



W. M. KECK OBSERVATORY

Maunakea, Island of Hawai'i

KECK VISITING SCHOLARS PROGRAM 2019

Introduction

We describe here a program aimed to inspire and develop the next generation of scientists and instrumentalists by providing hands on experience in observational astronomy, hardware and software involving active instrument operations and real time problem solving. In our Keck Visiting Scholars Program, funds would be provided for early career scientists (graduate students and Post Docs) to be resident at Keck Observatory, working with our Support Astronomers and instrumentalists for periods of one to three months.

Today's early career astronomer often has little or no experience with the telescope, the scientific instrument, the night time observing, or the data reduction via which their scientific data is obtained. Queue observing is in common usage on many ground based telescopes, space based telescopes come with fully developed data pipelines, and even Keck observers rarely attend in person.

All these factors reduce the intuition with which the early career astronomer approaches data. There is an expression in astronomy; "Only a theoretician believes the data, and only an observer believes the theory." With the new lack of depth of knowledge of data had by early career scientists, there is danger of early career scientists not successfully being able to make the leap correctly from data to knowledge. And most dangerous of all is that they don't know what they don't know.

Implementation

With early career scientists lacking some of the basic knowledge behind the collection of data, we have implemented a program to target opportunities that benefits both the visiting scientist and their mentor at Keck Observatory. Visiting Scholars are to be on-site at the Keck headquarters for 4-12 weeks working directly with a mentor/sponsor, a Keck Support Astronomer or staff scientist. The scholar will identify and mentor and program prior to applying to the program and describe the goals as part of the application letter. Scholars with a connection to Keck through the scholar's advisor and/or Keck scientist will be given priority.

The first year trial program in 2017 demonstrated the concrete benefits of having students and Post Docs performing their own observations on site at Keck Observatory, working directly with Support Astronomers, and even helping other scientists perform their observations.

The pilot trial created positive attention for the program, and was further expanded in 2018. An open call for applications was issued and created large interest from the entire early career Keck and NASA community.

The proposals received spanned many areas of matching interest with the Support Astronomers: software and DRPs improvement projects, science programs exploiting our instruments archival data, instrumentation projects, and projects aimed to improve our operational efficiency.

Building up on the past years success, we now invite the entire Keck early career community to apply for the 2019 Keck Visiting Scholar Program.



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Several examples of benefit for a Keck Visitor Program

- Early career scientists specializing in Adaptive Optics would benefit from an extended stay at Keck where they could experience hands on work with Adaptive Optics, at the same time Keck would benefit from their work to improve performance of the Keck AO system.
- Early career scientists working in any of the research fields of our Support Astronomers would benefit from the opportunity to work with the SAs and the research activity at Keck would benefit from having an outside expert collaborating with our scientists.
- Early career scientists in planetary science, who are working on bright, transitory events, such as the Volcanoes on Io, the innermost moon of Jupiter could help us to implement the new flexible observing mode while at the same time obtaining as much possible data on the phenomenon they are studying.
- Early career scientist working with instrumentation, for example related to any of our upcoming upgrades, such as the NIRSPEC upgrade, or the DEIMOS mask design software would gain invaluable hands on experience with instrument upgrades, and we would benefit from their contributions to the instrument project.
- Early career scientists working with us on Data Reduction Pipeline (DRP) or on the Point Spread Function (PSF) reconstruction facility would benefit greatly from the experience of working with active, incoming data. Keck would greatly benefit from the work on DRP and PSF.

Program Plan and Budget

Visitors coming as part of this program would have an assigned mentor according to the field in which they are involved. They would have their living expenses paid for a period of anywhere from 1 to 3 months, including insurance. It is assumed that they would receive their usual compensation from their place of work, whether they be graduate students or Post Docs. Eligible participants would be from the entire Keck community, including the University of California, Caltech, the larger US astronomical community brought to Keck by the NASA participation, our Australian partners as well as international students from technical collaborators where we have an active collaboration.

Applications are a simple, one page description of their project and purpose, along with a recommendation letter, a one page resume and the name of a mentor at Keck Observatory. Decisions on applicants will be made based on how well the applicant project fit with the observatories needs as well as the likelihood of success.



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The Keck visiting scholars are encouraged to give an introduction talk in their first week of visit to introduce themselves and their previous scientific interests to the Observatory.

All visits would culminate with a written report or an oral presentation given to the Keck Staff, which in the best case scenario would be a submission to an astronomical or technical journal.

The funding for this program is limited to travel and accommodation expenses only. Salary and/or stipend is not included and thus the scholars will need to coordinate their visit with their base institution and advisor to ensure financial support. The visit also needs to be scheduled and coordinated at a level of activity that the Keck staff would be readily able to support. So for example, if there were 6 scholars coming for 2 months each, we would need 6 mentors. If the mentors all came from the Support Astronomers, that would mean that 6 of our 9 Support Astronomers would be mentoring one person for 2 months of the year, a reasonable expectation. A typical level of funding would include round trip air fare, lodging for 4-8 weeks, per-diem for meals and incidentals, and car rental.