

CIMPA School Final Report

Title of the school : Mathematics of Climate Science

Dates : July 5-13, 2021

Location : Kigali, Rwanda

I. Summary

In a context where Africa is particularly affected by climate issues whether in terms of agricultural development, economy or health, it was proposed to hold a school in Rwanda, one of the countries that takes environmental issues most seriously. More precisely, the host institution was the AIMS Center in Kigali and the local supervisor was Blaise Tchapnda, Academic Director. The scientific program was entirely designed by Alberto Carrassi who was at NERSC, Nansen Environmental and Remote Sensing Center, at the time the program was put together, and at Reading University when the school took place. Alberto Carrassi was able to gather a dream team of renowned experts covering all aspects of the topic, from underlying physics to phenomenological or stochastic modeling, dealing with uncertainties, and data assimilation techniques, with an opening on societal issues. See below.

The school was meant to hold in July 2020 with an audience consisting of the AIMS students (end of Master level) and more advanced young researchers (PhD students, young academics) from the neighbouring countries. Because of the Covid pandemic, the school had to be postponed and, in the end, was transformed in a 2021 hybrid event with only students at AIMS attending on the spot. From a while, it had been expected that Rwandese participants outside from AIMS would join, but this was not the case. It so happened that on the very days the school took place, Rwanda which had been little affected by the pandemic until then, suffered a sudden peak of contaminations. Our decision of turning the school in the hybrid format had been wise.

The only person not already at AIMS who was able to travel was Annie Raoult, CIMPA supervisor of the school.

AIMS students had been prepared by a course on Data Assimilation during the academic year.

For the practical running of the school, we used the LMS platform of CIMPA. This required some additional work from Alberto Carrassi who had to implement the program on the platform. Although the timetable was adapted, it was mandatory that, for those lecturers with a significant time difference with Rwanda, lectures should be recorded in advance, and viewed either on a screen at their time-slot in the classroom, or individually by non AIMS participants. This had the additional virtue of allowing the students to have a look at the lecture beforehand. We encouraged other lecturers to record their lectures as well, as we were anticipating internet instable connexions and wanted the number of online sessions to be low. We warmly thank the lecturers who devoted a huge amount of time to record their lectures.

The Zoom connexion turned out to be very good and, finally, we used the personal meeting room of the account created for this school for all slots, either lectures, Q&A, or Meet the lecturer.

Indeed, it proved more lively that the lecturers who were on a similar time zone, either monitored their video by themselves, or gave a regular Zoom presentation by using slides associated with their recorded lectures.

There is now a full amount of scientific material available on the LMS platform: lectures that had been recorded before the school, pdf or links for the slides of the online sessions, references. We do hope this will be useful for future use by the students. During the school, we duly recorded the sessions via Zoom (not Q&A), but we feel that these recordings will be of minor interest as they are almost duplicates of recordings that were previously uploaded or of documents. We only uploaded on the platform the recording of the training session.

This whole process relied on both tutors Assionvi Hove Kouevi and Stive Roussel Tankio Djiokap, who took care of the audio and video. We thank them very much. Their presence and skills were essential.

Comments. Possible improvements.

LMS

- technical aspect of this newly-designed hybrid event: it worked very well.
- use by the participants of the scientific material offered to them on the LMS platform: from high to poor. Some participants would ask very late how to connect to the platform. Others seemed to navigate quite well. Perhaps repeated information should be given before any school is held.
- use of Zulip chat for notifications: difficult to assess. Zulip chat was quite useful in updating information @all. It is impossible to know if it really reaches all students. Do they check Zulip? Have they enabled automatic forwarding of notifications to their personal email address?
- there may have been some confusion with the local website for the school which had been designed for a in-person school.
- additional burden for the lecturers: most lecturers were really good at navigating the LMS platform and were familiar with all sorts of editing, uploading material, adding links... Some others needed some help, even after the recommended viewing of the tutorial. Others would simply send their material. It should be kept in mind that such format asks a lot of them and that they can feel that they have accomplished their mission when their teaching materials are ready. It should be stressed that, as this school was one on the first schools under this format, some confusing instructions may have been given to them.

Achievement of goals

- training of the AIMS students who had been prepared by a course during the year. They seemed happy with the school. Achieved.
- making the lectures available to PhD students, young academics of other African countries, young professionals, including provision of scientific documents prepared especially for the school, made as lively as possible, during the Zoom sessions and still available. Achieved.
- encouraging exchanges between students and lecturers: there was some interaction via Zulip, but rather limited. There were questions asked on Zoom, mainly via the chat.

Note that, in addition, this format makes the lecturers not to attend each other course.

- encouraging interactions between students from different countries: cannot be assessed. The free time of regular schools where students can exchange was deeply missing.

II. Scientific content

Course 1: Introduction to predictability of atmosphere and climate – Stephane Vannitsem (RMI, Belgium)

Course 2: Response fluctuations in the climate system – Valerio Lucarini (University of Reading, UK)

Course 3: A primer on data assimilation – Alberto Carrassi (University of Reading, UK)

Course 4: Geostatistics – Laurent Bertino (NERSC, NO)

Course 5: Simple models of tropical dynamics – Amit Apte (ICTS, India)

Course 6: Forecasting uncertain hazard in a changing climate (3 parts) – Elaine Spiller (Marquette University, USA)

Course 7: Climate Prediction – Francois Counillon (NERSC, NO)

Course 8: The geopolitics and environmental impacts of oil– Maria Rita D’Orsogna (UCLA, USA)

Training 1: Experimental learning of stochastic inference – Colin Grudzien (University of Nevada in Reno, USA)

Training 2: Data assimilation coding and experiments – Ali Aydogdu (CMCC, IT)

III. Participants

The selection of CIMPA participants had been made in 2020 on the basis of a face-to-face school. A number of 15 participants to be funded had been retained. In 2021, the call was reopened for a regular school and we selected 3 other participants. The 18 selected people were from Benin (4), Cameroon (3), Congo (2), Ethiopia (1), Ghana (4), Kenya (1), Malawi (1), Senegal (1), Uganda (1).

When the format was changed to hybrid, we decided to open largely. Indeed, the cost was nothing and there was no reason to refuse a not so good applicant. As a consequence, we had over 68 applicants not from AIMS who confirmed they would attend the school.

We asked them whether they needed some support for buying small equipment and finally sponsored 11 participants marked * in the list below, for a total amount of 1821€.

List of AIMS Kigali Students: 36

stephen.kiilu@aims.ac.rw	Stephen	Kiilu
jalene.mirgissa@aims.ac.rw	Jalene	Mirgissa
isaac.nsengiyumva@aims.ac.rw	Isaac Newton	Nsengiyumva
jeanirenee.akimana@aims.ac.rw	Jean Irene	Akimana
ange.iradukunda@aims.ac.rw	Ange Ernestine	Iradukunda
stanley.akor@aims.ac.rw	Stanley	Akor
valensi.grevazi@aims.ac.rw	Valensi M	Grevazi
rashida.salih@aims.ac.rw	Rashida Yagoub Abdalla	Salih

sandra.babyale@aims.ac.rw	Sandra Rebecca	Babyale
olive.byukusenge@aims.ac.rw	Olive	Byukusenge
germaine.neza@aims.ac.rw	Germaine	Neza Hozana
kachinga.silwimba@aims.ac.rw	Kachinga	Silwimba
japheth.kasomo@aims.ac.rw	Japheth	Kasomo
pamela.kariuki@aims.ac.rw	Joy	Kariuki
denis.mulumba@aims.ac.rw	Denis	Mulumba
elvira.dongmo@aims.ac.rw	Elvira	Dongmo
ornela.nanwou@aims.ac.rw	Ornela	Dehayem Nanwou
paulin.tshibuabua@aims.ac.rw	Paulin	Tshiunza Tshibuabua
ruth.ifeoluwa@aims.ac.rw	Ifeoluwa Ruth	Olonijolu
daniel.uwitonze@aims.ac.rw	Daniel	Uwitonze
emmanuel.niyibizi@aims.ac.rw	Emmanuel	Niyibizi
rashidi.yusuph@aims.ac.rw	Yusuph	Ramadhani
bernard.dadzie@aims.ac.rw	Bernard	Amponsah-Dadzie
pacifique.karekezi@aims.ac.rw	Pacifique	Karekezi
jeannette.mukangango@aims.ac.rw	Jeannette	Mukangango
patrick.shema@aims.ac.rw	Patrick	Ntwari Shema
jeanremy.kubwimana@aims.ac.rw	Jean Remy	Kubwimana
henriette.santatra@aims.ac.rw	Santatra Henriette	Rabariharylala
florence.uwimbabazi@aims.ac.rw	Florence	Uwimbabazi
patricia.azike@aims.ac.rw	Patricia Oluchi	Azike
mamy.rajaonarivelo@aims.ac.rw	Mamy Nirina	Rajaonarivelo
yvesbonheur.mugiraneza@aims.ac.rw	Yves Bonheur	Mugiraneza
origene.tuyishimire@aims.ac.rw	Origene	Tuyishimire
frimpong.sefah@aims.ac.rw	Sefah	Frimpong
abraham.mpandiko@aims.ac.rw	Abraham Denis	Mpandiko
redempta.manzi@aims.ac.rw	Redempta	Manzi

List of AIMS tutors: 3

stive.djiokap@aims.ac.rw	Stive Roussel	Tankio Djiokap
hove.kouevi@aims.ac.rw	Assionvi Hove	Kouevi
armeline.dembo@aims.ac.rw	Armeline Dembo	Mafuta

Others from Rwanda: 6 (expected)

v.baharane@ur.ac.rw	Valerien	Baharane
bazalexis40@gmail.com	Alexis	Bazambaza
isaac.hitimana@aims.ac.rw	Isaac	Hitimana
muhimpundugretta@gmail.com	Gretta	Muhimpundu
ndajadhon@gmail.com	Jean de Dieu	Ndayisenga
fauste.ndikumana@aims-cameroon.org	Fauste	Ndikumana

Other countries: 68 (expected) including sponsored participants marked with *

BF Burkina Faso 1, BJ Benin 11, CD Democratic Republic of Congo 1, CG Congo 2, CM Cameroon 12, DZ Algeria 3, ET Ethiopia 3, GA Gabon 1, GH Ghana 13, KE Kenya 4, MA Morocco 1, MW Malawi 1, NG Nigeria 3, PK Pakistan 1, SD Sudan 1, SN Senegal 2, UG Uganda 3, TZ Tanzania 1, ZA South Africa 2, AT Austria 1, AT Austria 1, FR France 1.

adamsdo@funaab.edu.ng	Daniel Oluwasegun	Adams	NG
dntwiga@gmail.com	Ntwiga	Davis Bundi	KE
ketemadejen@gmail.com	Ketema Mamo	Dejen	ET
mwakilama.elias@students.jkuat.ac.ke	Elias	Mwakilama	KE
castro.hounmenou@imsp-uac.org	Gbêmêmali Castro	Hounmenou	BJ
adewale.folaranmi@lmu.edu.ng	Lukman	Adewale	NG
berwamichelle@gmail.com	Michelle	Berwa	GH
lazaro.mashiku@eastc.ac.tz	Lazaro	Revocatus	TZ
mughogho.r@mzuni.ac.mw	Rosaliah	Mughogho	MW
gradi.l.kmingu@aims-senegal.org	Kamingu	Gradi	CD
lateefjolaoso89@gmail.com	Jolaoso	Lateef Olakunle	ZA
lbata1982@yahoo.fr	Batablinlè	Lamboni	BJ*
josephmalinzi@aims.ac.za	Joseph	Malinzi	ZA
benpatch2000@yahoo.fr	Tchilabalo	Patchali	NG
marc.niyongendako@imsp-uac.org	Marc	Nyongendako	BJ*
andami2016@gmail.com	Armel	Andami Ovono	GA
naomikumi@yahoo.com	Naomi	Kumi	GH
yolande@aims.edu.gh	Yolande Vanelle	Ngueabou	GH
sorelle@aims.edu.gh	Sorelle Murielle	Toukam Tchoumegne	GH
dangbeezekiel@yahoo.fr	Ezekiel	Dangbe	CM
kenne853@gmail.com	Cyrille	Kenne	CM*
semehuna@gmail.com	Semeneh	Hunachew Bayih	ET
s.aboagye-ntow@gaecgh.org	stephen	Aboagye-Ntow	GH
robert.egessa@gmail.com	Robert	Egessa	UG
elkanah@aims.edu.gh	Elkanah	Nyabuto	GH
bensaci93salim@gmail.com	Salim	Bensassi	DZ
e.dongmo90@yahoo.fr	Eric Donald	Dongmo	CM
idriss.c.t.tondji@aims-senegal.org	Idriss Cabrel	Tsewalo Tondji	SN*
myriamtapi@yahoo.fr	Myriam Sonia	Djoukwe Tapi	CM
asanteantwivincet@yahoo.com	Vincent Antwi	Asante	GH
schatta@usthb.dz	Sofiane	Chatta	DZ
ghaus957@yahoo.com	Ghaus	Ur Rahman	PK
magloirefossokeng@yahoo.fr	Joseph magloire	Fossokeng mouafo	CM
braimahmm@gmail.com	Mohammed	Braimah	GH
balehouane.abdelkhalek@gmail.com	Abdelkhalek	Balehouane	DZ
roy.ngakala@gmail.com	Roy Dorgeless	Ngakala	CG
teferi2005@gmail.com	Nebiyat Yilma	Teferi	ET

angelenankabirwa@gmail.com	Angela	Nankabirwa	UG
camellekabiwa@gmail.com	Camelle	Kabiwa Kadje	CM
nkwayepcedric@yahoo.fr	Cédric Iverdon	HameniI Nkwayep	CM*
npeguyroussel@yahoo.fr	Peguy Roussel	Nwagoum Tuwa	CM
b.yahaya@aims.edu.gh	Bashiru	Yahaya	GH
timoo.acknow@gmail.com	Timothy Kiprono	Yano	KE
hbouzahir@yahoo.fr	Bouzahir	Hassane	MA
sandy.ngaha@aims-cameroon.org	Sandy Frank	Kwamou Ngaha	CM
renaudkoukoui@gmail.com	Djidjoho Renaud Romeo	Koukoui	BJ*
Idene@gmail.com	Idene-Flore	Mantho	CM*
ninahazwesarah@gmail.com	Sarah	Nininahazwe	BJ
atchindafeudjio@yahoo.fr	Armand	Tchinda Feudjio	BJ*
yodayacoubapapy@gmail.com	Yacouba	Yoda	BF
yano.timothy@students.jkuat.ac.ke	Timothy	Yano	KE
edwige.akpoly@imsp-uac.org	Edwige	Akpoly	BJ*
joachna.m.l.bouaye@aims-senegal.org	Joachna	Meya Loua-Bouayi	CG*
betekorahafiz1@yahoo.fr	Kora Hafiz	Bete	BJ
miriam.hounsinou@imsp-uac.org	Miriam	Hounsinou	BJ
bright.s.e.aboh@aims-senegal.org	Aboh	Bright Silas Edem Yaw	SN
tchazino@gmail.com	Tchazinio	Tchamie	BJ*
wkulei@aims.edu.gh	Winnie	Kulei	GH
elsy.sielatchom@gmail.com	Cedric Elsy	Sielatchom Ngalaha	CM
markolokotum@yahoo.com	Mark	Olokotum	UG
adomaprisboad@gmail.com	Priscilla	Boadi	GH
peguy.kameni@aims.ac.rw	Peguy	Kameni Nteutse	CM
asarefi@yahoo.com	Kofi	Asare	GH
maureenahiataku@gmail.com	Maureen	Ahiataku	GH
ossenatou.mamadou@imsp-uac.org	Ossenatou	Mamadou	BJ
memeastro1988@gmail.com	Mohammed Yahya	Eldaw	SD
stephen.moore@ricam.oaaw.ac.at			AT
noxmbaimou@gmail.com	Auxence	Mbaimou	FR

Comments:

- an informal look at the names of the participants in the Zoom meetings makes it very likely that about 32+3 non AIMS participants attended several lectures. Note that some used computers under other names (3 unknown names). As a conclusion, 35 persons attended some of the lectures out of 74 who confirmed participation.

- in addition to PhD students and young academics, there were several professionals from meteorological agencies, environmental agencies, and fisheries.

- as far as can be said, 90% of the sponsored participants attended most of the lectures.

- as far as can be said, many of the participants who had asked for support but were not awarded support did not attend.

- dealing with the list of participants with this format, and such a huge number, was a failure. This has to be better prepared for next online schools.

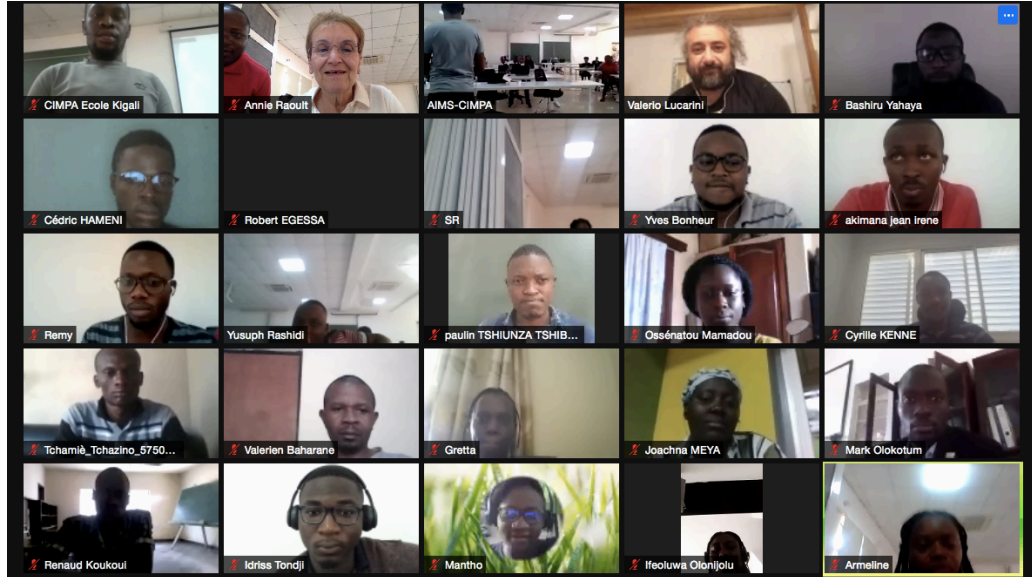
- in particular, it is not clear how to deliver certificates of attendance. We delivered certificates of successful admission at the school to those who asked in the few days after the school. It was good to see that, as far as can be said, they had indeed attended several lectures.

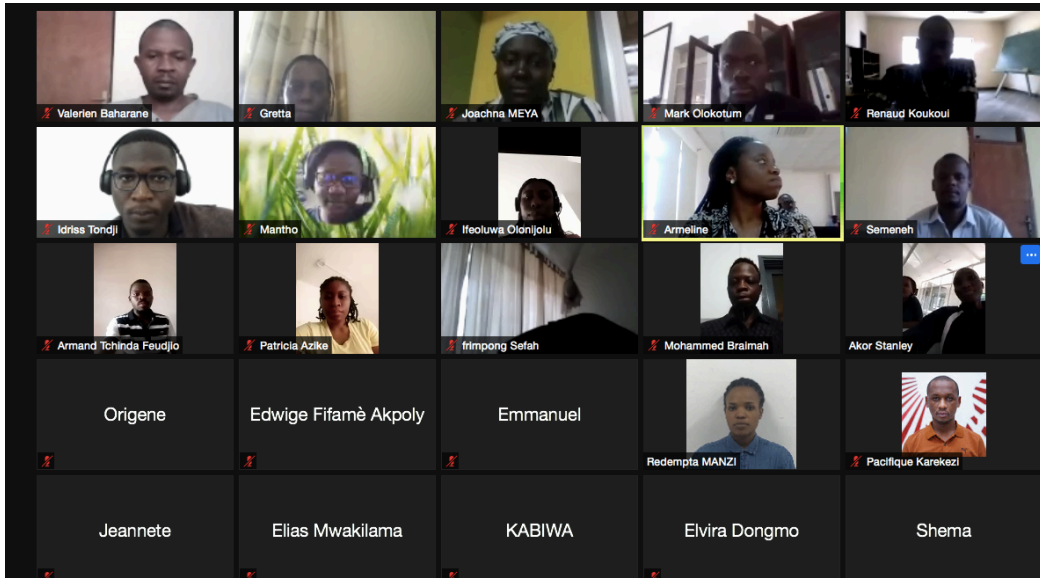
IV. Financial Report

The planned budget for a school in person included 24K€ from AIMS-Kigali and 12K€ from CIMPA. Alberto Carrassi had obtained 6K€ from the UK National Centre for Earth Observations (NCEO) for a school in 2020. IMU granted 1500€. The ICTP Selection Committee had evaluated positively the application for 2020. Because of the new format, we did not apply for the support from NCEO in 2021, nor from ICTP. IMU offered to support the school with a 500€ grant for improving the sound system. This support was actually used after the school took place with the kind approval of IMU.

	AIMS-Kigali	CIMPA	IMU	
Accommodation CIMPA Supervisor	826€			
Airfare and Covid tests CIMPA Supervisor		1730€		
Small equipment for students		1821€		
Zoom license		79€		
Panel CIMPA- AIMS	85€			
Loudspeakers			500€	
Total	911€	3630€	500€	5041€

V. Pictures







Blaise Tchapnda, Hove Kouevi, Annie Raoult, Stive Djiokap, Sam Yala



Graduation Day, July 9, 2021