



Next Frontiers in the Investigation of Extraterrestrial Organics

December 1-4, 2025
Overview Schedule

Monday, December 1, 2025
Chen 100 Lecture Hall - Caltech

Short Course: Next Frontiers in the Investigation of Extraterrestrial Organics

Time	Event	Speaker
8:15 - 8:45	Coffee and Refreshments	
8:45 - 9:00	Logistics / Introduction	Harriet Brettle Team Leads
9:00 - 9:45	Short Course Lecture #1 Meteorites, Asteroids, and Sample Science	Dionysis Foustoukos
9:45 - 10:30	Short Course Lecture #2 Abiotic /Prebiotic Organic Synthesis	Laurie Barge
10:30 - 11:00	Break	
11:00 - 11:45	Short Course Lecture #3 Cycling of Organic Molecules	Kirt Robinson
11:45 - 12:30	Short Course Lecture #4 Organics Detected on Spaceflight Missions	Marc Neveu
12:30 - 1:30	Short Course Ends: Informal Lunch is provided	

Invitation-Only Workshop Begins Keck Center - Think Tank, Room 155

1:30 - 1:45	Walk to Keck Center, pick up badge and welcome packet, find seat in the Think Tank	
1:45 - 2:30	Workshop Logistics and Introduction to KISS	Harriet Brettle
2:30 - 3:00	Participant Introductions	Harriet Brettle
3:00 - 3:30	Study Vision and Goals - including the key pillars for the two study weeks	Team Leads
3:30 - 4:00	Break	
4:00 - 5:00	Finalise study vision via plenary	Team Leads
5:00 - 5:30	Lightning Talks 1. Glycine Partitioning into Halite During Crystallization from Simulant Brines 2. Nate Reed Research Update 3. Formation pathways of amino acids in the Solar System 4. Core metamorphism controls dynamic habitability of Ceres 5. Tracing life-essential molecules across planets and deep time: Mars, meteorites, and fossils	Lucas Reynoso Nate Reed Ophélie McIntosh Samuel Courville YuanYuan He
5:30 - 6:00	Pack up and walk to dinner	All
6:00	Dinner at the Athenaeum	

Tuesday, December 2, 2025 - Keck Center - Think Tank, Room 155

Time	Event	Speaker
8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 10:00	Plenary discussion for topic 1: Abiotic Sources	Jessica Weber
10:00 - 10:30	Break	
10:30 - 10:45	Introduction to Breakout Groups and Topics	Harriet Brettle and Study Leads
10:45 - 11:45	Breakout Session 1: What types and in what abundance are there organics in these environments? IOM vs SOM? What cycles are influenced by biology? 1) meteorites 2) earth / planet crust organics / preservation 3) earth / planet mantle processing of organics 4) atmosphere reactivity	Groups
11:45 - 12:30	Breakout Session 1: Second Rotation	Groups
12:30 - 2:00	Group Picture and Lunch on your own	
2:00 - 2:40	Report outs from breakout groups (10 mins each)	Groups
2:40 - 3:10	Plenary Discussion and Individual Writing Time	All
3:10 - 3:30	Lightning Talks 1. Chemistry of thioacetate in the presence of sulfide 2. An Update from the KISS Sample Return Study 3. New techniques to analyze volatile organics from very small samples	Haruka Nakagawa Amy Hofmann Yongsong Huang
3:30 - 4:00	Break	
4:00 - 5:00	Breakout Session 2: What are the known limits to these prebiotic reactions based on the environment? How does this impact the ratio of products? What conditions are under explored? 1) known prebiotic reactions under crust 2) known prebiotic reactions in mantle 3) atmospheric prebiotic reactions	Groups
5:00 - 5:30	Breakout Session 2: Second Rotation	Groups
5:30 - 7:30	POSTER SESSION and Informal dinner at the Keck Center (dinner starts at 6:30 pm)	

Wednesday, December 3, 2025 - Keck Center - Think Tank, Room 155

8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 9:45	Report Outs from Breakout Groups (10 mins each)	Groups
9:45 - 10:15	Group Pulse: "Taking Away" & "Want to Accomplish Yet"	Harriet Brettle
10:15 - 11:00	Plenary Discussion: Next Frontiers, Key Challenges & Report Structure	All
11:00 - 11:30	Break	
11:30 - 12:15	Plenary Discussion: Special Conditions	Maitrayee Bose
12:15 - 12:30	Selection of breakout groups	All
12:30 - 2:00	Lunch at the Keck Center	
2:00 - 3:00	<p>Breakout Session 3: <i>Special conditions - how well characterized is organic matter in these environments and where are the holes? (i) What does supercritical CO₂ and water do to the pathways for organic evolution? (ii) Which came first - soluble organic matter or insoluble organic matter?</i></p> <p>1) Salty conditions in the outer solar system 2) WR ratios 3) atmospheric conditions 4) P/T conditions</p>	Groups
3:00 - 4:00	Breakout Session 3: Second Rotation	Groups
4:00 - 4:30	Break	
4:30 - 5:15	Report outs from breakout groups (10 mins each) and plenary discussion	Groups
5:15 - 5:30	<p>Lightning Talks</p> <p>1. Soot Lines 2. Cloud Facilities at Caltech and JPL</p>	Jenny Bergner Bryana Henderson
5:30	Walk over to the Athenaeum	All
6:00	Closing Dinner at the Athenaeum	

Thursday, December 4, 2025 - Keck Center - Think Tank, Room 155

8:00 - 8:30	Institute Opens - FREE THINK TIME	
8:30 - 9:00	Coffee and Refreshments at Keck Center	
9:00 - 9:15	Logistics and Team Lead Goals for the Day	Harriet Brettle and Team Leads
9:15 - 10:00	Breakout Session 4: 1. In situ detection 2. Spectroscopy 3. Sample handling	Groups
10:00 - 10:30	Breakout Session 4: Second Rotation	Groups
10:30 - 11:00	Break	
11:00 - 11:45	Report outs from breakout groups (15 mins each)	All
11:45 - 12:30	KISS Outputs - Final Report and Stakeholders	Study Leads
12:30 - 2:00	Lunch at the Keck Center	
2:00 - 2:30	FREE THINK TIME (individual, or self organizing small groups)	All
2:30 - 3:15	Breakout Groups - Report Drafting	Groups
3:15 - 3:30	Plenary Group Discussion: Path Forward for Collaboration, Discussion on future projects	Jessica Weber
3:30 - 4:00	Break	
4:00 - 4:30	Open Discussion of Breakout Group Recommendations and Path Forward	All
4:30 - 5:00	Workshop Closeout	Harriet Brettle
5:00	Institute Closes	