

Media Release, October 18, 2024

## Researchers from the University of Bern involved in NASA mission

**NASA's Europa Clipper was launched on October 14, 2024, on its mission to conduct a detailed study of Jupiter's moon Europa. It will determine if the icy moon currently has habitable conditions. Four researchers from the University of Bern are members of the scientific teams for the mission cameras, the Europa Imaging System (EIS), and the mass spectrometer MASPEX on board the spacecraft.**

On Monday, October 14, 2024, NASA's Europa Clipper mission began its journey to Jupiter. The spacecraft, the largest NASA has ever built for a planetary mission, will launch on a SpaceX Falcon Heavy rocket from Launch Complex 39A at NASA's Kennedy Space Center in Florida. NASA Europa Clipper will travel 2.9 billion km to reach Jupiter in April 2030. The main science goal is to determine whether there are places below the surface of Jupiter's icy moon, Europa, that could support life. The spacecraft, in orbit around Jupiter, will make nearly 50 flybys of Europa at closest-approach altitudes as low as 25 kilometers above the surface, soaring over a different location during each flyby to scan nearly the entire moon.

Europa Clipper has a powerful suite of nine science instruments that will work in sync while collecting data to accomplish the mission's science objectives. During each flyby, the full array of instruments will gather measurements and images that will be layered together to paint the full picture of Europa. On board the spacecraft is the Europa Imaging System (EIS), a camera system which was designed and built by Johns Hopkins Applied Physics Laboratory (APL). The EIS science team is led by Elizabeth Turtle of APL and includes Nicolas Thomas, professor of astrophysics at the University of Bern, as co-investigator. Members of the EIS science team also include Antoine Pommerol, co-leader of Thomas' Planetary Imaging Group at the Space Research & Planetary Sciences Division at the Physics Institute of the University of Bern, and Caroline Haslebacher, who has just completed her PhD in the same group. Audrey Vorburger, assistant professor of astrophysics at the University of Bern, is a member of the Europa Clipper science team for the Mass Spectrometer for Planetary Exploration (MASPEX).

### Extensive experience and expertise with camera systems at the University of Bern

"It is a real honor to be part of this incredibly exciting mission," says Nicolas Thomas, who was appointed to the EIS science team because of his extensive experience and expertise with camera systems including the CaSSIS camera system on board the ExoMars Trace Gas Orbiter (TGO), which is returning spectacular images from Mars and was developed by an international team led by Thomas and built at the University of Bern. "I hope that the EIS camera will be able to determine whether liquid water comes close to the surface of Europa (periodically or aperiodically), where this has occurred, and when it last happened," explains Thomas.

EIS science team member Antoine Pommerol has broad experience in calibrating and analyzing remote-sensing data from various Solar System objects with icy surfaces, such as Mars and comets. He developed a unique experimental facility at the University of Bern to simulate icy moon surfaces like Europa's. Pommerol explains: "We can simulate the surface material and conditions, measure the reflectance, and use this data to prepare the interpretation of future results." He therefore follows closely all discussions related to the calibration of the camera system and is preparing experimental datasets for future interpretation of the data collected at Europa.

Caroline Haslebacher joined the EIS science team through her PhD supervisor Thomas. "I was happy to give Caroline Haslebacher the opportunity to get involved in the EIS science team. Getting junior researchers on board at an early stage in these types of mission is life-changing," says Thomas. Haslebacher is developing a target database to help with planning for EIS imaging at Europa. She says: "The effort to develop a target database will help prioritize observations, which is important due to the limited time during flybys and data volume." The young scientist is particularly excited about imaging of regions of Europa that have been seen previously at only low resolution, and will be imaged by EIS at an unprecedented pixel scale.

### **Synergies with "sibling mission" to Jupiter**

Also involved in the Europa Clipper mission is Audrey Vorburger who has vast expertise in the field of mass spectrometry. She is a member of the science team for the MASPEX mass spectrometer which will study the chemistry of the moon's suspected subsurface ocean, how the ocean and surface exchange material, and how radiation alters compounds on the moon's surface.

Vorburger is also involved in ESA's Juice space mission, which started its journey to Jupiter in April 2023. She is the lead scientist for the Neutral and Ion Mass Spectrometer (NIM), which was completely designed and built at the University of Bern. "In my opinion, Juice and Europa Clipper are like siblings: slightly different, but sharing many similarities," says Vorburger. "For instance, eight out of the nine instruments on Europa Clipper have an equivalent on Juice. However, their mission profiles diverge significantly. Juice will explore the entire Jupiter system, ultimately entering orbit around Jupiter's largest moon Ganymede, while Europa Clipper will focus closely on Europa, providing the first detailed study of the icy moon. Their similarities yet differences are what make them two such promising synergistic missions." As Vorburger concludes, Europa Clipper will provide invaluable information about Europa and lay the groundwork for future life-searching missions.

More information about NASA Europa Clipper: <https://science.nasa.gov/mission/europa-clipper/>

### **Contacts:**

Prof. Dr. Nicolas Thomas

Physics Institute, Space Research and Planetary Sciences (WP), University of Bern

Email: [nicolas.thomas@unibe.ch](mailto:nicolas.thomas@unibe.ch)

PD Dr. Antoine Pommerol

Physics Institute, Space Research and Planetary Sciences (WP), University of Bern

Email: [antoine.pommerol@unibe.ch](mailto:antoine.pommerol@unibe.ch)

Dr. Caroline Haslebacher

Physics Institute, Space Research and Planetary Sciences (WP), University of Bern

Email: [caroline.haslebacher@unibe.ch](mailto:caroline.haslebacher@unibe.ch)

Prof. Dr. Audrey Vorburger

Physics Institute, Space Research and Planetary Sciences (WP), University of Bern

Email: [audrey.vorburger@unibe.ch](mailto:audrey.vorburger@unibe.ch)

**Bernese space exploration: With the world's elite since the first moon landing**

When the second man, "Buzz" Aldrin, stepped out of the lunar module on July 21, 1969, the first task he did was to set up the Bernese Solar Wind Composition experiment (SWC) also known as the "solar wind sail" by planting it in the ground of the moon, even before the American flag. This experiment, which was planned, built and the results analyzed by Prof. Dr. Johannes Geiss and his team from the Physics Institute of the University of Bern, was the first great highlight in the history of Bernese space exploration.

Ever since Bernese space exploration has been among the world's elite, and the University of Bern has been participating in space missions of the major space organizations, such as ESA, NASA, and JAXA. With CHEOPS the University of Bern shares responsibility with ESA for a whole mission. In addition, Bernese researchers are among the world leaders when it comes to models and simulations of the formation and development of planets.

The successful work of the [Department of Space Research and Planetary Sciences \(WP\)](#) from the Physics Institute of the University of Bern was consolidated by the foundation of a university competence center, the [Center for Space and Habitability \(CSH\)](#). The Swiss National Fund also awarded the University of Bern the [National Center of Competence in Research \(NCCR\) PlanetS](#), which it manages together with the University of Geneva.