

The Keck Institute for Space Studies
presents the following lecture:

Unseen but Measured:

Carbon-I's Global Mapping of Trace Gases

Prof. Christian Frankenberg

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Caltech / JPL

Tuesday, July 22, 2025

4:30 PM Refreshments

5:00 PM Lecture

**Sharp Lecture Hall, Arms Building
California Institute of Technology**

NASA's *Earth System Explorer* (ESE) program was created to fly mid-class, PI-led Earth-science missions that address high-priority observables from the 2017 Decadal Survey. Four candidate missions—including Carbon-I—were selected in May 2024 for one-year Phase A concept studies under this call. NASA will evaluate the four studies and down-select to one or two winners that will proceed to full development.

Carbon-I will be the first mission to merge land-imaging spatial detail with high-resolution atmospheric spectra, yielding simultaneous views of the atmosphere and the underlying surface. Its ≤ 400 m global sampling—paired with a < 50 m Target Mode over 100×100 km scenes—lets the sensor “peek” through cloud gaps and deliver far more data in the humid tropics, where carbon fluxes, uncertainties, and natural feedbacks are largest.

Over its planned three-year mission, Carbon-I would create the first global maps of CH_4 , CO_2 , and CO at sub-kilometer scales, revealing both natural and human-driven emission processes and providing the observational foundation needed to close critical carbon-budget gaps. We will outline the mission concepts, how we got there and paths forward.

**Register here or on our
website: kiss.caltech.edu**



Registration is required for this lecture as seating is limited.

CARBON-I