

## EDITORIAL

*Special Issue: Women in Contemporary Science in Africa*

# Invisible no more: African women redefining scientific and cultural frontiers

EUNICE F. FONDZE-FOMBELE<sup>1</sup>, LARA F. GÓMEZ,<sup>2</sup> EMAN SOBH<sup>3,4</sup>

### AFFILIATIONS:

<sup>1</sup>Department of English and Cultural Studies, Faculty of Arts, University of Buea, Cameroon

<sup>2</sup>Grupo de Investigação em Doenças Tropicais (GIDTPiaget), Unidade das Ciências da Vida, da Natureza e do Ambiente (UNCVA), Universidade Jean Piaget de Cabo Verde, Praia, Cabo Verde

<sup>3</sup>College of Medical Rehabilitation Sciences, Taibah University, Madinah, Saudi Arabia

<sup>4</sup>Chest Diseases Department, Faculty of Medicine for Girls, Al-Azhar University, Cairo, Egypt

### CORRESPONDENCE:

Dr. Eunice F. Fondze-Fombele  
Department of English and Cultural Studies, Faculty of Arts, University of Buea, Cameroon  
Email: fonyuy.eunice@ubuea.cm

### SPECIAL ISSUE EDITORS

Dr. Eunice F. Fondze-Fombele  
Dr. Lara F. Gómez  
Dr. Eman Sobh

### SPECIAL ISSUE EDITOR IN CHIEF

Prof. Bright Nwaru

### INTRODUCTION

African women have long been underrepresented in science, technology, engineering, and mathematics (STEM), facing deeply rooted cultural, social, and institutional barriers that limit both their participation and visibility. UNESCO reports that women constitute only one-third of researchers globally, and in Africa, they make up just 30% of science professionals, an estimate that is even lower in engineering and technology fields<sup>1,2</sup>. Paradoxically, Africa holds the world's highest proportion of female STEM graduates (47%)<sup>3</sup>, yet significant gender disparities persist, particularly in career advancement, leadership roles, and research productivity.

Across many African countries, indicators of empowerment and representation reflect some of the widest gender gaps. These persistent inequalities mirror longstanding norms and systemic barriers that discourage girls and women from entering, remaining, and thriving in STEM fields. This underrepresentation extends beyond scientific spaces into cultural sectors such as theatre, cinema, and literature, where the stories and scientific contributions of women have often been overlooked or undervalued<sup>4</sup>. The persistent gender gap in African science, compounded by historical and socio-economic challenges, underscores the urgent need to recognize, support, and amplify the voices and contributions of African women who are reshaping scientific inquiry, cultural expression, and advocacy across the continent.

In response to this need, ASFIRJ, in 2025, launched a special issue dedicated to supporting and amplifying the voices and contributions of African women in science. Authors were invited to submit manuscripts that highlight, through diverse lenses, the achievements, experiences, and impact of African women across scientific and cultural domains. This special issue emerged from a collective desire to challenge dominant narratives that rendered African women in science largely invisible and to showcase how they are breaking stereotypes, pushing boundaries, and building a transformative legacy that interweaves scientific discovery and cultural storytelling.

This is an open access article under the terms of the Creative Commons Attribution License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2025 The Authors. ASFI Research Journal published by The African Science Frontiers Initiatives

Together, the articles in this issue explore the intersection of gender, science, culture, and social change in Africa. They foreground African women as innovators, leaders, and agents of resilience. Crucially, they reinforce the truth that scientific development is not the responsibility of men alone; the visibility, support, and empowerment of African women researchers are essential for the continent's progress.

### **African Women in Science: Overcoming Barriers and Shaping New Narratives**

For decades, African women scientists have navigated systemic barriers stemming from gender bias, limited access to education, and restricted opportunities for career advancement and leadership positions. Yet, despite these challenges, many have made remarkable contributions that continue to transform scientific knowledge, public policy, and cultural narratives across the continent. For example, Wangari Maathai, Kenya's Nobel Peace Prize laureate, pioneered environmental conservation and sustainable development activism, inspiring generations of eco-activists in Africa and globally<sup>5</sup>. Contemporary leaders such as Prof. Francisca Nneka Okeke, a Nigerian physicist, have advanced critical research in geophysics and atmospheric sciences<sup>6</sup>. Women are also driving innovation in engineering innovations, technology and artificial intelligence, contributing significantly to intellectual property creation, even though their representation in startup ownership and leadership remains limited.<sup>7</sup> Supporting and mentoring emerging female scientists across Africa is therefore essential for strengthening research capacity and fostering the next generation of leaders. Nonetheless, African women still make up less than one-third of the continent's scientific workforce, a disparity perpetuated by socio-cultural norms, economic inequalities, and gendered family roles that continue obstruct visibility and career progression<sup>4,8</sup>. Beyond STEM, African women are also reshaping theatre, cinema, literature, and media advocacy, fields where their contributions bridge science and culture, yet remain underrecognized<sup>4,9</sup>.

### **The Content of this Special Issue**

This special issue captures the complexity of both the challenges and triumphs experienced by African women in science, bringing together an array thoughtful and compelling contributions. It includes rigorous

empirical studies that examine structural barriers and emerging opportunities; in-depth biographical narratives that celebrate the journeys of trailblazing scientists from Sudan to Mauritius, Kenya to Cameroon and to Nigeria; critical perspectives that interrogated historical, cultural, and political contexts shaping women's participation in STEM; and insightful literary and media analyses that explore how African women scientists are portrayed in fiction and film. By weaving together quantitative evidence, personal journeys, and cultural critique, this collection offers a multidimensional and empowering portrait of African women's past, present, and future in science.

The collection addresses questions of the representation of women in science and research. Historical contextualization highlights the longstanding contributions of women to socio-economic transformation under challenging political conditions. These historical perspectives situate African women not as latecomers to science but as longstanding participants whose knowledge systems have often been excluded from dominant epistemologies. Articles also demonstrate how African women are contributing to global technological innovation, thereby destabilizing stereotypes that continue to frame some careers as a masculine domain. These case studies serve not only as narratives of individual achievement but also as evidence of structural shifts within African science. Importantly, innovation is not confined to laboratories. Cultural and literary analyses alongside case studies from cinema and fiction provide empirical evidence of how entrenched beliefs continue to constrain women's advancement. This issue also involves pathways of transformation, such as capacity building, and exploring institutional mechanisms for supporting women, including mentorship, training, and research collaboration. The importance of networks emphasizes collective agency as a crucial strategy for overcoming isolation and marginalization. Women's collective knowledge practices have historically sustained communities and now represent a strategic model for advancing equity in science. This issue is also highlighted as a critical media visibility tool for shifting narratives and influencing policy.

A particularly significant contribution of this issue lies in its forward-looking perspectives and highlights

resilience as a scientific practice in itself—one that is both gendered and vital in contexts of political and humanitarian crisis.

### **Persistent Challenges and a Model for Support**

Despite notable progress in recent years, African women scientists continue to face significant challenges that limit their representation and impact in STEM disciplines. African women are disproportionately concentrated in junior positions and face limited leadership opportunities, especially political and representation roles<sup>4</sup>. This gender disparity not only hampers equity but also weakens the scientific agenda, as the perspectives and contributions of half the population remain insufficiently integrated into research and innovation. Without women's active participation, science risks missing critical insights relevant to diverse societal needs and sustainable development.

Furthermore, systemic barriers, including cultural norms, gender stereotypes, and unequal access to resources perpetuate these disparities. Women scientists are disproportionately affected by work life balance issues, which can lead to lower scientific communication productivity and fewer grants obtained compared to their male counterparts. African women scientists face pervasive cultural expectations and societal biases that significantly affect their career trajectories. Deeply ingrained gender roles often assign women primary responsibilities for family care and domestic work, limiting their time and mobility for research activities, conferences, and networking opportunities. These traditional expectations also contribute to workplace discrimination and subtle biases, such as being overlooked for promotions or leadership positions despite their qualifications and achievements. These structural inequalities hinder retention and career progression, ultimately limiting the pool of female role models and mentors necessary to inspire and support the next generation of women in science<sup>10</sup>. Efforts to address these challenges through targeted funding, mentorship programs, and inclusive policies have shown promise but require sustained investment and political will across Africa.

Moreover, female scientists frequently encounter challenges related to workplace safety and

harassment, which create hostile environments that discourage retention and sustained productivity. Reports from various African research institutions reveal instances of sexual harassment and gender-based discrimination, which many women are reluctant to report due to fear of professional retaliation or social stigma<sup>11,12</sup>. Addressing these issues requires robust institutional policies, transparent grievance mechanisms, and cultural shifts to foster inclusive and supportive research environments where women can thrive.

The African Science Frontiers Initiatives (ASFI) plays a crucial role in empowering African women scientists by focusing on the skills and networking they need to succeed. Understanding that a lack of access to resources and lack of mentoring can be a major barrier, ASFI provides essential training (scientific writing, grant writing, scientific leadership, scientific supervision, systematic reviews and data analysis). While ASFI does not distribute funds itself, it equips researchers with the expertise to successfully apply for grants from other major international organizations. Furthermore, the initiative builds strong professional networks, connecting women scientists across the continent for collaboration and support. By offering this powerful combination of skill-building, community, and visibility, ASFI provides a critical support system that helps African women researchers build confidence, compete effectively, and advance into leadership roles in science. ASFI offers equal opportunities to women and even prioritise them when it comes to selection. This special issue itself is a part of this supportive mission, aiming to amplify the voices and visibility of women in science. Furthermore, by building professional networks and showcasing research, initiatives like ASFI and publications like this one work together to connect women scientists across the continent.

### **Implications and Future Directions**

From an action-oriented perspective, the research and narratives emphasise the urgent need to integrate gender-sensitive approaches across scientific institutions and cultural sectors. This includes designing family-friendly work environments, implementing mentorship programs, and fostering peer networks that sustain women's careers and leadership in science and culture. For example, targeted

interventions to address the gender gap in STEM fields in Cameroon theatre and Anglophone cinema point to the power of interdisciplinary approaches that connect science with cultural expression, amplifying women's voices in arenas traditionally dominated by men.

At the policy level, the special issue highlights the importance of appointing women to decision-making bodies such as scientific boards, funding agencies, and administrative panels to ensure gender-responsive governance. National and continental policies must mandate gender equity indicators and monitor progress, while supporting institutional reforms that eliminate bias in recruitment, promotion, and resource allocation. The African Union's recent strategies emphasise such commitments, underscoring the critical role of political will in driving transformative change.

Societally, amplifying African women's contributions challenges entrenched stereotypes and reshapes narratives around women's roles in science and culture. This fosters broader public recognition of women as innovators and leaders, inspiring young girls and creating cultural shifts that value gender diversity as essential to innovation and sustainable development. Biographical accounts of trailblazers like Professor Rose Gana Fomban Leke and Dr. Hana ElBadawi illustrate how individual achievements can influence social attitudes and policies regionally and globally.

Future directions should focus on consolidating these advances through sustained funding, research that integrates gender with intersectional social variables, and expanded capacity-building programs that include mid-career and senior scientists. It is vital to promote cross-sector partnerships linking education, media, health, and environmental sciences as demonstrated in papers addressing climate reform activism and artificial intelligence in education. Moreover, expanding research on the impacts of family roles, cultural norms, and institutional practices through evidence-based methodologies can inform targeted policies that dismantle persistent barriers. A call for action for adaptation of work hours of women in science and research to the inherent roles of women as family caregivers is required.

## CONCLUSION AND CALL TO ACTION

In bringing these diverse contributions together, this issue demonstrates that African women in science are not passive recipients of global scientific trends but active producers of knowledge, innovation, and cultural meaning. They are challenging structural exclusions, rewriting cultural scripts, and advancing scientific frontiers in ways that are deeply rooted in African histories and realities. Yet, as many articles remind us, structural barriers remain: from underrepresentation in leadership positions, to cultural expectations, to systemic biases in research funding and publication.

This special issue is thus both a celebration and a provocation. It celebrates the achievements of African women scientists, innovators, and cultural producers, while also provoking critical reflection on the structural reforms required to sustain these gains. The future of science in Africa cannot be imagined without the full participation of women. To exclude their voices is to silence half of the continent's intellectual capacity; to amplify them is to unleash Africa's full potential for innovation, sustainability, and transformation.

African women's scientific and cultural contributions are no longer invisible; they are a powerful force shaping the future of knowledge, innovation, and societal sustainable transformation across the continent. This special issue reveals that addressing structural barriers, cultural norms, and institutional bias is not only a matter of equity, but it is essential for unlocking Africa's full scientific potential. Elevating African women in science and culture fosters more diverse, relevant, and transformative solutions to the continent's pressing challenges, from health and environment to education and technology.

The impactful model of the African Science Frontiers Initiatives (ASFI) serves as a powerful example for other organizations, institutions, and funders. We issue a call to action: it is time to multiply these efforts. The challenges are too vast for any single entity to address alone. We urge more partners to create and expand programs that provide targeted skill-building, foster professional networks, and, crucially, dedicate resources to increasing the visibility of African women scientists. This means funding more research led by

women, featuring their expertise in global forums, and consciously nominating them for awards and leadership positions. By following ASFI's lead in creating tangible opportunities and combining it with a committed effort to amplify success stories, we can collectively dismantle barriers and accelerate progress. Let us work together to build an ecosystem where every African woman in science has the tools, the connections, and the platform she needs to thrive and lead.

The path forward requires collective commitment from policymakers, institutions, funders, and communities to implement gender-responsive policies, sustained mentorship programs, and inclusive research environments. It demands intentional efforts to amplify women's voices through media advocacy, strengthen networks, and ensure equitable access to resources and leadership opportunities.

The conversations started in this special issue are just the beginning. We invite you, our readers—researchers, policymakers, journalists, and advocates—to extend this critical dialogue and contribute your own voices. The journey toward equity in science requires continuous reflection, new evidence, and diverse perspectives.

We encourage you to build upon the foundations laid here. Submit your own research, write the biographies of the pioneers in your networks, and share perspectives from your unique contexts. Let us collectively expand this repository of knowledge and inspiration. Share these stories in your classrooms, cite this work in your research, and amplify the achievements of African women scientists within your own communities.

True change is a collaborative endeavor. Let this issue not be an endpoint, but a catalyst. We call on you to join this growing movement, to ask the next questions, and to help write the next chapter in the story of African women in science.

If this vision is embraced, African science and culture can embody a more inclusive transmodern legacy that empowers women, nurtures innovation, drives sustainable development, and fosters inclusive

environments where diverse female talents can thrive and transform African knowledge economies and societies for generations to come.

## ACKNOWLEDGMENTS

The authors thank: ASFI RJ editorial support and all the authors that contributed with this ASFI RJ Special Issue on African Women in Science.

## CONFLICT OF INTEREST

None declared

## AUTHORS' CONTRIBUTIONS

EFFF, LFG, and ES were the editors of the ASFI RJ special issue on African Women in Science. Regarding this editorial, the authors' contributions are: EFFF: Conceptualization, writing original draft, review and editing, validation. LG: supervision, Writing– review & editing, validation. ES: Supervision, Conceptualization, writing, review and editing, validation.

## REFERENCES

1. Women and Girls in science and technology: Bridging the gender gap | United Nations Development Programme [Internet]. [cited 2025 Dec 8]. Available from: <https://www.undp.org/ghana/blog/women-and-girls-science-and-technology-bridging-gender-gap>
2. What you need to know about the challenges of STEM in Africa | UNESCO [Internet]. [cited 2025 Dec 8]. Available from: <https://www.unesco.org/en/articles/what-you-need-know-about-challenges-stem-africa>
3. Africa has highest proportion of female STEM graduates - Women in Science Africa [Internet]. [cited 2025 Dec 8]. Available from: [https://www.womeninscience.africa/africa-has-highest-proportion-of-female-stem-graduates/#google\\_vignette](https://www.womeninscience.africa/africa-has-highest-proportion-of-female-stem-graduates/#google_vignette)
4. Africa Gender Index: African women in times of crisis [Internet]. 2024. Available from: [www.uneca.org](http://www.uneca.org)
5. Wangari Maathai | Biography, Nobel Peace Prize, Books, Green Belt Movement, & Facts | Britannica [Internet]. [cited 2025 Dec 8]. Available from:

- <https://www.britannica.com/biography/Wangari-Maathai>
6. Francisca Nneka Okeke | Office of the Special Adviser on Africa [Internet]. [cited 2025 Dec 8]. Available from: <https://www.un.org/osaa/content/francisca-nneka-okeke>
  7. The quest for gender parity in African tech | McKinsey [Internet]. [cited 2025 Dec 8]. Available from: <https://www.mckinsey.com/capabilities/tech-and-ai/our-insights/closing-the-loop-the-quest-for-gender-parity-in-african-tech#/>
  8. Sibisi NT, Jokazi S, Lefalatsa L, Mamabolo JK, Dienga AM, Nkhumise B. Gender disparities in science, technology, engineering, and mathematics (STEM): A review of challenges and inclusion strategies in South Africa. *Perspectives in Education*. 2025; 43(4):341–63.
  9. Ofori KA. The Role of Women in Contemporary African Cinema: A Case Study of Nigeria. *Studies in Art and Architecture*. 2024;3(1):35–44.
  10. Sougou NM, Ndiaye O, Nabil F, Folayan MO, Sarr SC, Mbaye EM, et al. Barriers of West African women scientists in their research and academic careers: A qualitative research. *PLoS One*. 2022; 17(3):e0265413. Available from: <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0265413>
  11. Barriers and enablers for enhancing career progression of women in science careers in Africa - UKCDR [Internet]. [cited 2025 Dec 8]. Available from: <https://ukcdr.org.uk/barriers-and-enablers-for-enhancing-career-progression-of-women-in-science-careers-in-africa/>
  12. Levine R, Young D, Hawkins G. Women in African STEM Fields: Challenges and Progress. *Journal of African Development*. 2021;1(2):12–15.