

The Department of Aerospace Science and Technology at Politecnico di Milano (Polimi) is searching for **8 positions** at PhD, PostDoc, and RA level to work on the following two projects.

ERC-EXTREMA. The miniaturisation of electronics has enabled CubeSats, which reduced the entry-level cost in low-Earth orbit. Yet, the current paradigm prevents their usage for deep-space exploration. The ERC-funded project **EXTREMA** introduces “self-driving interplanetary CubeSats”: probes able to drive themselves during the cruise, without requiring any contact with ground. This concept implies autonomous guidance, navigation, and control (GNC). The project exploits ballistic capture, a delicate mechanism to acquire an orbit about a planet. The project was awarded an ERC Consolidator Grant.



European Research Council
Established by the European Commission

• **PhD positions.** *Position 1: Autonomous navigation.* This position involves conducting research in the field of celestial triangulation. Task: To develop an optical navigation algorithm. *Position 2: Autonomous guidance and control.* This position involves conducting research in the field of autonomous guidance and control. Task: To develop a deep-space closed-loop guidance algorithm. *Position 3: Autonomous ballistic capture.* This position involves conducting research on ballistic capture, a mechanism that allows a spacecraft to approach a planet and enter a temporary orbit about it without requiring manoeuvres in between. Task: To design and execute an experiment to prove validity of autonomous ballistic capture.

• **Application links:** [All PhD calls](#), [This PhD call](#), [Topic](#); [All PhD calls \(it\)](#), [This PhD call \(it\)](#), [Topic \(it\)](#).

• **Deadline:** December 3rd, 2020. **Start date:** February 1st, 2021. **Duration:** 3 years.

• **Monthly net income:** €1,425.

• **PostDoc positions.** The activities to be performed involve designing, developing, and operating the Orbital Simulation Hub within EXTREMA. Each of the three PostDoc researchers will be in charge of one key building blocks, namely: 1) An experimental apparatus with a thruster in the loop, 2) an air-bearing system to mimic the attitude motion of deep-space CubeSats, and 3) a software simulator to propagate the spacecraft translational and rotational motion. The PostDoc researchers will contribute to founding, organise, and set up the newly DART Lab (Deep-space Astrodynamics Research & Technology Laboratory) at Polimi's DAER. The PostDoc researchers will be responsible for the co-supervision of one PhD candidate each. There will be the possibility to co-supervise MSc students for their final thesis and to serve as TA for BSc and MSc classes.

• **Application links:** [Call](#); [Call \(it\)](#).

• **Deadline:** January 7th, 2021. **Start date:** February 1st, 2021. **Duration:** 2 years (+ 2 years).

• **Monthly net income:** €2,000.

ESA-Milani. Hera space mission is ESA's next step towards the exploration of asteroids. Together with NASA's DART mission, it is part of AIDA, the first ever real-scale planetary defense test. Hera will be launched in 2024 to explore binary asteroid Didymos. In 2027, after rendezvous with Didymos, Hera will release two CubeSats in the proximity of the binary system. The two Research Assistant positions (RA) are in the context of the phase B design of Hera's Milani CubeSat.



European Space Agency

• **RA positions.** *Position 1: Design and analysis of CubeSat's trajectories.* The researcher will work on the consolidation, development and harmonisation of (i) numerical models of the dynamics in the close-proximity of small and irregular bodies and (ii) numerical methods to find solutions within non-linear dynamical systems. *Position 2: Development of an optical navigation facility.* The research will design and develop an apparatus to test navigation algorithm of Milani, including calibration and operation of the experimental setup.

• **Application links:** [Call](#); [Call \(it\)](#).

• **Deadline:** January 7th, 2021. **Start date:** February 1st, 2021. **Duration:** 1 year.

• **Monthly net income:** €1,500.

Polimi is an affirmative action, equal opportunity employer. More info about Polimi's Department of Aerospace Science and Technology [here](#).



POLITECNICO
MILANO 1863