concepts for future NASA missions such as the Habitable Worlds Observatory.
- Planetary Geosciences and Remote Sensing: Expertise within the Hawai‘i Institute of Geophysics and Planetology (HIGP) in understanding impact processes on planetary bodies (e.g., Lucy asteroid mission contributions), volcanology, and analyzing extraterrestrial materials.
- Analog Research Facilities: Hosting the HI-SEAS (Hawai‘i Space Exploration Analog and Simulation) facility, providing an isolated, Mars-like environment for human factors and other research enabling long-duration space missions.

Small Satellite Development and Operations:

- Hawai‘i Space Flight Laboratory (HSFL): A multidisciplinary center specializing in the design, construction, integration, testing, launch, and operation of small satellites (CubeSats and microsatellites) for science and technology demonstration.

- Flight Heritage: Proven capability with missions like the HyTI satellite (Hyperspectral Thermal Imager), which provides high-resolution thermal images for Earth surface processes and disaster response.
- Mission Operations Software: Development of the Comprehensive Open-architecture Solution for Mission Operations Systems (COSMOS) software framework, used to support spacecraft mission operations. Earth System Science and Remote Sensing:
- Ocean and Earth Sciences Expertise: Consistently ranked among the top institutions globally in oceanography, atmospheric sciences, and earth sciences, providing crucial insights into Earth's climate, environment, and natural hazards.
- Environmental Monitoring: Research utilizing Earth observation data to detect environmental health threats, inform health and air quality management, and monitor active volcanoes, coral reef health, and invasive species using Unmanned Aerial Systems (UAS).
- Hyperspectral Imaging: Development and deployment of hyperspectral imagers for various applications, including the HyTI satellite.

Advanced Engineering and Technology Development:

- Guidance, Navigation, and Control (GNC) Laboratory: Research and development in GNC theory, platforms, and software algorithms for space operations and missions, including small satellite propulsion systems and autonomous control technologies.
- Robotics and Autonomous Systems: Expertise in autonomous control technologies for UAS, including applications in extreme environments, and research into robotic autonomy and navigation.
- Infrastructure for Space Exploration: Exploration of interlocking frames for cost-efficient and sustainable infrastructure development in deep space exploration (e.g., Moon and Mars).

Advanced Data Visualization Facility:

- LAVA Lab: Cutting-edge data visualization technologies for science, including SAGE 3 which is an AI-enhanced collaborative environment system that has supported projects ranging from astronomy, renewable energy, environmental management, among others.
- Hawai‘i Data Science Institute: A UH System-wide effort that supports data science education, collaborative research, and partnerships with industry.

Unique Geographic Advantage and Partnerships:

- Strategic Location: Hawai?i's unique position in the Pacific provides unparalleled access to observing facilities and a natural laboratory for studying marine, atmospheric, and terrestrial phenomena.
- Land-, Sea-, Space-, and Sun-Grant Institution: One of only three universities in the U.S. with all four designations, fostering a broad and integrated approach to research and education relevant to national priorities.
- Strong NASA Collaborations: Continuous engagement with NASA through Space Grant Consortia, EPSCoR programs, and direct project funding, fostering a pipeline of talent and cutting-edge research.

FACILITIES & INSTRUMENTATION

Small Satellite Development and Integration: Comprehensive capabilities for designing, building, testing, launching, and operating CubeSats and microsatellites (1-150 kg). This includes clean rooms for assembly and testing. Satellite Testing Equipment: Features an Intlvac Thermal Vacuum Chamber (1.6m x 2.25m, 10-8 Torr, -70° to 70°C) for thermal-vacuum testing, a Vibration and Shock Table (up to 7000 kgf), a Spin Balancer, and an ADCS (Attitude Determination and Control System) Testbed with an air-bearing platform for satellites up to 100 kg, including magnetic field, sun, and

GPS simulations. Mission Operations Center: Utilizes the Comprehensive Open-architecture Solution for Mission Operations Systems (COSMOS) software framework for spacecraft command and control, data downlink, mission planning, and scheduling. Instrument Development: Development of various instruments for small satellites, including hyperspectral imagers. The ADCS Test Facility was built by Astro-und Feinwerktechnik Adlershof GmbH (AFW), or Astrofein for short. Mauna Kea Observatories (Hawai‘i Island): While not solely owned by UH Mānoa , the Institute for Astronomy (IfA) manages the NASA Infrared Telescope Facility (IRTF), a critical resource for planetary defense and solar system observations. IfA astronomers also utilize other world-class telescopes on Mauna Kea. Haleakal? High Altitude Observatory (Maui): Home to solar and lunar ranging observations, and two all sky surveys: Pan-STARRS, and one of the four Asteroid Terrestrial-impact Last Alert system (ATLAS) telescopes (one is located on Mauna Loa and the others are in Chile and South Africa). IfA Manoa Headquarters (O?ahu): Contains laboratories for instrument development, extensive computing facilities, and remote observing stations for controlling telescopes on Mauna Kea and Haleakal?. Cosmochemistry and Materials Analysis Labs: Specialized facilities for analyzing extraterrestrial materials, including lunar samples and meteorites, crucial for understanding planetary formation and evolution (instruments include a Cameca ims 1280 ion microprobe, with SCAPS solid-state imaging detector). The advanced electron microscopy and secondary ion mass spectrometry labs (including a FEI Helios NanoLab 660 Extreme High Resolution Dual Beam FIB, with Electron Backscatter Diffraction (EBSD) detector). Planetary Remote Sensing: Capabilities for analyzing remote sensing data from planetary missions and developing new instrumentation for planetary exploration (e.g., hyperspectral imagers, Raman spectrometers). Infrasound Laboratory: Research on infrasound phenomena, which has applications in atmospheric studies and monitoring for events like bolides entering Earth's atmosphere. Planetary Analog Research: A Mars-like habitat located on the slopes of Mauna Loa (Hawai‘i Island) that provides an isolated environment for conducting human factors research, crew performance studies, and technology testing for long-duration space missions. Aerospace Control Systems: Conducts research and development in GNC theory, platforms, and software algorithms for space operations, small satellite propulsion, and autonomous control technologies. UAS Development and Testing: Focuses on creating, testing, and developing real-time and autonomous control technologies for unmanned aerial vehicles (UAVs) with applications in environmental monitoring, particularly in extreme environments.

PAST PERFORMANCE

The University of Hawai‘i at Mānoa boasts a strong and consistent record of past performance in advancing NASA's scientific and exploration goals, distinguished by long-standing operational partnerships and successful contributions to critical missions. Since 1979, UH Mānoa 's Institute for Astronomy has continuously operated the NASA Infrared Telescope Facility (IRTF) on Maunakea, a vital asset for planetary defense and supporting numerous NASA deep-space missions. Furthermore, the Hawai‘i Space Flight Laboratory (HSFL) has demonstrated full lifecycle capabilities in small satellite development, successfully designing, building, launching, and operating the Hyperspectral Thermal Imager (HyTI) CubeSat, which provides high-resolution thermal data for Earth science applications. Beyond hardware, UH Mānoa researchers have been instrumental in over a dozen NASA planetary science and astrophysics missions, leading the development of several Discovery and New Frontiers-class mission concepts, contributing to data analysis for lunar exploration, developing instruments for future Mars and Europa missions, and utilizing the HI-SEAS analog research facility to provide critical insights into human factors for long-duration space travel. A UH team of researchers have had a strong track record as a member of the NASA astrobiology research institute for 11 years which conducted research and early career training. UH Mānoa received over $90M in NASA grants between FY 22 and FY24. This proven track record, reinforced by continuous NASA funding and a strong commitment to workforce development through hands-on student involvement, positions UH Mānoa as a reliable and high-impact partner for future NASA endeavors.