

Keck Institute for Space Studies

List of Study Programs

2017 Programs:

1. [Accessing the Subsurface Oceans of Icy Worlds](#)
2. [Cryogenic Comet Sample Return – Compelling New Science vs. Technological Challenges](#)
3. [Designing Future CMB Experiments](#)
4. [Next-Generation Approach for Detecting Climate-Carbon Feedbacks: Space-Based Integration of Carbonyl Sulfide \(OCS\), CO₂, and SIF](#)
5. [The Architecture of LISA Science Analysis: Imagining the Future](#)
6. [Unlocking the Climate Record Stored within Mars' Polar Layered Deposits](#)
7. [Caltech Space Challenge 2017 \(Student-Led Program\)](#)

2016 Programs:

1. [Addressing the Mars ISRU Challenge: Production of Oxygen and Fuel from CO₂ Using Sunlight](#)
2. [Exoplanet Imaging and Characterization: Coherent Differential Imaging and Signal Detection Statistics](#)
3. [Optical Communication on SmallSats – Enabling the Next-Era in Space Science](#)
4. [Space Science Opportunities Augmented by Exploration Telepresence](#)

2015 Programs:

5. [Don't Follow \(Just\) the Water: Does Life Occur in Non-Aqueous Media?](#)
6. [Exploring New Multi-Instrument Approaches to Observing Terrestrial Ecosystems and the Carbon Cycle From Space](#)
7. [Methane on Mars](#)
8. [Optical Frequency Combs for Space Applications](#)
9. [Three Dimensional \(3D\) Additive Construction for Space using In-Situ Resources](#)
10. [Caltech Space Challenge 2015 \(Student-Led Program\)](#)

2014 Programs:

1. [Adaptive Multi-Functional Space Structures for Micro-Climate Control](#)
2. [Bridging the Gap: Observations and Theory of Star Formation Meet on Large and Small Scales](#)
3. [Gazing at the Solar System: Capturing the Evolution of Dunes, Faults, Volcanoes and Ice from Space](#)
4. [Mapping and Assaying the Near Earth Object Population Affordably on a Decadal Timescale](#)
5. [Science and Enabling Technologies to Explore the Interstellar Medium](#)
6. [Venus Seismology](#)

2013 Programs:

1. [Airships: A New Horizon for Science](#)
2. [Inferring Thermal and Mechanical Properties of Celestial Bodies Regolith Using \(Simple\) Low-T](#)
3. [New Approaches to Lunar Ice Detection and Mapping](#)
4. [Planetary Magnetic Fields: Planetary Interiors and Habitability](#)
5. [RUAV Scout and Recharging Station](#)
6. [Satellites to the Seafloor: Autonomous Science to Forge a Breakthrough in Quantifying the Global Ocean Carbon Budget](#)
7. [The Sleeping Giant: Measuring Ocean Ice Interactions in Antarctica](#)
8. [Caltech Space Challenge 2013 \(Student-Led Program\)](#)

2012 Programs:

1. [CMB Polarization Cosmology in the Coming Decade](#)
2. [Engineering Resilient Space Systems](#)
3. [In Situ Science and Instrumentation for Primitive Bodies](#)
4. [New Methods to Measure Photosynthesis from Space](#)
5. [Quantum Communication, Sensing and Measurement in Space](#)
6. [Small Satellites: A Revolution in Space Science](#)
7. [Tools and Algorithms for Sampling in Extreme Terrain](#)

2011 Programs:

1. [Asteroid Return Mission Study](#)
2. [Digging Deeper: Algorithms for Computationally-Limited Searches in Astronomy](#)
3. [High Altitude Ballooning for Space and Atmospheric Observation](#)
4. [Monitoring of Geoengineering Effects and their Natural and Anthropogenic Analogues](#)
5. [Next Generation UV Instrument Technologies Enabling Missions in Astrophysics, Cosmology a](#)
6. [xTerramechanics - Integrated Simulation of Planetary Surface Missions](#)
7. [Caltech Space Challenge 2011 \(Student-Led Program\)](#)

2010 Programs:

1. [Future Missions to Titan: Scientific and Engineering Challenges](#)
2. [Innovative Approaches to Planetary Seismology](#)
3. [Innovative Satellite Observations to Characterize the Cloudy Boundary Layer](#)
4. [Quantifying the Sources and Sinks of Atmospheric CO₂](#)
5. [The First Billion Years](#)

2009 Programs:

1. [Climate Feedbacks and Future Remote Sensing Observations](#)
2. [Innovative Approaches to Exoplanet Spectra](#)
3. [Innovative Concepts in IR/Submm Astronomy from Space](#)
4. [Mission Concepts for Accessing and Sampling High-Risk Terrains on Planetary Surfaces](#)
5. [Monitoring Earth Surface Changes from Space](#)
6. [Shedding Light on the Nature of Dark Matter](#)
7. [Single Photon Counting Detectors](#)

2008 Programs:

1. [Coherent Arrays for Astronomy and Remote Sensing](#)
2. [Large Space Structures](#)
3. [New Directions in Robotic Exploration of Mars](#)