



TOPIC # - TDC - 207

NASA PSYCHE: Modification of Heritage Scientific Instrumentation for Exploration of Hypothesized Surfaces

BACKGROUND

The NASA Psyche mission is an orbiter mission to the metal-rich asteroid, Psyche, in the asteroid belt between Mars and Jupiter. The spacecraft, which launched in October 2023 and will arrive at the asteroid in mid-2029, will study the asteroid from orbit for the first time and will not land on the surface.

Using Psyche's known and hypothesized environmental and surface conditions, which have been laid out in recent scientific reports, and keeping in mind other constraints such as its gravity, length of day and year, rotation, surface temperature, etc., you will identify a prior landing, roving, or sampling mission with a suite of instruments you think are most compelling for scientific exploration of Psyche and will determine and design adjustments and modifications to that scientific instrument package (including, for example, determinations of placement on the landed craft) for the greatest chance of operational and scientific success at Psyche. Examples could include selecting instruments from a specific Mars rover or lander, another asteroid mission, such as OSIRIS-REx, or a CLPS instrument package from a small lunar lander. Other considerations include minimizing both mass and power requirements, as landed missions to a body as far from Earth as Psyche will be more constrained than missions to Earth's closer neighbors (e.g., the Moon, near-Earth asteroids, and Mars). The project deliverables can include, for example, calculations, simulations, design packages, or, if time and resources in your course allow, physical prototyping.

NASA PSYCHE

The Psyche mission is developing Psyche-focused projects for capstone courses across a range of disciplines. Note: to participate in the PSYCHE topics, teams should be part of a capstone class.

See NASA PSYCHE for additional program information.

DESIGN TEAM PROFILE

NASA MENTOR:	Cassie Bowman
LEVEL:	Undergraduate students of any level
MAJOR/DISCIPLINE:	All relevant majors welcome
TEAMS:	Teams should be capstone classes.
DURATION:	1 or two semesters

