

# Planetary Defense Webinar



Link to the [Website](#)

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|-------|----------------------------------|
| DATE  | September 9 <sup>th</sup> , 2022 |
| TIME  | 19:00 – 22:30 JST                |
| PLACE | Online                           |

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[Registration](#)

# Program



19:00 ~  
19:55  
JST

## “Basics of planetary defense and JAXA's activities”

When celestial bodies like asteroids or comets collide with the earth, they cause very big disasters. We want to avoid such disasters, and the activity to avoid such disasters is called planetary defense or spaceguard. In this lecture we will explain the basics of planetary defense. Then, we will show what is being done at JAXA in relation to planetary defense. In particular, we will talk about discovery observations for small fast-moving objects and the Hayabusa2 extended mission.



20:00 ~  
20:55  
JST

## “ The ESA Hera mission: Rendezvous with binary asteroid Didymos and investigation of the DART crater”

On 26 September 2022 NASA's Double Asteroid Redirection Test (DART) spacecraft will impact Dimorphos, the satellite of asteroid (65803) Didymos. ESA's Hera spacecraft will rendezvous with Didymos four years after the impact. It will perform the measurements necessary to understand the effect of the DART impact on Dimorphos in detail, in particular by measuring its mass, and investigating its internal structure, and thus determining the momentum transfer and detailed characterization of the crater left by DART. Those investigations will be valuable for cratering physics in general, as Hera has the unique opportunity to study a crater for which the impactor properties are accurately known . Finally, as the first mission to a binary asteroid, Hera will study the mechanism of the formation of binary asteroids.



21:00 ~  
21:55  
JST

## “ NASA's Planetary Defense Activities and the DART Mission”

NASA's Planetary Defense Coordination Office leads a number of planetary defense activities, including: detection, tracking, and characterization of near-Earth objects; coordination of planning and response actions; and strategies to mitigate potential future impacts with Earth. The Double Asteroid Redirection Test (DART) is one part of NASA's larger planetary defense portfolio and is the world's first full-scale planetary defense test, demonstrating one method of asteroid deflection technology. DART's target asteroid is no threat to our planet but is an ideal candidate for taking this first step to demonstrate asteroid deflection via a kinetic impactor. DART is on its way to collide with the asteroid Dimorphos on 26 September 2022; for more information, visit: <https://dart.jhuapl.edu/>.

22:00 ~ 22:30 JST

Discussion

# Profile



## **Dr. Makoto Yoshikawa**

Associate professor, Institute of Space and Astronautical Science (ISAS), JAXA

JAXA session

Dr. Makoto Yoshikawa is an associate professor at Institute of Space and Astronautical Science (ISAS) of Japan Aerospace Exploration Agency (JAXA). He received Ph.D. in Astronomy from the University of Tokyo. For Hayabusa mission, he was the project scientist for the second half of the mission period, and the project manager in the final phase. He was the first project manager of Hayabusa2 and then he worked as the mission manager until the end of the mission. He is also working in the Deep Space Tracking Technology Group in ISAS and he is now involving in the missions, such as GEOTAIL, Akatsuki, Hayabusa2 extended mission, MMO, SLIM, DESTINY+, MMX, and some future missions. In the past, he worked for the missions of LUNAR-A (launch was cancelled), HALCA, Nozomi, and IKAROS. The research field is celestial mechanics, especially the dynamics of small bodies in the solar system. He is working for the issues of the planetary defense. He attends to the NEO (Near Earth Object) working group of UN COSPAR, SMPAG (Space Missions Planning Advisory Group), and IAWN (International Asteroid Warning Network). He is the volunteer team leader for Planetary Defense in JAXA.



## **Dr. Yuya Mimasu**

Researcher, Institute of Space and Astronautical Science (ISAS), JAXA

JAXA session

Dr. Yuya Mimasu is a researcher at Japan Aerospace Exploration Agency (JAXA). He graduated with a Ph.D. in Aerospace Engineering from the Kyushu University. After graduation he has entered JAXA, and has been working on guidance, navigation and control (AOCS) subsystem of Hayabusa2 mission which is JAXA's sample return mission from the asteroid. His research interests are astrodynamics and mission analysis around the small body. Currently he is an operation leader of the extended mission of Hayabusa2.



## **Dr. Toshifumi Yanagisawa**

Associate senior researcher, Research and Development Directorate, JAXA

JAXA session

Dr. Toshifumi Yanagisawa is an associate senior researcher at Japan Aerospace Exploration Agency (JAXA). He received Ph.D. in Astrophysics from the Nagoya University. He has been working on the observation technologies and the image-processing for space debris and near-earth objects in Japan Aerospace Exploration Agency (JAXA) for more than 20 years. He was the chairman of the working group 1 (space debris observation) of the Inter-Agency Space Debris Coordination Committee (IADC) from 2017 to 2018.



## **Dr. Michael Küppers**

Project Scientist, Planetary Defense mission Hera of ESA

ESA/HERA session

Michael Küppers is currently the Project Scientist of the European Space Agency's Planetary Defense mission Hera and of the Comet Interceptor science mission. As a Planetary Scientist, he has been working on the physics of small bodies for more than 20 years. His Research focusses on the gas and dust activity of small bodies in the solar system and the evolution of surfaces. He is author of ~180 refereed publications, 13 of them as first author (2 in Nature). He worked for the Rosetta mission for 15 years, as liaison scientist and uplink coordinator in the Rosetta Science Operations Centre, and as co-Investigator in the OSIRIS camera team. In addition, he was CoInvestigator on the HIFI instrument on Herschel and team member on DISR on Huygens. He is experienced in the scientific operations of payload instruments, having worked both in instrument teams at scientific institutions and in science operations at ESA. Michael Küppers received his PhD in 1996 at the University of Göttingen, Germany, with a thesis on the plasma torus around Jupiter originating from its moon Io. After staying as postdoc at Univ. of Colorado in Boulder and Univ. of Berne (Switzerland), he became a member of the scientific staff at the Max-Planck-Institute for Solar System Research, where he was responsible for the coordination of the science team of the OSIRIS cameras on Rosetta. Since 2007, he has been an ESA staff member, stationed at the European Space Astronomy Centre (ESAC) near Madrid.



## Dr. Patrick Michel

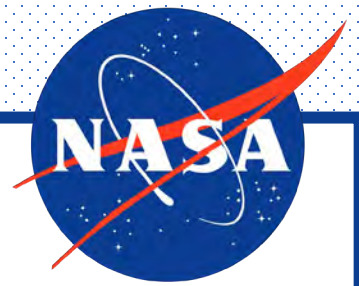
Hera mission Principal Investigator,  
Director of Research at Scientific  
Research National Center (CNRS)

### ESA/HERA session

Dr. Patrick Michel is an international expert of asteroids born in the famous village SaintTropez in France. He is Director or Research at CNRS (French Scientific Research National Center) and leads the Planetology team of the Lagrange laboratory at the Côte d'Azur Observatory (Nice, France). With more than 200 publications in international peer-review journals, he develops numerical simulations of the impact process between asteroids and of their surface and interior. He is the Principal Investigator (PI) of the ESA Hera mission (launch in 2024), which will contribute to the first asteroid deflection test with the NASA DART mission by investigating the binary asteroid target and the impact outcome in great details. He is co-coordinator of the AIDA cooperation in support of both DART and Hera missions. He is Co-Investigator of the two asteroid sample return space missions, Hayabusa2 (JAXA) and OSIRIS-REx (NASA). He is co-PI of the CNES-DLR rover onboard the Phobos sample return mission MMX (JAXA, launch in 2024). He is also coordinating the NEO-MAPP project funded by the H2020 program of the European Commission to study asteroid deflection and space instrumentations. He is the lead Editor of the book Asteroids IV (University of Arizona Press, 2015), which reviews asteroid knowledge. He is the President of the Near-Earth Object Working Group of the International Astronomical Union and a member of the Steering Committee of the International Asteroid Warning Network (IAWN). He was awarded the NASA Silver Achievement Medal, the Carl Sagan Medal by the Division of Planetary Science of the American Astronomical Society for Excellence in Public Communication in Planetary Science, the Prize Paolo Farinella 2013 for his contribution to our understanding of the collisional process, the Prize Young Researcher of the French Society of Astronomy and Astrophysics (SF2A) and the asteroid (7561) Patrickmichel is named after him.

## Did you know?

Near-Earth Objects, or NEOs, are asteroids and comets that orbit the Sun and can pass within 50 million kilometers of the orbit of the Earth. Out of around 30,000 NEOs that have been discovered so far, about 2,000 of them are potentially hazardous objects (PHOs), meaning that they can get especially close to the Earth and are large enough to cause significant damage if they collide with the Earth. The objective of planetary defense is to find, track, and study such near-Earth objects, and to prevent future asteroid impacts.



## **Dr. Thomas Statler**

Program Scientist, DART mission  
of NASA

NASA/DART session

Dr. Thomas Statler is a planetary scientist at NASA Headquarters in Washington, DC, a member of NASA's Planetary Defense Coordination Office and Program Scientist for the Double Asteroid Redirection Test (DART) mission — humanity's first attempt to change the motion of a natural celestial body in space and the first full-scale test of an asteroid deflection technology.

At NASA HQ, Dr. Statler helps to develop and manage robotic space missions to explore our Solar System, working closely with each mission's Science Team to help turn their visions of discovery into reality. In addition to his role on DART, he serves as Program Scientist for the Lucy mission, now on its way to explore the still-unvisited Trojan asteroids, and for the Japan-led MMX mission, which will land on Mars's moon Phobos and return samples to Earth in 2029.

An accomplished scientist and educator, Dr. Statler earned his Ph.D. in Astrophysics from Princeton University, and for nearly 20 years was professor of physics and astronomy at Ohio University and founding director of its Astrophysical Institute. His research has spanned topics from the collisions of multiple universes to supermassive black holes and the spins and orbits of near-Earth asteroids.

Dr. Statler is an enthusiastic science communicator, and has given countless public presentations, including radio shows, TV interviews, online videos, telescope nights, and stargazing hikes, and has collaborated with artists on space-themed public exhibits. He is a past chair of the American Astronomical Society's Division on Dynamical Astronomy, and asteroid 9536 Statler is named in his honor.

## **What is JAXA Academy ?**

JAXA Academy offers exciting opportunities for all of those who are eager to learn about STEM subjects. One of the goals of SDGs (Sustainable Development Goals) is to provide educational opportunities for all (Goal 4). It is a very difficult task, but JAXA's Space Education Center gives opportunities to connect people with diverse background through teaching and learning. It will continue to extend its reach in the coming years to all who share the desire to solve urgent global issues such as climate change. Come along and join us!

Find more about us here : <https://edu.jaxa.jp/contents/english/academy/>



## **Dr. Nancy Chabot**

DART Coordination Lead  
Johns Hopkins University Applied Physics  
Laboratory

NASA/DART session

Dr. Nancy L. Chabot is a planetary scientist at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, MD, USA. She is the Coordination Lead on NASA's Double Asteroid Redirection Test (DART) mission, the Deputy PI for the Mars-moon Exploration with Gamma rays and NEutrons (MEGANE) instrument on the JAXA Martian Moons eXploration (MMX) mission, and an Interdisciplinary Scientist on the joint ESA-JAXA BepiColombo mission. Previously on NASA's MESSENGER mission, she served as the Instrument Scientist for the Mercury Dual Imaging System (MDIS) and the Chair of the Geology Discipline Group. She has been a member of five field teams with the Antarctic Search for Meteorites (ANSMET) program, is a Fellow of the Meteoritical Society, and asteroid 6899 Nancychabot is named in her honor. She has served in community leadership positions such as Chair of NASA's Small Bodies Assessment Group and Chair of the Panel on Small Solar System Bodies for the 2023–2032 Planetary Science and Astrobiology Decadal Survey. Dr. Chabot earned an undergraduate degree in physics at Rice University and a PhD in planetary science at the University of Arizona.



## **Dr. Elizabeth Tasker**

Associate Professor in Department  
of Solar System Sciences, ISAS

Moderator of the Discussion Session