THE AFRICAN SCHOOL OF PHYSICS

Dr. Kétévi Adiklè Assamagan Brookhaven National Laboratory (BNL)



Outline

- Overview
- Organization
- Scientific Program
- Activities
- Students Profile
- Lecturers
- Funding
- Host country and venue selections
- Mentorship



The African School of Physics is much more than a school. It is a program of actions with directed ethos toward physics as an engine for development in Africa



African School of Fundamental Physics and Applications

■ Also known as "The African School of Physics"

Acronym: ASP

■ Logo: as above

https://www.africanschoolofphysics.org

3-week intensive schools with activities in parallel Even when there no term school,

Continuous Structured Mentorship

- Organized biennially in different African countries since 2010 by an International Organizing Committee (IOC)
 - ASP-IOC@CERN.CH

ASP	Host Country	Applicants	Students	Mentorship	Teachers	Pupils	Conference
2010	South Africa	125	65	Continuously, even when there is no term school			
2012	Ghana	138	50				
2014	Senegal	330	70				
2016	Rwanda	429	75	Program formalized in 2016	20	150	
2018	Namibia	523	85		63	> 1200	+60
2020	Morocco	Postponed to 2021 because of COVID-19 but mentorship continues					
2022	South Africa	At the Nelson Mandela University in Port Elizabeth but mentorship is a continuous process					

ASP Organization

Local Organizing Committee (LOC) –
in the host country
Local logistics
Liaise with Education and Research
branches of host country government

Objective:

Increase capacity development in fundamental and applied physics in Africa

International Advisory Committee (IAC)

Representatives of funding agencies Advise on the program Advise of the host country selection

Assessment of Impact

Survey of students
Survey of their Professors
Follow academic developments

International Organizing Committee (IOC)
Program management

Fund raising Coordination of activities

Activity reports to Funding agencies

Board of Trustees Legal Responsibilities Fund raising Assess Managements

Spin-Offs

ASP Mentorship/Coaching Program
Networking and sharing of information
Align ASP with educational priorities
Improve future editions of ASP
Promote research collaborations
Promote research consortia

International Lecturers (IL)
Design the scientific Program
Help with the student selections
Mentor and Coach students
continuously

Current Members of the IOC



Dr. Anne E. Dabrowski CERN



Dr. Steve G. Muanza CNRS-IN2P3 France



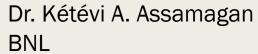
Prof. Bobby Acharya ICTP and King's College London

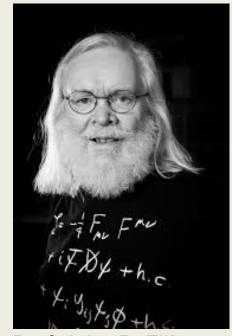


Dr. Christine Darve ESS



Prof. Fernando Ferroni GSSI-INFN





Prof. John R. Ellis CERN and University of London



Board of Trustees



Mr. Brian Masara
(South African Institute of Physics)



Prof. Simon Connell (University of Johannesburg)



Dr. Kétévi A. Assamagan (BNL)

- ASP is a non-profit international organization registered in South Africa
- Headquarter at the South African Institute of Physics

ASP Scientific Program

Fundamental and Applied Physics

Astrophysics and Cosmology;
Nuclear and Particle Physics;
Accelerator, Medical and Radiation Physics;
High Performance Computing;
The fourth Industrial Revolution—4IR
Renewable Energies and Energy Efficiency;
Material Physics;
Physics Education & Communication

Emphasis tailored to the physics interests of the host country, e.g. Namibia: astro & cosmology, material physics

ASP Activities

Student Program

3-week intensive school 3rd year of University to Ph.D. Mostly African Students.70-80 Students selected from >500 applications by a committee of lecturers.

Mentorship / Coaching Program At all times

Work with Academic Advisors
Connect Students with
Researchers
Place students at Laboratories
Listen to students and help
address their academic needs if
possible

ASP Conference

1-week International Conference Participation of ASP Alumni Participation of Research Faculties Networking and collaborations

ASP Forum

1-day to discuss capacity development and retention in Africa & the role of ASP

High School Teachers Program 1-week intensive workshop to Train High School Teachers for improved physics teaching

Learners Program

1-week learners Outreach
10-12th grade learners
Encourage learners to
develop and maintain
interests in Physics and
Applications

Online Lectures

To supplement the term schools

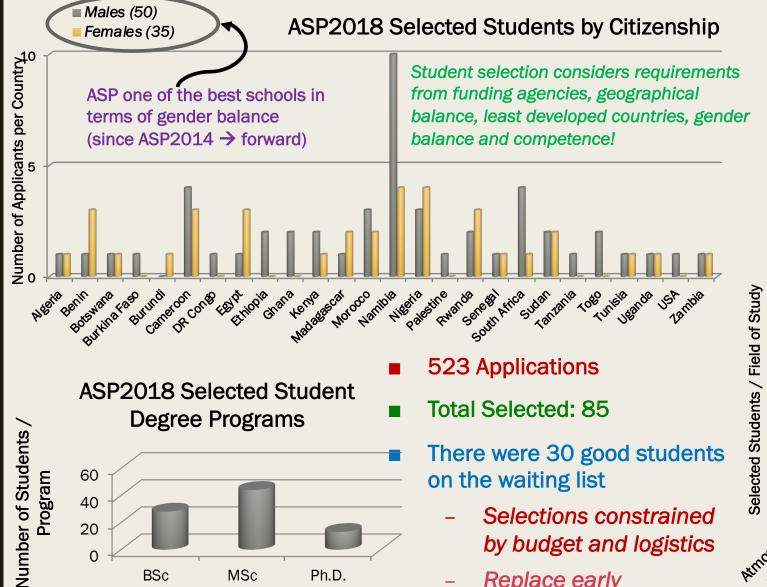
ASP2016-Students

- During a hands-on tutorial in Linux
- Session organized and led by Prof. Pheneas Nkundabakura (University of Rwanda)



Dr. Kétévi A. Assamagan, BNL & Fellow of the African Academy of Sciences

ASP2018 Students Profile

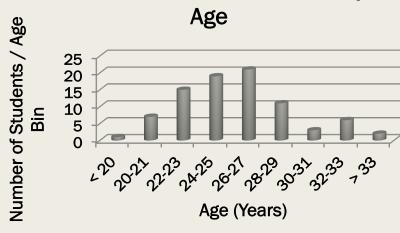


40 20 0 MSc Ph.D. BSc **Degree Pursued**

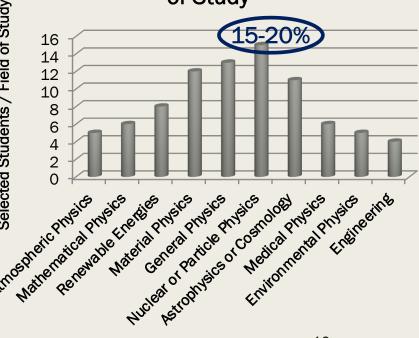
on the waiting list

- Selections constrained by budget and logistics
- Replace early declinations

ASP2018 Selected Students by



ASP2018 Selected Students by Field of Study



High School Teachers Program

Objective:

Support teachers growth in the planning and delivery of physics instructions

One week event:
Up to 70 teachers from the host country identified by the Local Organizing Committee and the Ministry of Education



Teachers program runs in parallel to the students program

High School learners Program

Objective:

Motivate high school pupils to develop and maintain interest in Physics



We cover up to 40 high schools around the venue; 1500-2000 high school learners



Learners program runs in parallel to the students program

Program designed such that the lecturers that are not lecturing to students can help with the learners program

ASP - Conference

Objective:

Attract ASP alumni;

Attract African research faculties;

Attract international participants not part of ASP;

Foster new research collaborations



One week:

The physics topics taught at the school form the core of the ASP conference.

People may attend only the conference part of ASP. We had 60 extra participants in ASP2018

> Peer-reviewed conference proceedings published by the African Review of Physics

http://aphysrev.ictp.it/index.php/aphysrev/issue/view/35

ASP Forum

One day during the school. Objective:
Align ASP with the research and education priorities of African countries

2012-Ghana



The African Light Source (AfLS)

Prof. H. WINICK, Prof. Emeritus, SLAC and

Prof. S. Connell (University of Johannesburg

THE THIRD BIENNIAL AFRICAN SCHOOL OF FUNDAMENTAL PHYSICS AND ITS APPLICATIONS
Cholks And Digo University
Data: Senegal
August 3-23, 2014

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Cholks And Digo University
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August 3-23, 2014

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PHYSICS AND ITS APPLICATIONS
Cholks And Digo University
Data: Senegal
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UN support (2014-Senegal)

Dr. H. TOURE, UN ITU Secretary General.

Prof. A. WAGUE and Prof. Oumar Ka





2010-South Africa

Dedicated to Knowledge and Transfer of Technology

Dr. D. ADAMS, chief director: Emerging Research areas & Infrastructure, Human Capital and Knowledge Systems.

East African Institute for Fundamental Research (EAIFR)
Rwandan Ministry of Education



Dr T. TJIVIKUA, Vice-Chancellor, Namibia University of Science and Technology (Namibia) Dr. R. ADAM (SKA, SA)



Lecturers

 People-oriented lecturers willing to share their experience with African students

Highly motivated and motivating characters

Most of ASP lecturers are financially supported by their home institutes

♦ Provide fruitful interactions with students

Lecturers typically attend the ASP for 3 - 7 days _____



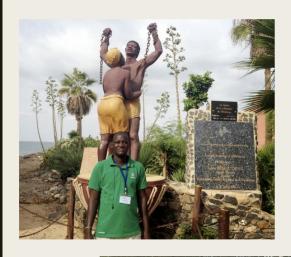




Excursions and Festivities



















ASP2020 - Marrakesh Morocco - July 5-25, 2020



ASP Host Country and Venue Selections

- The host country of the next edition of ASP is selected 2.5 years earlier
 - The selected host country is invited to join the organization of the current edition, to gain experience
 - ASP2020 / 2021: Morocco. In December 2019, South Africa was selected to host ASP2022 at the Nelson Mandela University in Port Elizabeth
 - Approximately one year before the school starts, the IOC makes a one-week site visit to the host country, and together with the LOC, they set the timeline and planning of the event
- African countries are invited to submit proposals to host the next ASP
 - The IOC sets the guideline of what to include in the proposal
 - Deadline: September of the odd years (2019, 2021, ..)
 - The IOC reviews the proposals and make a selections in December of the odd years

Site Visit to Morocco—April 2019



ASP Sponsorships for Participants

"If each African country supports its participants, or contributes 2500 Euros every year to the ASP budget, ASP will be entirely financed by African countries. And *2500 Euros* is marginal even for the least developed country"

Budget for each cycle: 200 kEuros

Student participation
Management of
application database
Arrange student travels

Host Country Support Significant

In-kind support
Direct Financial
contributions
Human Resources toward
ASP Organization

ASP2018 Sponsors in addition to USA DOE Labs (BNL)



African Contributors (2018):

- Namibia
- SA DST/NRF
- IUCEA

Integrated: ~40% ASP2018 budget

Fund Management

By the Board of Trustees & South African Institute of Physics

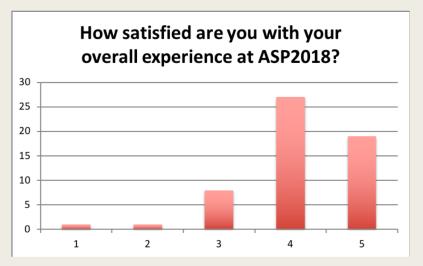
100

Writes Proposals, Requests for Supports
Produces Final Reports of Activities
Seeking permanent financial
backing

Lecturers and Organizers
Supported by External Sources Significant

Support received then used to maximize student participation

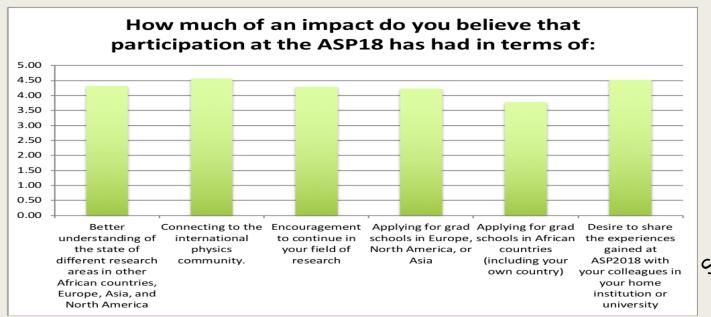
ASP Impact



Two types of surveys done

- One toward the end of each edition (current participants)
- One every 4 years (all alumni)

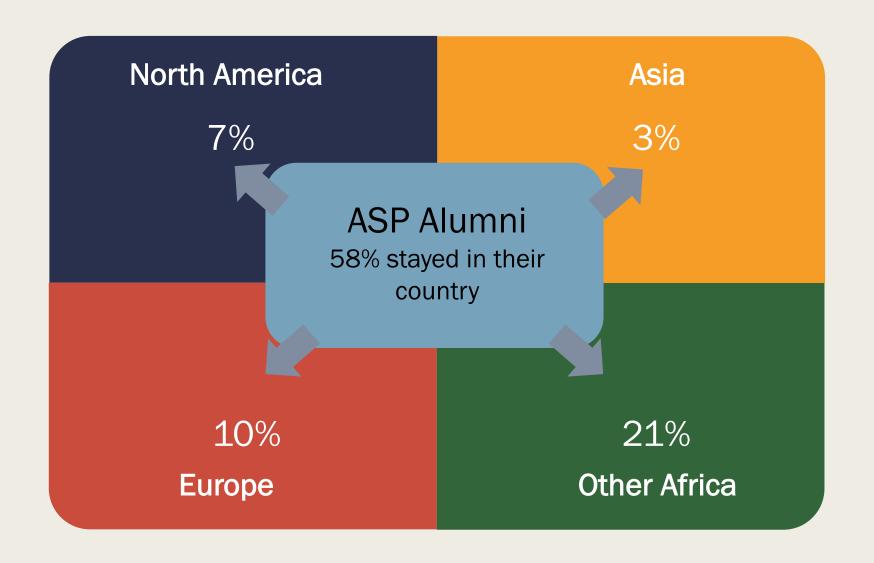
5 = very satisfied; highest impact





My research has benefited

Retention. Where do ASP alumni go?



ASP Structured Mentorship

■ This includes all the activities in-between consecutive term ASPs to further support alumni's growth and academic progress

Short-Term Visits for Research

■ June-December 2019, 9 ASP alumni came to Brookhaven National Laboratory for short-term research



From left to right: in front, Christelle Ekosso (Cameroon), Dr. Mounia Laassiri (Morocco); standing, Diallo Boye (Senegal), Dr. Somiealo Azote (Togo), Jesutofunmi Fajemisin (Nigeria), Hassnae El Jarrari (Morocco), Dr. Kétévi A. Assamagan, Raymond Yogo (Kenya), and Yves Kini (Burkina Faso). Heba Sami Abdulrahman (Egypt), not in the figure, arrived in September.

Alumni from African School of Physics Come to Brookhaven Lab for Hands-on Work Experience

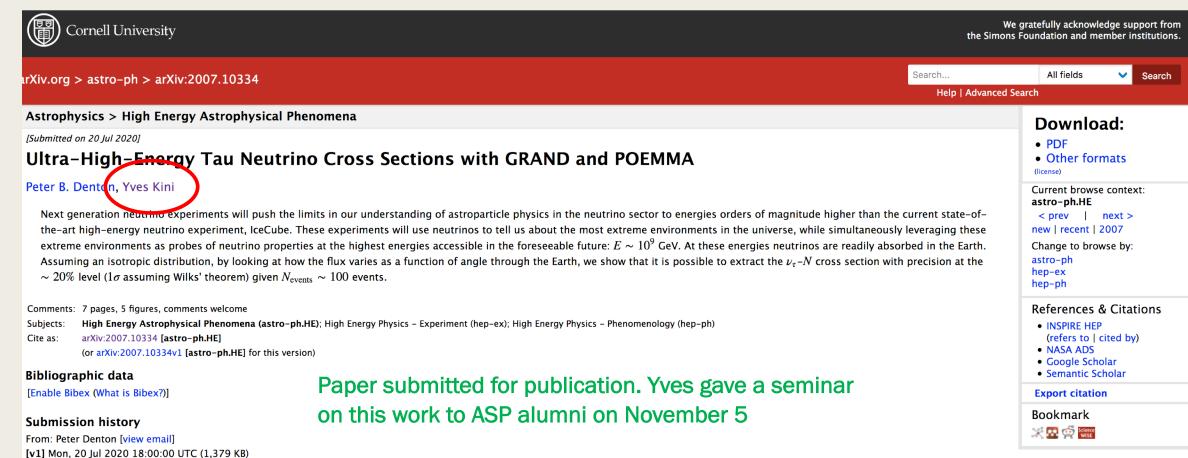


https://www.bnl.gov/newsroom/news.php?a=216732

Alumni from African School of Physics Come to Brookhaven Lab for Hands-on Work Experience



ASP Alumnus Yves Kini Publication Based on Study Done during his Short-Term Visit at BNL



BNL Advisor during short-term visit: Dr. Peter Denton (Theorist, neutrino physics)

ASP Alumnus Dr. Mounia Laassiri gave an invited talk at DPF 2019-Boston

arXiv.org > physics > arXiv:1909.06309

Search...

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Physics > Physics Education

[Submitted on 13 Sep 2019 (v1), last revised 18 Nov 2019 (this version, v2)]

The African School of Fundamental Physics and Applications (ASP)

Kétévi Adiklè Assamagan, Mounia Laassiri

The African School of Fundamental Physics and Applications is a biennial school in Africa. It is based on the observation that fundamental physics provides excellent motivation for students of science. The aim of the school is to build capacity to harvest, interpret, and exploit the results of current and future physics experiments and to increase proficiency in related applications. The participating students are selected from all over Africa. The school also offers a workshop to train high school teachers, an outreach to motivate high school pupils and a physics conference to support a broader participation of African research faculties. Support for the school comes from institutes in Africa, Europe, USA and Asia. In this paper, we will present the school and discuss strategies to make the school sustainable.

Comments: 8 pages, 7 figures, Talk presented at the 2019 Meeting of the Division of Particles and Fields of the American Physical Society (DPF2019), July 29 - August 2, 2019, Northeastern University, Boston, C1907293

Subjects: **Physics Education (physics.ed-ph)**Cite as: arXiv:1909.06309 [**physics.ed-ph**]

(or arXiv:1909.06309v2 [physics.ed-ph] for this version)

Bibliographic data

[Enable Bibex (What is Bibex?)]

Contribution to the DPF-2019 Proceedings

Submission history

From: Mounia Laassiri [view email] [v1] Fri, 13 Sep 2019 15:59:36 UTC (719 KB) [v2] Mon, 18 Nov 2019 19:16:04 UTC (719 KB)

Which authors of this paper are endorsers? | Disable MathJax (What is MathJax?)

Assisting Alumni in higher education opportunities



THE AFRICAN SCHOOL OF PHYSICS: A SPRINGBOARD FOR THE FUTURE

A biennial African School of Physics (ASP) on fundamental physics and its applications was established in 2010 in order to promote international cooperation in the field of fundamental physics among African countries and between them and western countries.

An ASP has taken place every second year from 2010 to 2016 ...





Top: Dr. Chilufya Mwewa, (Zambia, ASP2010), PhD (2020) Diallo Boye (Senegal, ASP2012), PhD (expected 2020)

> Both Chilufya and Diallo have post-doc positions at BNL to work on the ATLAS Experiment

> > Many other cases of active engagement to help alumni

Serving on Thesis Committees / External Examiners / External Reviewers

Many of us, organizers or lecturers at ASP, do this

Files status determination in a Large Scale Data Center

Aulan Lucrèce ZAHOUNDO (aulan@aims.ac.za)
African Institute for Mathematical Sciences (AIMS)

Supervised by: Dr Kétévi Adiklè ASSAMAGAN Brookhaven National Laboratoty, USA

02 May 2020

Submitted in partial fulfillment of a structured masters degree at AIMS South Africa



Abstract

Being able to manage the space allocated to the ATLAS dCache despite the large amount of data that comes into it is a great challenge for analysts at the Brookhaven National Laboratory. The main goal of our work is to classify these data according to their importance for physics. To do this, we have, at first glance simulating data in the ideal case, discussing experiences which in reality have made it possible to obtain them. And we then apply a Machine Learning algorithm to our simulated data in order to find solve the storage issue.

Lucrèce Zahoundo (Bénin), alumnus ASP2018
MSc thesis study done using Deep Learning Tools

Dr. Assamagan, Prof. Connell and Prof. Lerothodi Leeuw co-advised Diallo Boye (alumnus ASP2012) to the PhD on ATLAS. Diallo is now a post-doc at BNL.

Many other cases like this

Getting Busy during COVID-19 Pandemic

- ASP alumni studying COVID-19 data of of African Countries
- Previous study submitted for publication in the Scientific African
 - https://arxiv.org/pdf/2007.10927.pdf
- In subsequent work, we analysis one years of COVID-19 data of 10 African countries, including South Africa
 - Because South Africa has near 50% of all the COVID-19 cases in Africa, our analysis covered over 50% of all the African COVID-19 cases
 - https://arxiv.org/pdf/2104.09675.pdf



Dr. Somiéalo Azote Togo



Toivo Samuel Mabote Mozambique



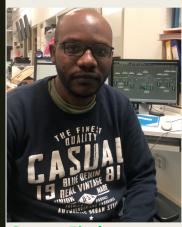
Ebode Fabien Onyie Cameroon



Dr. Dephney Mathebula South Africa



Kondwani C. C. Mwale (Malawi)



George Zimba Zambia



Essossolim C. Haliya Togo



Ann Njeri Kenya



Dr. Kossi Amouzouvi Togo



Aluwani Guga South Africa



Francisco F. Macucule Mozambique



Dr. Laza Rakotondravohitra Madagascar



Dr. Fenosoa Fanomezana Madagascar

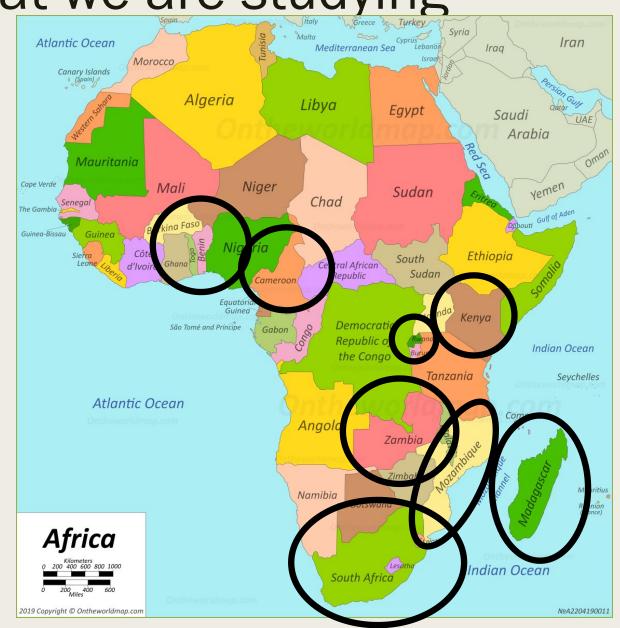




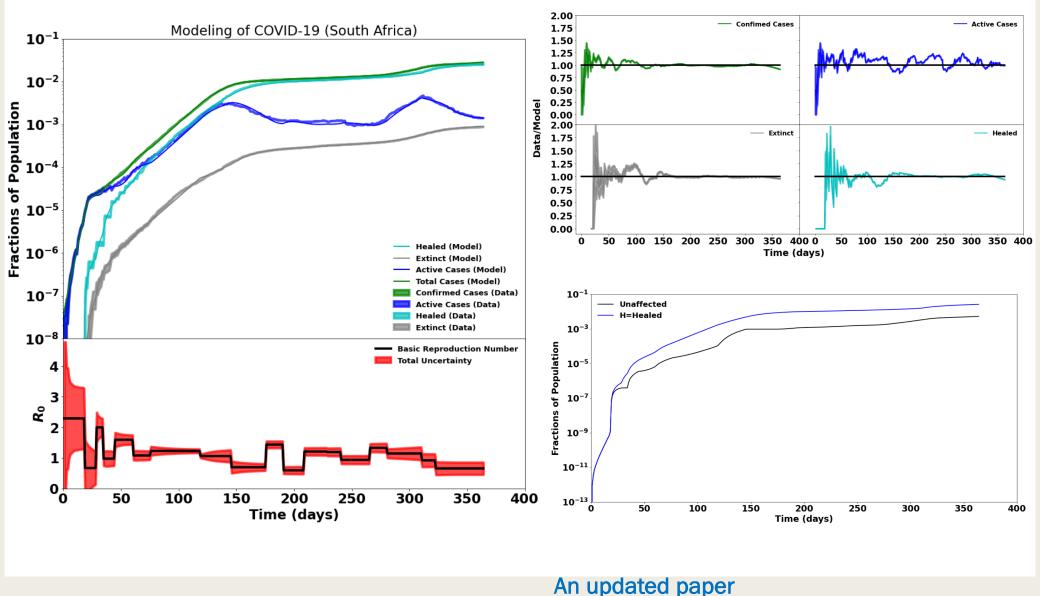
Prof. Simon Connell (University of Johannesburg)

The countries that we are studying

- Benin
- Cameroon
- Ghana
- Kenya
- Madagascar
- Mozambique
- Rwanda
- South Africa
- Togo
- Zambia



COVID-19 Data Analysis - South Africa



https://arxiv.org/pdf/2104.09675.pdf Dr. Kétévi A. Assamagan, BNL & Fellow of the African Academy of Sciences

Recent events / What's happening...

- ASP mentorship program is on-going
- ASP2020 → ASP2021
 - July 19-30, 2021,
 https://indico.cern.ch/event/812393/timetable/?view=standard
 - 3-week program condensed into 2 weeks where the 2nd week has 2 parallel sessions
 - In parallel, online workshop for African high school teacher, July 21-23, 2021, https://indico.cern.ch/event/1050810/
- African Conference on Fundamental and Applied Physics (ACP)
 - This conference is normally integrated in ASP in its 3rd week
 - ACP2020 was planned in Marrakesh, Morocco in July 2020; postponed to December 12-18, 2021, ACP2021
- ASP online seminars
 - Weekly or bi-weekly since May 2020

ACP2021, March 7-11, 2022; virtual

- 649 registrations
 - Largest participation see in these types of events in Africa
- Scientific program
 - https://indico.cern.ch/eve nt/1060503/
- Conference proceedings
 - In preparation



ASP2022 in South Africa

- Due to uncertainty about COVID-19
 - In 2022, ASP will be split in 2 events in 2022

■ ASP2022

- 2-week school in-person (Nelson Mandela University) or online
- Date: November 28 December 9, 2022

■ ACP2022

- One week conference, hybrid
- November / December 2023
- Venue to be decided

Conclusions

- Since the first edition in 2010, on top of the students program, ASP has evolved with the addition of:
 - Teachers program
 - High school outreach
 - Structured mentorship program
 - International conference catered to student alumni and research faculties
 - Online lectures
- ASP has evolved to be much more than a school. It is a program of actions with directed ethos toward physics as an engine for development in Africa
- Application for ASP 2021-2023 Mentorship closed
 - Program currently running
- ASP online seminar series to re-start in September until November 2021
- ACP2021: March 7-11, 2022 in Virtual
 - Conference proceedings being prepared
- ASP in 2022 in South Africa
 - 2-week School on November 28 December 9, 2022, at NMU
 - 1-week conference in November / December 2023

ASP Structured Mentorship

- It runs continuously even when there is no school;
- Open to ASP student alumni in Ph.D. programs;
- Pairing of students to lecturers. Lecturers to mentor and coach them;
 - Not a replacement of academic advisors,
 rather in addition to / in collaboration with it
- Helps IOC track students after the school;
- Helps answer the questions, "Where are they now?", "What happens to them after they've attended ASP?"
 - These are legitimate questions
 - Mentorship program supplemented by periodic of surveys
- Program formalized soon after ASP2016;
- Through this program, we place ASP alumni in high education programs in South Africa, Asia, Europe and North America



Project Goals/Aims

- ☐ To build capacity for Africa
- ☐ Support students
- ☐ Identify academic related obstacles
- □ Study problems solving trends
- ☐ Identify physics related challenges in Africa
- ☐ Help manage and differentiate types of needs
- ☐ To measure the impact of the ASP

Not a replacement of Academic Advisor. Rather in collaboration with

Mentorship Registration & Selection

- ☐ Registration closed for 2021-2023
 - □ https://indico.cern.ch/event/971926/
- ☐ Selection
 - ☐ IOC and lecturers make selections after the registration period
- □ 2021-2023 Mentorship
 - □ Started in March/ April 2021 after briefings

Mentorship Program 2021-2023

- ☐ Background... Looking back at 2016-2020
- ☐ Project Goals/Aims
- ☐ Responsibilities of the Mentor
- ☐ Responsibilities of the Mentee
- □ Pairing process
- □ Evaluating the Mentor
- ☐ Overview what's next?
- Methods of communication
- Application period

Mentorship Program Background

- ☐ The previous round (2016-2020)
- □ Lecturers & Student interactions during/after the ASP school
- ☐ What is the idea of a mentorship?
- ☐ Benefits of Mentorship
- □ Accelerating and addressing African students' academic needs
- ☐ Help increase information access

Responsibilities: Mentor

Supplement Academic Advisory to support and ensure student growth and progress

- ☐ Active contact
- ☐ Concern self with students progress
- ☐ Point student to resources
- ☐ Direct student
- □ Every activity must be for the student's benefit
- ☐ Minimum coaching where needed

Responsibilities: Mentee

- □ To Communicate
- ☐ Be enthusiastic about their own work
- ☐ To seek help
- ☐ To explore all possible resources first at own University
- ☐ Consult your supervisor
- ☐ Keep Mentor informed of necessary changes
- ☐ Be available either on call or through Skype or other means when needed
- ☐ To follow through with suggestion of Mentor unless with good reason

Pairing Process

- ☐ Current situation
- ☐ Choosing participants:
- ☐ The mentors the correct students







- □ Teaching fanatic
- ☐ Previous ASP participant
- Understanding of African dynamics projects

- PH.D students
- Previous ASP student
- Is involved in direct science related

Evaluation the Mentor

- ☐ Mid-point evaluation in a year...?
- □ ...and at the end of the program

Plan Overview

- Mentees briefing
- ☐ Introduction email to Mentors & Mentees
- ☐ Start of program March-April 2021
- Duration of a cycle
- ☐ 1/2 years

Communication with your Mentor...

- □ Email, Skype, Zoom, ...
 - ☐ Issues of good internet connectivity
- Telephone

Areas that need improvement (mentees/mentor)



- Mentor's area of expertise
- Improve in ways to hear how the program is going, like regular meeting with the mentees
- For a good mentorship program, you need to be close by student and mentor.
- Sharing of opportunities and networking of prominent researchers in the mentee's field should be encourage. Also, the mentees should be motivated to engage in community services in his/her home country and be supported if need be.
- I think financial resources are the biggest issue.
- It may be very great if we have more exchange.
- Better communication platform

Additional Materials