



Priscilla Nyadoi ed.

CAREER GROWTH  
FOR FEMALES  
IN SCIENCES,  
THE CHALLENGES,  
OPPORTUNITIES  
AND EXPERIENCES

Gender Studies

Collection Editors

**JAN ETIENNE**

**&**

**REHAM ELMORALLY**

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Jan Etienne & Reham ElMorally



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# Abstract

This publication profiles persisting challenges and opportunities underlying career growth for females in sciences based on perspectives from researches, practice and lived experiences. The lived experiences have been drawn from managers, academic staff and students of academic institutions including primary schools, secondary schools and universities and, females in Sciences. Analysis made of all the submissions show and is demonstrated in this publication that, there are recurrent barriers and opportunities perceived to affect females in science academic and career progression. This publication makes no attempt to document the same for males. Nevertheless, researchers, policymakers and the academia world over will find this book useful for insight and guiding decisions regarding development and implementation of strategies towards enhancement of academic and career growth for females in sciences.

## Key words

High heels, Leakage, Marriage, Mentorship, Galaxies, Nobel prizes, Gender equity, STEM, Gender bias, Resilience.



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# **Part I**

## **Learning from the past to the present: Experiences, challenges and opportunities**

### **Introduction**

In Part I of this book, experiences, lessons and knowledge on the challenges, opportunities and experiences of females in science in academic and career growth are presented as profiled by leaders who have been involved in training or managing the career progression of females in sciences in one way or another. The leaders are from academic and professional institutions and include higher institution of learning managers, lecturers and teachers,

who have been involved in training and employing females in the sciences. Some of the perspectives are given based on the lived experiences of these leaders, some of them being female in the sciences themselves or being deeply involved in the career paths of females in the sciences at some point in their work.

By the end of reading the chapters in Part I of this book, readers will be able to:

1. Understand the critical role that trainers and higher education institutions play in either perpetuating or solving the gender gap in science.
2. Identify the main barriers to women's participation in science from an educator's perspective.
3. Describe the key strategies that higher educational institutions (universities, colleges) and lower educational institutions (primary schools) can implement to create a more supportive and equitable environment.
4. Recognize the importance of creating visible role models within academic institutions to inspire future generations.

# 1

## **Reflecting on experiences and lessons learned from a university engaged in training and mentoring women in sciences for career growth advancement**

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Reflecting on issues affecting and opportunities underlying career growth for females, the vice chancellor of Uganda Martyrs

University here, outlines the historical struggles, current opportunities, and persistent challenges for women in scientific fields and, institutional efforts that have been to foster an inclusive environment promoting equality.

Historically, the global scientific community was predominantly patriarchal, with the significant contributions of many women scientists being overlooked or credited to their male colleagues (Galos and Coppock, 2023; WHO, 2019; UN Women, 2023; World Economic Forum, 2023). Notable examples include Rosalind Franklin, whose work was fundamental to understanding the structure of DNA, and Lise Meitner, a key figure in the discovery of nuclear fission.

Pioneers like Marie Curie, the first woman to receive a Nobel Prize in 1903 and the only person to win in two different scientific fields, and Florence Nightingale, the founder of modern nursing and a proficient statistician, broke significant barriers.

While there has been progress, a considerable gap remains. Although 55% of the Nobel Prizes awarded to women have been granted since the year 2000, women have received only 3% of the total Nobel Prizes awarded in the sciences (Schiebinger, 1999; UN Women, 2023; World Economic Forum, 2023).

Today, an expanding scientific landscape and more inclusive socio-cultural norms are creating greater opportunities for women (African Development Bank, 2019; Makerere University, 2018; MOES, 2023). In Uganda, several women hold key leadership positions in science and technology, including Honorable. Dr. Monica Musenero, the Minister of Science, Technology and Innovation, and Dr. Jane Ruth Aceng, the Minister of Health.

Affirmative action policies and the UN Sustainable Development Goals (specifically SDG 4 on quality education and SDG 5 on gender equality) are helping to mainstream the inclusion of women in Science, Technology, Engineering, and Mathematics (STEM). This has opened diverse career paths (UNESCO, 2023):

Women are holding key science leadership positions in universities, such as research offices, and industry in fields like renewable energy and healthcare, among others. Women are serving as professors, deans, and mentors for the next generation of scientists. In healthcare and medicine, women constitute a large portion of the healthcare workforce, making significant impacts in biomedical research and public health. Advances in technology and engineering, growing opportunities in artificial intelligence, data science, and engineering are enabling women to lead in tech startups and innovation hubs. Other women in entrepreneurship, founding and leading biotechnology firms, environmental companies, and pharmaceutical corporations.

Despite the opportunities, however, significant barriers persist, including gender bias and the underrepresentation of women in leadership roles (Zeng et al., 2016; Tripp, 2021; Casad et al., 2021). While grants and mentorship programs are crucial for building a more inclusive community, the text points out an internal challenge: the failure of some senior women to mentor and support their junior counterparts (Joshi et al., 2015; Saha, 2016; Dennehy and Dasgupta, 2017). There is a strong emphasis on the need for women to actively “pull up” fellow women in the field. At Uganda Martyrs University, we demonstrate commitment to fostering the growth of women in science through deliberate actions. We

have had and continue to implement interventions for the purpose and among others, these include:

1. Ensuring fair admission of female students to science programs.
2. Appointing female leaders to academic and administrative roles to serve as role models.
3. Establishing safe spaces and implementing safeguarding policies to ensure equal and safe engagement for all students.

In January 2025, the university hosted a symposium, in collaboration with the Organization for Women in Science for the Developing World (OWSD) and other partner institutions, to build momentum for these crucial efforts towards enabling career growth for women in the sciences. We believe in the African proverb, “you educate a woman, you educate a nation,” underscoring the societal benefit of empowering women.

# 2

## **Personal experiences on career growth for females in sciences as shared by a female-top rated African scientist**

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Drawing from her personal experiences in her own journey as a top-rated African scientist, professor, wife and mother, Professor Olubukola Oluranti Babalola in her talk documented in this section focused on the challenges and strategies for women pursuing careers in science. Following are summaries of what Professor Olubukola had to say.

## **Navigating personal and professional challenges**

Professor Babalola highlighted the multifaceted lives of women in science, who must balance demanding careers with family responsibilities. She identified the key challenges they face:

1. **Work-Life Balance:** juggling research, publication pressures, and family life is a significant hurdle.
2. **Discrimination:** women often encounter gender bias during hiring and professional advancement.
3. **Systemic Barriers:** navigating institutional and societal structures that may not be supportive of their careers.

## **Key strategies for career success**

To overcome these obstacles and excel, Professor Babalola offered the following advice:

1. **Develop Essential Skills:** women need to build a strong portfolio of transferable skills beyond their scientific expertise. This includes communication, critical thinking, data analysis, time management, and negotiation.
2. **Seek Mentorship and Role Models:** finding mentors and role models is crucial for guidance and support. She stressed that “there is no wisdom in isolation” and urged women to build strong professional networks.
3. **Embrace Collaboration:** working with others and taking part in local and international conferences are vital for visibility, showcasing research and demonstrating career excellence.
4. **Inform Policy and Practice:** female scientists should ensure their research is impactful by using it to inform policies and development at both local and international levels.

5. Challenge the Status Quo: essential to challenge actively gender stereotypes and advocate for diversity in knowledge creation. Professor Babalola noted that gender equity is a driver for progress across all Sustainable Development Goals.

## **Foundations for a thriving career**

Professor Babalola concluded by emphasizing the foundational elements required for success:

1. Education and Training: a strong educational background, continuous training and professional certifications are non-negotiable.
2. Networking and Visibility: actively taking part in relevant networks, conferences and workshops is essential for staying informed and gaining recognition.
3. Mentoring the Next Generation: successful women have a responsibility to nurture and motivate the upcoming generation of female scientists.

Ultimately, she asserted that the inclusion and support of women in science are not just matters of equity but are “essential for a sustainable future.” Society has a role to play in valuing and creating an environment where female scientists can thrive.



# 3

## **Experiences and lessons for career growth for females in sciences from the perspectives of educators in higher institutions of learning**

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Related to the perspectives of the trainers, mentors, and educators who work within the very institutions that shape the next generation of scientists. The author of this chapter argues that while societal barriers are powerful, higher education institutions have a unique and critical role to play in dismantling them.

Gender gaps in science will only widen if we do not make a conscious effort to change the way we teach, mentor, and support women.

This chapter outlines the challenges underlying career growth for females in the sciences, as seen from a trainer’s desk and, more importantly, provides a comprehensive toolkit of strategies for change. It is a call to action for educators everywhere to become active agents in fostering a future where talent, not gender, determines success.

## **The challenge from the trainer’s desk**

From our vantage point within universities and colleges, we see the “leaky pipeline” firsthand. We see bright, enthusiastic young women enter our science programs, only to face a series of systemic hurdles that can diminish their confidence and drive them out of the field (Sadker and Sadker, 1994; Steinke et al., 2007; Ceci and Williams, 2011; Antecol et al., 2018; UN Women, 2023). Globally, women remain a minority of the world’s researchers. In Africa, the average is around 34.5%, and in critical fields like ICT, women hold less than 25% of jobs (African Development Bank, 2019).

The challenges we see every day are multifaceted:

**Deep-Seated Stereotypes:** we see how societal stereotypes the idea that science is “for boys”—can affect a young woman’s self-esteem and her willingness to speak up in a male-dominated classroom (Sadker and Sadker, 1994; Moss-Racusin et al., 2012; Nature Editorial, 2021).

Lack of Role Models: students look to the front of the classroom for inspiration. When they see very few female professors, department heads, or research leaders, it sends a powerful, unspoken message that leadership in science is not for them (Nature Editorial, 2021).

An Unsupportive System: we see how rigid academic structures, a lack of family-friendly policies, and subtle biases in funding and promotions can force women to choose between their career and their family. For too long, our institutions have operated with “gender-neutral” policies that, in reality, fail to address the real-world disadvantages that women face (UNCST, 2019).

## **The trainer’s toolkit: Strategies for building an inclusive system**

To fix this, we as trainers and educators must move from being passive observers to active builders. Here is a toolkit of strategies that higher education institutions can use to empower women in science (Ashencaen and Shiel, 2019; Akbar et al., 2023).

### **Rewrite the curriculum and rethink how we teach**

The change must start in the classroom.

Inclusive Curricula: textbooks and course materials must actively include the contributions of female scientists. This is not just about adding a name; it is about normalizing women’s presence in the history of science and providing diverse role models from the very start.

Innovative Pedagogy: we need to adopt teaching methods that are collaborative and supportive, rather than purely

competitive. This is especially important for adult women who may be returning to education, as flexible and innovative learning models can help them succeed.

## **Build robust mentorship and networking programs**

No one succeeds alone.

**Formal Mentorship:** institutions should create formal mentorship programs that pair female students with experienced women in science. These mentors provide not only career guidance but also crucial emotional support and a living example of success.

**Women-Centered Forums:** creating networks, workshops, and conferences specifically for women in science helps build a sense of community, fosters collaboration, and combats the feelings of isolation that are all too common.

## **Drive institutional policy reform**

Culture change must be backed by official policy.

**Gender-Balanced Recruitment:** institutions must adopt affirmative recruitment policies to ensure that women are equally represented in hiring, promotions, and leadership roles. A “deliberate measure” is needed to close the gender gap.

**Family-Friendly Policies:** to support work-life balance, universities must provide flexible work options, adequate parental leave, and accessible childcare.

**Equitable Funding:** we must design funding opportunities that are tailored to support women-led research projects and ensure that the grant allocation process is transparent and free from bias.