The Pan-African Citizen Science e-Laboratory Project

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About PACS e-Lab

PACS e-Lab is a non-profit organization/platform dedicated to advancing STEM education, promoting citizen science, and enabling entry-level research participation through hands-on activities in astronomy and space science across Africa.

Founded Dec 2020
Motto/Slogan - Bringing the stars to your doorsteps

Aim and Objectives

The organization aims to improve access to inclusive and high-quality STEM education in Africa through hands-on learning in astronomy and space science.

The objectives are:

- To expand inclusive participation in STEM, particularly among underrepresented groups
- To develop learners' digital, analytical, and problem-solving skills using real scientific data
- To build a strong Africa-wide network of amateur/citizen scientists contributing to global STEM efforts
- To foster sustainable local and international partnerships that advance space-based STEM education

Target Audience

We engage learners across Africa, the Middle East, Ukraine, and beyond, including students, educators, early-career researchers, STEM enthusiasts, etc.

Secondary schools, universities, research institutes, space agencies, observatories, STEM clubs, and nonprofit organizations with limited access to practical STEM education and research opportunities.

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Requirements

All PACS e-Lab projects are open and accessible to individuals regardless of age, religion, nationality, academic background, professional affiliation, or experience level.

Participants are only expected to have:

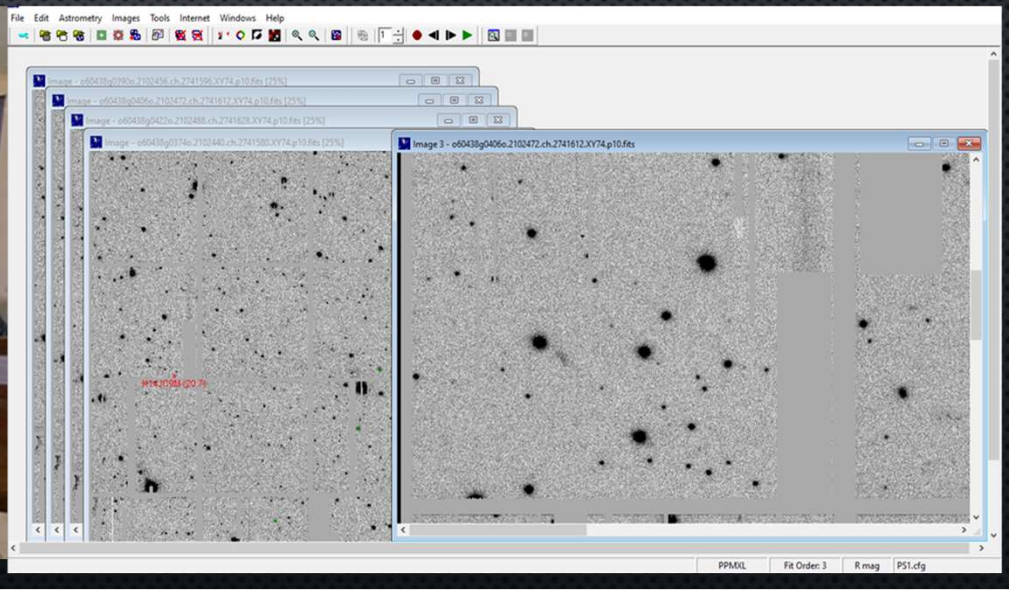
- Basic computer operation skills (Windows OS)
- Internet access
- Interest and passion for STEM learning.

Project Division

Citizen Science – Entry Level Research - Applied Science & Engagement (ASE)

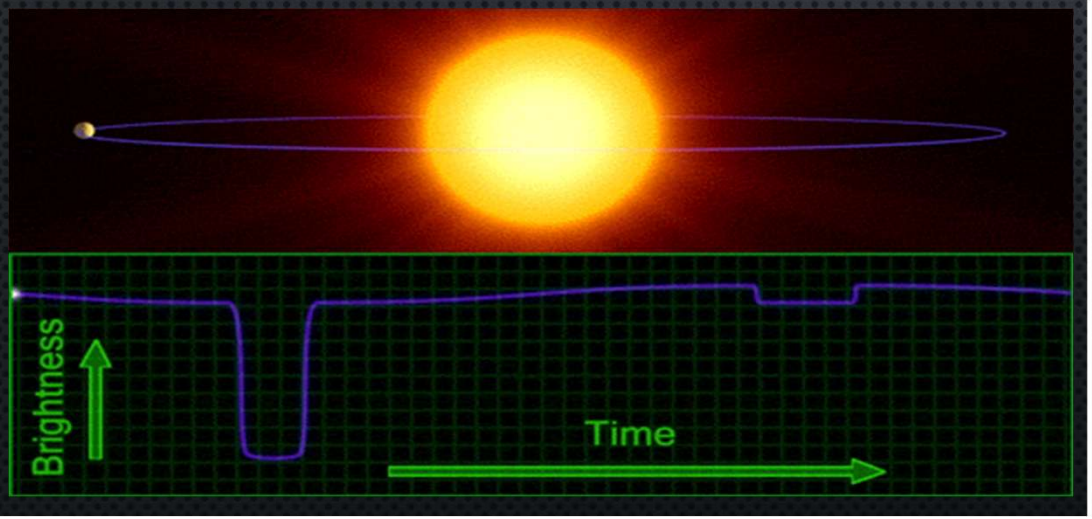
Citizen Science: Asteroid Hunting

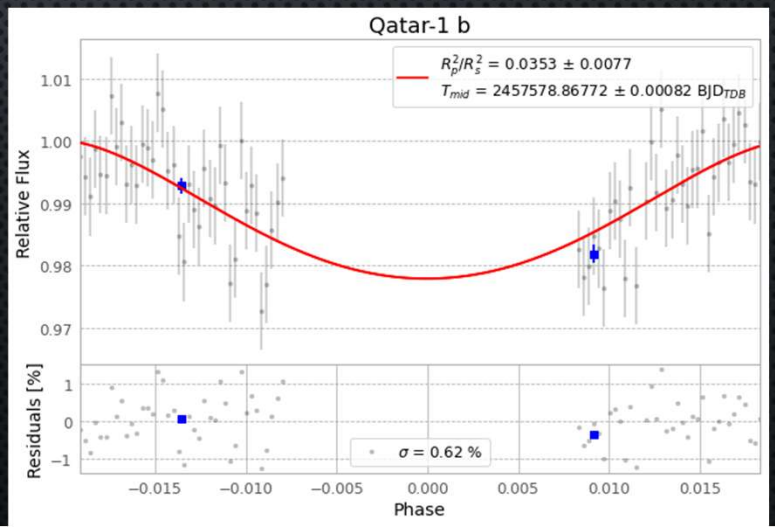
- Objective: Analyze astronomical data with Astrometrica to discover new asteroids.
- Collaboration: International Astronomical Search Collaboration (IASC)



Citizen Science: Exophotometry

- Objective: Observe known exoplanets and perform photometric analysis with the EXOTIC program to refine their orbital parameters.
- Collaborations: NASA Exoplanet Watch, Las Cumbres Observatory (LCO), and the Micro Observatory.



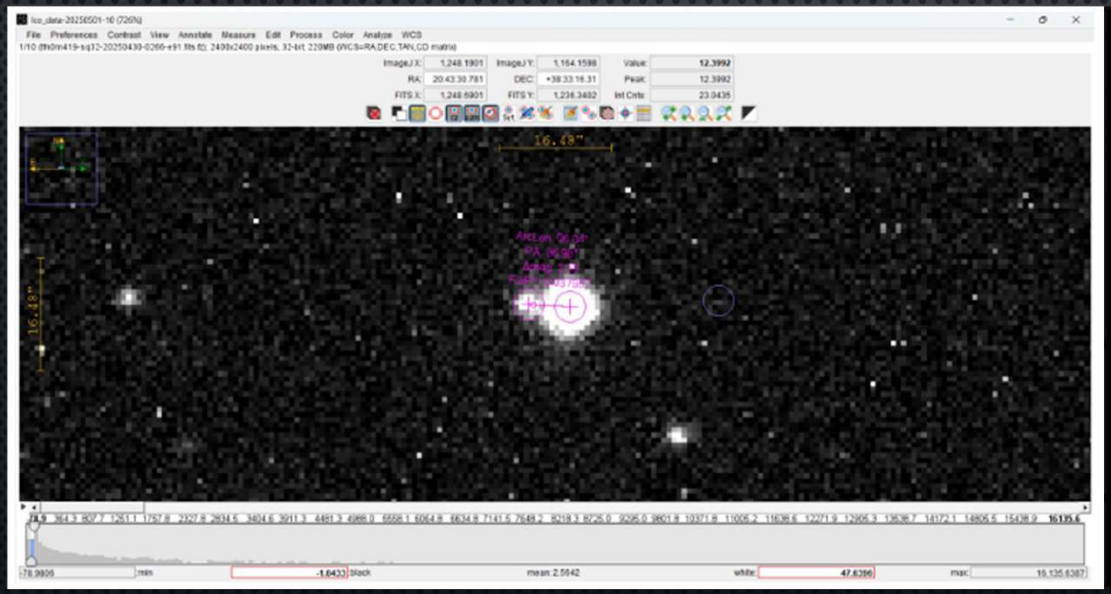


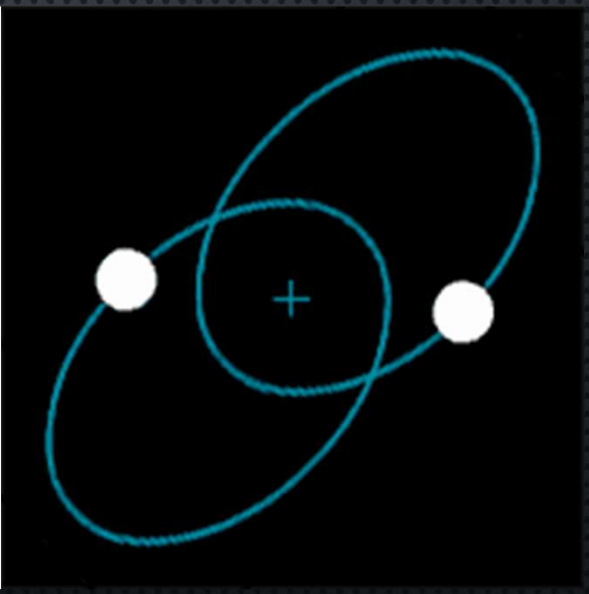
Citizen Science: SETI-SkyMapper

- Objective: Connect telescopes across Africa to a global decentralized telescope network for astronomical observations and collaborative research.
- Collaboration: SETI-SkyMapper

Research project: Double-Star Research

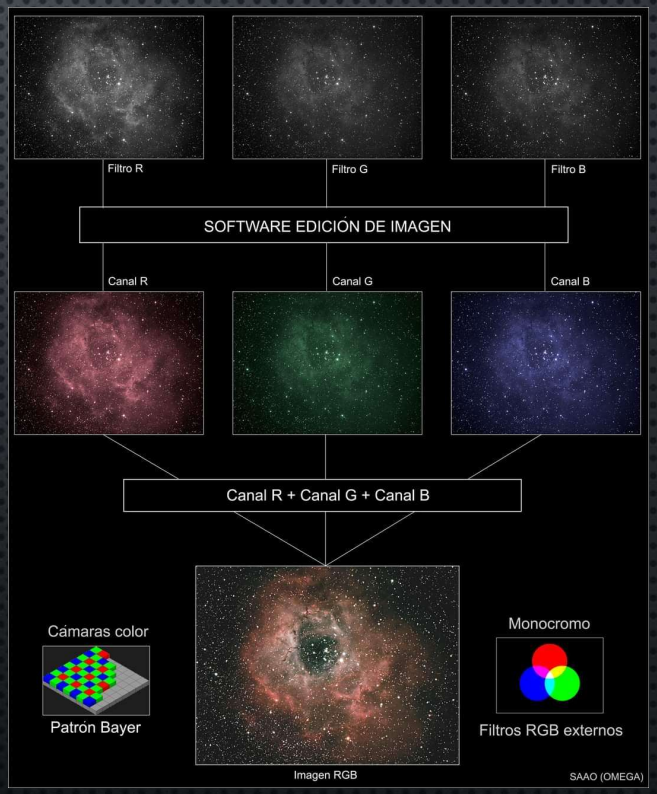
- Objective: Observe double stars, perform astrometry on position angles & separations, and confirm the nature of binarity.
- Collaborations: Institute of Student Astronomical Research, Las Cumbres Observatory, etc.





ASE: Astrophotography

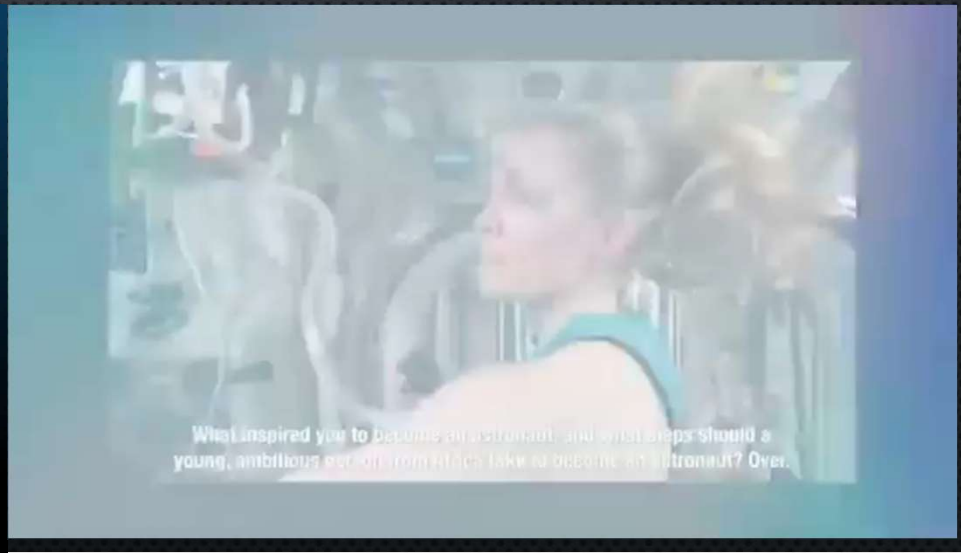
- Objective: Develop skills in processing deep-space images.
- Collaborations: Las Cumbres Observatory, SkyGaze India



Steps in image Processing

ASE: Amateur Radio on the ISS (ARISS)

- Objective: Students and learners connect and interact with an astronaut on the ISS.
- Collaborations: ARISS-Amateur Radio on the International Space Station



ASE: Telescope Project

- Objective: Support local groups to acquire handy telescopes for outreach and teacher training.
- Collaborations: Jean Pierre Grootaerd and the African Astronomical Society.




Display of some of the telescopes donated to our African collaborators, from left to right: Senegal, Uganda, Botswana, and Zimbabwe.

ASE: Astronomy Lectures and Podcasts

- Objective: Deliver free astronomy lessons via social media and podcasts
- Collaborations: Free AstroScience

Research Telescopes

Outcome

Develops skills in observations, telescope operation, digital literacy, data acquisition and analysis, image processing, pattern recognition, data interpretation, scientific reasoning, technical system management, scientific writing & publication, teamwork, research collaboration, science communication, experience with satellite communication and signal transmission, conference participation, etc.

The program also contributes to planetary defense, promotes STEM education, strengthens public awareness of astronomy and space science, and encourages lifelong learning.

Achievements (1)

Engaged over 5,000 learners and young people across more than 50 countries in Africa, the Middle East, Ukraine, and beyond.

PACS e-Lab now represents Africa's largest citizen science network, supporting over 100 STEM-focused groups across the continent.

Over 150 citizen scientists from 28 countries have contributed to the discovery of more than 100 asteroids through international asteroid search campaigns.

More than 15 research papers have been published in international scientific journals, with citizen scientists and students serving as co-authors.

Secured access to professional observatories and research infrastructure, including Las Cumbres Observatory, Slooh, and MicroObservatory, enabling participants from emerging nations to engage in authentic scientific research.

Achievements (2)

Forged partnerships with NASA, IASC, ARISS, LCO, and more than 15 international scientific institutions to expand access to space science opportunities.

Hundreds of exoplanet observations have been conducted and submitted to international databases, including the American Association of Variable Star Observers (AAVSO), contributing to global exoplanet research efforts.

More than 60 students from Africa, the Middle East, and beyond have interacted directly with astronauts through educational outreach programs.

Supported the successful participation and hosting of student-astronaut interactions by the Nigeria Space Agency, Ethiopian Space Science Society, Kenya Space Agency, Rwanda Space Agency, StellarView Technologies (Uganda), and the Department of Physics, Kwame Nkrumah University of Science and Technology (KNUST), Ghana.

Achievements (3)

Hundreds of astronomical images of galaxies, nebulae, and star clusters have been produced and published through educational and scientific outreach initiatives.

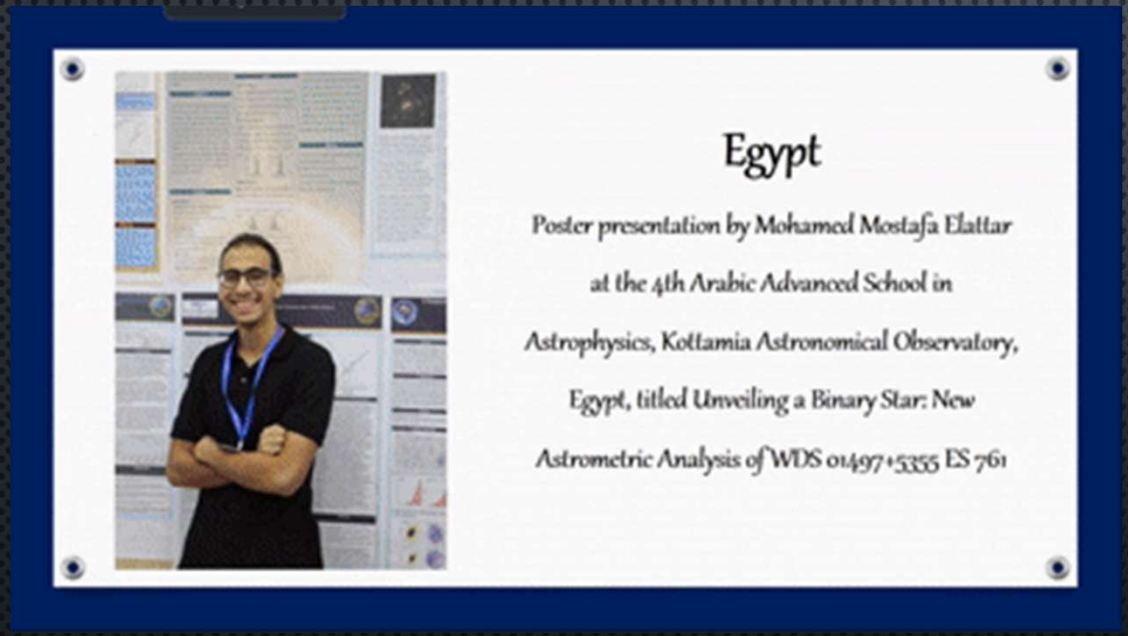
Learners and citizen scientists have participated in more than 20 international conferences, presenting research and sharing best practices in citizen science and STEM engagement.

Distributed 12 telescopes to citizen science teams in Malawi, Morocco, Senegal, Libya, Sudan, Lesotho, Botswana, Zimbabwe, Gabon, Uganda, Burundi, and Rwanda to strengthen local observational capacity.

Featured in multiple local, regional, and international media outlets for advancing citizen science, astronomy education, and space science development in Africa.

PACS e-Lab aims to scale its impact to tens of thousands of participants by 2030.

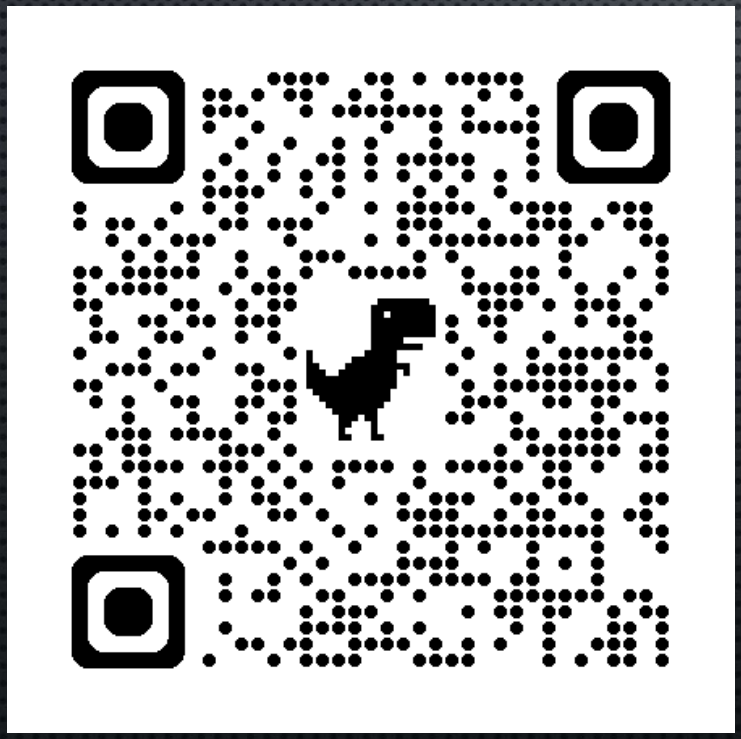
Some picture excerpts from project participation



Contributions to the United Nations SDGs

Connect on social media

Contact PACS e-Lab for Collaboration



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