

9th MAY 2025

STELLENBOSCH
UNIVERSITY



EXPLORING NEAR-EARTH OBJECTS (NEOs)

Increasing Student Interest & Engagement in
Space Exploration



FASESA
FUTURE AFRICAN SPACE EXPLORERS' STEM ACADEMY



INTRODUCTION

The "Exploring Near-Earth Objects (NEOs)" workshop gives students a unique opportunity to delve into the fascinating realm of Near-Earth Objects. NEOs, including asteroids and comets, are celestial bodies whose orbits bring them into proximity with Earth. Their study offers essential insights into our universe and plays a vital role in planetary defense.

This workshop is designed to inspire and educate young minds about these celestial objects, their significance in the cosmos, and their relevance to space exploration. Participants will emerge with a renewed sense of wonder about the universe and a solid understanding of NEOs.

Education and Awareness

To educate high school students about Near-Earth Objects (NEOs), including asteroids and comets, their characteristics, origins, and significance in astronomy and space science.

To create awareness of NEOs as potential impact hazards and the importance of studying and monitoring them for planetary defence.

BENEFITS OF THE WORKSHOP

Knowledge Enhancement: Participants will gain in-depth knowledge about NEOs, enhancing their understanding of astronomy and space science.

Hands-on Experience: Engage in telescope observations, fostering practical skills and a deeper connection with the night sky.

Inspiration for Careers: Explore potential careers in astronomy, space exploration, engineering, and related fields through discussions with experts.

Creativity: Encourage creativity by exploring NEO-related themes in art, literature, and movies, promoting imaginative thinking and expression.

Who Should Attend?

We encourage students, educators, and space enthusiasts, to join us on this celestial journey and let their curiosity reach for the stars.

ABOUT FASESA

Future African Space Explorer's Stem Academy (FASESA) is a not-for-profit organisation, formed to grow the Space Exploration landscape in South Africa and eventually the whole of Africa. Our goal is to enable nations to achieve greater technological success through spacefaring endeavours by engaging, encouraging, and empowering the youth to pursue space careers through dedicated exposure to Science, Technology, Engineering, and Mathematics (STEM) topics.



WORKSHOP OUTLINE

08:30 Registration & Arrival Coffee

09:00 NEOs Unveiled

- Introduction to NEOs: What are they and why are they important?
- NEO Classification: Different types of asteroids and comets
- NEOs and Earth: Exploring the potential impact hazards and mitigation strategies

10:00 Observing the Skies

- Introduction to telescopes and observation techniques
- Hands-on telescope usage: Observing NEOs and other celestial objects
- Sky mapping: Identifying NEOs and tracking their movements

11:15 Tea Break

12:00 NEOs and Space Missions

- Overview of past, present, and upcoming space missions related to NEOs
- Designing a hypothetical space mission to study or deflect a NEO
- Space exploration careers: Inspiring the next generation of astronomers and engineers

13:00 Lunch

14:00 Sentry: Earth Impact Monitoring

14:30 Planetary defence

15:00 Snack Break

15:15 NEOs in Popular Culture

- **NEOs in movies, literature, and art: Exploring their portrayal in popular media**
- Don't Look Up (2021)
- Asteroid Hunters (2020)
- Impact (2009)
- Armageddon (1998)
- Deep Impact (1998)
- Asteroid (1997)
- **Creative hands-on activity: Designing NEO-themed artwork, short stories, or movie concepts**
- **Presentations and discussions: Sharing and appreciating the creative works of fellow participants**

16:00 Workshop Wrap up



DISTINGUISHED GUEST

DR. AVI LOEB

Abraham (Avi) Loeb is the Frank B. Baird, Jr., Professor of Science at Harvard University and a bestselling author (in lists of the New York Times, Wall Street Journal, Publishers Weekly, Die Zeit, Der Spiegel, L'Express and more). He received a PhD in Physics from the Hebrew University of Jerusalem in Israel at age 24 (1980-1986), led the first international project supported by the Strategic Defense Initiative (1983-1988), and was subsequently a long-term member of the Institute for Advanced Study at Princeton (1988-1993).

Dr. Loeb has written 9 books, including most recently, *Extraterrestrial and Interstellar*, as well as over a thousand scientific papers (with h-index of 128 and i10-index of 597) on a wide range of topics, including black holes, the first stars, the search for extraterrestrial life and the future of the Universe. Loeb is the Director of the Institute for Theory and Computation (2007-present) within the Harvard-Smithsonian Center for Astrophysics, and also serves as the Head of the Galileo Project (2021-present).

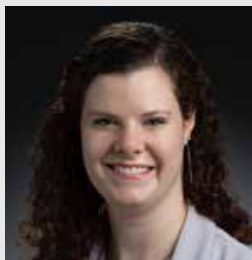
He had been the longest serving Chair of Harvard's Department of Astronomy (2011-2020) and the Founding Director of Harvard's Black Hole Initiative (2016-2021). He is an elected fellow of the American Academy of Arts & Sciences, the American Physical Society, and the International Academy of Astronautics. Dr. Loeb is a former member of the President's Council of Advisors on Science and Technology (PCAST) at the White House, a former chair of the Board on Physics and Astronomy of the National Academies (2018-2021) and a current member of the Advisory Board for "Einstein: Visualize the Impossible" of the Hebrew University. He chaired the Advisory Committee for the Breakthrough Starshot Initiative (2015-2024) and served as the Science Theory Director for all Initiatives of the Breakthrough Prize Foundation.

In 2012, TIME magazine selected Dr. Loeb as one of the 25 most influential people in space and in 2020 Dr. Loeb was selected among the 14 most inspiring Israelis of the last decade. In 2024, Loeb was ranked number 3 in publication record and impact of research among all astronomers worldwide over the past 5 years by ScholarGPS.





SPEAKERS



Caitlin Shearer

Caitlin Shearer is a project manager and materials engineer at JHUAPL. She was the project manager for NASA's recently completed Double Asteroid Redirection Test (DART). Caitlin previously served as the deputy project manager on DART during Mission Operations, working under former DART project manager Ed Reynolds. She is also the assistant project manager on the Europa Plasma Instrument for Magnetic Sounding (PIMS) and is the project manager for a CubeSat instrument, the Relativistic Electron Atmospheric Loss (REAL) instrument. In addition to project management, she is a materials engineer, working on multiple projects including NASA's Europa Clipper and Dragonfly missions. Caitlin also has experience as a planetary protection engineer on Europa Clipper. Caitlin holds a Master of Science in Materials Engineering from the University of Maryland and a Bachelor of Science in Biochemistry and Molecular Biology from the University of Maryland Baltimore County.



Schalk Kruger

Chief Executive Officer
Ultranexus Pty Ltd



Dr. Nicolas Erasmus

Instrumentation Scientist
and Astronomer
**South African Astronomical
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