



African Strategy for Fundamental and Applied Physics (ASFAP)

Pan-African, gender balanced and inclusive



Mandating Body : African Physical Society (AfPS)

Steering Committee: ASFAP-SteeringCommittee@cern.ch

Working Group Conveners: ASFAP-GroupConveners@cern.ch

Web : <https://africanphysicsstrategy.org/>,

Wiki : <https://twiki.cern.ch/twiki/bin/view/AfricanStrategy>

Twitter: <https://twitter.com/StrategyAsfap>

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Brookhaven National Laboratory

Physics strategies

- Physics strategies are regularly developed / updated in other regions
 - European strategy
 - Snowmass
 - LASF4RI
 - etc.
- Colleagues in Latin America developed their first grassroots strategy for Research Infrastructures, LASF4RI, in High Energy, Cosmology and Astrophysics
- Folks in Africa came together to develop an inaugural physics strategy at grassroots physicists level—**The African Strategy for Fundamental and Applied Physics (ASFAP)**



ASFAP



1. Many strategies & implementation issues

a. What is ASFAP going to bring?

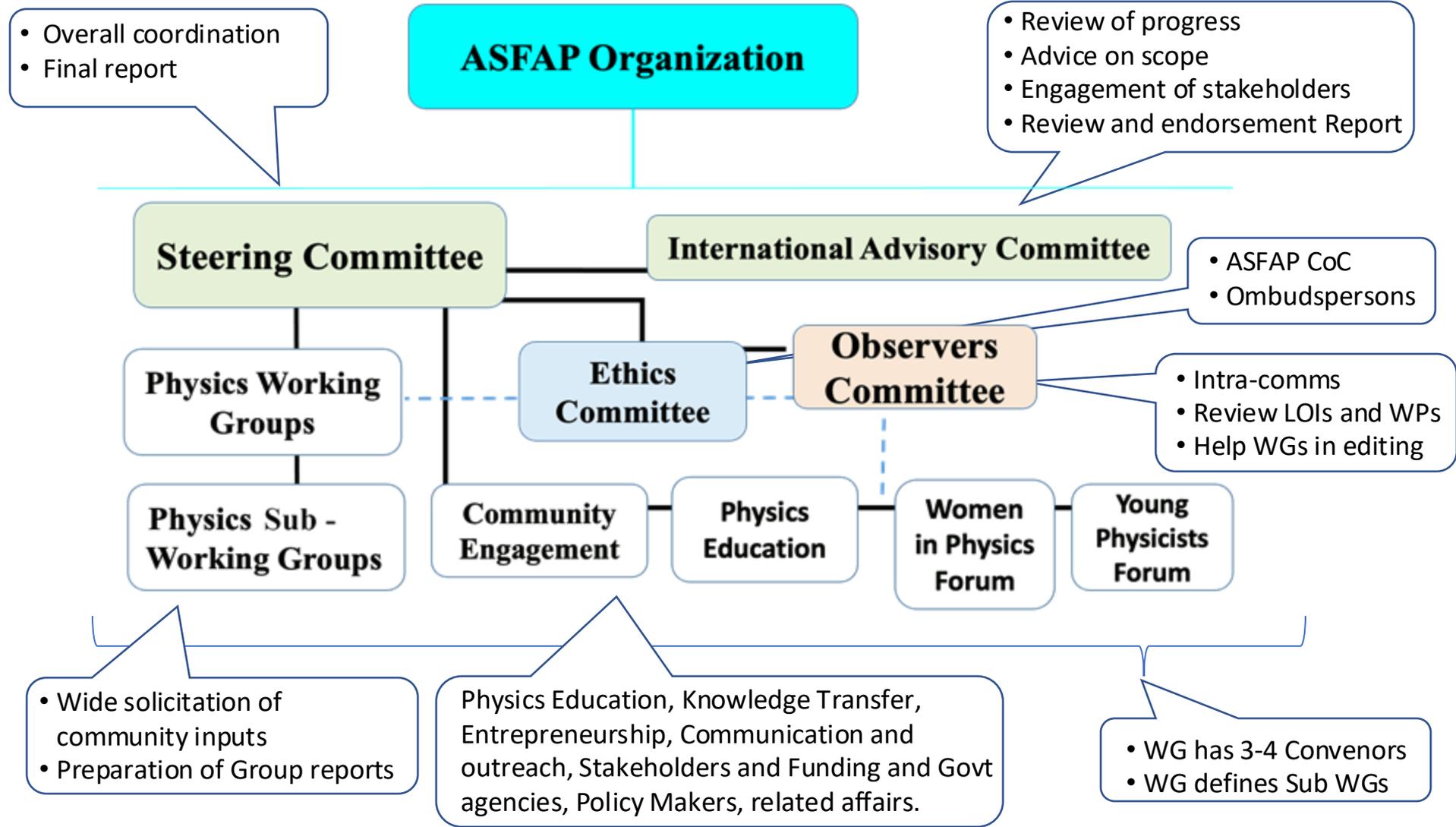
1. Objectives

- a. Engage African scientists and the international community in the Strategy development.
Increase and sustain networking
- b. Develop the culture of regular strategies done by grassroots physicists, as opposed to top-down strategies initiated by governments or large political bodies where the broad community of physicists is not consulted
- c. The physics community plays an active role in shaping the strategic directions
- d. Support the African Physical Society to become a strong professional body

1. ASFAP Structure

- a. Broad footprint by discipline and fields
- b. Steering Committee, Advisory Committee, Group Conveners, Sub-group Conveners
- c. Solicitation of inputs from the community in the form of Letters of Interest (LOI), Surveys, Panel Discussion, Workshops, Conferences, regular meetings, and white paper Study Groups
 - i. Progress discussed in the relevant groups
 - ii. Subgroup and group final reports (at the subgroup and convener levels); Strategy report at the Steering Committee level
 - iii. Feedback and advice from the IAC

Structure and Organization



Endorsements from national or international organizations

<https://africanphysicsstrategy.org/>

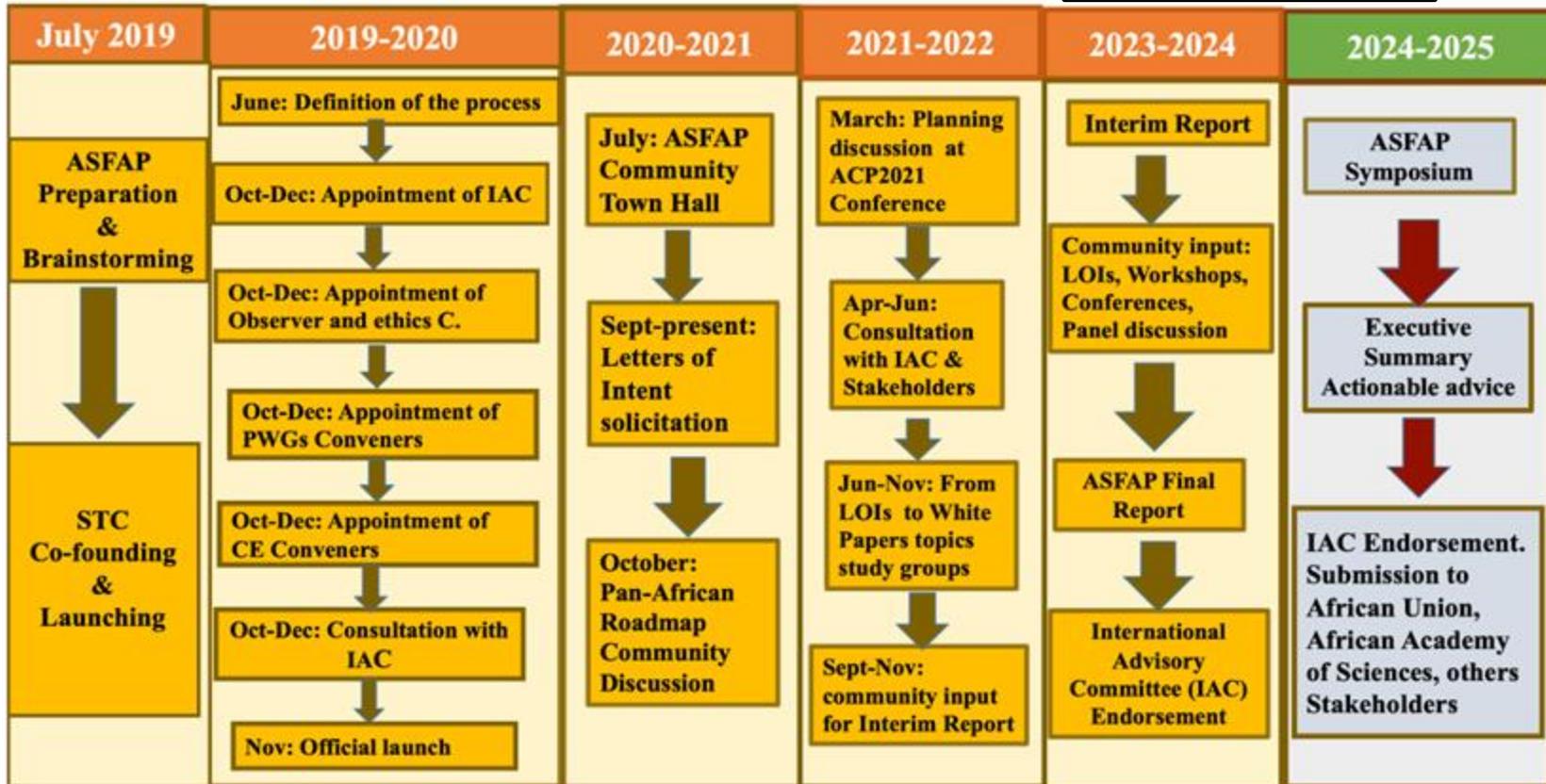


ASFAP Timeline

**ASFAP
Town Hall**

**ASFAP
Community
Planning
Meeting,
March 7-
11, 2022**

**ASFAP Working
Meeting towards
Final Report
Dec 15-17, 2024**



Delay: final report & symposium in 09/22-25/2025



Physics or Engagement Working Groups



ASFAP has 16 Physics Working Groups on physics areas relevant for strategic development in Africa

Instrumentation & Detectors Group

This is the working group on the Instrumentation and Detectors physics, development, design, implementation and evolution for a broad range of applications in Africa. The group is convened by three experts and may be subdivided into subgroups for a more efficient management.

Mailing list: ASFAP-Instruments-Detectors[at]cern.ch

GROUP CONVENERS

Co-conveners Mailing list: ASFAP-Instruments-Detectors-admin[at]cern.ch

NAME	AFFILIATION	EMAIL	Gender	African origin/Diaspora/Related
Dr. Ulrich Goerlach	CNRS-IN2P3, France	ulrich.goerlach[at]cern.ch	M	N/A
Dr. Paul Guèye	Michigan State University	Gueye[at]frib.msu.edu	M	Senegal
Dr. Nieldane Stodart	iThemba Labs, South Africa	nieldane[at]tlabs.ac.za	M	South Africa

Observers Committee members

NAME	AFFILIATION	EMAIL	Gender
Prof. Peter Jenni	Freiburg University and CERN	peter.jenni[at]cern.ch	M
Dr. Claire Lee	Fermilab, USA	claire.lee[at]cern.ch	F
DR. Uli Raich	CERN and ASP	uli.raich[at]gmail.com	M

Unfortunately, not all the working groups will contribute to the final report.

We are here, at this workshop, to assess the readiness of the groups' work to be included in the final report

ASFAP includes 6 societal engagement groups necessary for human capacity development in Africa

Young Physicists Forum

The Young Physicists' Forum (YPF) — from undergraduates to postdoctoral researchers — is an opportunity for the Young African Members of the African Strategy for Fundamental and Applied Physics to gather, study and debate the major issues in their research careers.



Vision of the YPF

Promoting the next generation of leaders in physics.

Mission of the YPF

Creating an environment where young physicists assume an active role.

Mailing list: ASFAP-YoungPhysicists[at]cern.ch

Forum Conveners

NAME	AFFILIATION	EMAIL	Gender	African origin/Diaspora	Country of residence	Committee/WG involvement
Dr. Mounia Laassiri MouniaBio	Mohammed V University	mounia.laassiri[at]gmail.com	F	Morocco	Morocco	Energy and Nuclear Physics
Dr. Diallo Boye DialloBio	Brookhaven National Laboratory	Diallo.Boye[at]cern.ch	M	Senegal	France	Particle Physics
Dr. Benard Mulilo BenardBio	University of Zambia	benard.mulilo[at]gmail.com	M	Zambia	Zambia	Nuclear and High Energy Physics
Dr. Amani M. Ebrahim AmaniBio	SLAC	amanimamer[at]gmail.com	F	Egypt	USA	Light Sources and their applications

Co-conveners Mailing list: ASFAP-YoungPhysicists-admin[at]cern.ch

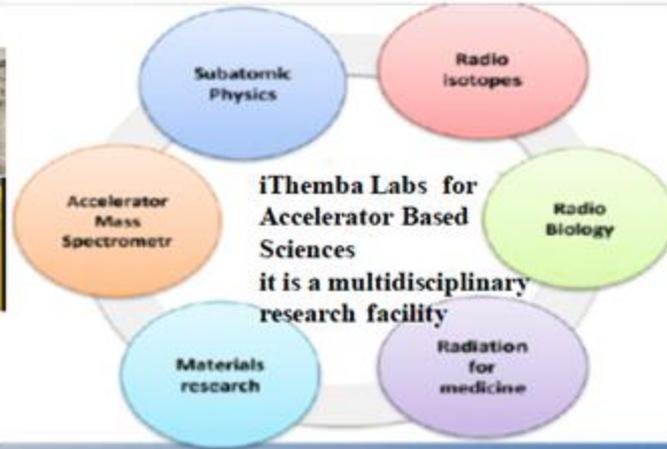
Outline

- Motivation
- Structural Organization
- Timeline
- Endorsement and Support
- Final report



The Hope is Great for Science in Africa

HEP@CERN



SAAO

SALT

Boyden

Hartebeesthoek

Hermanus

HESS

Astronomy; Observatories and Telescopes



Egypt in CMS



South Africa in ATLAS



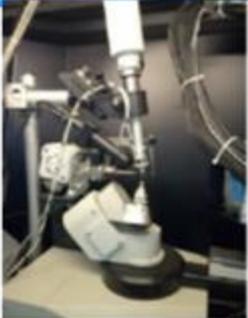
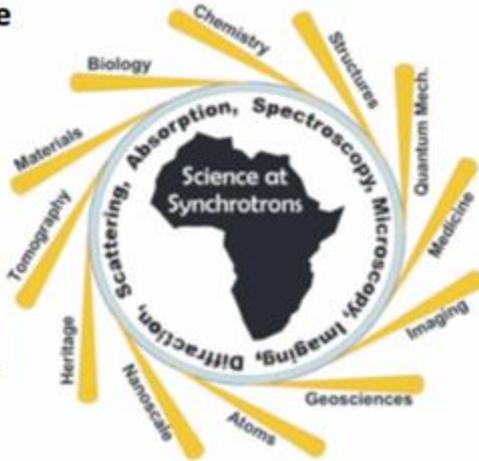
Morocco in ATLAS

Madagascar is a part of the DUNE Collaboration

Africa Engagement in EIC: Algeria, Egypt, Morocco, South Africa, Senegal, Tunisia, Zambia

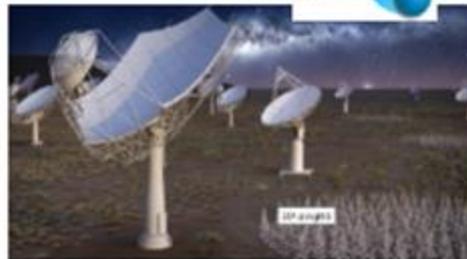
More on Scientific Infrastructures in Africa...

The African Light Source
Future Global and Africa relevant
Research and Innovation

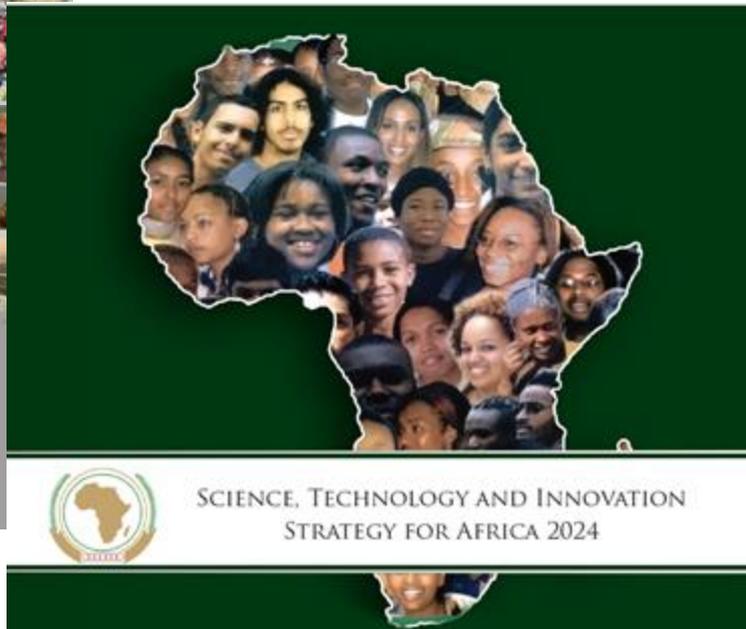
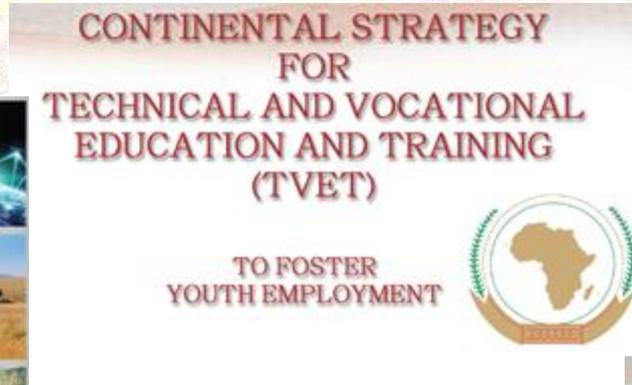
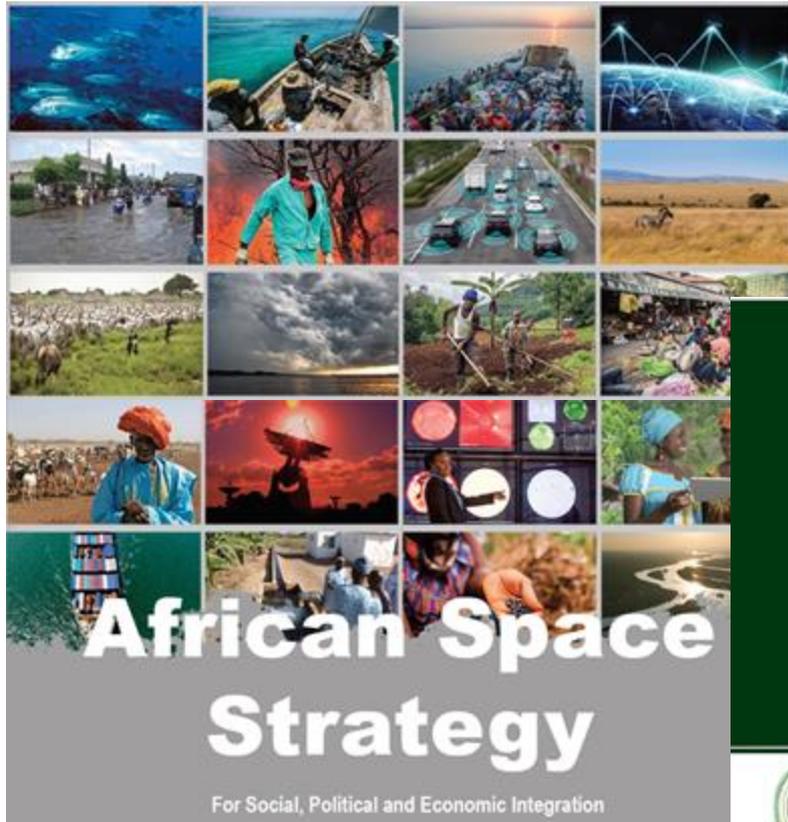
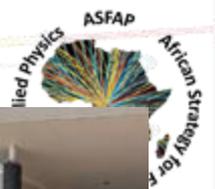


It is the first X-ray techniques platform in Bénin devoted to the community

The largest radio telescope ever built. Hosted in South Africa



African strategies from the African Union



1. Roadmaps / Strategies not new in Africa

- a. Governments have roadmaps
- b. Professional societies do
- c. Large continental scientific collaborations do

**The issue has been
in implementation**

Advisory & Steering Committees

The International Advisory Committee

Currently, the confirmed members of the advisory committee are:

- **Prof. Ahmadou Wagué** (President of the African Physical Society, [AFPS](#))
- **Prof. Atish Dabholkar** (Director of ICTP)
- **Prof. Azwinnidini Muronga** (Dean of Science, Nelson Mandela University, South Africa)
- **Prof. Emmanuel Tsesmelis** (CERN International Relations)
- **Prof. Omar FASSI-FEHRI** (The perpetual secretary of Hassan II Academy of Science and Technology, Morocco)
- **Prof. Fernando Quevedo** (Former Director of ICTP)
- **Prof. James S. Gates** (Brown University, former President of APS)
- **Dr. Latifa Elouadrhiri** (Physicist Jefferson Lab & DOE, USA)
- **Prof. Malik Maaza** (iThemba Labs, South Africa, Representing the African Academy of Sciences (AAS))
- **Prof. Michel Spiro** (President of IUPAP)
- **Prof. Shuji Hassegawa** (University of Tokyo) Vice President of JPS
- **Prof. Mohamed Hassan** (President of TWAS)
- **Dr. Najat Mokhtar** (IAEA Deputy Director General and head of the Department of Nuclear Sciences and Applications)
- **Prof. M. Norbert Hounkonnou** (President, Network of African Science Academies (NASAC))
- **Prof. Petra Rudolf** (University of Groningen, The Netherlands, former President of EPS)
- **Dr. Raïssa Malu** (former member of the Democratic Republic of Congo Presidential Panel to the African Union)
- **Prof. Rob Adam** (former Director of SKA, South Africa)
- **Prof. Rohini Godbole** (former India Institute of Science)
- **Prof. Rolf Heuer** (President of the SESAME Council)
- **Prof. Setsuko Tajima** (President Elect of the Japan Physical Society, Osaka U., Japan)
- **Prof. Wang Yifang** (Director at IHEP/CAS, China)
- **Prof. Winston Soboyejo** (Former president of AUST, Nigeria, Provost Worcester Polytech. Inst., USA)
- **Dr. Shamila Nair-Bedouelle** (UNESCO Assistant Director-General for Natural Sciences)
- **Prof. Young-Kee Kim** (Louis Block Distinguished Service Professor of Physics Chair, University of Chicago, USA)
- **Prof. Zeblon Vilakazi** (Vice Chancellor, University of the Witwatersrand, South Africa).



Steering Committee

- | | |
|------------------------------------|-----------------------------------|
| Dr. Kétévi Adiklè Assamagan | (BNL, USA) |
| Prof. Simon Connell | (University of Johannesburg, SA) |
| Prof. Farida Fassi | (Mohammed V University, Morocco) |
| Prof. Shaaban Khalil | (CFP, Zewail City, Egypt) |
| Dr. Fairouz Malek | (CNRS and Grenoble Univ., France) |

Observers Committee

Members of this committee are people with experience in long term planning (either senior or junior) but also an outstanding involvement with projects in and with Africa. OC is an intermediate body, conveying ideas between STC and WGs. Members participate in WG discussions, they review papers, attend meetings and participate to the editing of the reports together with the WGs they are assigned to follow. OC members can easily report any Ethics issues or just a problem with the WGs.

Working Group Activities

- 1. Provide contributions to community inputs collections**
 - Letters of Interest (LOI), Survey, Workshop, Panel Discussions, Conferences, talks
 - **Submit LOIs** <https://indico.cern.ch/event/1061921/>
- 2. Participate in (sub)group activities**
- 3. Participation in WG report preparations**
- 4. Encourage institutional credits for those working on this Strategy**
 - For people in leadership roles as (sub)conveners and liaisons
 - White papers aim to be published
 - White paper finding reviewed and referenced in the Strategy report
- 5. Contribute to the final report in preparation**
 - **Addressing feedback and improving the final draft**

Final Report in Progress

1. A draft of the final report is in preparation

<https://www.overleaf.com/read/wngqnfvvmgmb#db02a0>

1. All the working groups were expected to contribute to it

- At this workshop, we intend to access the progress on chapter of the report and converge on a minimum set of chapters that have matured enough to be retained for the final report
- In early 2025, we will further improve the chapters that have been retained
- In spring 2025, the final draft will go to the IAC for feedback
- In summer 2025, the final draft will go to UNESCO for copy editing and formatting

2. At the conclusion of the draft report

- We will organize a symposium to present the report to the international community
- Integrate further feedback from the symposium to prepare the ultimate final report
- The symposium will take place at the University of Lome, Togo, on September 22-25, 2025

What we expect from this workshop

- **A presentation from each working group on their activities**
 - Status of their chapter
 - Expected improvement
 - Overlap with other chapters and recommendations toward improved synchronization
- **Discussions with feedback**
 - Discussion sessions are arranged after the related group presentations
 - Feedback to further improve the chapter presented
 - Assessment of the chapters to be included in the final report
- **Session conveners' reports**
 - Discussion session conveners are expected to follow the presentations on the chapters
 - Take note with the subsequent discussions
 - **Prepare a few slides on the assessment and recommendations, to be presented at the summary session on December 17.**
- **Final report synthesis**
 - In the session, we reach agreement on which chapters have matured enough to be included in the final report
 - From that point, we will focus on these chapters, to improve them further in 2025 and submit the final report draft to the IAC, then to UNESCO
- **Detailed agenda for this workshop**
 - <https://indico.cern.ch/event/1464802/timetable/?view=standard>

Acknowledgements & Thanks

- **UNESCO**
 - Air ticket coverages and travel arrangements for many participants
 - Help with visa application
- **APS**
 - Air ticket and hotel coverages for some participants
- **Prof. Young-Kee Kim**
 - Hotel, airport transfer and meal coverages for many participants
- **INFN, BNL**
 - Full travel coverage for their staff
- **Prof. Shaaban Khalil and our hosts**
 - The logistical support and their diligent efforts
- **The in-person participants**
 - For making the efforts to show up
- **Online participants**
 - For their participation

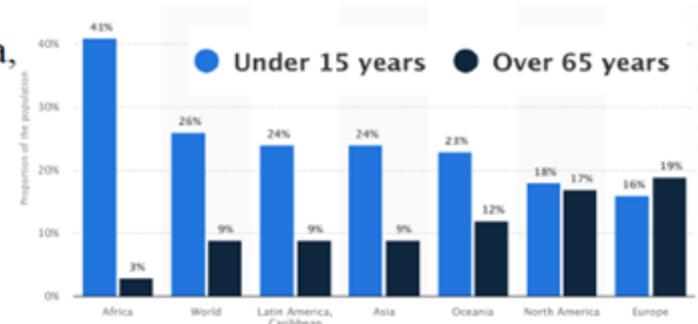
Conclusions

- Many roadmaps or strategies already developed in Africa
 - Mandated and carried out governments, physics societies, large institutes
 - Often lacking broad community consultations and inputs
 - Often facing problems in implementation
- With ASFAP, we propose to develop a strategy mandated by the African Physical Society, with
 - Broad community consultations driven at grassroots by physicists
 - Broad footprints in all the physics and engagement topics of importance to Africa
 - Bring the African physics communities together
- After a few years of work, a strategy report is under development
 - Expected to be completed in 2025 and presented to the international community and policymakers
 - Then move to the implementation phase
 - **The objective of this workshop, Dec 15-17, 2024, is to prepare a path towards the final report, to be presented and released at ASFAP symposium, in September 2025, in Togo.**
- Future Strategies
 - Must encourage greater participation and engagements from physicists in Africa
 - Integrate lessons learned from this inaugural strategy
 - Review what was implemented and not, and why
 - Adapt to the changing priorities of African communities to better serve these communities

But...there are not enough scientists in Africa!

- Africa is home to **15%** of the world's population (UNESCO Science Report 2017)
 - but it produces just **2%** of the world's research out come
- Only **1%** of global investment in R&D is spent in Africa
 - **Africa has 198 researchers per million people**
- To achieve the world average for the number of researchers per capita,
 - **Africa needs another million new PhDs**
 - The situation is getting worse
 - Lack of opportunity gets Africa lose roughly 20,000 professionals to high-income countries every year

Africa is the world's youngest population in 2020



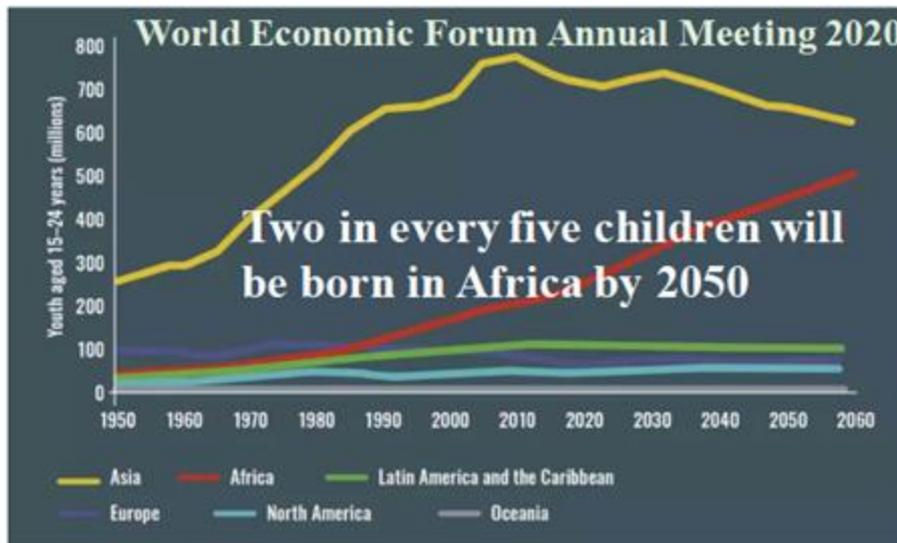
World Economic Forum

How can we reverse the curve?

- **African Science Renaissance**
 - Encourage and strengthen High Education, Capacity Building, Scientific Research, etc
 - Support the return of the African Diaspora - new opportunities for young excellent scientists
 -

The Future is African

- Predictions show that by 2050, Africa's population will double



Where are we headed?

To do nothing is to go backwards



What needs to be done to give Science and Technology their due weight in the development process?



Implementation— Discussion



1. Implementation requires

- Community buy-in
- Financial resources

Future African Strategies—Discussion

1. Strategies must be repeated periodically

- Every 7-10 years
- Review what was implemented in the previous strategies / what was not and why?
- Update with new development as national / regional priorities changes
- Integrate lessons learned from doing the previous strategy
- Bring in more of the grassroots international body of physicists