



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

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

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

| <b>Time</b>   | <b>Event</b>   | <b>Speaker</b>                  |
|---------------|--|---------------------------------|
| 8:15 - 8:45   | Coffee and Refreshments  |                                 |
| 8:45 - 9:00   | Registration   |                                 |
| 9:00 - 10:00  | Workshop Logistics and Introduction to KISS<br>Participant Introductions   | Harriet Brettle                 |
| 10:00 - 10:30 | Break  |                                 |
| 10:30 - 11:20 | Study vision and goals for the workshop<br>- Reaffirming our Digital Twin Framework  | Krista Soderlund                |
| 11:20 - 11:30 | Intro to Breakout Sessions   | Harriet Brettle and Study Leads |
| 11:30 - 12:30 | <b>Breakout Session - Revisit Sub Groups 1-3</b><br>1. Plume provenance – Karl Mitchell<br>2. Nutrient budget focused on Ocean Density – Steven Vance<br>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   | <b>Study Sub-group Updates</b> ( <i>The Mission Simulator</i> ) - summary of work between workshops including challenges faced<br>1. Plume provenance – Karl Mitchell<br>2. Nutrient budget focused on Ocean Density – Steven Vance<br>3. Thermal budget focused on Ice Shell Thickness – Matthew Siegler/Daniel Abdulah | Subgroup leads                  |
| 2:30 - 3:30   | <b>Plenary Discussion:</b> <i>The Accountant and the Adjudicator (Generic)</i> - definition, inputs, and examples  | Mark Simons                     |
| 3:30 - 4:00   | Break  |                                 |
| 4:00 - 5:15   | <b>Breakout Session - Revisit Sub Groups 4-5</b><br>4. Instruments – Gregor Steinbruegge<br>5. Implementation – Michael Aivazis  | All                             |
| 5:15 - 5:30   | <b>Study Sub-group Updates</b> ( <i>The Mission Simulator</i> ) - summary of work between workshops including challenges faced<br>4. Instruments – Gregor Steinbruegge<br>5. Implementation – Michael Aivazis  | Subgroup leads                  |
| 5:30 - 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  | <b>Breakout Session</b> - Report Session Round 1<br>- Review drafting and current status<br>- Identify gaps and parts to update<br>- Writing sprint  | All                             |
| 10:30 - 11:00 | Break  |                                 |
| 11:00 - 12:00 | <b>Adjudicator (Data sufficiency) Breakout Groups</b> - <i>map out how the adjudicator will decide if the following objective is met</i><br>- Thermal data<br>- Nutrient data<br>- Provenance data | All                             |
| 12:00 - 1:30  | Group Photo and Informal Lunch at the Keck Center  |                                 |
| 1:30 - 2:15   | Report out from breakout groups  | All                             |
| 2:15 - 3:00   | <b>Plenary Discussion:</b> Other Flavors of Adjudicators (e.g. mission optimization, phase E, other)   | Mark Simons                     |
| 3:00 - 3:15   | Quick break  |                                 |
| 3:15 - 4:15   | <b>Adjudicator Part 2 Breakout Groups</b> - <i>mission optimization, Phase E, other (TBD)</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   | <b>Guest Lecture</b> - 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   | <b>Group Pulse:</b> "Taking Away" & "Want to Accomplish Yet"   | Harriet Brettle                 |
| 9:45 - 10:30  | <b>Plenary Group Discussion:</b> Path Forward for Collaboration, Discussion on future projects and funding | Krista Soderlund                |
| 10:30 - 11:00 | Break  |                                 |
| 11:00 - 11:30 | Report out from adjudicator breakout groups  | All                             |
| 11:30 - 12:30 | <b>Plenary Discussion:</b> Adjudicator Implementation  | Study Leads                     |
| 12:30 - 2:00  | Lunch on your own  |                                 |
| 2:00 - 2:30   | <b>Plenary Discussion:</b> What are we missing? (Enceladus specific)                                       | Study Leads                     |
| 2:30 - 3:15   | <b>Plenary Discussion:</b> broader applications and expanding to other missions/targets                    | Study Leads                     |
| 3:15 - 4:00   | Report Writing Sprint - Round 2  | All                             |
| 4:00 - 4:30   | Break  |                                 |
| 4:30 - 5:15   | <b>Plenary Session:</b> Workshop Findings and Recommendations  | All                             |
| 5:15 - 6:00   | <b>Plenary Session:</b> 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 - 9:15   | Logistics and Team Lead Goals for the Day   | Harriet Brettle and Study Leads |
| 9:15 - 9:45   | Future Proposals and next steps             | All                             |
| 9:45 - 10:30  | Report Writing Sprint - Round 3             | 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                            |                                 |