



What's New in This Issue of the Newsletter?

Dear Readers,

Welcome to the 25th issue of the African Physics Newsletter! Due to enthusiasm and determination across continents, we are in the 7th year of publication. If you do nothing else, please read Victor Ekpo's article, "More Than Machines," covered in the last paragraph of this editorial!

Quantum is hopping

The first secure quantum exchange between the Northern and Southern Hemispheres has been achieved – Africa's first quantum satellite link and the world's longest intercontinental quantum communication channel at 12,900 kilometers between Beijing and Stellenbosch University. See Yaseera Ismaili's report!

Tunisian Quantum Network's QUANTUN Youth Branch celebrated both the International Year of Quantum Science and Technology (IYQ) and World Quantum Day, sponsored by the Tunisian Optical Society. Experts in numerical modeling, applied physics, computational physics, quantum computing, and cryptography added energy. Students jumped up to a new level of knowledge and understanding through hands-on experience with IBM's Qiskit framework, an introduction to the variational quantum eigensolver, and quantum algorithms for real-world scientific and engineering problems.

There's a rapid growth in the potential market value of quantum technology – the figures are in the article on the Quantum Roadshow Nigeria 2024. Those who are school learners now are the future leaders and decision-makers, and they need to know what they are talking about. These participants were offered practical experience with quantum circuits, Python, and the use of IBM's quantum hardware.

Connections are what African young physicists need

The aim of the African Physics Newsletter is to connect physicists across the continent. It's great to hear how, in 2019, Claire David was invited to lecture at the African Institute for Mathematical Sciences (AIMS) in South Africa and has since continued working across Ghana, Cameroon, Rwanda, and Senegal, as well as Benin, Togo, and the Democratic Republic of Congo (DRC). She's participated with Raïssa Malu at the University of Kinshasa and Université Kongo – and she has amazing things to say about the young people she met.

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The asteroid and the outreach

The respected astronomer Youssef Moulane, speaking from Morocco, shares his path from a village upbringing to studying the Cosmic Microwave Background – via the first known interstellar comet. Along the way an asteroid has been named after him!

Access to top programs

The next generation of Ethiopia's scientific leaders has just been empowered by intensive classes at a summer school supported by the Ethiopian Physical Society in North America. In their article, Iwnetim Abate, Kassahun Betre, Daniel Erenso, and Mesfin Tsige describe their passion for helping talented physics students gain access to graduate programs in the U.S., and guiding them on how to navigate complicated admission processes.

Accelerating active learning

In the words of Linda Strubbe and Tom Rice, "This is a special time for astronomy in Africa, thanks to investment in new world-class astronomical facilities around the continent." Undergraduate astronomy teaching is a cornerstone; the first of a series of BLUEshift programs has just been held for early career scientists, to accelerate them toward outstanding active learning techniques for undergraduate teaching. There are more programs coming up – see their article in this issue.

Rescue from suffering

Behind the scenes in hospitals, clinics, and research centres, a medical physicist may well be responsible for saving your life. Do we have enough in Africa? The first known study of how many medical physicists we need on the continent [1] has this to say: "From the data analysis, the number of ... clinically qualified medical physicists is largely inadequate, at least by a factor of 20 in almost all countries in the region."

Medical physicists focus their work largely on the use of radiation in therapy. They are responsible for scientific and technical aspects of imaging and diagnosis, radiation treatment, and radiation safety. As patients, we hardly ever see them, but we unknowingly put our trust in their qualifications and experience. In this issue, doctors Adeneye, Levy, and Weygand, of Nigeria and the U.S., describe how training in the use of linear accelerators is carried out.

Read This: Could there be a vaccine that prevents cancer?

Yes. In particular, cervical cancer is primarily caused by a virus, and the vaccine for it is available across the continent. It is tragic that many people simply don't know about it. Victor Ekpo talks about the unnecessary suffering caused by late detection, misinformation, weak policies, and silence. As a medical physicist, he has written an inspirational article for us. Dear reader, if you share this article with your family and friends, you may be saving a life.

Yours truly,
Joe Niemela, Guest Editor
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References:

[1] Trauernicht, C., Hasford, F., Khelassi-Toutaoui, N. et al. Medical physics services in radiology and nuclear medicine in Africa: challenges and opportunities identified through workforce and infrastructure surveys. *Health Technol.* 12, 729–737 (2022).
<https://doi.org/10.1007/s12553-022-00663-w>

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We encourage you to forward this newsletter to colleagues you think may be interested in hearing about the latest developments in physics in Africa. Subscriptions to the newsletter are free and open to both Africans and non-Africans. To subscribe go to <https://go.aps.org/africanphysics>.

Do you have a meeting, conference, school, award, etc. you would like posted? Do you have any other news or articles you would like to share with your colleagues? [Click here](#) for more information on how to submit this information to the newsletter and share it with colleagues across the African continent.



Africa, China Establish Longest Quantum Link via First Intercontinental Satellite



Figure 1: Left: Prof. Francesco Petruccione (left) and Dr. Yaseera Ismaili (right), the South African research team at Stellenbosch University (SU). Right: The portable ground station of the Jinan-1 microsatellite mounted on the rooftop of the Engineering Building at SU. The names of the partner institutions - SU and USTC (University of Science and Technology of China) - are visible in the background. (Photo credit: Left: Stefan Els and Right: Ignus Dreyer)

Africa's first quantum satellite link has been successfully established through a collaboration between China and South Africa, creating the world's longest intercontinental quantum communication channel at 12,900 kilometers between Beijing and Stellenbosch University. This groundbreaking connection represents the first secure quantum exchange between the Northern and Southern Hemispheres and sets a new benchmark in global quantum communication. The achievement was enabled by China's Jinan-1 quantum microsatellite, marking a major step forward in the advancement of secure, space-based communication technologies.

Jinan-1, China's latest quantum microsatellite, orbits Earth at an altitude of approximately 500 km and utilizes quantum key distribution (QKD), a method governed by quantum mechanics that enables secure key exchange between the satellite and the optical ground station. Unlike conventional cryptography, which depends on complex mathematical puzzles, quantum key distribution is based on the development of physical hardware.

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Figure 2: Implementation of the first quantum satellite link in the Southern Hemisphere at Stellenbosch University, South Africa. The microsatellite Jinan-1, launched in lower earth orbit, transmits secure keys with the portable ground station that is mounted on top of the roof of the engineering building at Stellenbosch University. Laser beams (represented by the dashed line) are used for communication with the microsatellite. (Photo Credit: Ignus Dreyer)

Groundbreaking research and impact

The first successful exchange of quantum secure keys occurred in October 2024. Favorable weather conditions in South Africa's Western Cape contributed to optimal signal clarity, allowing scientists to generate over 1.07 million secure bits in a single satellite pass, an unprecedented achievement on the African continent and a major milestone in quantum satellite performance globally.

These secure keys were then used to encrypt and transmit high-resolution images between the two optical ground stations in Beijing and Stellenbosch, leading to an ultra-secure link of 12,900 km and the first link between the Northern and Southern Hemispheres.

The research collaboration is led by China's University of Science and Technology and South Africa's Stellenbosch University. The principal researchers of this collaborative research were Professors Juan Yin and Jianwei Pan from China, and Dr. Yaseera Ismail and Professor Francesco Petruccione from South Africa. Their joint efforts highlight the vital role of international partnerships in advancing frontier technologies.

This research was published on March 19, 2025, in the scientific journal *Nature*. Dr. Ismail and Professor Petruccione co-authored the paper with leading Chinese physicists [1].

References:

[1] Li, Y., Cai, WQ., Ren, JG. et al. Microsatellite-based real-time quantum key distribution. *Nature* 640, 47–54 (2025).
<https://doi.org/10.1038/s41586-025-08739-z>

Stepping toward a global quantum internet

Quantum satellite communication marks a critical advancement in the pursuit of a global quantum internet, an interconnected system capable of supporting secure communication, distributed quantum computing, and precision sensing across continents. Traditional fiber-optic networks face inherent limitations due to photon loss and signal noise over long distances, making them unsuitable for truly global quantum communication. Satellite-based quantum links, by contrast, operate above the atmosphere where such losses are minimal, offering a scalable and practical alternative. The success of China's Jinan-1 microsatellite illustrates how compact, cost-effective satellites can enable secure quantum key distribution on a global scale, paving the way for a future network of interconnected quantum nodes in space.

With this record-setting achievement, South Africa has taken a major step toward expanding its quantum activities on the African continent. This milestone showcases the potential of international collaboration for achieving scientific breakthroughs. As more countries and institutions participate in quantum satellite research, the vision of a fully integrated secure quantum internet draws ever closer.



More Than Machines: Why Medical Physicists Should Be Cancer Advocates in Africa



Figure 1: Victor Ekpo as a medical physicist at ASI Ukpo Cancer Centre, Nigeria. (Photo Credit: Victor Ekpo)

Recently, while speaking to a group of physics students, I narrated Charles Plumb's story "Who is packing your parachute?" In this powerful tale, Plumb, a former Navy pilot, recounts how his aircraft was shot down during the Vietnam War and how he successfully deployed his parachute, thanks to the meticulous work of the unknown person who packed it.

In the realm of cancer care, medical physicists play a similar role, often working behind the scenes to ensure the safety and effectiveness of radiation treatments calibrating equipment and planning therapies — that better enable patients to navigate their cancer journey toward recovery (Figure 1).

Saving patients today, serving tomorrow's medical physicists

We often reach medical physics in unusual ways. For most, the path to a career in medical physics is hardly straight. The course is highly specialized and at the crossroads of two seemingly diverging roads — physics and medicine. When the course finds us, it takes a firm grip and brings the joy connected with helping people.

It is one of the areas of medical practice that is mainly performed in the background, yet vital for patient health. With little or no light shining on our work, most young people are not exposed to it enough to consider medical physics as a career path—it is often misunderstood and rarely mentioned in career talks.

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“Whether it is organizing school cancer talks, health clubs, city road walks, educating communities in local languages, challenging harmful myths, or working to influence national cancer policies, you can be a voice for patients who cannot speak for themselves.”



Figures 2 and 3: Victor Ekpo as a cancer advocate during the Pink Africa Foundation Cancer Walk. (Photo Credit: Victor Ekpo)

While we pack current cancer patients’ parachutes, we must also inspire future generations of medical physicists, telling our story of what we do, why it matters, and how others can join. Shining a brighter light on medical physics helps ensure that the brightest minds recognize it as a career option, potentially improving the caliber of care on the continent.

Serving hospitals, serving communities

Africa bears a disproportionate share of the global cancer burden, and many lives are lost not only due to the lack of treatment options, but also due to late detection, misinformation, weak policies, and silence. Many African men and women never even make it to the hospital due to misinformation or superstition. This silence, however, can be broken and must be broken by a new generation of Africans taking action.

As Africans, we must ask ourselves, who is packing the parachutes for our communities? Are we preparing the health care systems — from prevention to treatment — that will save lives, or are we waiting on others to act first?

With around 660,000 new cases of cervical cancer per year globally, at least 18 of the top 20 countries with cervical cancer burden (by age-standardized incidence rates) are in Africa [1]. Africa needs action by everyone in the cancer care space, not just some. Cervical cancer is caused by persistent infection with the human papillomavirus (HPV). HPV vaccines are now available

across the continent (in some African countries, for free) for girls aged 9 to 15 as a preventive measure against cervical cancer and other cancers [2]. Are each of us helping to lead the campaign in schools, religious houses, social groups, and communities? Are we speaking to African girls and women about the importance of breast self-examination and early detection of breast cancer?

Whether it is organizing school cancer talks, health clubs, city road walks, educating communities in local languages, challenging harmful myths, or working to influence national cancer policies, you can be a voice for patients who cannot speak for themselves (Figure 2). *Advocacy is a skill you can learn and a path you can walk alongside your academic or clinical journey.*

Serving policies

Advocacy does not require a title; it requires a decision and commitment to care and the courage to speak up. One of my favorite poems by Edward Hale says, “I am only one, but I am one. I cannot do everything, but I can do something.” It is a call for each of us to be one additional voice. Everyone’s voice counts in the fight against cancer. Whether it is a friend, colleague, acquaintance, or distant relative in your network that hears your words, a life is impacted.

We need scientists who know how to speak to power, who can help translate clinical evidence into practical policy. While radiotherapy is a critical component for

the treatment of cancer, only 28 to 30 African countries (out of 54) have at least one operational radiotherapy center [3]. We need physicists to join and speak to those in authority, and in the healthcare industry, about the need for radiotherapy machines. We need physicists who relate to the humanity of patients and recognize that a better treatment machine elsewhere in the world means nothing if African patients cannot access it.

Africa's future in cancer care will not be shaped only in conference halls or research journals. It will also be shaped by those willing to step into the streets. At this moment, the African continent needs more than technical excellence. Your scientific knowledge, passion for humanity, and credibility in your communities already position you to be a powerful agent of change. Africa needs cancer advocates.

As a student or early-career professional, you may sometimes feel like your contributions are small or unseen. But like the parachute packer, your preparation, your voice, your advocacy, might one day save someone's life.

Let this be your invitation. Join or start a cancer charity. Inspire your professional physics groups to present medical physics as a viable career option to young people and to improve cancer care in your community. Even if you are not a medical physicist, you can become an influential cancer advocate. Be one of the people who pack the parachutes and save lives.

References:

- [1] Mulongo M, Chibwesa CJ. 2022. Prevention of cervical cancer in low-resource African settings. *Obstet Gynecol Clin North Am.* 49(4):771-781. doi: 10.1016/j.ogc.2022.08.008.
- [2] World Health Organization Regional Office for Africa. 2024. Accelerating cervical cancer elimination in Africa through strengthened HPV vaccination, screening, and treatment. WHO Afro Investment Case Series. Available from: <https://www.afro.who.int/publications/who-afro-investment-case-series-accelerating-cervical-cancer-elimination-africa>
- [3] Dosanjh M, Ige TA, et al. 2024. Tackling the radiotherapy shortage in Sub-Saharan Africa by gathering and using data from Lower-Middle Income and High-Income Countries' facilities for designing a future robust radiotherapy facility. *Med Res Arch.* 12(8). doi: 10.18103/mra.v12i8.5530.



Celebrating IYQ 2025 and World Quantum Day with the Tunisian Quantum Network's QUANTUN Youth Branch



Figure 1: QUANTUMCODE FUSION, February 12-13, 2025. (Photo Credit: QUANTUN Youth Branch Organizing Committee)

The year 2025 marks a historic milestone in the global scientific community with the official designation of the International Year of Quantum Science and Technology (IYQ 2025). This initiative was proclaimed by the United Nations and emphasizes the significant influence of quantum research and technology on contemporary developments, from materials science to computers and communication.

In line with this global celebration, Tunisia made a notable contribution to IYQ 2025 through a two-day event titled, "QUANTUMCODE FUSION: Python Meets Qiskit," held at the Faculty of Science of Tunis, University of Tunis El Manar, on February 12-13, 2025. Organized by the Tunisian Quantum Network's QUANTUN Youth Branch and sponsored by the Tunisian Optical Society, the event brought together researchers, students, and professionals to explore key topics in quantum science. The event started with an opening ceremony, featuring welcome addresses by Professor Mourad Telmini, co-coordinator of QUANTUN, and Professor Adel Megriche, Dean of the Faculty of Science of Tunis. A key highlight of the ceremony was the tribute to Emeritus Professor Habib Bouchriha, a pioneering figure in quantum physics in Tunisia, in recognition of his outstanding contributions to the field. His work has shaped generations of researchers and advanced quantum science in the region, making this honor a well-deserved acknowledgment of his enduring legacy.

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The event featured a diverse lineup of distinguished speakers aimed at uniting the quantum community and discussing the most recent developments in the field, including quantum computing, artificial intelligence, cryptography, and next-generation communication technologies. Each session offered a unique perspective on how quantum research is evolving in contemporary applications.

The event started with an insightful talk by Dr. Ahmed Ammar, an assistant professor at ESPRIT School of Engineering, Tunisia. With a strong background in scientific computation and applied physics, he introduced participants to the role of computational techniques in quantum research, drawing on his expertise in numerical modeling and physics-based simulations.

The second session featured Dr. Fahmi Khadri, an associate professor at the Faculty of Sciences of Tunis, University of Tunis El Manar, and a specialist in computational physics. He provided a practical introduction to Python and its applications and offered insights into leveraging Python for solving complex quantum problems.

The second day of the event began with a thought-provoking talk by the engineer Dr. Iyed Ben Slimen, an associate professor at the National School of Engineers of Carthage (EniCarthage) and an expert in quantum computing and cryptography. His session was a practical training on quantum computing using Qiskit, an open-source quantum software framework developed by IBM. He guided participants through quantum algorithms, quantum gates and circuit design, and provided hands-on experience in quantum programming. By combining theoretical insights with live coding examples, his session gave attendees a solid foundation in quantum computing and its real-world applications.

Mohamed Amine Hechmi, a Ph.D. candidate at Sup'Com, led the final session. His talk explored the workflow of the Variational Quantum Eigensolver (VQE) algorithm, highlighting its advantages over traditional classical methods in tackling complex quantum systems. Participants gained insights into the practical implementation of VQE using quantum programming frameworks, as well as an appreciation of the ongoing research efforts to enhance its accuracy and efficiency.

This session provided a hands-on perspective on how quantum algorithms like VQE can be applied in real-world scientific and engineering problems, reinforcing the role of quantum computing in solving computationally intensive challenges.

In addition to enhancing participants' comprehension of the areas cited above, these workshops brought attention to Tunisia's expanding position in the international quantum research community.

World Quantum Day

The second event, titled "Qiskit Journey 2.0," took place on World Quantum Day (April 16). It featured an extended quantum computing workshop using Qiskit, serving as a continuation of the first event's training, and was led by Dr. Iyed Ben Slimen. Attendees had the unique opportunity to deepen their understanding of Qiskit, explore the principles behind quantum gates and quantum circuits, and simulate quantum algorithms in real time. The event successfully blended theory with practice and contributed to fostering curiosity and skill development in the rapidly evolving field of quantum computing.

The success of both events was further highlighted by their inclusion on the websites of World Quantum Day (WQD <https://worldquantumday.org/>), IQQ 2025, and the Africa Quantum Consortium (AQC <https://africaquantum.org/>). With the combined participation of over 120 attendees, the strong engagement demonstrated a growing interest in quantum science and technology across both academic and professional spheres.

Looking ahead, we remain firmly committed to advancing quantum education and research in the future with similar programs. The International Year of Quantum Science and Technology offers a unique opportunity to enhance Tunisia's contribution to quantum science and cultivate a new generation of scientists committed to pushing its frontiers.



Quantum Roadshow Nigeria: Africa's Gateway to the Quantum Future



INTERNATIONAL YEAR OF Quantum Science and Technology

Figure 1: The IYQ logo. (Photo Credit: <https://quantum2025.org/>)

Quantum technologies are rapidly gaining momentum, with the global market projected to reach \$42 billion by 2027 and the recognition of 2025 as the International Year of Quantum Science and Technology. This rapid growth is driven by the potential of quantum systems to enable energy-efficient, sustainable solutions, and advanced manufacturing. Unfortunately, Africa is at a growing risk of being left behind in the second quantum revolution, which is shaping global science and technology.

In November 2024, Nigeria witnessed an unprecedented milestone in scientific outreach with the Quantum Roadshow Nigeria 2024. This inspiring initiative, under the Physics Without Frontiers program, set out to introduce the revolutionary field of quantum science and technology to eager learners at two prestigious institutions: the Federal University of Technology Akure (FUTA) and the University of Nigeria, Nsukka (UNN). With its focus on equipping participants with foundational knowledge and skills, the roadshow attracted a vibrant mix of high school students, undergraduates, and postgraduates.

The Quantum Roadshow was the brainchild of Dr. Obinna Abah from Newcastle University, United Kingdom, and Mr. Obinna Uzoh from Simon Fraser University, Canada. Their vision was brought to fruition through meticulous planning and the unwavering support of local coordinators, including Dr. Nkiruka Eunice Adesiji at FUTA and Professors P.U. Asogwa and Michael Nwakanma at UNN.

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The Roadshow kicked off at FUTA on Nov. 10 and concluded at UNN on Nov. 16, 2024, with 120 participants across the two institutions. Of the participants in the program, 19% were female, and the program offered a segment for girls in secondary school. Both institutions provided hubs of intellectual energy, fostering collaborative learning and sparking curiosity. The first day at each institution featured a mix of engaging lectures and practical sessions. Dr. Yisau A. Odusote provided a background perspective lecture on quantum mechanics. Dr. Abah set the stage with his thought-provoking keynote address, "Is Africa Part of the Second Quantum Revolution?" The lecture highlighted Africa's potential to lead in the burgeoning field of quantum science, sparking lively discussions among participants. It is worthy to note that Professor Moses O. Ajewole (FUTA) argued that African nations would accelerate their development by collaborating with other Global South countries.

Python practicals and advanced hardware

Practical sessions followed, with the introduction of Python programming — a critical tool for quantum programming. The participants were guided through the basics of quantum computing, using IBM Qiskit to provide hands-on experience in constructing quantum circuits. These sessions demystified complex concepts and empowered attendees to explore quantum applications independently.

In addition, the program delved into advanced topics like "Why Quantum in Thermodynamics?" which illuminated the principles of quantum thermodynamics, contrasting them with classical approaches. Participants were also introduced to the fascinating subject of "Quantum Materials," highlighting the transformative potential of these materials in shaping future technologies. Participants then engaged in advanced exercises using IBM's quantum hardware. Despite technical challenges with account access, the session provided invaluable practical insights. The day culminated with a career development workshop, where attendees explored academic and professional opportunities in quantum science and technology. Resources and guidance shared during this session offered participants a roadmap for their continued journey in the field.

The first Quantum Roadshow in Nigeria was a success and left an indelible mark on its participants. The participants expressed newfound enthusiasm for quantum science and its technology applications. Educational materials distributed during the program will support their independent learning, while plans to establish quantum study groups at FUTA and UNN promise sustained engagement.

Finally, the generous support from the Abdus Salam International Centre for Theoretical Physics (ICTP), Italy; the Physics Without Frontiers program; FUTA; Newcastle University, U.K.; the Natural Sciences and Engineering Research Council of Canada; and Quantum BC, Canada, played a key role in the success of the program. The Quantum Roadshow Nigeria 2024 stands as a beacon of progress, inspiring the next generation of scientists to envision a future where Africa plays a pivotal role in the quantum revolution.



Bridging Borders: Empowering Ethiopia's Next Generation of STEM Leaders



Figure 1: Fourteen STEM students and two instructors (left), and 50 STEM students and 13 instructors (right), participated in the 2019 summer school program held in Gondar and Addis Ababa, respectively. (Photo credit: EPS-NA Virtual Summer School)

In 2019, a team of 13 scientists and graduate students from several U.S. institutions — including Stanford University, the University of California, Berkeley, Pepperdine University, and the University of Akron — embarked on a transformative journey to Ethiopia. Their mission: to inspire and empower Ethiopia's brightest undergraduate students in science, technology, engineering, and mathematics (STEM).

Hosted by Addis Ababa University, the University of Gondar, and Addis Ababa Science and Technology University, the five-day summer school exceeded all expectations. Initially planned for 40 top STEM students from five universities throughout the country, we welcomed 50 eager participants due to high demand. These students engaged in intensive classes covering physics, computer science, materials science, and engineering, while also gaining practical insights into securing admission into graduate programs, research opportunities, and internships — laying the groundwork for future STEM careers.

A vision that grew

The success of the 2019 program, initially funded in part by the National Science Foundation (NSF, acknowledging grant number DMR_1935833), laid the foundation for a lasting partnership between U.S. organizers and Ethiopian universities. Recognizing the importance of expanding accessibility and in response to the impact of the COVID-19 pandemic, the program transitioned to a virtual format in 2021, with support from the American Physical Society (APS) and members of the Ethiopian Physical Society in North America (EPS-NA). This innovative shift enabled students from across Ethiopia to participate, transforming the program into a truly inclusive and national platform for STEM education.

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“This initiative has not only enriched the educational experience of Ethiopian students but has also provided invaluable opportunities for U.S. researchers from different universities across the country.”



Figure 2: Centers such as Mekelle University (left) and Jimma University (right) played pivotal roles in fostering engagement and active learning. (Photo credit: EPS-NA Virtual Summer School).

By 2023, the EPS-NA Virtual Summer School had evolved into a vibrant hub of scientific engagement, attracting nearly 200 participants eager to explore cutting-edge topics and connect with global experts. The virtual format proved transformative, removing geographical barriers and opening new doors for Ethiopia’s next generation of scientists and innovators. The 2023 program brought together a diverse cohort from Ethiopian universities and partnering institutions in the U.S., facilitated through the collaboration of EPS-NA and six regional centers across Ethiopia: Mekelle University, Bahir Dar University, Addis Ababa University, Jimma University, Haramaya University, and Hawassa University. Each center fostered a collaborative environment that enriched participants through dynamic discussions, presentations, and shared learning experiences, thereby broadening their exposure to advanced research and innovation.

Another important dimension of EPS-NA’s engagement with the physics community in Ethiopia is through a Graduate School Mentorship Program that was started soon after the inaugural 2019 summer school with the aim of increasing awareness about navigating the admission process to graduate programs in the U.S. for talented physics students. In addition to information sharing and mentorship, the program offered financial assistance for taking standardized exams such as the Graduate Record Examination (GRE) and Test of English as a Foreign Language (TOEFL), as well as to cover application fees. The program was successful in helping several students obtain admission to top graduate programs, including the Massachusetts Institute of Technology (MIT).

Global collaboration, local impact

This initiative has not only enriched the educational experience of Ethiopian students but has also provided invaluable opportunities for U.S. researchers from different universities across the country. Faculty and graduate students involved in the program gain cross-cultural perspectives and establish collaborations that enhance their teaching and research. Ethiopian students, in turn, gain access to global academic networks, with many advancing to graduate programs in the U.S. By bridging borders, this program is building a sustainable pipeline of talent, fostering innovation, and addressing local and global challenges through education and research.

Inspiring tomorrow’s leaders

For graduate students and early-career scientists delivering lectures, the experience is transformative. It sharpens their teaching skills, strengthens their ability to communicate complex ideas, and builds confidence in mentoring the next generation. Over time, their efforts have shaped new curricula and courses, integrating cutting-edge research into classrooms worldwide.

Preparing for the future

As the program prepares for its next iteration in mid-2025, organizers are working closely with academic leaders in the U.S. and Ethiopia to maximize participation and impact. By aligning with local academic calendars and addressing logistical challenges, the upcoming workshop aims to inspire even more students while laying the groundwork for future collaborations.

Expanding within Africa

Inspired by the program's profound impact in Ethiopia, organizers are discussing the extension of similar opportunities to other African countries. This ambitious initiative aims to learn from other similar activities across the continent and coordinate with other African initiatives to provide young scientists and engineers with the tools and mentorship needed to address both local and global challenges. By fostering regional collaboration and cross-border academic networks, the program hopes to elevate STEM education throughout Africa.

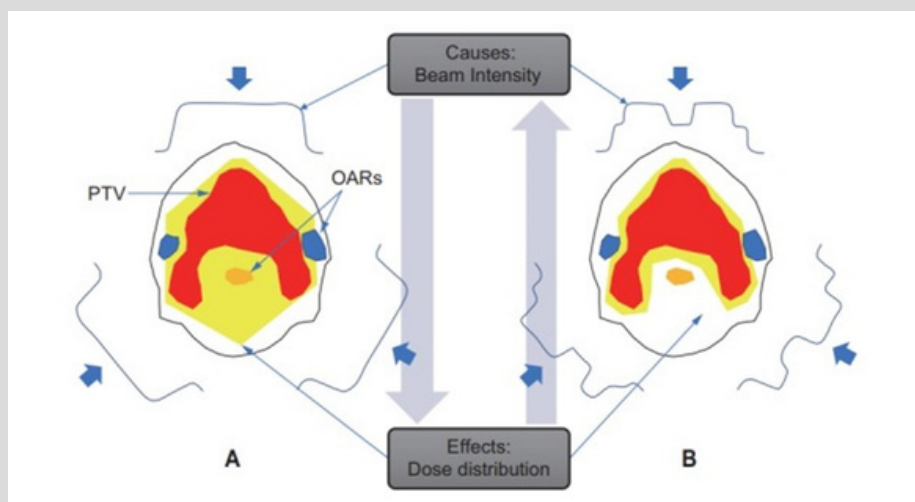
A model for change

This Ethiopia-U.S. STEM partnership highlights how virtual collaboration, enabled by reliable internet access, is transforming education and innovation across borders. By connecting Ethiopian students with U.S. experts, the program fosters meaningful exchanges and strengthens long-term institutional partnerships across Africa, offering a model for impactful global engagement. For more information or collaboration opportunities, contact us at epsna2008@gmail.com or visit www.epsna.org.



International Medical Physics Training in Lagos, Nigeria

Cancer cells can be destroyed by high-energy X-rays or electrons. In hospitals, linear accelerators are used to provide the beams — this is one of the great benefits of physics for human health. The aim is to arrange beams to destroy cancer cells while minimizing damage to surrounding tissues, especially vital organs. The target tumor is imaged in three dimensions by computed tomography (CT), and then the beams are designed to fit the target by inverse CT. Beams from different directions are used so that intensity is highest at the target (Three-Dimensional Conformal Radiation Therapy, 3D-CRT). In intensity-modulated radiation therapy (IMRT), fixed beams are often used, but each beam is divided into smaller radiation beamlets, so that intensity is varied spatially across the tissues (Figure 1). More precise dosage can be achieved by rotating the beams on a gantry, varying the beam aperture, and controlling the dose rate — this is volumetric modulated arc therapy, VMAT [1].



Box Figure 1: Comparison of the principle of 3D-CRT (A) and IMRT (B) with illustrations of forward vs. inverse planning. Considering the dose calculation problem of radiation therapy in terms of the concept of causality, while the causes are beam parameters, including energy, direction, size, and intensities, the effects are dose distributions. Therefore, conventional planning, in which the beam parameters are given first and the dose distributions are calculated, is 'forward' planning. By contrast, intensity-modulated radiation therapy planning, in which the beam intensities are calculated to provide the given objectives and constraints on dose distributions to the target volume and organs at risk (OARs), is termed 'inverse' planning. 3D-CRT, three-dimensional conformal radiotherapy; IMRT, intensity-modulated radiation therapy; PTV, planning target volume. (Figure credit: [1] Copyright © 2018 The Korean Society for Radiation Oncology Open Access article Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>))

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How do you test or calibrate medical imaging? A phantom [2] is used — an object which mimics the transmission properties of human tissue. A calibration phantom might be a physical box or cylinder composed of specialized materials (Figure 2(b) in this article).

— APN Editors

[1] Radiat Oncol J. 2018 Mar 30;36(1):1–10. doi: 10.3857/roj.2018.00122

[2] <https://radiopaedia.org/articles/phantom>

In April 2025, the NSIA-LUTH Cancer Center in Lagos hosted an intensive training program in advanced radiotherapy techniques for approximately 20 medical physicists from six public teaching hospitals across Nigeria — Lagos, Ibadan, Enugu, Katsina, Jos, and Benin City.



Figure 1: Dr. Joe Weygand. (Photo credits: NSIA-LUTH)

Developed by BIO Ventures for Global Health (BVGH) under the African Access Initiative (AAI), the course was designed to support Nigerian radiotherapy centers preparing to receive or commission linear accelerators and advance their radiotherapy practices. The training was delivered as part of a broader partnership between BVGH and the Nigeria Sovereign Investment Authority (NSIA), through which BVGH is working to expand access to high-quality cancer medicines and technologies, enhance clinical oncology training, and position NSIA cancer centers as leaders in cancer research in Nigeria. NSIA's Advanced Medical Services Limited (MedServe) arranged for representatives from across Nigeria to participate in this program. The training was led locally by Dr. Sam Adeneye, Chief of Medical Physics at NSIA-LUTH, and coordinated by Ms. Chaja Levy of BVGH. The program featured instruction by Dr. Joe Weygand, Director of Global Radiation Oncology at Dartmouth College in the U.S.

Over five days, participants followed a structured curriculum centered on intensity-modulated radiation therapy (IMRT) and volumetric modulated arc therapy (VMAT), with broader coverage of clinical dosimetry, quality assurance, and commissioning procedures. Didactic sessions addressed the theoretical foundations, including dose calculation algorithms, beam modeling, the theory and application of gamma analysis, and the integration of imaging into radiotherapy workflows. Additional lectures explored differences between international dosimetry calibration standards and the challenges posed by small field dosimetry (to concentrate on smaller targets), an increasingly relevant topic in the context of highly modulated treatment techniques utilizing small radiation beams. These sessions were designed to establish conceptual groundwork for subsequent clinical application. Figure 1 captures a lecture being delivered on the commissioning of IMRT and VMAT, which attempted to provide a bridge between theory and practice.

“One of the most pressing concerns raised by participants was the lack of formal recognition of medical physics as a distinct profession within Nigeria’s health system, a challenge that mirrors similar issues across sub-Saharan Africa.”

Practical experience

Practical components were delivered in a full-group format using the NSIA-LUTH center’s VitalBeam linear accelerator and CT simulator. Participants engaged in beam calibration, machine quality assurance on both the treatment unit and the simulator, and quality assurance, applying concepts discussed previously in the classroom in a real-world clinical environment. The hands-on portion culminated in an end-to-end test of the full IMRT and VMAT workflows. During the CT simulation phase, shown in Figure 2(a), attendees collaboratively verified phantom positioning prior to collecting images that would then be used in the planning and treatment delivery stages (see Box above). Figure 2(b) shows the group at the linear accelerator setting up the same phantom with an ionization chamber to measure the delivered dose as part of the end-to-end test.

Formal recognition for medical physicists

These practical sessions reinforced both technical fluency and clinical integration. Equally important, the course provided a forum for open discussion about professional development in the medical physics field, such as systemic barriers and workforce challenges in different geographic locations. One of the most pressing concerns raised by participants was the lack of formal recognition of medical physics as a distinct profession within Nigeria’s health system, a challenge that mirrors similar issues across sub-Saharan Africa. Without regulatory acknowledgment, medical physicists often work without clearly defined roles, have limited pathways for advancement, and have minimal institutional support and remuneration. The absence of structural recognition serves as an even greater obstacle to long-term sustainability.

The network grows

Beyond the technical and policy discussions, the week also helped foster professional relationships among participants from different regions. The course served as a rare opportunity for in-person exchange among colleagues working in varied institutional settings but facing many of the same constraints. Figure 2(c) — a group photo taken on the third day — reflects this growing network of professionals committed to advancing radiotherapy practice across Nigeria.

The structure of the initiative contributed significantly to its impact. By delivering the training on-site, using equipment familiar to the host institution and increasingly common across the country, the material was immediately applicable. The involvement of both local and international instructors helped anchor the course in a spirit of collaboration, with a balance of external expertise and domestic leadership. Discussions were tailored to the specific realities of Nigerian clinics, whether in workflow adaptation, resource management, or navigating equipment utilization.

Expanding radiotherapy access

The AAI model, developed through BVGH, offers a practical approach to regional capacity building. It avoids the cost and logistical complexity of sending trainees abroad while providing access to specialized instruction and fostering national coordination. A follow-up edition of the course is planned for later this summer and in subsequent years, with a different international trainer delivering similar expert instruction to a new cohort. As part of the broader three-year training program and partnership with BVGH, NSIA, and MedServe intend to train approximately 500 healthcare professionals from across Nigeria — including doctors, lab scientists, nurses, radiographers, therapists, and medical physicists. In this way, the initiative promotes not just skill development, but also continuity and scale.

“The continued expansion of radiotherapy in sub-Saharan Africa will depend as much on the quality and support of its workforce as on any specific technology.”

Nigeria’s current effort to expand radiotherapy access is built not only on infrastructure, but also on people. As new linear accelerators come online in regional centers, the physicists who attended this course will be responsible for ensuring treatment is delivered safely and effectively. Their training must be grounded in clinical realities and supported by peer networks and professional recognition. Programs like this one help create those conditions, offering a path toward nationally consistent and technically robust care.

By embedding education within clinical settings, centering local leadership, and building repeatable systems for training, this initiative represents a model that others in the region may choose to follow. The continued expansion of radiotherapy in sub-Saharan Africa will depend as much on the quality and support of its workforce as on any specific technology. The experience in Lagos is a reminder that when those two elements are addressed in tandem, meaningful progress becomes possible.



Figure 2: (a) Participants with the phantom (the white box); (b) Setting up the same phantom at the linear accelerator; (c) The participants. (Photo credit: NSIA-LUTH)



BLUEshift Africa: Accelerating the future of undergraduate astronomy education in Africa



Figure 1: Participants of the BLUEshift Africa Workshop 2025 on Undergraduate Astronomy Teaching, held at the University of South Africa (UNISA). (Photo credit: Nombali Qodi/AfAS)

We are delighted to share that the first BLUEshift Africa Workshop on Undergraduate Astronomy Teaching took place on March 22-23, 2025, at the African Astronomical Society (AfAS) Conference in Johannesburg, South Africa. BLUEshift Africa is a project of the American Astronomical Society (AAS), funded by a Venture Grant from the American Institute of Physics (AIP). Twenty-three early-career African scientists from nine countries (South Africa, Ethiopia, Zambia, Nigeria, Kenya, Uganda, Zimbabwe, Botswana, and Mozambique) participated in a two-day in-person workshop designed and led by Dr. Linda Strubbe from Strubbe Educational Consulting. The workshop focused on evidence-based inclusive teaching practices, designed to strengthen undergraduate astronomy teaching in Africa.

The cornerstone of the BLUEshift Africa project is to convene two, two-day workshops on undergraduate astronomy teaching for early-career scientists (2025 and 2026). The main goals of the workshop are to help participants learn to teach astronomy in more interactive and inclusive ways and to build community around university-level astronomy teaching in Africa. Workshop topics include research-based principles of teaching and learning, teaching to promote equity and inclusion, and active learning techniques such as Think-Pair-Share. Later this year, we will hold online “Communities of Teaching” for workshop participants and others interested. Contact Dr. Strubbe via the link [here](#) if you’d like to participate.

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“This is a special time for astronomy in Africa, thanks to investment in new world-class astronomical facilities around the continent, such as the High Energy Stereoscopic System, the African Very-long-baseline Interferometry Network, and soon, the Square Kilometre Array.”



Figure 2: BLUEshift Africa workshop participants in a small-group discussion. Foreground: Dr. Chukwuebuka Jude Ugwu (UNISA), Chidi Joseph Nicholas (Copperbelt University), Daniel Egbo (South African Astronomical Observatory), and Dr. Eliab Malefahlo (UNISA). (Photo credit: Nombali Qodi/AfAS)



Figure 3: Josephine Chishala (Botswana International University of Science and Technology) explains her group's active learning activity design to Lealem Kinfe Alula (Ethiopian Space Science Society) and Dr. Eliab Malefahlo (UNISA). (Photo credit: Nombali Qodi/AfAS)

Dr. Strubbe is the recent co-winner of the International Astronomical Union (IAU) Astronomy Education Prize for her leadership on the Pan-African School for Emerging Astronomers (PASEA) project, in collaboration with fellow prize recipient Dr. Bonaventure Okere. Dr. Tom Rice, the AAS Education Program Manager, is supporting the BLUEshift Africa project and providing guidance as the AAS Project Liaison.

Workshop participants engaged deeply with the workshop, sharing ideas in rich discussions, with great thoughtfulness and care in how to bring the best for their students. “The BLUEshift workshop was incredibly helpful,” said participant Mehbuba Ahmed (Associate Researcher at the Space Science and Geospatial Institute, Ethiopia). “As an astronomy teacher, I gained practical strategies and fresh perspectives to better engage my students. In short — valuable and practical astronomy teaching tools, inspired learning, and enhanced student engagement.” In the post-workshop survey conducted by our external evaluators at Pivot Global Education Consulting, 100% of participants strongly agreed that they learned things they feel motivated to try out in their teaching, and 95% gave the workshop 5 stars out of 5.

Another main goal of the BLUEshift Africa project is to increase our understanding of the landscape of university astronomy instructors and professional development opportunities across the continent. In January 2025, we conducted a pilot study of undergraduate astronomy teaching in Africa, offering a survey to the African astronomical community in both

English and French. The pilot study indicates that undergraduate astronomy courses are being taught in many African countries, and that there is a real need and interest in professional development in teaching for early-career African astronomers. In the future, we plan to share these results and conduct more in-depth studies of this topic. BLUEshift Africa will hold a panel discussion about undergraduate astronomy teaching for AfAS and AAS members in late 2026.

This is a special time for astronomy in Africa, thanks to investment in new world-class astronomical facilities around the continent, such as the High Energy Stereoscopic System, the African Very-long-baseline Interferometry Network, and soon, the Square Kilometre Array. The African scientific community has a strong desire to play leadership roles in these facilities. A growing number of African universities are offering postgraduate programs in astronomy, and, in August 2024, the IAU held its General Assembly in Africa for the first time in the Union’s 100-year history. In the vision to increase the number of African astronomers and related STEM professionals, strengthening undergraduate astronomy education is a crucial and often overlooked piece. The BLUEshift Africa project speaks to the African astronomical community’s [Vision 2024](#), which highlights “a need to improve teaching capacity” and recommends “organizing teaching skills development workshops.”

The second BLUEshift Africa workshop will be held at the 2026 AfAS Conference in Botswana. We are excited about this project and welcome you to [contact Dr. Strubbe](#) if you would like to learn more.



Figure 4. Dr. Linda Strubbe leads a discussion on how to use group work in teaching astronomy. (Photo credit: Nombali Qodi/AfAS)

Acknowledgments

We gratefully acknowledge project contributions by: Dr. Tshiamiso Makwela (IAU-OAE, MPIA, UCT) for collaboration on project visioning and survey design; Dr. Charles Takalana (AfAS, IAU-OAD) and Yunus Manjoo (AfAS) for workshop coordination at AfAS; Dr. Electra Eleftheriadou (Educational Consultant and Coach) for collaboration on workshop design; Professor Saalih Allie and the PHASER group (UCT) for survey feedback; Pierre Paquette (Astronomie-Québec), Kaoutar Saadi (Oukaimeden Observatory), and Dr. Jamal Chafi (Université Cadi Ayyad) for French translation; and Joyce Achampong and Patrice Ajai-Ajagbe (Pivot Global Education Consulting) for project evaluation.

References:

- [1] Strubbe Educational Consulting, <https://sites.google.com/site/lestrubbe>
- [2] BLUEshift Africa, <https://tinyurl.com/blueshiftafrica>



Connections Are What Young African Physicists Need



Figure 1: Talk at ICMPE, University of Abomey Calavi, Benin (left). Presentation about the ATLAS Experiment from CERN's Large Hadron Collider at Université de Lomé. (Photo credit: Paul Baneto)

The first time I stepped onto the African continent was in 2019. I was invited to co-teach along with my friend Sam Meehan, whom I met at CERN. We both worked as postdocs for the ATLAS Experiment of the Large Hadron Collider. We flew to Accra, Ghana, and got a shuttle to Biriwa, where the African Institute for Mathematical Sciences (AIMS Ghana) was located. The talented students accepted into the program get the best conditions to focus on advanced graduate courses and their research capstone project. After an intense 10 months, they earn a master's degree in mathematical sciences. They also gain something even more valuable: connections. AIMS invites lecturers from top universities and institutes — mostly from Europe and North America — to teach during three-week-long course blocks. Also hosted on campus, the lecturers share meals with the students, and usually have nice chats late at night in the corridors. This makes a huge difference as students can interact with scholars from the international scientific community and discover its culture — in particular, the less formal way to deal with hierarchy — while understanding what they need to know to find opportunities overseas.

Returning with a purpose: ASP2022

Fast forward to 2022, the overworked assistant professor I became started to negotiate a year off — not paid — to be able to go back to Africa. AIMS South Africa kindly invited me to teach, and so did AIMS Senegal. After a struggle, I finally obtained a leave of absence and spent the first four months training myself in artificial intelligence (AI), finally learning the math behind the machine learning algorithms used in my research! I built a series of lectures aligned with the AIMS three-week course block format. While I was seeking sponsors, the

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“The future of higher education lies in Africa, but that is only if we give talented minds opportunities.”



Figure 2: Professor Raïssa Malu taking selfies with students at the opening ceremony of the Semaine de la Science et des Technologies (upper left). Professor Raïssa Malu and Dora Muanda welcome a school of girls during the Villages of Sciences at the Institut De La Gombe, Kinshasa, DRC. Professors Kétévi Assamagan and Claire David explaining the science done at CERN at the experimental particle physics booth (lower left). A classroom posing in front of the scatterer demonstrator (lower right). (Photo credit: Semaine de la Science et des Technologies).

Arthur McDonald Institute — founded by the 2015 Physics Nobel laureate — named me their first Ambassador for 2022-2023 and helped me financially. I landed in South Africa in November 2022 and headed to Gqeberha. Professor Kétévi Assamagan kindly invited me to teach at the African School of Fundamental Physics and Applications [1], hosted that year at Nelson Mandela University.

Teaching AI across AIMS centres

In January 2023, I arrived at AIMS Senegal, a beautiful campus with manicured gardens and a patio right next to the beach, literally 20 meters from the sand. I delivered the first version of my course to 19 students eager to discover the machinery behind the basic AI algorithms. I taught it again at AIMS South Africa (February) and AIMS Ghana (April/May). From the equations to the Python code, the students built their own classifier and a small neural network “by hand,”

that is, by entering the formulae themselves. The motto: “It’s not magical, it’s mathematical!” The goal is to demystify, so that these future informed citizens and likely decision makers can educate and empower those not having the luxury to receive technical training on this topic. Africans should join the global conversation on AI regulation, especially since their stance, grounded in African values, may differ from that of the Western world. Should the software in autonomous cars save a baby or an elderly person in case of an avoidable crash?

Physics inspiration and a continental tour

I prepared a colloquium featuring the ATLAS detector at CERN’s Large Hadron Collider and DUNE, the Deep Underground Neutrino Experiment, a flagship facility located in the U.S. to operate in 2026. I added slides featuring AIMS alumni or African collaborators working on those big scientific collaborations, as a way to say:

“it can be you.” During the six months spent in Africa, I presented this talk in eight African countries. In the five AIMS centers — located in Cameroon, Ghana, Rwanda, Senegal, and South Africa — as well as elsewhere in Senegal, Benin, Togo, DRC, and the University of Ghana.

Empowering the next generation in Congo

The stay in Congo-Kinshasa deserves a special paragraph. Back in December at the African School of Physics (ASP2022), I met Professor Raïssa Malu, a renowned figure of science in the country. She gave a presentation promoting the Semaine de la Science et des Technologies (Week of Science and Technology) [2], a country-wide event made of a series of talks, presentations, debates, speeches, booths, and even a theatre piece to promote a scientific culture — and vocations — among the youth. I simply asked her, “How can I help?” She invited me and my astronomer friend, Dr. Nour Skaf, as keynote speakers. We presented about the infinitely small (me) and infinitely big (Skaf) at the University of Kinshasa and Université Kongo. I had a booth and made a “scattering demonstrator” with cardboard. It was a mission to find marbles, but we did. With skewers glued to inclined planes acting as rails, the marbles would fall into a square frame with an obstacle in the middle. I explained how Rutherford estimated the size of the nuclei with respect to the atom’s radius. I showed a fancy video of CERN’s Large Hadron Collider. A total of 10,000 pupils visited the Village of Sciences. I’ve never seen such a craze for science. Some already passionate characters had read extensively, and I was impressed at their deep interrogations.

Looking ahead: The future is African

The strength of Africa is the mere fact it is a continent with a large young population, and this population will grow. By 2030, young Africans are expected to constitute 42% of global youth [3]. The future of higher education lies in Africa, but that is only if we give talented minds opportunities. This goes with more funding for programs open to Africans, and of course, connections. I have connected students to my networks in particle physics, and this got some of them opportunities. And it goes both ways: my collaborators learn about Africans. Their obstacles. Their grit. And their incredible potential.

References:

[1] <https://africanschoolofphysics.org/asp2022/>

[2] Science and Technology Week, 11th Edition, accessed 30 June 2025 <https://semainedelasciencercdc.org/>

[3] Population Reference Bureau, Africa’s Future: Youth and the Data Defining Their Lives, accessed 30 June 2025 <https://www.prb.org/resources/africas-future-youth-and-the-data-defining-their-lives/>



Bridging Academia and Society: Youssef Moulane's Astronomy Outreach in Africa



*Figure 1: July 2019, La Silla Observatory (left); December 2018, Paranal Observatory (right).
(Photo credit: Youssef Moulane)*

Youssef Moulane is a research scientist in space science and astronomy at the University Mohammed VI Polytechnic (UM6P) in Morocco. He was born in a small village in the Marrakech region's Rahamna province. He began his education in the same village, where he earned his baccalaureate in physical sciences in 2010. He then joined Cadi Ayyad University in Marrakech, earning a bachelor's degree in physics in 2013, followed by a master's degree in high energy physics and astrophysics in 2015.

For his master's thesis, he worked on the detection of celestial objects such as asteroids and comets using data from the Oukaïmeden Observatory, under joint supervision from the University of Liège (Belgium) and Cadi Ayyad University (Morocco).

In this context, he began his doctoral research in 2016, jointly between Cadi Ayyad University and the University of Liège, focusing on the physical and chemical properties of comets. Comets are among the oldest bodies in the solar system and allow us to study the primordial material from which our solar system formed. In 2017, he completed a research stay at the University of Le Havre in France, where he worked on a theoretical topic involving electron collisions with molecular ions in cometary atmospheres. In 2018, he moved to the University of Liège to continue his Ph.D. research, using observational data collected from the Transiting Planets and Planetesimals Small Telescope (TRAPPIST) telescopes in Morocco and Chile.

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Figure 2: Exploring the solar system with young students (top left); looking at the sun with a young student at a museum in the Marrakech Region (top right); a conference on astronomy for the public (bottom left); exploring the International Space Station (ISS) using Virtual Reality (bottom right).
(Photo credit: Youssef Moulane)

In 2019, he received a two-year international fellowship at the European Southern Observatory (ESO) in Chile to finalize his doctoral thesis. ESO is one of the largest astronomical observatories in the world, hosting three major observing sites. He defended his Ph.D. thesis in March 2021. As part of a collaboration with researchers from various European universities, he contributed to the discovery of cyanogen (CN) gas molecules in the first known interstellar comet. This marked the first-ever detection of gas in an interstellar object by astronomers. At the end of 2021, he moved to Auburn University in the U.S. to continue his research in the same field, where he published several scientific papers.

In January 2024, he joined Mohammed VI Polytechnic University (UM6P), where he has since worked on a project focused on advancing Cosmic Microwave Background (CMB) research by integrating theoretical modeling with experimental approaches. His work contributes to ongoing international CMB initiatives

while establishing a research program at UM6P. The project aims to explore the CMB as a powerful probe of early-universe phenomena, including cosmic inflation, primordial gravitational waves, and potential dark matter interactions. This involves both the development of CMB instrumentation and the analysis of observational data, with the objective of producing refined theoretical models and experimental techniques. These efforts are intended to support current and future CMB observational missions and to train young researchers within an innovative and collaborative research environment.

In addition to his academic career, Moulane has a deep passion for astronomy outreach targeted at the general public. Over the past years, he has been actively involved in organizing various events and workshops for children and students in schools and institutions across multiple Moroccan cities. He also played a key role in coordinating virtual lectures shared through social media platforms.

“We have a duty to share knowledge with the broader community as a way of giving back to the society that we are an integral part of,”

For him, science communication and public outreach are not just side interests but represent a core responsibility of scientists and astronomers. He believes it is essential to ensure that science and astronomy are accessible to everyone, beyond academic circles. “We have a duty to share knowledge with the broader community as a way of giving back to the society that we are an integral part of,” he says.

In 2023, the International Astronomical Union (IAU) announced [1] that asteroid 33903 would be named “Youssefmoulane” in recognition of his contributions to the study of small bodies in the solar system.

References:

[1] Barlaman Today, 23 June 2023, Asteroid “Moulane” Named after Moroccan Researcher, <https://barlamantoday.com/2023/06/23/asteroid-moulane-named-after-moroccan-researcher/>



Forthcoming Event: UNESCO International Year of Quantum



Figure 1 Photo Credits: UNESCO

UNESCO is pleased to inform you of the launch of a new virtual training program entitled “Empowering African Women in Quantum Science and Technology,” organized by Maria Longobardi from the University of Basel and James Wootton from Moth Quantum.

In the context of the International Year of Quantum Science and Technology (IYQ 2025) and the International Decade of Sciences for Sustainable Development (IDSSD), this initiative aims to equip young African women researchers with foundational training in quantum computing and offer tailored mentorship.

The program includes 10 online sessions based on Learn Quantum Computation using Qiskit, followed by a three-month mentorship for up to 50 selected participants. It is open to African women in STEM aged ≤ 35 , including Ph.D. students, postdocs, and junior faculty. Proficiency in English and linear algebra is required.

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<https://www.unesco.org/en/articles/unesco-empowers-african-women-quantum-science>

We invite you to share this opportunity with relevant national institutions and academic communities.

Should you require further information or clarification, the IYQ secretariat is available at iyq2025@unesco.org or Maria.longobardi@unibas.ch.

From: Xing Qu, Assistant Director-General for Priority Africa and External Relations a.i., UNESCO

