



**Digital Twins for Solar System Exploration:
Enceladus**

**Date May 6-9, 2025
Overview Schedule**

**Tuesday, May 6, 2025
Keck Center - Think Tank, Room 155**

Time	Event	Speaker
8:15 - 8:45	Coffee and Refreshments	
8:45 - 9:00	Registration	
9:00 - 10:00	Workshop Logistics and Introduction to KISS Participant Introductions	Harriet Brettle
10:00 - 10:30	Break	
10:30 - 11:20	Study vision and goals for the workshop - Reaffirming our Digital Twin Framework	Krista Soderlund
11:20 - 11:30	Intro to Breakout Sessions	Harriet Brettle and Study Leads
11:30 - 12:30	Breakout Session - Revisit Sub Groups 1-3 1. Plume provenance – Karl Mitchell 2. Nutrient budget focused on Ocean Density – Steven Vance 3. Thermal budget focused on Ice Shell Thickness – Matthew Siegler/Daniel Abdulah	All
12:30 - 2:00	Buffet Lunch at the Athenaeum	
2:00 - 2:30	Study Sub-group Updates (<i>The Mission Simulator</i>) - summary of work between workshops 1. Plume provenance – Karl Mitchell 2. Nutrient budget focused on Ocean Density – Steven Vance 3. Thermal budget focused on Ice Shell Thickness – Matthew Siegler/Daniel Abdulah	Subgroup leads
2:30 - 3:30	Plenary Discussion: <i>The Accountant and the Adjudicator (Generic)</i> - definition, inputs, and examples	Mark Simons
3:30 - 4:00	Break	
4:00 - 5:15	Breakout Session 2 4. Instruments Revisit – Gregor Steinbruegge 5. Implementation Revisit – Michael Aivazis A. ET Components	All
5:15 - 5:45	Study Sub-group Updates (<i>The Mission Simulator</i>) - summary of work between workshops including challenges faced 4. Instruments – Gregor Steinbruegge 5. Implementation – Michael Aivazis A. ET Components	Subgroup leads
5:45 - 6:00	Plan for Day 2	Alphan Altinok
6:00	Reunion Dinner at the Keck Center	

Wednesday May 7, 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 Study Leads
9:15 - 10:30	Breakout Session - Report Session Round 1 - Review drafting and current status - Identify gaps and parts to update - Writing sprint	All
10:30 - 11:00	Break	
11:00 - 12:00	Adjudicator Part 1 (Data sufficiency) Breakout Groups - <i>map out how the adjudicator will decide if the following objective is met</i> - Thermal data - Nutrient data - Provenance data	All
12:00 - 1:30	Group Photo and Informal Lunch at the Keck Center	
1:30 - 2:15	Report out from Adjudicator Part 1 breakout groups	All
2:15 - 3:00	Plenary Discussion: Review and discuss updates to the Exploration Twin framework from the morning writing session	ET framework writing group (G7)
3:00 - 3:15	Quick break	
3:15 - 4:15	ET Breakout Groups - <i>how does the ET change in Phase E?</i>	All
4:15 - 4:30	Pack up and move to Lecture	All
4:30 - 5:00	Lecture Reception (Sharp Lecture Hall)	All
5:00 - 6:00	Guest Lecture - What Makes a Model a Digital Twin? An Atmospheric Science-based Perspective (Sharp Lecture Hall)	Dev Niyogi
6:00 - 7:30	Dinner on your own	

Thursday May 8, 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 Study Leads
9:15 - 9:45	Group Pulse: "Taking Away" & "Want to Accomplish Yet"	Harriet Brettle
9:45 - 10:30	Plenary Discussion: Final Report Status Update and Review	Krista Soderlund
10:30 - 11:00	Break	
11:00 - 11:45	Report out from Moon-Mars-Earth breakout groups	All
11:45 - 12:30	Report Writing Sprint Round 2 - address relatively empty sections	All
12:30 - 2:00	Lunch on your own	
2:00 - 2:30	Lightning Talks: - Lessons learnt from Europa Clipper Phase A - Update of DT graphics - Digital Twin for Endurance - Mars weather Digital Twin - Value Proposition of ET beyond an integrated collection of traditional OSSEs	Steve Vance Eitan Rapaport Saptarshi Bandyopadhyay Manmeet Singh Gregor Steinbrugge
2:30 - 3:30	Breakout Session: Specific Next Steps	All
3:30 - 4:00	Report out from breakout groups	All
4:00 - 4:30	Break	
4:30 - 5:15	Plenary Session: Workshop Findings and Recommendations	All
5:15 - 6:00	Plenary Session: Importance of Illustrations - KISS Gallery	All
6:00	Closing Dinner at the Athenaeum	

Friday May 9, 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 - 9:05	Logistics and Team Lead Goals for the Day	Harriet Brettle and Study Leads
9:05 - 9:30	Key Findings	All
9:30 - 10:30	Small Group Time: Key Findings Key Recommendations Next Steps: small/medium/large Figures	All
10:30 - 11:00	Break	
11:00 - 12:00	Report Review and timeline to completion	Study Leads
12:00 - 12:30	Workshop Highlights & Summary	Harriet Brettle
12:30 - 1:30	Informal lunch in the Keck Center Courtyard	
1:30	Institute Closes	