



Keck Institute for Space Studies

Tuesday - 14 October 2019
Director: Prof. Tom Prince

Room: 180-101

Keck Institute for Space Studies – Overview

- W.M. Keck Foundation awarded Caltech a founding grant (2008-2016) to develop a “Think-and-Do Tank” for new planetary, Earth and astrophysics science and engineering approaches that will impact future space missions
- Ongoing endowment provided by private donors (2017 onwards)
- Objectives:
 - Convene the best expertise from Campus, JPL and the wider scientific and technical community
 - Conduct in-depth technical studies (“programs”) in focused areas of science and technology leading to new mission and instrument concepts
 - Identify key innovations and challenges in the science and technology needed for new missions and instruments
 - Fund the initial steps towards making progress on key innovations and challenges



KISS Goals

- develop ideas and **concepts that have the potential to revolutionize space science and engineering**, especially those that have the potential to impact or create future space exploration/missions
- we are not interested in incremental advances – **we want technically oriented studies that significantly advance a field**, even if they are inherently riskier than the comfort level of most programmatic offices
- we realize that external involvement is critical moving forward beyond the study; **ideas that build upon combined capabilities from Campus and JPL are especially attractive**



KISS Approach

1. Pick the right topic/problem (at the right time)
2. Assemble a team of experts with the right capabilities
3. Provide a highly interactive environment

We do not fund single investigator or single group efforts

We look for those problems that are beyond the capabilities of a single individual, a research group, or a single institution

We bring together a diverse team of experts to brainstorm new ideas



We are interested in any unique approach to the exploration of space

These concepts and ideas can be in any area (including but not limited to):

- Planetary and Small Bodies Science, Astrobiology
- Earth Science
- Astrophysics and Heliophysics
- Communication and Navigation
- Engineering and Applied Sciences

What Can a Study Program Look Like?

10 days

Two week intensive workshop

5 days

2-5 days



Two workshops over a year

5 days

2-5 days

2-5 days

Multiple workshops over a year

5 days



One week workshop



1-2 days

Symposium

Keck Institute Workshops

- Keck Institute workshops: a critical component of Study Programs
 - Typically have an opening and a closing workshop
- Most “workshops” in academia are more “shop” than “work”
 - They are actually mini-conferences
 - However, (speaker → audience) format becoming less relevant with increased dissemination of electronic materials (slides/video)
 - OK for one-on-one and few-person interactions
 - Very sub-optimal for group brainstorming
- Keck Institute workshops are different
 - Optimized for flexible interactions of groups of various sizes
 - Entire group (30 people), smaller groups (4-10 people), 1-on-1 and few-person
 - “Speakers” are encouraged to be discussion leaders
 - Keck workshops have defined objectives
 - Informal interaction time very important (meals, breaks, poster sessions)
 - Individual study/work areas provided (in new location)



Selection Criteria

- potential for generating innovative new ideas
- quality of the core-group participants, and of letters of commitment
- balance between, and diversity of, JPL, Campus, and external participants
- quality of the plans for formal and informal technical interactions
- quality of the plans for how the Study Program events will be implemented
- opportunities for junior members of the community to participate in program activities, and
- co-sponsorship/partnership (external funding)

KISS 2020 Study Program Opportunity

- Proposal Call Out – October 1, 2019
- Proposals Concepts Due – November 1, 2019 NOON
- Receive informal feedback by ~ November 15, 2019
- Proposals Due – 18 December, 2019 NOON
- Selections - ~ End of January 2020

http://www.kiss.caltech.edu/programs/2020_proposals.html

Elements for a Keck Study

JPL, Campus and the external community are core participants and co-leads

- 30 total participants (24 core participants, 6 early career folks)
 - Propose 18 core participants (includes team leads)
 - After selection, Steering Committee adds 6 core participants
 - After the program has been selected and the 24 core participants have been formally invited to join (and been accepted to) the study program, then those core-participants can nominate postdocs, graduate students and early career hires to fill the final 6 spots.

Foreign Nationals are allowed to participate (they can be team leads, core participants or early career folks)

Elements for a Keck Study

Significant opportunities for frequent and sustained technical interaction amongst the participants:

- One or more free-wheeling workshops with relaxed agendas
- Study periods for face-to-face interactions amongst the core participants between the workshops
- Public lectures at Campus/JPL (encouraged for studies with 2 workshops)
- Participation of students and junior scientists strongly encouraged

End products

- Final Report (required)
- Possible follow-on technical development proposal and program

KISS staff support

Funding and Follow-On

JPL Participation in first year studies, workshops, and the like, is funded on an ad-hoc basis by the OCSCT at JPL [a.k.a. Mark and Fred]

Study programs may spin off a technology development program [“think and do”] for one year (with the possibility of a second year, at JPL’s discretion):

- There is no guarantee of a technical development opportunity following the studies being selected through this solicitation – but it appears very likely
- In addition, the groundwork laid in the KISS study may open other doors

The Steering Committee is Here to Help - What's Next?

- The November 1 proposal concept submission is via email to KISS (see website instructions)
 - Campus participation is highly recommended, but not required – the steering committee can help you with this
- The proposal concept submission addresses the following:
 - Description of proposed study including scope of study and technical goal
 - Possible leverage from partners?
 - Potential list of attendees
- The great thing about the Keck Institute is that we are dedicated to creating the best possible programs – there is no GO/NO-GO gate:
 - Feel free to contact the JPL Steering Committee members – see next page - to discuss your Proposal Concept
 - We will contact you following the initial submission to discuss ways of improving the final proposal
 - View the Proposal Concept as an opportunity to get feedback on your ideas



2019 Steering Committee



- Jack Beauchamp (Campus – Chemistry and Chemical Engineering/Biology)
- Les Deutsch (JPL – Interplanetary Network)
- George Djorgovski (Campus – Physics, Math and Astronomy)
- Bethany Ehlmann (Campus – Geological and Planetary)
- Randy Friedl (JPL – Earth)
- Fred Hadaegh (JPL Chief Technologist)
- Charles Lawrence (JPL - Astrophysics)
- Dan Meiron (Campus – Engineering and Applied Science)
- Mark Simons (JPL Chief Scientist)



More Information on KISS process?

<http://kiss.caltech.edu/>

Sign up to get updates of current KISS events



KECK INSTITUTE FOR SPACE STUDIES

Earth Planetary **Keck** Astrophysics Engineering

Generously supported by the W. M. Keck Foundation

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Email Us

View Map

Final Report Available
Tidal Heating - Lessons from Io and the Jovian System

Upcoming Events

October 1
Call for Concepts for Study Programs
The Keck Institute for Space Studies (KISS) is soliciting concepts for Study Programs to be carried out during the 2020 calendar year. Concepts are solicited in the areas of space engineering, planetary science, remote sensing and earth system science, astrobiology, and astronomy and physics from space.

October 14
Short Course: Forest Water Dynamics and the Earth System Responses to Droughts
This short course will explore the theoretical basis for tree hydraulics, linking hydraulic stress and tree mortality, and observations of the water in trees from space. It will also analyze how we can best capture vegetation water interactions in Earth system models.

October 14 - 18
Workshop: Sensing Forest Water Dynamics from Space: Towards Predicting the Earth System Response to Droughts
The focus of this workshop is to greatly increase our current capacity to understand and predict the response of forest ecosystems to droughts and links between water and carbon processes in the earth's biosphere.

October 2019

S	M	T	W	T	F	S
29	30	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2

Call/email
Michele



Questions?



Keck Institute for Space Studies

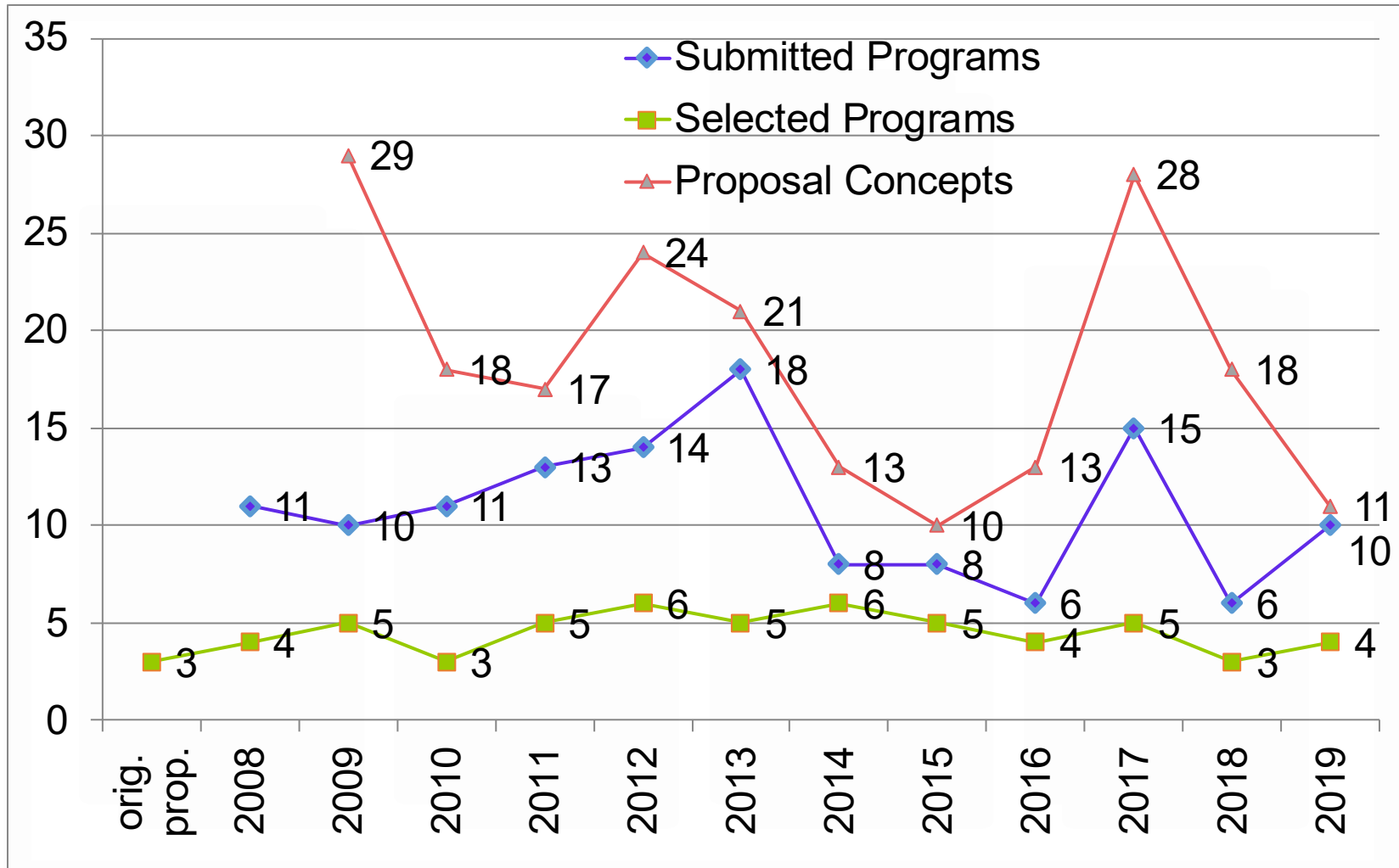


Study Programs for 2019

- Beyond Interstellar: Extracting Science from Black Hole Images
- Nebulae: Deep-Space Computing Clouds
- Sensing Forest Water Dynamics from Space: Towards Predicting the Earth System Response to Droughts
- Data-Driven Approaches to Searches for the Technosignatures of Advanced Civilizations

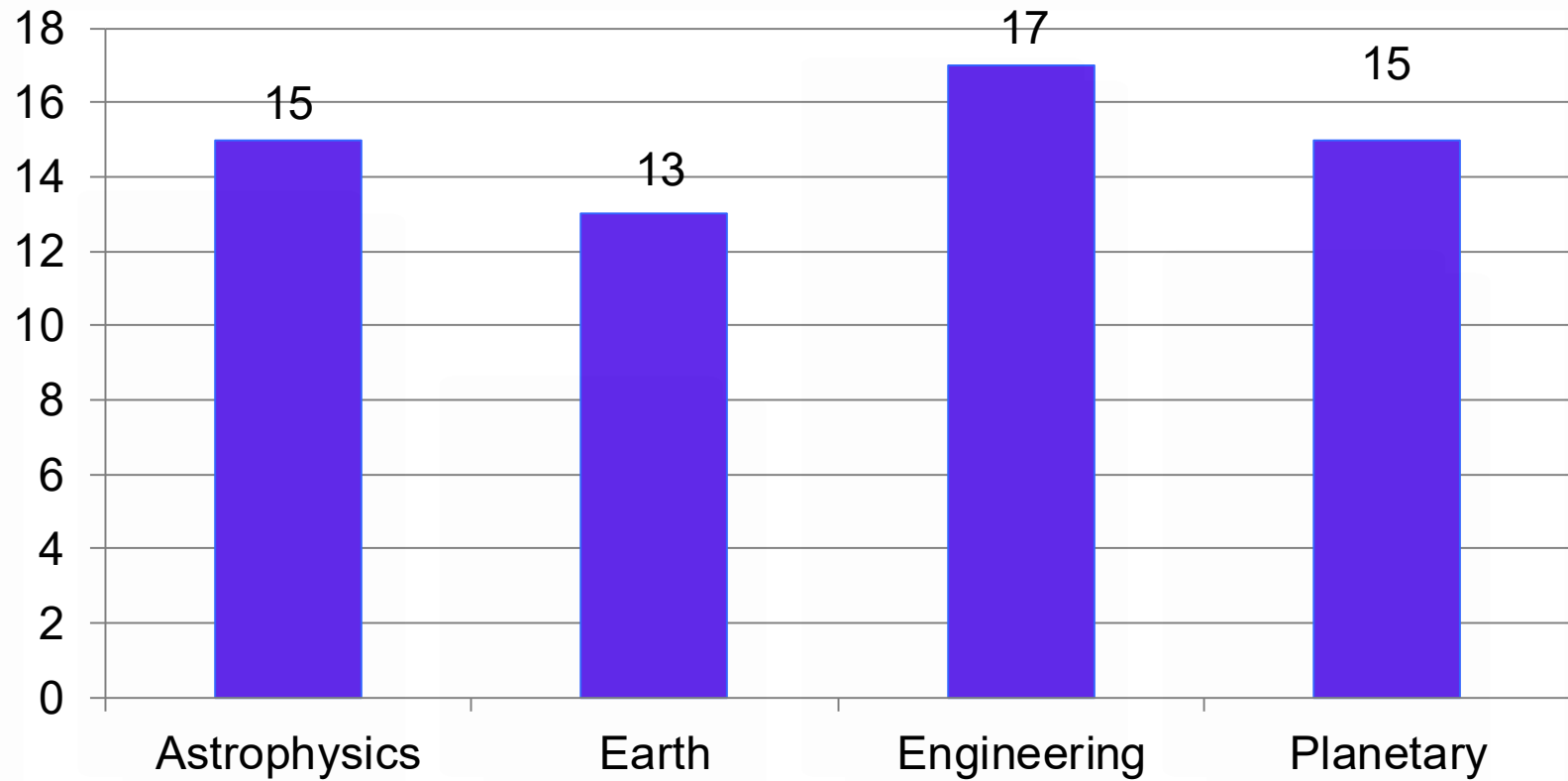


Study Programs: Submit vs. Select





Study Programs: Disciplines



The Institute currently supports:

STUDY PROGRAMS and TECHNICAL DEVELOPMENT

2019 CY Programs

- 4 programs

Previous Programs

- 60 study programs
 - 22 funded technology development follow-on programs (KISS funded through 2015)
 - plus 7 student-led programs

PUBLIC PROGRAMS

- Public lectures
- Public symposia
- Public short courses