



TOPIC # - TDC - 201

NASA PSYCHE: Additive Manufacturing with Hypothesized Surface Materials

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 investigate the potential of the Psyche asteroid to support in-situ resource utilization (ISRU) specifically to make refined metals, such as iron and aluminum, as well as other materials such as silicon, to enable vapor deposition systems to additively build structures in the low-gravity environment of Psyche, taking into account prior concepts for similar activities on the Moon or Mars as well as analogs on Earth. 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

