

EUROPLANET 2024 RESEARCH INFRASTRUCTURE  
GLOBAL COLLABORATION & INTEGRATION DEVELOPMENT 2020–2024

Satellite for Space Science and Technology in Africa  
*EPN 2024 RI WorkshopSeries*

15.11.2021 - 19.11.2021

Palapye, Botswana



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WELCOME

The Europlanet 2024 RI together with the University of Bologna and Botswana International University of Science and Technology, is organizing the first of the Global collaboration and integration development Workshop Series in Palapye, Botswana, which aims to bring together people interested on the field satellites and space technology, and create the opportunity to build and consolidate a African network in Space Science.

**The Organizing Committee:**

*Prof. Barbara Cavalazzi*

*Dr. Fulvio Franchi*

*Mrs Anita Heward*

*Prof. Nigel Mason*



Europlanet 2024 RI has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871149

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## AIM

Space has become an attractive frontier for African countries that have launched satellites based on scientific, technological or political ambitions. Satellites are used for Earth observation, communication, navigation atmospheric studies, astronomical observations and military applications, and more. This first EPN2024 RI Workshop on Satellite for Space Science and Technology in Africa will bring together space tech specialists, scientists and students to discuss current topics in this rapidly developing space field. This workshop format is focusing on content and collaboration, and target to create a African network in planetary science.

The Satellite for Space Science and Technology in Africa Workshop will enable post-doc and career scientists to design satellite missions tackling scientific themes and specific target objects. The objective of the workshop is to discuss and reconcile recent methodological advances in the validation and application of global satellite. The workshop aims to provide ample opportunities to all those who are interested particularly multi-disciplinary academics, engineers, and researcher etc. The workshop would have a number of sessions including lectures, sharing and exchanging of ideas, and discussion panels on research relating to the scope of the workshop such as satellites, satellite subsystems, aerospace engineering, orbital and attitude dynamics of spacecraft, and Spacecraft-Environment interactions.

- **Day 1, 15.11.2021 (Monday): Open Day (hybrid)**

The Satellite for Space Science and Technology in Africa Workshop will enable post-doc and career scientists to design satellite missions tackling scientific themes and specific target objects. The objective of the workshop is to discuss and reconcile recent methodological advances in the validation and application of global satellite. The workshop aims to provide ample opportunities to all those who are interested particularly multi-disciplinary academics, engineers, and researcher etc.

The dedicated Satellites and Space Programme is pulling together space scientists, technologists, industry and mission designers to conceive novel scientific satellite perspective and accelerate the Space and Satellite research Africa's transition into social and economic impact.

- **Days 2-5, 16-19.11.2021 (Tuesday to Friday): Training School (hybrid)**

In this training school the student acquires fundamentals on systems engineering of space systems and the key aspects of spacecraft systems design. He/she will also learn the design considerations which come into play in laying out a space mission and its preliminary design.

The module will enable students to design and engineer a scientific space mission. Therefore, the high-level learning objectives are:

- Knowledge of the main aspects of satellite missions;

Due to COVID-19, the physical presence can only be allowed to applicants from Botswana



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- Understanding the usage of systems engineering methods and practices;
- Expertise in the elements and architecture of a spacecraft mission;
- Capability to present and defend their design of an element in the architecture of a spacecraft mission;
- Familiarity with current trends in space industry and space science mission research.

This Training school aim to drive revolutions in thinking, as well as science and technology, at all levels from observations, to mission concept design, to instruments, where the impact must advance our knowledge and accessibility to space at a fundamental level.

AIM

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# Satellite for Space Science and Technology in Africa

## EPN 2024 RI Workshop Series

### 15.11.2021 - 19.11.2021

Open day PROGRAM 1/2  
15.11.2021

#### Open day | chair B. Cavalazzi (09.00-10.30 CAT)

09:00-09:10: Welcome Remarks from BIUST Vice-Chancellor, Prof. O. Totolo

09:10-09:20: Welcome Remarks from BIUST DVC RD&I, Prof. A. Ogwu

09:20-09:30: Workshop opening by the Head of European Union Delegation to Botswana and SADC, Ambassador J. Sadek

09:30-09:40: Remarks from Head of Dept. Heart and Environmental Science, Dr. L. Molwalefhe

09:40-09:55: Welcome from the Coordinator Africa-Europe Science Innovation, Prof. D. Kirrane.

09:55-10:10: Welcome from the Coordinator of PAPPSN Infra-Africa EU Project, Dr. F. Franchi

10:10-10:30: Welcome from the Coordinator Europlanet RI H2024, Prof. N. Mason

#### Coffee Break → RESTART AT 10.50 CAT

#### Open day | chair F. Franchi (10.50-12.30 CAT)

10:50-11:00: Global Collaboration & Integration Development – EPN24, Prof. B. Cavalazzi, Europlanet

11:00-11:30: Satellite technologies in Botswana, Dr. B. Basutli, BIUST, Botswana

11:30-12:00: Satellite Earth Observation, Dr. R. Longo, ASI, Italy

12:00-12:30: UN-SPIDER's contributions to disaster management in Africa: enhancing the use of space technologies, Mr. J.C. Villagran de Leon, United Nations, Germany

#### Lunch Break (2h) → RESTART AT 14.30

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# Satellite for Space Science and Technology in Africa

## EPN 2024 RI WorkshopSeries

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Open day | Chair A. Haward (14.30-17.00 CAT)

T. B. D.

15.11.2021 Open day PROGRAM 2/2

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### 16 Nov. 2021 (Central Africa Time)

09.00-10.30 (90 min, lecture 1): Introduction and space environment

#### Coffee Break (10 min)

10.40-13.10 (90 min, lecture 2): Orbital mechanics

#### Lunch Break (50 min)

14.00-15.30 (90 min, lecture 3): Mission analysis and system engineering

15.30-17.00 (90 min, lecture 4): System engineering

### 17 Nov. 2021 (Central Africa Time)

09.00-10.30 (90 min, lecture 5): Power subsystem I

#### Coffee Break (10 min)

10.40-13.10 (90 min, lecture 6): Power subsystem II

#### Lunch Break (50 min)

14.00-15.30 (90 min, lecture 7): Structures

15.30-17.00 (90 min, lecture 8): Telecommunications

### 18 Nov. 2021 (Central Africa Time)

09.00-10.30 (90 min, lecture 9): Spacecraft Attitude Dynamics and Control I

#### Coffee Break (10 min)

10.40-13.10 (90 min, lecture 10): Spacecraft Attitude Dynamics and Control II

#### Lunch Break (50 min)

14.00-15.30 (90 min, lecture 11): OBDH

15.30-17.00 (90 min, lecture 12): Propulsion

#### Coffee Break (10 min)

17.10 - 18.10 (60 min): On the combined use of satellite imageries and dynamical fields for characterization of weather systems over Africa

### 19 Nov. 2021 (Central Africa Time)

09.00-10.00 (60 min, lecture 13): Thermal control subsystem

10.00-11.00 (60 min, lecture 14): Payloads for Remote Sensing

#### Coffee Break (10 min)

11.10-12.10 (60 min, lecture 15): Solar System Exploration Missions

#### Lunch Break (50 min)

13:00-14.00 (60 min, exam): Evaluation text

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**Prof. Paolo Tortora, University of Bologna**  
Full Professor at University of Bologna since 2017, carries out his research in the field of Space Systems. His research interests include small satellites and innovative spacecraft subsystems, including the ground segment, and planetary exploration focusing on radio science experiments with deep space missions. Scientific director of several national and international research projects, he collaborates with European and US-based companies and space agencies. Author of 127 publications indexed on Scopus (h-index = 22, May 2021).



**Prof. Gizaw Mengistu Tsidu, BIUST**  
Prof. G.M. Tsidu is currently Professor at Department of Earth and Environmental Sciences at Botswana International University of Science and Technology (BIUST). He obtained his BSc and MSc in Physics from the Addis Ababa University. He obtained a PhD in Atmospheric Physics from the Karlsruhe Institute of Technology in 2004. Specialized in atmospheric remote sensing from satellites, his research interests include modelling and observational studies of lower atmosphere dynamics and climate, understanding mechanisms of coupling of the middle atmosphere and ionosphere and its impact on space weather.



### **Dr. Dario Modenini, University of Bologna**

Assistant Professor at University of Bologna since 2020, carries out his research in the field of Space Systems. His research interests include small satellites subsystems, such as attitude determination and control, navigation and micropropulsion. He is involved in several research projects, collaborating with companies and space agencies.



### **Dr. Marco Zannoni, University of Bologna**

Assistant professor at the Department of Industrial Engineering of the University Bologna, since 2010 is member of the Radio Science and Planetary Exploration Laboratory, participating to radio science experiments (Cassini, Juno, Bepi Colombo, Juice), working on data analysis and orbit determination for geodesy applications.



# Satellite for Space Science and Technology in Africa

## EPN 2024 RI WorkshopSeries

15.11.2021 - 19.11.2021

### PRACTICAL INFOS

#### When?

15-19 November 2021  
Central Africa Time

#### Where?

Earth and Environmental Science Dept., BIUST, Palapye, Botswana.  
Note: Due to COVID-19, the physical presence is only allowed to applicants from Botswana and is limited by the ongoing regulation at BIUST.

#### Who is for?

Post-graduated students, researchers and professionals interested on the field satellites and space technology.

#### No Fee

The workshop is free of charge but it requires a [registration](#) (for practical organisation).

#### Registration

Registration opening: 15.09.2021  
Registration deadline: 12.11.2021

#### Language

English.

#### Deliverables

- Attendees will be issued with a certificate of attendance
- Satellite for Space Science and Technology in Africa materials will be available

#### Travel Grants

[Travel Grants](#) are available for applicants residing in Botswana.

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# Satellite for Space Science and Technology in Africa

## EPN 2024 RI WorkshopSeries

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The Europlanet WorkshopSeries links travel grants to selected applicants who intend to physically attend the workshop. However, due to COVID-19, the physical presence can only be allowed to applicants from Botswana, and can not be guaranteed due to current COVID regulation.

**Not just a travel grant!** The Europlanet Workshop Series grants will provide opportunities for leveraging on established research networks to directly contribute to the applicant's current research and career.

### Eligibility and Travel Grant Conditions

- You must be a (undergraduate or graduate) student, lecturer, professor, or a professional interested in satellites.
- You must reside in Botswana (due to COVID-19, the physical presence could only be allowed to applicants residing in Botswana).
- Travel grants (subject to availability of funds and current COVID regulation) will be attributed only to selected applicants who intend to physically attend the workshop.
- All travel grant requests should be received no later than 17.10.2021, after that date the applications will not be considered.
- Only applications loaded on the Registration Form under Travel Grant Application will be eligible for evaluation.
- Your grant application (Registration Form) should be accompanied by a short CV and a motivation letter. Students (undergraduate or graduate) should also provide a reference letter from the supervisor.
- Travel grants will cover A/R trip and accommodation. More details in the acceptance letter.

Travel grant application deadline: 17.10.2021.

Please see workshop website for registration details:

<https://eventi.unibo.it/ept24-botswana-workshop>

For more information contact:

Mr Karabo SEROME: [karabo.serome@studentmail.biust.ac.bw](mailto:karabo.serome@studentmail.biust.ac.bw)

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## COMMITTEE & CONTACTS

### Scientific committee:

Prof. Barbara Cavalazzi, Europlanet and University of Bologna  
Dr. Fulvio Franchi, Europlanet and Biust  
Prof. Nigel Mason, Europlanet and University of Kent  
Mrs. Anita Heward, Europlanet and University of Kent  
Prof. Paolo Tortora, University of Bologna  
Prof. Declan Kirrane, Africa-Europe Science Collaboration Astronomy Platform  
Dr. Raffaele Mugnuolo, Italian Space Agency-ASI  
Dr. Bokamoso Basutli, BIUST, Botswana

### Organizing committee:

Prof. Barbara Cavalazzi, University of Bologna and Europlanet  
Dr. Fulvio Franchi, BiLUST and Europlanet  
Mrs Anita Heward, University of Kent and Europlanet  
Prof. Nigel Mason, University of Kent and Europlanet  
Prof. Gareth Davies, Vrije Universiteit

### Contact:

Mr Karabo SEROME: [karabo.serome@studentmail.biust.ac.bw](mailto:karabo.serome@studentmail.biust.ac.bw)

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## SUSTAINABLE GOALS

The Europlanet 2024 RI Strategy for Collaboration and Integration Development 2020–2024 has a key role to play in building a community, resilient infrastructure, fostering innovation, promoting education and gender equality, with sustainable goals such as action for the mitigation of climate change, and preserving forests and oceans. The Strategy for Global Collaborations and Integration Development 2020–2024 has a vision for a better future, not simply as a shared guide but with an active intention to mobilise societal change and channel investments and strategies towards urgent global problems.





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eur  **PLANET 2024**  
Research Infrastructure



ALMA MATER STUDIORUM  
UNIVERSITÀ DI BOLOGNA  
DIPARTIMENTO DI SCIENZE BIOLOGICHE,  
GEOLOGICHE E AMBIENTALI



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## **Links:**

### **Europlanet RI H2024**

<https://www.europlanet-society.org/europlanet-2024-ri/>

### **Europlanet Society**

<https://www.europlanet-society.org>

### **Europlanet 2024 RI**

[Global Collaboration & Integration Development Strategic Plan 2020-2024](#)

### **University of Bologna**

<https://www.unibo.it/it>

### **BIUST-Botswana International University & Technology**

<https://www.biust.ac.bw>



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