

# 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](mailto:ASFAP-SteeringCommittee@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?

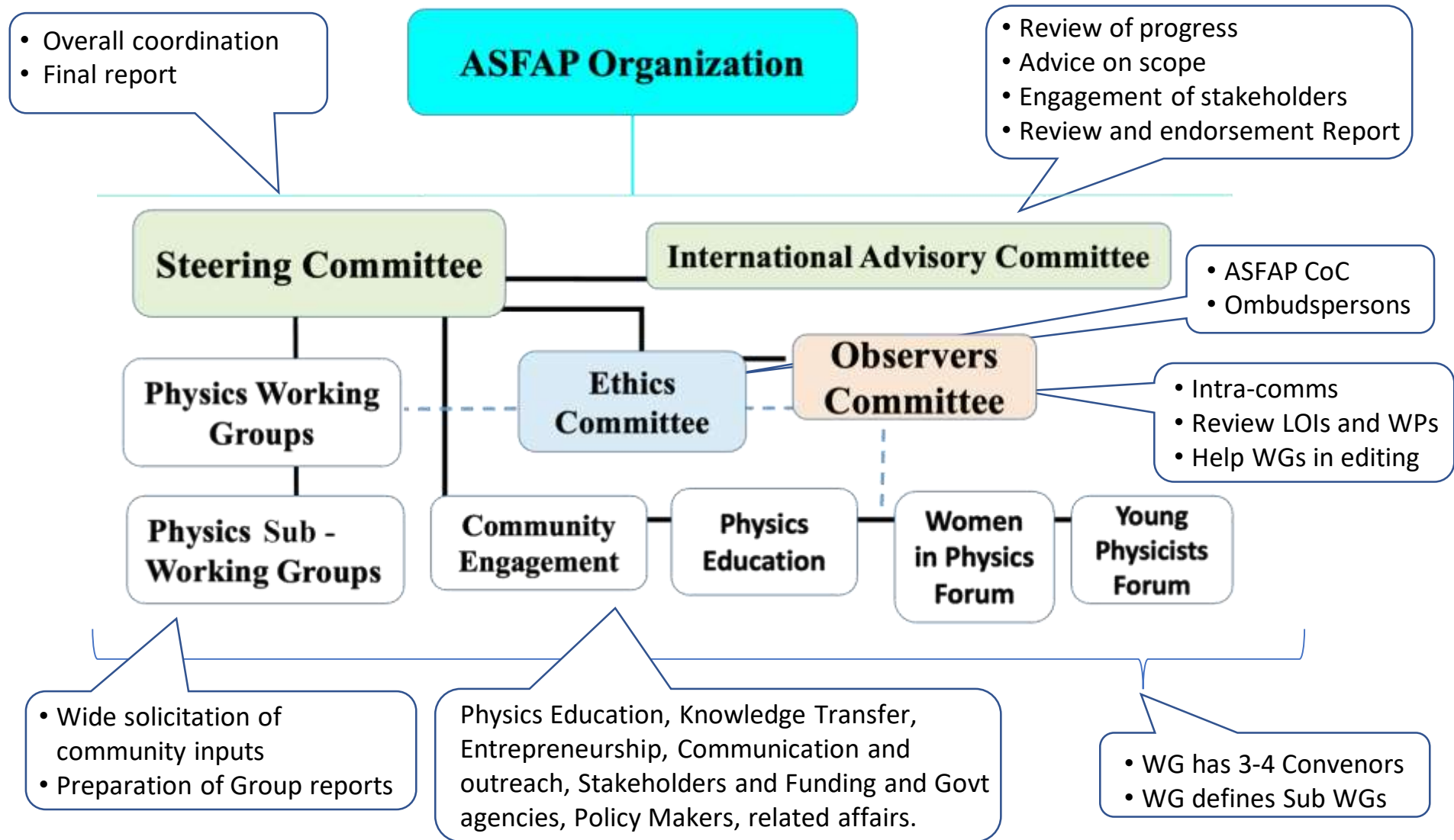
## 1. Objectives

- 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/>

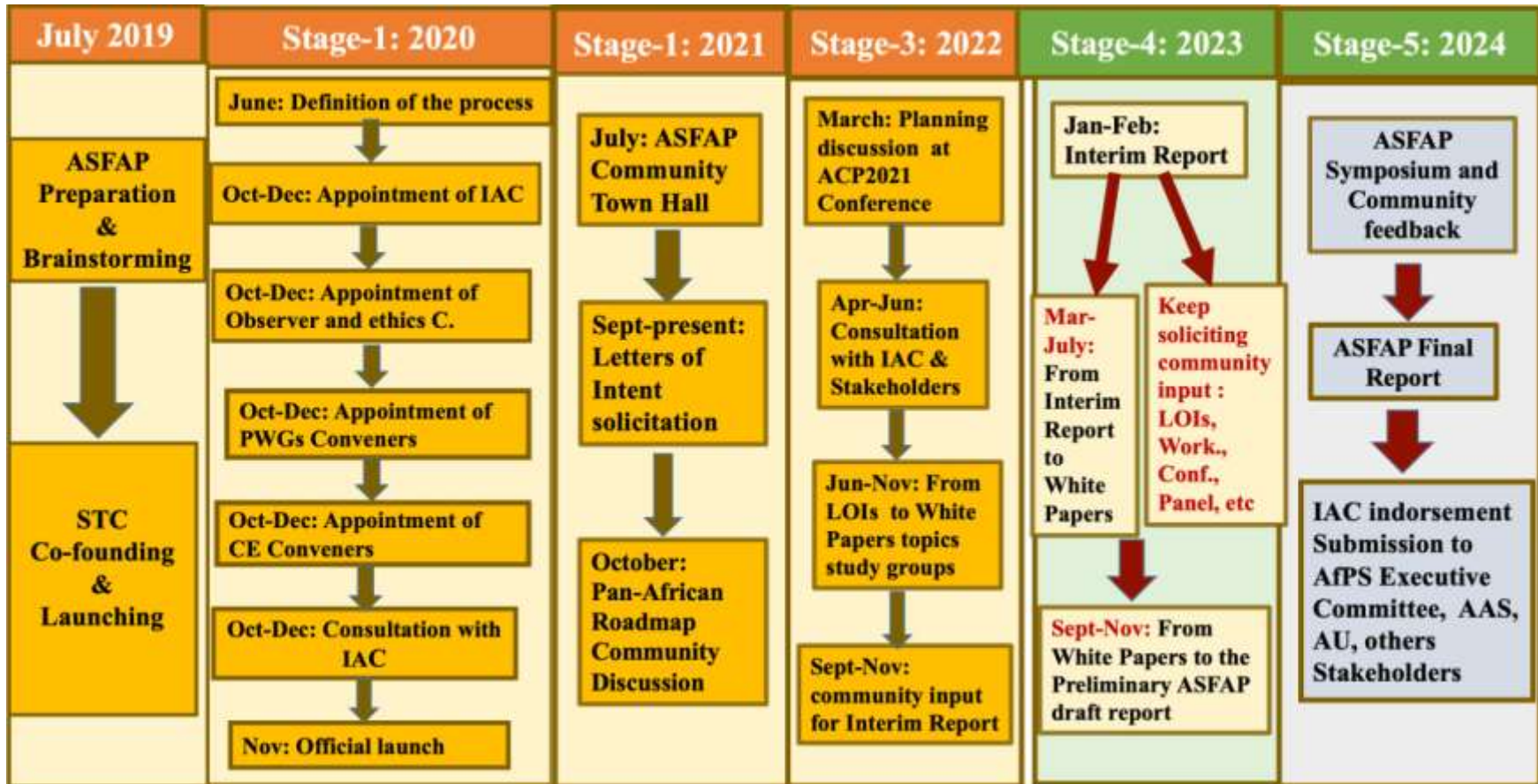


# ASFAP Timeline

ASFAP  
Town Hall

ASFAP  
Community  
Planning  
Meeting,  
March 7-  
11, 2022

Delay: final report & symposium in 2025



# Physics or Engagement Working Groups

## 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

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

**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 <a href="#">MouniaBio</a>	Mohammed V University	mounia.laassiri[at]gmail.com	F	Moreocco	Morocco	Energy and Nuclear Physics
Dr. Diallo Boye <a href="#">DialloBio</a>	Brookhaven National Laboratory	Diallo.Boye[at]cern.ch	M	Senegal	France	Particle Physics
Dr. Bernard Mulilo <a href="#">BernardBio</a>	University of Zambia	bernard.mulilo[at]gmail.com	M	Zambia	Zambia	Nuclear and High Energy Physics
Dr. Amari M. Ebrahim <a href="#">AmaniBio</a>	SLAC	amanimamer[at]gmail.com	F	Egypt	USA	Light Sources and their applications

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

# Outline

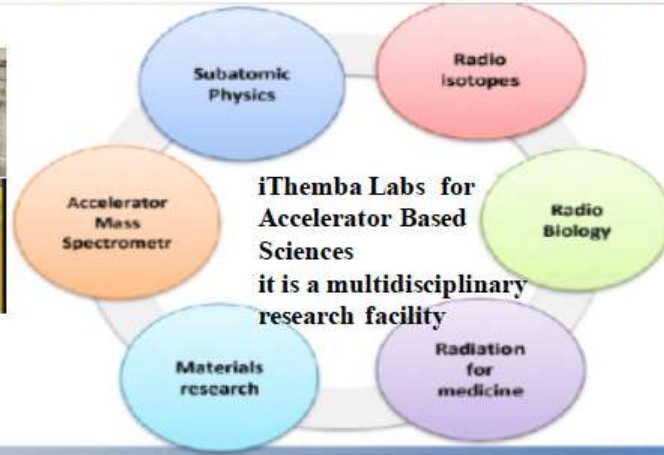
- Motivation
- Structural Organization
- Timeline
- Endorsement and Support
- Final report





# The Hope is Great for Science in Africa

HEP@CERN



SAO

SALT

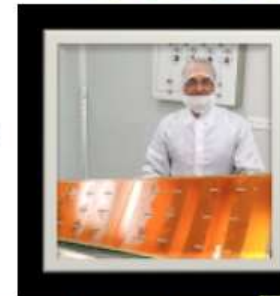
Boyden

Hartebeesthoek

Hermanus

HESS

## Astronomy; Observatories and Telescopes



Egypt in CMS



South Africa in ATLAS



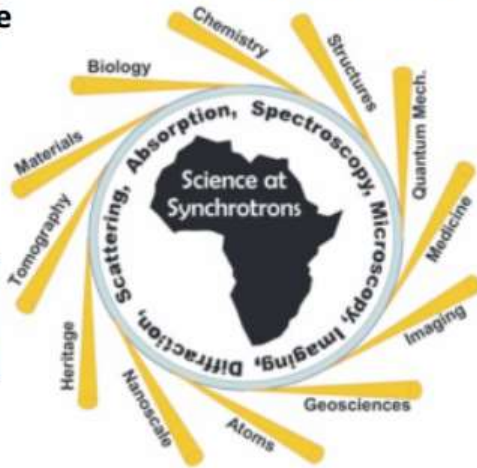
Morocco in ATLAS

Madagascar is a part of the DUNE Collaboration

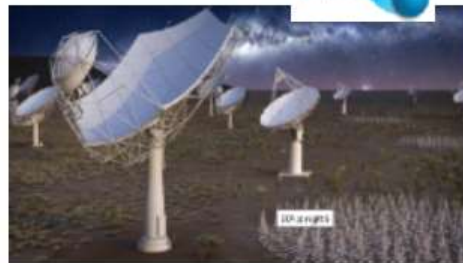
Africa Engagement in EIC: Algeria, Egypt, Morocco, South Africa, Senegal, Tunisia, Zambia<sup>9</sup>

## More on Scientific Infrastructures in Africa...

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



The largest radio telescope ever built. Hosted in South Africa

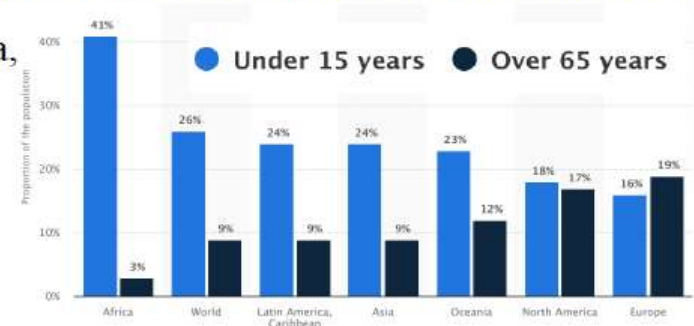


It is the first X-ray techniques platform in Bénin devoted to the community

# 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*



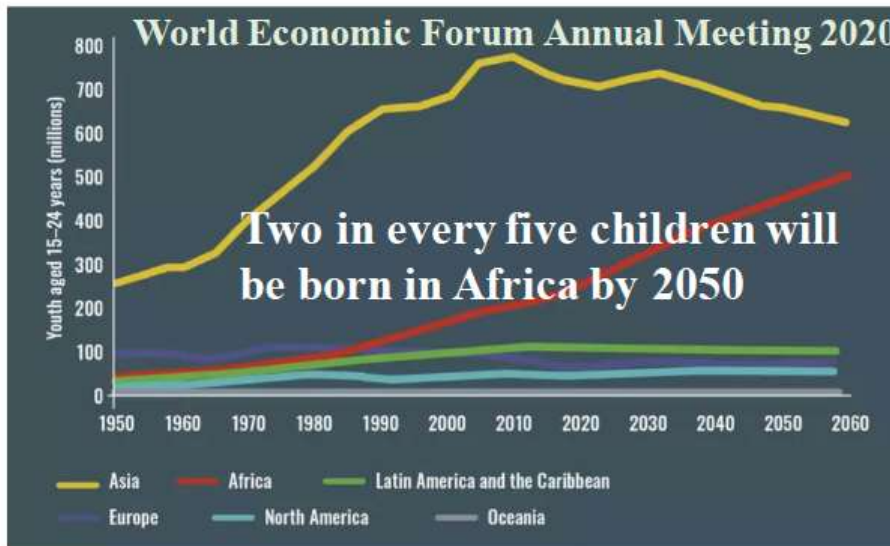
World Economic Forum

## 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



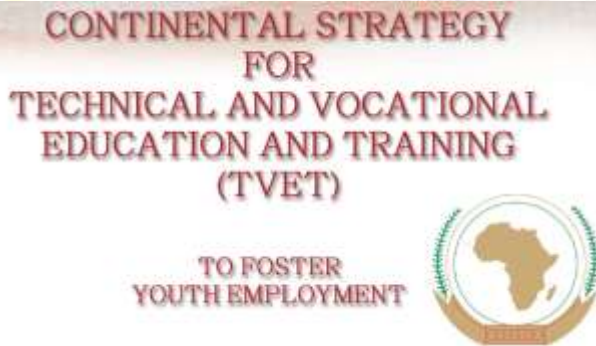
**Where are we headed?**

**To do nothing is to go backwards**



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

# 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. Azwinnndini 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. Zebion Vilakazi** (Vice Chancellor, University of the Witwatersrand, South Africa),



## Steering Committee

- |                                    |                                   |
|------------------------------------|-----------------------------------|
| <b>Dr. Kétévi Adiklè Assamagan</b> | (BNL, USA)                        |
| <b>Prof. Simon Connell</b>         | (University of Johannesburg, SA)  |
| <b>Prof. Farida Fassi</b>          | (Mohammed V University, Morocco)  |
| <b>Prof. Shaaban Khalil</b>        | (CFP, Zewail City, Egypt)         |
| <b>Dr. Fairouz Malek</b>           | (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**
  - a) LOI, Survey, Workshop, Panel Discussions, Conferences, talks
  - b) **Submit LOIs**

<https://indico.cern.ch/event/1061921/>
2. **Participate in (sub)group meetings**
  - b) Register to mailing lists of working groups of interest
  - c) Offer your constructive opinions and expertise
3. **Encourage your research groups to get involved**
4. **Participate in White Paper study groups**
5. **Encourage institutional credits for those working on this Strategy**
  - b) For people in leadership roles as (sub)conveners and liaisons
  - c) White papers aim to be published
  - d) White paper finding reviewed and referenced in the Strategy report
6. **Contribute to the final report in preparation**

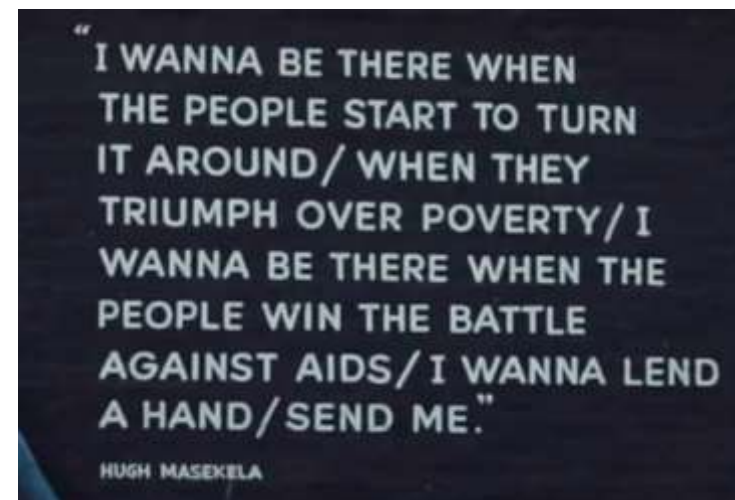


**Thuma mina – Send Me**

<https://www.youtube.com/watch?v=d4Bwux-btq0>

Musician Hugh Masekela

**Inspired SA President Cyril Ramaphosa**



# Final Report in Progress

- 1. A draft of the final report is in preparation**
- 2. All the working groups are expected to contribute to it**
  - We hold regular meetings to gauge progress
  - We expect a complete and preliminary draft by December 2024
  - We expect a final report in 2025 with community feedback
- 3. 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 date and host country / venue of the symposium still to be decided





# 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

# 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
- 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