



W. M. KECK OBSERVATORY
Maunakea, Island of Hawai'i

Aloha,

For the past two decades, astronomers using data obtained at the W. M. Keck Observatory with the High Resolution Echelle Spectrograph (HIRES) have placed Keck Observatory at the very center of exoplanet discovery and investigation. Data collected at the observatory has played a major role in the explosion of knowledge about extrasolar worlds, and has revolutionized our understanding of how planetary systems form and evolve. The Keck Observatory's future in continuing to make fundamental discoveries about exoplanets is bright, but it is a future dependent on our ability to build the next generation of sophisticated instrumentation required to study worlds around other stars.

State-of-the-art instruments are the key to discovery at every observatory. At Keck, HIRES has served our community of astronomers supremely well as a work horse instrument for measuring the properties of hundreds of individual exoplanets: identifying new classes of planets, mapping planet masses and densities, and identifying Earth-size exoplanets. Building on this powerful legacy, our next great instrument for exoplanet research, now underway, is the Keck Planet Finder (KPF).

Keck Planet Finder will push the frontiers in exoplanet studies and allow Keck to maintain its leadership in this field. KPF paired with the Keck telescope will be the most sensitive and efficient spectrometer in the world for measuring the masses of small planets. The Keck Planet Finder will serve our community of astronomers in three important ways: by enabling us to study in great detail discoveries made by current spacecraft such as TESS and Kepler; by identifying the best exoplanet candidates for further study by the next generation of space-based telescopes, such as the soon to be launched James Webb Space Telescope; and most importantly, by performing fundamental research using the Keck telescopes directly.

This exciting new instrument will excel at the discovery and characterization of smaller Earth-mass planets in the habitable zones of nearby stars – locations where liquid water could exist. These are the most likely places where life may gain a toehold in an otherwise inhospitable universe. And in the end, the detection of life in places other than Earth is one of the grand quests of modern astronomy.

I invite you to participate with us in accomplishing this vital research by making a gift to the Director's Fund at W. M. Keck Observatory. Your gifts help us bring instruments such as the Keck Planet Finder to fruition, as well as supporting other vital programs at the Observatory.

On behalf of all of us at Keck, I thank you for your past support, and hope you will consider making a gift today. Please use the enclosed donation form or, if you prefer, go to <http://www.keckobservatory.org/support/donate> to make your gift online.

With sincere gratitude,

Hilton

Hilton Lewis
Observatory Director

In 2008, a team of astronomers used Keck Observatory's Keck II telescope in conjunction with observations on the Gemini telescope to get the first-ever direct images of another solar system, revealing three planets orbiting around a dusty young star named HR8799, which is 129 light-years away from Earth. In December of 2010, the team announced a fourth, innermost planet, "HR8799e" once again detected with Keck II telescope's adaptive optics infrared imaging. This was a technical *tour de force* made possible by advances in high-contrast adaptive-optics imaging that allow astronomers to explore the space closer to bright stars and reveal dim planets.

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