



AIMS

African Institute for
Mathematical Sciences
SENEGAL

TRAINING AFRICA'S TOP MATHEMATICAL SCIENTISTS



OUR VALUES



EXCELLENCE



RESPECT



PAN-AFRICANISM



INTEGRITY



AIMS

African Institute for
Mathematical Sciences
NEXT EINSTEIN INITIATIVE

WE ARE CONTRIBUTING TO AFRICA'S SOCIO-ECONOMIC TRANSFORMATION THROUGH:



Innovative
scientific training



Technical advances
& discoveries



Public engagement for
the continent's scientific
emergence

HOW ARE WE DOING THIS?



PROFILE OF AIMS ALUMNI



OVER
2200
ALUMNI
FROM 43 COUNTRIES SINCE 2003

OVER
70%

OF OUR ALUMNI REMAIN
ON THE CONTINENT



ALUMNI ARE FROM **43** COUNTRIES



ALUMNI POST AIMS



In Partnership with

AIMS – ACCELERATING KNOWLEDGE-LED DEVELOPMENT IN AFRICA

The African Institute for Mathematical Sciences (AIMS) is a pan-African network of centres of excellence for post-graduate training in mathematical sciences, research and public engagement in Science, Technology, Engineering and Mathematics.

Founded in 2003 in South Africa by acclaimed physicist Prof Neil Turok and later replicated in Senegal, Ghana, Cameroon, Tanzania and Rwanda, AIMS is leading Africa's socio-economic transformation through:

- Innovative scientific training (the development of human capital);
- Technological advances and cutting-edge scientific discoveries; and
- Public engagement for the continent's scientific emergence.

Africa's youth are at the heart of the innovation and transformation ecosystem which consists of a set of academic and non-academic programs expertly tailored to provide AIMS learners with a unique post-graduate training experience on the continent.

AIMS offers a Master's in mathematical sciences, including a co-operative option with a direct link to industry, the African Master's in Machine Intelligence (AMMI), as well as research programs, with over 100 researchers conducting studies across the network. In addition to the AIMS Industry Initiative and a gender-responsive Teacher Training Program currently implemented in Cameroon and Rwanda, AIMS equally created two critical initiatives: Quantum Leap Africa, a think tank looking into the coming quantum revolution and the Next Einstein Forum to propel Africa on to the global scientific stage.



FIVE FACTS ABOUT AIMS SENEGAL



Founded in 2011, AIMS Senegal was the **second centre** within the AIMS global network to be created under the Next Einstein Initiative, with the support of the Government of Senegal;



AIMS Senegal has graduated **356 students** since 2011, with **84 students** from 12 African countries currently enrolled;



AIMS Senegal has hosted over **196 world-class lecturers** from more than 30 countries around the world;



Qualified students benefit from **full scholarships**;



AIMS Senegal hosted the first edition of the Next Einstein Forum in 2016. The centre was equally visited by President Macky Sall in 2013 and inaugurated by former President Abdoulaye Wade in 2011.



OUR PROGRAMS

ACADEMIC PROGRAM

The AIMS Master's in mathematical sciences consists of courses grouped in teaching units. The program offers a Master's II, targeting students with at least a Master's I or an equivalent diploma, or four years of undergraduate studies in the Anglo-Saxon system. Students with a background in mathematical sciences, physics, computer science or related sciences are eligible. Each year, the academic program is validated by the academic council, based on the proposal of the academic manager. Based on feedback from academic stakeholders and industry, the proposed courses can be slightly modified from one year to the next.

The AIMS Senegal Master's in mathematical sciences is delivered under two streams: a regular or classical program designed for research and a co-operative program which is industry oriented, with a work placement phase.

AIMS Structured Master's Program



AIMS Co-op Master's Program



Academic Program Features



The curriculum runs through three semesters;



Core courses are mandatory for all students for both programs;



Semester I Skills Courses are compulsory and designed to provide introductory and foundational material to the students for both programs, to achieve predefined outcomes, with little flexibility in their content. In this phase, both programs have many courses in common;



Semester II Review Courses include a wide range of topical issues and allow for flexibility in course design for each program. The structured program includes courses like optimal control, topology and functional analysis, numerical method for PDEs, computational commutative algebra, elliptic curve and cryptography, differential geometry, general relativity, quantum computing etc. While the Co-operative program includes courses in machine learning, deep learning, neural network, computer security, data mining/web mining/text mining, biomathematics, database, mathematical modelling for network security, computational finance with python, case studies from industries in big data and computer security etc. Students are required to complete two out of the three available review courses in each time slot. The ongoing communication skills, entrepreneurship and leadership skills, as well as computing classes, are compulsory for both programs;



Semester III is designed for work placement for Co-op students and the research phase for both programs. Co-op Students are supposed to spend six months of internship in a local or international company, to gain hands-on experience and prepare for future career opportunities. Co-op students are required to submit internship reports at the end of the work term. The research phase begins one month before the work placement and resumes in November at the end of the internship phase. Students enrolled in the structured program are required to define their research projects by January- February. During this phase, they get familiarized with the project, get to know their supervisor and start reading on their free time. As from April to the end of the program in June, structured program students focus solely on research;



After defending their research projects before a jury composed of professors from universities in Senegal and abroad, research students graduate in June, while Co-op students graduate in February of the following year.

SKILLS FOR EMPLOYABILITY PROGRAM

The Skills for Employability (SFE) program is a five-year initiative of the African Institute for Mathematical Sciences (AIMS) supported by Global Affairs Canada (GAC). The program aims to adequately meet Africa's socio-economic needs by facilitating school-to-work transition for students in Science, Technology, Engineering and Mathematics (STEM), through specialized trainings to make it easier for them to thrive in the labour market through professional employment or entrepreneurship.

Implemented in Senegal with a focus on the Francophonie region in Africa, SFE aims to contribute to improving the economic prosperity of the target populations through:

- Strengthening AIMS Senegal's organizational management capacity in the delivery of skills development programs for employment;
- Increasing the employability of young STEM students by exposing them to employment-oriented skills programs that integrate gender equality, environmental concerns and meet the needs of the labour market or entrepreneurship;
- Building gender-responsive partnerships between professional development institutions and private sector companies, including women-led organizations from Francophone African countries.



Skills for Employability Program Features



Supporting the Co-operative Master's program, 200 trained;



Massive Open Online Courses (MOOCs) will be offered to 2250 students. Through the African Virtual University's digital platform, online courses are offered free of charge to students from the mathematics departments of 10 partner universities. The objective of the MOOCs is to enable students from targeted universities, as well as their peers from other universities to learn about opportunities for professional insertion available to anyone with a scientific background while giving them the tools and knowledge that will prepare them to become real professionals. Students receive digital certificates at the end of the training. The first MOOCs generated applications from 2,192 applicants, 35% of whom were women;



The Post AIMS Business Certificate (PAB) is a training course for AIMS alumni and non-AIMS students from Francophone universities, designed to prepare them for the labour market and to develop competencies relevant to entrepreneurship. Delivered by a qualified entity, the PAB handles several topics including: entrepreneurship, professional development, self-employment, corporate structure, finance and program management. Since inception, SFE has trained 117 students in Senegal under two cohorts of the Post-AIMS Business Certificate, 40% of whom are women.



Gender inclusion and outreach are key components of the SFE program, with an overall target of at least 30% women for all program components.

PAB Launch



AFRICAN MASTER'S IN MACHINE INTELLIGENCE

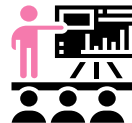
In September 2018, AIMS launched the African Masters in Machine Intelligence (AMMI) at AIMS Rwanda, and subsequently AIMS Ghana (2019), with the support of Facebook and Google as well as the global AI community. Founded by Moustapha Cissé, Professor of Machine Learning and Lead of the Google AI centre Accra, Ghana, the goal of AMMI is to bring the best of AI education in Africa and contribute to building a healthy ecosystem of AI practitioners committed to making a positive impact on our societies. A novel fully-funded one-year intensive graduate program, AMMI provides brilliant young Africans with state-of-the-art training in machine learning and its applications, to respond to the present and future needs of Africa and the world. AIMS Senegal will host its first cohort of 42 AMMI students this 2020-2021 academic year.

Features of the African Master's in Machine Intelligence



State-of-the-art training in machine learning and its applications;

World-class AI lecturers;



Panafrican student body.



Launch of the AMMI program in Rwanda, 2018

RESEARCH CENTRE

The Research Centre at AIMS Senegal came into existence in 2013 with the appointment of Prof Mouhamed Moustapha Fall as the German Research Chair in Mathematics and its Applications, funded by the Alexander von Humboldt Foundation and DAAD. Its mission is to conduct and foster exceptional research as well as national, continental and international collaborations.

Since 2013, the research centre has welcomed more than 400 visitors to summer schools, winter schools, workshops, short research visits (1-2 weeks) and long-term research visits (2-4 weeks). The Research Centre, led by Prof Fall, has published more than 40 articles in internationally recognized peer-reviewed journals.

On May 4, 2018, AIMS Senegal attended its first-ever doctoral defence, featuring two researchers: El Hadji Abdoulaye Thiam from Senegal, presented a thesis entitled «L'influence de la courbure sur certaines inégalités fonctionnelles», while Ignace Aristide Minlend from Cameroon defended a doctorate in differential geometry and applications with a thesis titled: «Solutions aux problèmes surdéterminés sur les variétés». Awarded by the Cheikh Anta Diop University (UCAD) Dakar, their doctoral research was conducted under the tutelage of the Research Chair in Mathematics and Applications. Both candidates were recently awarded for their research: Dr El Hadji Abdoulaye Thiam received the Ibni Prize for his thesis and Dr Ignace Aristide Minlend received the Inaugural Prize of Professor Abbas Bahri at Rutgers University, United States of America.

Research Centre Features



Six doctorate researchers currently enrolled;



One post-doc researcher currently enrolled;



Summer and winter research schools organized annually;



Over 50 articles and over 500 citations since 2013;

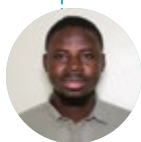


Partial differential equations, geometric analysis, mathematical modelling of ecology and human harvest and shape optimization.



Summer school on statistics and data science

ALUMNI SPOTLIGHT



Dr El Hadji Abdoulaye Thiam (Senegal)
2012/2013 Alumnus, AIMS Senegal

After graduating from AIMS in 2012, El Hadji won a three-and-a-half-year scholarship from DAAD, to conduct PhD research at the AIMS Senegal Research Centre. In May 2018, he was one of the first two PhD researchers to defend at AIMS Senegal, presenting a thesis titled: «L'influence de la courbure sur certaines inégalités fonctionnelles». In June 2018, El Hadji won the Ibni Oumar Mahamat Saleh prize for mathematics, awarded by the Centre International de Mathématiques Pures et Appliquées (CIMPA) and the Fondation de l' Université d'Orléans, France. He is currently a Post-doc researcher at AIMS Senegal.



Ndèye Mbeuguet Niang (Senegal)
2015/2016 Mastercard Foundation Alumnus, AIMS Senegal

Member of our pioneer Co-op cohort, Mbeuguet did her internship at the Centre des réseaux et des systèmes d'informations, Ministry of Higher Education, Senegal, where using Java and Hadoop, she prepared a sharing framework to accommodate data, converting and modelling it to facilitate its accessibility to users. Her work was so compelling that during her defence in February 2017, Atos offered her a position as data scientist. Now working for Sonatel-Orange as data scientist manager for Orange Sierra Leone, she nurses the dream of creating a software system more performant than Google.



Leclaire Anjipu Mfoncha Enock (Cameroon)
2016/2017 Mastercard Foundation Alumnus, AIMS Senegal

As a big data consultant at Smile Open Source Solutions, Côte d'Ivoire, Leclaire uses predictive analysis and machine learning to determine the impact of change on complex products. A member of the pioneer Co-op cohort, he gained admission into AIMS with a Master's I in applied mathematics and computer science from the University of Douala. Leclaire describes his Co-op experience at AIMS Senegal as a milestone, where he gained professional experience by doing his internship at Atos, after which the company immediately hired him.



Deborah Dormah Kanubala (Ghana)
2017/2018 Mastercard Foundation Alumnus, AIMS Senegal

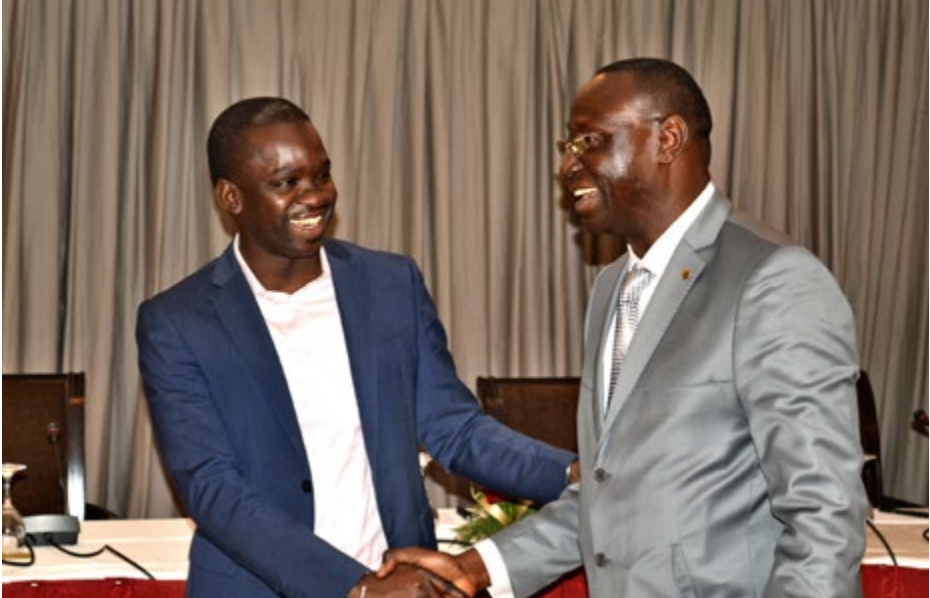
Deborah obtained a Bachelor's degree in financial mathematics from the University for Development Studies, Tamale, after which she gained admission into AIMS. During her internship at Manobi, she developed risk scoring and control algorithms for smallholder farmers. Winner of the Mastercard Foundation Scholars Research Fund, Deborah is working to assess the social and cultural factors accounting for gender disparity in higher education in Africa, to identify ways to overcome them. She believes the key to Africa's development depends on our capacity to interpret large data sets.

AIMS Industry Initiative

The AIMS Industry Initiative is leveraging the mathematical sciences towards the economic promotion of AIMS host countries, through the provision of quality human capital, knowledge transfer and research applied to development. AIMS industry partners have become real laboratories in which AIMS students test innovative solutions to boost company performance.

The AIMS Industry Initiative aims to expand and diversify the organisation's partner base to propel greater direct industry involvement in our training model. An essential part of our co-operative education program, this initiative has facilitated the transition to employment of our students through professional training within partner companies.

The surge in the number of industry partners across the network (from over 30 industry partners in 2017 to over 100 this year) is a clear indication of the increase in the demand for skills offered by AIMS programs. Our industry partners recognise AIMS as a pool of human resources where they can go to tap from skills in big data, computer security, data science and problem-solving competencies with relevance to their business sectors. Over 70% of our Co-operative Master's graduates have found employment six months after graduation.



AIMS Senegal Board Chair, Abdel Kader Ndiaye with InTouch SA CEO, Omar Cissé, AIMS Senegal Business Day

Institutional Partners



The Government of Senegal has supported the installation of AIMS in Senegal and remains a funding partner for the implementation of AIMS Senegal programs.



Mastercard Foundation, in November 2014, partnered with AIMS to support 30% of all admitted students from 2015/2016 to 2018/2019, targeting 503 scholarships for the AIMS Co-operative and Structured Master's in Mathematical Sciences, as well as the Teacher Training Program in Cameroon. Launched in March 2018, the Mastercard Foundation Leaders in Teaching Initiative is supporting the AIMS Teacher Training Program in Rwanda.



Global Affairs Canada is currently funding the Skills for Employability Program, which is built upon the Co-operative Master's, targeting 200 AIMS Co-op students, 320 Post-AIMS Business Certificates and 2250 beneficiaries of Massive Open Online Courses across Francophonie Africa.



In August 2017, the International Development Research Centre (IDRC) partnered with the African Institute for Mathematical Sciences to launch the Mathematical Science for Climate Change Resilience (MS4CR) program over five years. The program sets out to increase the contribution of African mathematical scientists to finding solutions to climate change-related challenges in Africa through training, internships, and research.



The Alexander von Humboldt Foundation and DAAD support the Research Chair in Mathematics and Its Applications. This program is beneficial to PhD and post-doctoral researchers across Africa.



Facebook and Google are supporting the implementation of the African Master's in Machine Intelligence (AMMI), now offered at AIMS Senegal.

TESTIMONIALS

“Canada is committed to investing in young people, especially women in the domain of science, which can play a huge role in the African continent. We have complex challenges to address and it’s important to equip the youths with entrepreneurial skills, so they will in turn invest in their communities.”

LISE FILIATRAULT, former Canadian Ambassador to Senegal

The Skills for Employability program is funded by Global Affairs Canada.

“We found that they had a very solid scientific program – on the other hand, we felt the training was a little theoretical. A year later, they came back to us saying, we made some changes...we want to co-develop a Master’s in Big Data and Computer Security. That’s the flexibility of AIMS.”

MOMADOU NDOYE, Director of Operations, Atos

Atos has hired over 10 AIMS Senegal alumni post-internship, since the inception of the Co-op Program.

“AIMS is a reference institution where students benefit from quality training in the mathematical sciences, a field which a technological start-up like Wutiko finds indispensable for its international influence.”

KÉMO TOURÉ JR.CEO, Wutiko

Wutiko has hired 3 AIMS Senegal alumni post-internship, since the inception of the Co-op Program.

“Ever since the AIMS Coop students became available on the market, I have seen tangible changes in the start-up ecosystem. These talents are an unexpected resource allowing our local start-ups and businesses to be more ambitious and develop better products. My wish is for this program to be consolidated, specifically helping students transition from the academic to the professional world.”

CAMILLE KRAMER Designer, Co-Founder, YUX

Camille has been working with AIMS Senegal as a consultant in entrepreneurship and co-creation.

MEET THE TUTORS



Dr Moussa Thiaw
 Applied Mathematics



Dr Seydou Nourou Sylla
 Machine Learning, Data Mining



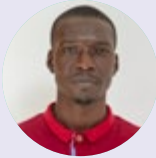
Dr Leila Zahhafi
 Cryptography



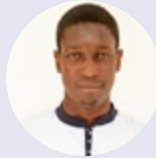
Eliane Raissa Fankem
 Physics (PhD Candidate)



Dr Coura Baldé
 Mathematical Modelling



Dr Lema Logamou Seknewna
 Statistics & Data Science



Pape Birame Seye
 Algebra & Cryptography (PhD Candidate)



Mory Touré
 Meteorology (PhD Candidate)

MEET THE AIMS SENEGAL TEAM



**Prof Mouhamed
Moustapha Fall**
Centre President
& Research
Chair



Gérard Djololo
Acting Executive
Director &
Regional
Finance
Manager



**Prof Franck
Kalala
Mutombo**
Academic
Director



**Dr Layih
Butake**
Senior Outreach
Manager & Ag.
Director of
Communications



Jean Adoho
Student
Development
Manager



**Mohamed
Lamine Diallo**
IT Manager



**Diane Divine
Umuhire**
Industry
Relations
Manager



**Ben Eliziel
Ndizera**
Finance Manager



Nathalie Texeira
Logistics &
Facilities
Manager



**Souleymane
Konte**
IT &
Database
Specialist



**Oumalkhaire
Ismael Oubed**
Finance Officer



**Jeanne
Madelaine
Seck**
Administrative
Officer



Boubacar Fall
Logistics &
Facilities
Assistant



Sylla Diagne
Driver



**Serge Pacôme
Goudiaby**
Driver

AIMS SENEGAL AT A GLANCE



Meeting with Dr Cheikh Oumar Anne, Minister of Higher Education, 2019



AIMS Senegal students pose with Lydie Hakizimana, CEO, AIMS Global Network at the Forum de St Louis, 2017



2020/2021 cohort



Abdel Kader Ndiaye, President of AIMS Senegal board gives opening remarks at AIMS Senegal Business Day, 2019



Reeta Roy, President and CEO, Mastercard Foundation visits AIMS Senegal, 2017



Former Canadian Ambassador Lise Filiatrault at first Co-op graduation, 2017



Alumni MeetUp Dakar, 2019



AIMS Senegal students and staff at Women's Mathematics Workshop, Abidjan, 2017



Ivy Mwai, Mastercard Foundation Country Representative for Senegal at Co-op graduation, 2017



First Co-op Graduation, 2017



International Day of Women and Girls in Science, 2019



Visit of Prof Amadou Abdoul Sow, Director General of Higher Education, 2019



Structured Master's graduation, 2019

A young African woman with dark hair and a wide smile is in the foreground, wearing a brown and tan patterned shawl. She holds a blue and a red marker over an open notebook on a desk. In the background, a young African man in a blue and white striped shirt is focused on his work at another desk. The setting is a classroom with blue walls and a purple curtain. The text 'WE BELIEVE THE NEXT EINSTEIN WILL BE AFRICAN' is overlaid in white capital letters.

**WE BELIEVE THE
NEXT EINSTEIN
WILL BE AFRICAN**

TB- Out

CONTACT INFORMATION

Focal person for media coverage, outreach and cooperation

Dr Layih Butake

Senior Outreach Manager
& Acting Director of Communications, AIMS-NEI
Lbutake@nexteinstein.org

Focal person for academic programming, visiting lecturers and tutors

Prof Franck Kalala Mutombo

Academic Director
franckm@aims-senegal.org

Focal person for general information, appointments and administrative matters

Jeanne Madelaine Seck

Administrative Officer
jmseck@aims-senegal.org



AIMS

African Institute for
Mathematical Sciences
SENEGAL

Centre IRD, KM2 Route de Joal
P.O. Box 1418, Mbour
Telephone: 339567693

Apply:

https://applications.nexteinstein.org/?application_type=Masters+Intake

 AIMS-SENEGAL  @AIMS_Next  www.aims-senegal.org

