

## 1 Identification

- 1.1 Session ID: **230413**
- 1.2 Session Title: Pan-African Citizen Science e-Lab: An Emerging Online Platform for Astronomy Research, Education and Outreach in Africa.
- 1.3 Session Date and Time: September 17, 2024 07:00 EDT - September 17, 2024 09:00 EDT
- 1.4 Convenor name: Miracle Chibuzor Marcel

## 2 Speakers and Panelists

*Please list all speakers and panellists, including their names, titles, and organisational affiliations.*

### 2.1 Speaker 1

- 2.1.1 Name: Miracle Chibuzor Marcel (Nigeria)
- 2.1.2 Organisation name: Pan-African Citizen Science e-Lab
- 2.1.3 Position: Founder and Director
- 2.1.4 Type of Organisation: Non-profit organization for astronomy research, education, and Outreach
- 2.1.5 Title of the presentation: Pan-African Citizen Science e-Lab: An Emerging Online Platform for Astronomy Research, Education and Outreach in Africa.
- 2.1.6 Summary of the presentation (max 200 words):

The presentation began by introducing PACS e-Lab, its founding year and aims, and the ways in which it collaborates to disseminate astronomy projects across Africa. This was followed by an explanation of the logo's meaning and how the community is coordinated through a WhatsApp group. Miracle Chibuzor Marcel then highlighted the various projects carried out at PACS e-Lab, including the Pan-African Asteroid Search Campaign with the International Astronomical Search Collaboration (IASC), Exoplanet and Photometry research with NASA Exoplanet Watch, Double-Star Research with Dr. Rachel Freed of the Institute for Student Astronomical Research, U.S.A., Radio Contact with the International Space Station (ISS) through ARISS – Amateur Radio on the International Space Station, Astro Photo Visual Development using data from the James Webb Space Telescope, Hubble Space Telescope, and Las Cumbres Observatory, Telescope Giveaway with Jean Pierre Grootaerd, and Live Observations with Slooh web telescopes.

Miracle Chibuzor Marcel also shared results from a survey used to evaluate the impact of these projects on the African community. He further explained how the projects align with the Sustainable Development Goals, including Quality Education (SDG 4), Gender Equality (SDG 5), Decent Work and Economic Growth (SDG 8), Industry, Innovation, and Infrastructure (SDG 9), Reduced Inequality (SDG 10), Peace, Justice, and Strong Institutions (SDG 16), and Partnerships for the Goals (SDG 17).

## 2.2 Speaker 2

- 2.2.1 Name: Dr. Sherine Ahmed El Baradei (Egypt)
- 2.2.2 Organisation name: The German University in Cairo
- 2.2.3 Position: Associate Professor in the civil engineering program
- 2.2.4 Type of organisation: Academic Institutions
- 2.2.5 Title of the presentation: Space-Water-Environment Nexus E-Centre for Research and Education Africa's Voice to the World
- 2.2.6 Summary of the presentation (max 200 words):

The SWEN e-center is the latest initiative under PACS e-Lab, currently in its promotion phase. The center is founded on the belief that space, water, and the environment are closely interconnected. Water mining on planets is a major focus for many space agencies, and recent discoveries suggest that water on Earth may have originated from comets and asteroids. Global issues like climate change, aerosols (such as microplastics in oceans and the atmosphere), and changes in Earth's water reservoirs are closely monitored via space satellite missions like PACE and GRACE. Additionally, environmental impact assessments are conducted for space missions.

The mission of the SWEN e-center is to promote sustainable improvements in space, technology, water, and the environment for the benefit of communities across Africa. We aim to educate future generations about these topics, emphasizing capacity building. By fostering strong partnerships with academic institutions, businesses, and civil society, we aim to drive research that leads to community service. The center brings together experts in space, water, and environmental sciences, as well as engineering, while also encouraging interdisciplinary collaboration with those from other fields. Our offerings will include online seminars, educational materials, and efforts to secure funding for research projects.

## 2.3 Speaker 3

- 2.3.1 Name: Keketso Qhomane (Lesotho)
- 2.3.2 Organisation name: Blue Crane Space – University of Pretoria
- 2.3.3 Position: Executive Chairperson, Blue Crane Space
- 2.3.4 Type of organisation: Academic Institutions
- 2.3.5 Title of the presentation: The Rise of Blue Crane Space – Student Society to African Citizen Science Collaborators
- 2.3.6 Summary of the presentation (max 200 words):

The presentation details the founding and establishment of Blue Crane Space from a concept conceived by Muteb Benedict Tshimbalang, Aimee Kotzee, Kara Herbst, Wayne Swanepoel and Zander Mertz in October 2022. Moreover, the presentation outlines the registration of the society at the University of Pretoria and its incorporation into the Pan-African Citizen Science e-Lab (PACS e-Lab) network in April 2023. This paved the way for the society's participation in the Pan-Africa Asteroid Search Campaign, coordinated by PACS e-Lab with the International Astronomical Search Campaign (IASC). The campaigns that the society took part in were led by Keketso Qhomane, the first Astronomy & Astrophysics Department Coordinator, during the Executive Chairperson term held by Muteb Benedict Tshimbalang. In the first three campaigns, Blue Crane Space made 2 preliminary asteroid discoveries courtesy of Nicholas Wright, Asante Ndlovu, Yolandie van Wyk and Rorisang Mahomo. The first asteroid discovery – 2023 GQ10 was confirmed on the 17 th May 2024. Following Keketso Qhomane's

ascent to Executive Chairperson, the team was co-led by Sambesiwe Nanto and Katlego Mogamisi – the current Astronomy & Astrophysics Department Coordinators. Under their leadership, 8 more preliminary discoveries were made with a cumulative team count of 17 members since 2023.

## 2.4 Speaker 4

2.4.1 Name: JOSEPH MAFUKA (Democratic Republic of Congo)

2.4.2 Organisation name: Astroclub Kongo Central

2.4.3 Position: Founder

2.4.4 Type of Organisation: Non-profit organization for astronomy Outreach

2.4.5 Title of the presentation: Vulgarization of STEM in DR CONGO

2.4.6 Summary of the presentation (max 200 words):

The Week of Science and Technology (SST), launched in 2014 by the NGO Investing in People (IIP ASBL) in the Democratic Republic of Congo (DRC), aims to promote a scientific culture in Africa. The event offers conferences, exhibitions, and interactive workshops, highlighting African contributions to global science. Since its inception, the SST has welcomed over 77,938 visitors, trained 450 students as facilitators, and organized 203 interactive workshops. It has attracted 174 exhibitors and 134 internationally renowned speakers, solidifying its role as a platform for scientific dissemination in the DRC.

In parallel with this event, the promotion of astronomy in the DRC is notably carried out through an astro-club and initiatives such as the Pan Africa Asteroid Search from the international IASC (International Astronomical Search Collaboration) program, which engages young people in scientific research. The On the Moon Again initiative organizes moon observations for the general public, while 1000 Hours in Astronomy offers celestial observation sessions in several cities.

The DRC also participates in international events such as the 32nd General Assembly of the International Astronomical Union (IAU), as well as the NASA Space Apps Challenge, a global hackathon aimed at solving technological challenges. These initiatives strengthen scientific education in the country while connecting young Congolese to international scientific programs.

## 2.5 Speaker 5

2.5.1 Name: Ms. Nagat Yasser Mohammed (Egypt)

2.5.2 Organisation name: Beni Suef University

2.5.3 Position: Student

2.5.4 Type of organisation: Academic Institutions

2.5.5 Title of the presentation: A summary of my little journey in space

2.5.6 Summary of the presentation (max 200 words):

Nagat Yasser Mohamed, a 19-year-old second-year student from Egypt, delivered a passionate presentation at the United Nations Science Summit. She is currently studying Navigation and Space Technology and has a strong interest in astronomy. Her involvement in this field began when she heard about the asteroid hunting initiative, which she eagerly joined, marking the start of her journey in space science.

Through this program, she has gained valuable experiences, including the opportunity to work with a dedicated team, analyze real images of celestial bodies, and interact with NASA professionals. Since joining in November 2023, Nagat has successfully identified two preliminary asteroids and is awaiting their confirmation.

The PACS e-Lab management team invited volunteers to train Libyan participants on using the "Astrometrica" program, and Nagat was selected for this role. She recorded the training session and uploaded it to YouTube, where it garnered international attention from viewers interested in the initiative.

Nagat's leadership skills have grown as she now leads a team in Egypt, guiding both young men and women. She ensures equal opportunities by distributing tasks fairly and fostering enthusiasm for astronomy. Her journey highlights the significant role that educational programs play in nurturing passion and collaboration within the astronomy community.

## 2.6 Speaker 6

2.6.1 Name: Mrs. Joy U. Olayiwola (Nigeria)

2.6.2 Organisation name: National Space Research and Development Agency

2.6.3 Position: Chief Scientific Officer

2.6.4 Type of Organisation: Government

2.6.5 Title of the presentation: Exploring the Universe: A Citizen Scientist's Journey

2.6.6 Summary of the presentation (max 200 words):

The presentation served as a testimonial of my early years journey in astronomy as a citizen scientist and amateur astronomer, as it highlights my involvement with Pan African Citizen Science (PACS) e-Lab, her activities in space science and astronomy, and collaborations with international organizations such as the International Astronomical Search Collaboration (IASC). Two notable activities mentioned in the presentation include: My participation in the Pan-African Asteroid Search Campaign, which contributes to planetary defense by discovering and monitoring asteroids, and my research and peer-reviewed publication (still undergoing review) on double stars using the Las Cumbres Observatory, aimed at contributing to the knowledge and dynamics of astrophysics.

There are future plans to join other exciting projects carried out in PACS e-Lab, such as, Photometry and Exoplanets, and ARISS Events. My work aligns with at least three of the 17 SDGs of the United Nations: Goals 4, 5, and 10. It also emphasizes the importance of international collaboration, STEM education, and the empowerment of citizen scientists, especially the young and vibrant ones, in space exploration.

## 2.7 Speaker 7

2.7.1 Name: Ms. Salma Regaibi (Morocco)

2.7.2 Organisation name: Steps into Space Association

2.7.3 Position: President

2.7.4 Type of Organisation: Non-profit organization for astronomy Outreach

2.7.5 Title of the presentation: The role of the Moroccan Steps into Space Association in spreading astronomy.

2.7.6 Summary of the presentation (max 200 words):

The presentation was delivered by Salma Regaibi, a 21-year-old from Morocco and the president of our astronomy association, “Steps into Space.” During her speech, she introduced the association, its activities, and future plans. Founded in August 2022 by a group of passionate young adults, the association has organized over 70 events in Morocco and internationally, including lectures, online sessions, and astronomy competitions. Notable collaborations include a session with Egypt’s Mustafa el-Sharabini on global warming and a lecture by Salam Abualhayjaa, the first Jordanian woman to design spacesuits. We also held an astronomical photography competition to engage Arab enthusiasts. A key event was “Step Towards Space,” where experts such as Professor Hassan Talibi and Ahmed Farid presented on Morocco’s astronomical heritage and the German space agency. The association has also organized camps, educational games, and observatory visits. Their achievements include discovering four asteroids and winning the first award for promoting astronomy in Morocco for 2024. Future projects include manufacturing a nanosatellite, spreading astronomy to deaf children, and establishing partnerships in Africa and beyond.

## 2.8 Speaker 8

2.8.1 Name: Walid Badenjki (Egypt)

2.8.2 Organisation name: The Egyptian Physics Network

2.8.3 Position: Co-Founder

2.8.4 Type of Organisation: Non-profit organization for astronomy Outreach

2.8.5 Title of the presentation: Empowering Youth Through Citizen Science: The Egyptian Physics Network's Journey in Asteroid Search

2.8.6 Summary of the presentation (max 200 words):

Walid, a 22-year-old Syrian astrophysics student, shared his journey at the UN Science Summit, emphasizing his commitment to citizen science and climate advocacy. With a background in writing simplified scientific content for Arabic audiences, he co-founded the Egyptian Physics Network to enhance public participation in scientific projects, particularly in astronomy. His collaboration with PACS e-Lab allowed him to engage over 130 students in asteroid monitoring efforts, promoting scientific skills among youth.

Walid highlighted the critical role of citizen science in fostering community involvement and addressing environmental issues, while also linking these efforts to the United Nations Sustainable Development Goals (SDGs), particularly in education (SDG 4) and gender equality (SDG 5). He acknowledged the importance of creating inclusive opportunities, especially for girls, within scientific initiatives. In conclusion, he expressed gratitude to PACS e-Lab and the participants for their support and collaboration, emphasizing a shared vision for future scientific advancements.

## 2.9 Speaker 9

- 2.9.1 Name: Harold Lumumba Safary (Kenya)
- 2.9.2 Organisation name: Kenya Space Agency
- 2.9.3 Position: Software Engineer
- 2.9.4 Type of Organisation: Government
- 2.9.5 Title of the presentation: Advancing Space Exploration: Implementing the Asteroid Search Campaign
- 2.9.6 Summary of the presentation (max 200 words):

Kenya Space Agency is embracing the Asteroid Search Campaign! One of Our missions is to foster hands-on activities in astronomy and space science across Africa, and mandated to promote, coordinate and regulate all space related activities in Kenya. The presentation is about how our agency is adopting asteroid search campaign which is a partnership with Pan-African Citizen Sciences e-Lab (PACS e-Labs) and IASC in promoting hands on virtual tools to be leveraged by students, young professionals and citizen scientists. These programs are vital for planetary defence and advancing our understanding of the solar system which began by the Ceres discovery in 1801. There has been an advancement in technology to detect the Near-Earth objects through programs like DART and Asteroid search campaign. The methodology behind it is access to a PC, internet and the Astrometrica software. There are free recorded videos on YouTube for tutorials in different languages and can schedule a zoom training. At KSA, students who came on attachment are inducted through the process and issued with certificates after participating in the campaign. Since we get students from different departments in the Universities we are partnering with, we have realized that there has been a significant shift of students from Engineering to astronomy. This evident that having more hands-on educational tools is the best for instilling curiosity in the upcoming generation of space leaders. As participation continues to increase, we are poised to make greater contributions to planetary defence and better our understanding of the universe which aligns with the SDG's 10 (Reduced inequalities), 5(Gender Equality) and 4(Quality Education).

## 3 Content

### 3.1 Session Abstract (max. 500 words)

In response to the limited hands-on activities in space science and astronomy in Africa, the Pan-African Citizen Science e-Lab (PACS e-Lab) was founded on December 4, 2020, with the aim of promoting hands-on activities in astronomy and space science through citizen science and Soft Astronomy research in Africa. The goal is to advance space exploration and enhance research, education, and outreach in these fields. This online platform disseminates cutting-edge projects, including asteroid hunting, exoplanet research, astronomy writing, astrophoto visual development, and more to Africans.

PACS e-Lab partners with international organizations such as the International Astronomical Search Collaboration, Las Cumbres Observatory, the Institute for Student Astronomical Research, and NASA Exoplanet Watch, facilitating over 30 provisional asteroid discoveries and providing training in astronomical observation and research writing. Participants also develop research skills in processing deep-space images using software like GIMP, AstroImageJ, Siril, and FITS Liberator.

In its three years of operation, PACS e-Lab has expanded to over 40 African countries, aiming for continent-wide coverage. Participation in the 79th United Nations General Assembly Science Summit will highlight how these projects empower Africans to acquire astronomy skills, contributing to the

Sustainable Development Goals. The conference will also foster valuable networks to enhance astronomy education and outreach across Africa.

## 3.2 Project Objectives

*List the key objectives your session or project aimed to achieve.*

### 3.2.1 Objective 1

#### **Promote Hands-on Activities in Astronomy and Space Science**

PACS e-Lab aims to address the lack of practical experiences in space science and astronomy in Africa by providing hands-on opportunities through citizen science and Soft Astronomy research.

### 3.2.2 Objective 2

#### **Advance Space Exploration in Africa**

The goal is to contribute to space exploration efforts on the continent by empowering Africans with the skills and knowledge necessary to engage in space science.

### 3.2.3 Objective 3

#### **Enhance Research, Education, and Outreach in Astronomy and Space Science**

Through partnerships and project dissemination, PACS e-Lab seeks to strengthen research capabilities, educational opportunities, and outreach efforts in Africa.

### 3.2.4 Objective 4

#### **Facilitate Participation in Cutting-edge Space Science Projects**

By offering access to projects such as asteroid hunting, exoplanet research, and astrophoto visual development, PACS e-Lab aims to engage Africans in real-world space science activities.

### 3.2.5 Objective 5

#### **Build Research Skills in Data Processing and Analysis**

PACS e-Lab trains participants to develop skills in processing deep-space images using advanced software tools, contributing to their growth as space science researchers.

### 3.2.6 Objective 6

#### **Expand Astronomy Participation across Africa**

The organization seeks to continue expanding its presence across the African continent, aiming for comprehensive coverage and increased participation.

### 3.2.7 Objective 7

#### **Contribute to the Sustainable Development Goals (SDGs)**

By empowering Africans with astronomy skills, PACS e-Lab intends to contribute to the SDGs, particularly in areas such as quality education, innovation, and global partnerships.

### 3.2.8 Objective 8

#### **Foster Networks for Astronomy Education and Outreach**



Participation in international forums like the UN Science Summit will help build valuable networks to further enhance astronomy education and outreach in Africa.

### 3.3 Key Themes

*Main themes and topics that were covered during the session. The same ones you selected when you submitted your original session proposal. Select from the following. Maximum three*

- Space & Astronomy
- Education & Youth
- Development

## 4 Planned Impacts of the science and innovation presented in you session

### 4.1 Contribution to the SDGs

*The SDGs provide a comprehensive framework for addressing the world's most pressing challenges and promoting sustainable development globally. Select the Goal/s that your project contributes to (max 3 SDGs)*

4. **Quality Education:** Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5. **Gender Equality:** Achieve gender equality and empower all women and girls.
10. **Reduced Inequality:** Reduce inequality within and among countries.

## 5 Contribution to the UN Summit of the Future

### 5.1 Main challenges (max 200 words)

*Main challenges and difficulties experienced in implementing the science to contribute to the Sustainable Development Goals and provide recommendations to address the same whole.*

PACS e-Lab has been operating without external funding, relying on the collective resources of the management team to execute its projects. Although they have applied for grants in the past from various potential funders, the results have largely been unsuccessful. As a result, PACS e-Lab's management has stated that any of the teams are free to apply for any available grants they qualify for by referencing PACS e-Lab's projects to support their endeavors. Management will not take offense to this approach.

Currently, each participating group is responsible for securing resources to execute the projects in their communities. The management team supports them by proofreading proposals and offering improvements, and some of these applications have been successful.



Depending on the availability of funds, PACS e-Lab's management hopes to acquire temporary office space to facilitate its work in an organized environment. In the long term, PACS e-Lab aims to establish a permanent location with an observatory, serving as a center for astronomy research, education, and outreach initiatives in Africa.

## 5.2 Additional goals (max 200 words)

*Additional goals, beyond the Goals, which are considered priorities*

PACS e-Lab will continue to expand its existing projects, particularly double star research, Astrophoto Visual Development, and Exoplanet & photometry, which are not yet widespread as the asteroid search among citizen astronomers. There are also new projects in development called ARISS contact with astronauts aboard the International Space Station. This opportunity will enable the African citizen astronomers to interact with astronauts in the orbiting laboratory by asking questions and receiving replies, just as students from advanced countries do.

PACS e-Lab will continue to pursue new, innovative 21st-century astronomy projects to engage the African citizen science community and enhance their research experiences. Additionally, PACS e-Lab plans to organize in- workshops across universities in Africa to disseminate the projects and collaborate with African regional astronomy bodies to organize award events celebrating the achievements of African citizen scientists.

PACS e-Lab plans to continue supporting its African citizen astronomers who are interested in astronomy outreach by providing telescopes, books, and other incentives to enhance the astronomy outreach experience in their communities.

For the few African countries that have not yet reached, PACS e-Lab plans to refine its methodology to identify deserving groups that might appreciate and adopt these projects.

## 5.3 Integration: economic, social and environmental (max 500 words)

*The steps being taken to integrate the three dimensions of sustainable development (economic, social, and environmental) and share best practices where available and how activities are being designed and implemented to reflect such integration.*

PACS e-Lab significantly enhances the quality of STEM education in Africa through hands-on activities in asteroid search, exoplanet research, astrophoto visual development, double star research, and more, all contributing to Quality Education (SDG 4). Many partner institutions across the continent have integrated these projects into their curricula. Some participants have discovered new asteroids, and in the coming years, they will have the opportunity to name them. Others have conducted research that has been published in peer-reviewed journals and are preparing to present at international conferences, integrating African researchers into the global scientific community. By simplifying complex astronomical concepts through citizen science projects, PACS e-Lab improves comprehension and retention while using tools like the MicroObservatory (MOBS), Las Cumbres Observatory (LCO), and Slooh web telescopes. This practical exposure ignites a passion for continuous learning and discovery in astronomy.

In addressing Gender Inequality (SDG 5), PACS e-Lab actively engages and empowers African women in space research. Women and girls gain equitable access to STEM education through its online platform, breaking down barriers that have historically limited their participation in space science and astronomy. This empowerment through skill development narrows the gender gap, boosts confidence, and provides opportunities for women to take on leadership roles in STEM.

PACS e-Lab initiatives also promote Decent Work and Economic Growth (SDG 8) by equipping participants with research and data analysis skills. This opens up career opportunities in astronomy,

astrophysics, and space science, laying the foundation for future professionals in science education, public outreach, and science communication. These roles are vital in enhancing STEM literacy and ensuring that scientific knowledge is accessible. The versatile skills gained from these projects contribute to sustainable economic development and the creation of quality jobs in STEM.

Aligned with Industry, Innovation, and Infrastructure (SDG 9), PACS e-Lab fosters innovation by collaborating with international organizations and utilizing robotic facilities like Las Cumbres Observatory, Slooh telescopes, and the MicroObservatory. Participants use advanced technologies and software tools, contributing valuable data to planetary defense and astronomical research. These activities nurture a scientific ecosystem in Africa, potentially leading to the establishment of research facilities, space technology hubs, and a skilled workforce, contributing to Africa's overall economic development.

In terms of Reduced Inequality (SDG 10), PACS e-Lab offers an inclusive platform that reaches participants across Africa, regardless of geographical or socioeconomic status. Having engaged over 600 individuals from 45 African countries, PACS e-Lab's initiatives reduce the gap in access to advanced scientific knowledge and skills, integrating African researchers into the global astronomy community.

By collaborating with national space agencies, astronomy organizations, universities, and secondary schools across Africa, PACS e-Lab strengthens institutional capacities, contributing to Building Strong Institutions (SDG 16). These partnerships facilitate hands-on training, practical experiences, and the exchange of knowledge, promoting scientific exploration and cooperation in African space science and astronomy.

Finally, PACS e-Lab's commitment to Partnerships for the Goals (SDG 17) is evident in its strategic alliances with leading international organizations like the International Astronomical Search Collaboration (IASC), Las Cumbres Observatory, NASA Exoplanet Watch, and many African space and astronomy institutions. These partnerships are vital for advancing scientific research and education across Africa, promoting international cooperation, and building scientific capacity within the continent.

## 5.4 Impact on the 2030 Agenda (max 1000 words)

The PACS e-Lab project is deeply aligned with the core principles of the 2030 Agenda, ensuring inclusivity and respect for human rights, gender equality, non-discrimination, and the principle of *Leaving No One Behind* across its science and education initiatives.

### **Respect for All Human Rights**

At the heart of PACS e-Lab's mission is the belief that access to knowledge and scientific education is a fundamental right for all individuals, regardless of their background. By providing open access to space science and astronomy projects, the PACS e-Lab platform ensures that Africans have the opportunity to engage in hands-on learning experiences that promote intellectual growth. The promotion of scientific literacy contributes to broader educational goals and fosters individual empowerment, in line with the right to education and participation in scientific progress, as outlined in the Universal Declaration of Human Rights.

### **Gender Equality**

PACS e-Lab actively addresses gender inequality in STEM fields by creating equitable access to science education for women and girls across Africa. Through targeted outreach and inclusion efforts, the platform has succeeded in engaging female participants in activities such as asteroid hunting, exoplanet research, and astrophoto visual development. This empowerment not only provides women with the skills and confidence to pursue careers in space science but also challenges cultural barriers that have

historically limited their participation in STEM. The success stories of women team leaders and contributors across PACS e-Lab reflect the platform's commitment to gender equality, a key objective of Sustainable Development Goal 5.

### **Leaving No One Behind**

The principle of "Leaving No One Behind" is foundational to PACS e-Lab's approach, ensuring that marginalized or underserved communities across Africa are not excluded from the advancements in space science and education. By providing an entirely online platform, the PACS e-Lab platform transcends geographic, socioeconomic, and infrastructural barriers that might otherwise limit participation. PACS e-Lab engages individuals from over 45 African countries, including those in rural and remote areas, ensuring that they are included in space science projects that have traditionally been reserved for more developed regions.

### **Non-Discrimination**

PACS e-Lab ensures that no participant faces discrimination based on race, ethnicity, gender, socioeconomic status, or nationality. The platform operates with the understanding that scientific inquiry and education should be accessible to all, and it actively works to dismantle barriers to participation by providing equal opportunities to individuals from diverse backgrounds. Projects are designed to be inclusive and accessible, with flexible training and educational materials that accommodate different learning levels and technological access.

Through these efforts, PACS e-Lab mainstreams the key principles of the 2030 Agenda, ensuring that science education in Africa is inclusive, respectful, and empowering for all.

Transition relevant to science project: Education

## **6 Forward-looking Statement**

### **6.1 Financial aspects**

Three bullets (50 words/bullet).

With \$1 million, PACS e-Lab's management aims to establish a permanent center or observatory to facilitate its work in a more structured environment, as the team currently operates without funding and works from home. This observatory would serve as a hub for astronomy research, education, and outreach initiatives across Africa.

### **6.2 To further advance your science project, you will need:**

#### **- Access to Funding**

Funding will enable PACS e-Lab to expand its reach by providing essential equipment and resources that the management team will use to execute the hands-on astronomy and space science projects. It will support the establishment of a permanent centre, enhance educational programs, and foster collaborations, empowering more Africans to engage in research, STEM education, and outreach across the continent.

## **7 Conclusions (max. 300 words)**

Our science projects play a pivotal role in achieving the Sustainable Development Goals (SDGs) by driving innovation, improving education, and addressing global challenges through evidence-based solutions. In the context of SDG 4 (Quality Education), PACS e-Lab initiatives provide hands-on

learning experiences, fostering critical thinking and problem-solving skills. For SDG 5 (Gender Equality), our projects create opportunities for women and marginalized groups to participate equally in STEM fields, closing long-standing gaps. Additionally, our programs enhance SDG 9 (Industry, Innovation, and Infrastructure) by fostering technological advancements and building local capacities for research and development, particularly in space sciences.

During the session, key emerging issues such as the need for greater inclusivity in scientific research and the importance of accessible technology for education were highlighted. Additionally, gaps in funding and infrastructure in developing regions were noted as barriers to progress.

Policy recommendations include increased investment in scientific research and education, particularly in underrepresented regions, to ensure equitable access to cutting-edge tools and knowledge. Governments and organizations should also prioritize collaborations between public and private sectors to scale up science-driven solutions to global challenges.

Next steps should involve focused research on sustainable technology in space, increased support for citizen science, and exploring new partnerships to strengthen Africa's role in global science initiatives. Support needed includes sustained funding, capacity-building programs, and international cooperation to ensure that science and innovation drive sustainable development and empower communities worldwide.