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# Career Development Activities for African Women, Students, and Young Professionals in Geoscience and Remote Sensing

The underrepresentation of women in science, technology, engineering, and mathematics (STEM) fields remains a pressing challenge across Africa. This gender disparity not only impedes women's advancement in these vital sectors but also deprives nations of the potential contributions and innovative solutions that a diverse workforce can offer. Studies show that sociocultural, economic, and systemic factors contribute to the low participation of African women in STEM disciplines

[1], [2]. With women accounting for only 30% of STEM professionals in Africa [3], initiatives like the United Nations (UN) Educational, Scientific and Cultural Organization's STEM and Gender Advancement [4] have been launched to address this issue. Additionally, the African Development Bank's gender equality index tracks the progress of appointing women to positions of responsibility, monitoring African women's representation [3].

**THE WIA HIGHLIGHTS PROFESSIONAL DEVELOPMENT OPPORTUNITIES THROUGH WEBINARS AND NETWORKING EVENTS AND INSPIRES THE NEXT GENERATION TO PURSUE GEOSCIENCES AND REMOTE SENSING.**

## INTRODUCTION

The Women in Africa (WIA) initiative emerged from the Inspire, Develop, Empower, and Advance (IDEA) committee of the IEEE Geoscience and Remote Sensing Society (GRSS) to further empower African women in STEM fields. Initially spearheaded by IDEA member Nkeiruka Onyia in 2020, this initiative aims to create a supportive network, provide mentorship, and promote opportunities and career paths for African women and young professionals pursuing geoscience and remote sensing careers across academia, government, and industry. WIA high-

lights professional development opportunities through webinars and networking events and inspires the next generation to pursue geosciences and remote sensing.

Since the WIA program was formed, it has grown to a team of six members, including Mary Immaculate Neh Fru, Kassim Kalinaki, Sunni Kanta Prasad Kushwaha, Mousmi Ajay Chaurasia, Arioluwa Aribisala, and Cletah Shoko (current lead). Through planning meetings, the group laid plans to launch WIA's first activity: Career Development Webinars targeting African women historically underrepresented in geospatial fields, along with students and young professionals interested in geoscience and remote sensing. The Career Development Webinars marked the first step in realizing WIA's vision to expand engagement and leadership among African women in geospatial fields.

## CAREER DEVELOPMENT WEBINARS FOR WOMEN IN GEOSCIENCE, STUDENTS, AND YOUNG PROFESSIONALS

The webinar series aims to spark interest in the geosciences and remote sensing by showcasing opportunities across academia, industry, and government. Specifically, the webinars feature professionals who share their career journeys and helpful resources to give attendees visibility into different career trajectories and opportunities for advancement to guide their paths. By reaching undergraduate and graduate students and early career geoscientists across Africa, the initiative encourages them to consider and pursue geoscience as a rewarding career choice despite regional challenges. It also facilitates connections and learning, which are critical for the growth of this burgeoning community.

The webinars are held online (via Zoom) and are open to all. Past recordings of the webinars are also available on the GRSS YouTube channel. We encourage others to contact IDEA if you want to speak at one

of our upcoming webinars. At the close of each online event, IDEA also provided two attendees who showed interest and engagement with gifted GRSS student memberships. In 2023, the GRSS IDEA initiative of WIA held three webinars to inform and empower the next generation of African geoscience professionals.

### FIRST WIA WEBINAR SERIES: FAMILY AND CAREER LIFE FOR GEOSPATIAL FOLKS

The inaugural webinar for the WIA Webinar Series on 28 June 2023 sparked an enlightening discussion on the intersections of family, culture, and careers in the geosciences (Figure 1). This webinar gathered several participants for a conversation led by speaker Nancy Oduor, a Ph.D. candidate at the Leibniz Centre for Tropical Research in Germany and a mother of three (Figure 2). She shared wisdom from her journey navigating family responsibilities and her passion for marine biogeochemistry.

As an African woman rising through the ranks of a demanding, male-dominated field requiring significant travel and fieldwork, Nancy offered a unique perspective on the tensions between the cultural expectation placed on African women to prioritize parenting and household duties versus pursuing academic and professional goals. More-

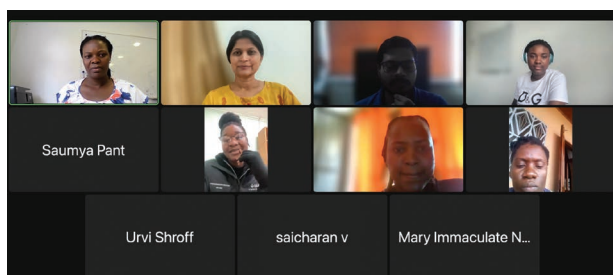


FIGURE 1. Group photo for the first WIA webinar series.

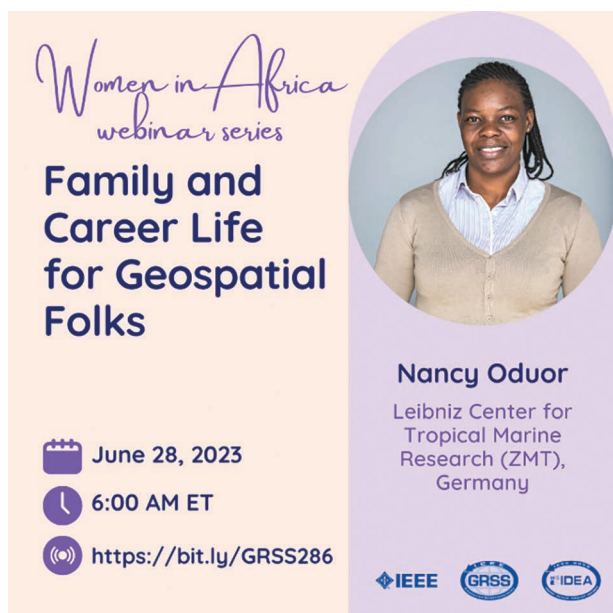


FIGURE 2. Flyer for the first WIA webinar series.

over, she tackled these issues head-on while emphasizing that more space can be created for African women in the geosciences through communication, understanding from partners, and learning from other women who balance these priorities. Equally important, she highlighted the challenges faced by women in STEM, provided solutions, and showcased success stories of distinguished women navigating careers and family matters in geosciences and remote sensing arenas. Among the coping mechanisms to overcome challenges and improve the work-life balance, Nancy advised attendees to “accept their situations, avoid seeking sympathy, believe in themselves, be dedicated and always hardworking.”

Attendee engagement was inspiring during the question-and-answer session, sparking conversations about challenges faced at all career stages, from early academic programs to senior faculty and industry positions. Nancy’s openness about mistakes made, insights gained, and her vision for a more equitable and family-friendly scientific culture resonated with participants, who were mostly females. While live attendance numbers fell short of hopes because of limited publicity, this first webinar set a powerful precedent for future conversations elevating African women in science through the GRSS IDEA initiative of WIA. The inspiring stories and practical wisdom shared will undoubtedly empower more African women to boldly pursue their passions in the geospatial and geoscience communities. With more robust social media promotions and publicity efforts, future WIA webinars are poised to build on Nancy’s momentum to engage and energize even larger audiences.

### SECOND WIA WEBINAR SERIES: FALL ARMYWORM MONITORING AND EARLY WARNING SYSTEM

The second webinar (Figure 3), held on 19 September 2023, convened a discussion around cutting-edge remote sensing technologies being deployed to combat food insecurity [5]. Dr. Maria Luisa Buchailot of the Fall Armyworm Monitoring and Early Warning System (FAMEWS) project [6] shared insights from FAMEWS’ recent research leveraging satellite imagery to detect fall armyworm (FAW) infestations and protect vulnerable smallholder farmers in sub-Saharan Africa (Figure 4).

Dr. Maria emphasized that the FAW has devastated maize crops across Africa since 2016, critically impacting

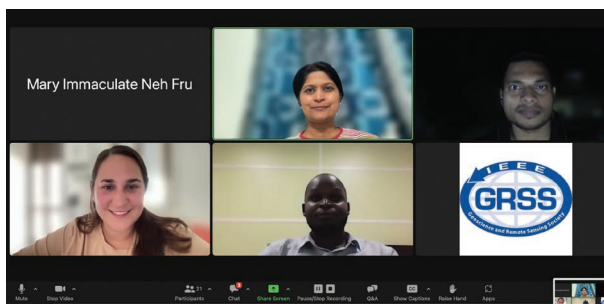


FIGURE 3. Group photo for the second WIA webinar series.

food supply stability. However, the rapid detection of emerging infestations can dramatically improve containment and treatment response times. This is where FAMEWS comes in: through the analysis of vegetation health data from the Sentinel 2 satellites, the FAMEWS algorithms can detect the decreasing greenness that indicates FAW attacks on maize. Such early warning capabilities are a game changer for protecting smallholder yields and livelihoods. By alerting farmers to nascent infestations sooner, the farmers can take timely action and prevent extensive losses. Escalating to regional agencies, the satellite-based models also provide critical insights into the spread of crop threats to support broader food security interventions.

Aligned with the UN's Second Sustainable Development Goal of Zero Hunger, the FAMEWS initiative showcases how geospatial technology can be operationalized for real-world humanitarian impact. Dr. Maria answered audience questions about current model limitations and future expansions into pan-African early warning systems. Attendees gained inspiration from seeing geospatial applications advancing social good and technical knowledge to inform their pursuits at this intersection of technology and sustainability. Compared to the first webinar, the second webi-

nar involved more participants, highlighting the increased interest in the webinar series.

### THIRD WIA WEBINAR SERIES, "DON'T BE AFRAID TO REACH FOR THE STARS": LESSONS LEARNED FROM A CAREER IN REMOTE SENSING

The third webinar gathered insights and inspiration from renowned remote sensing scientist Dr. Heather McNairn in a session titled "Don't Be Afraid to Reach for the Stars" (Figures 5 and 6). Dr. McNairn drew upon more than 30 years of groundbreaking research leveraging synthetic aperture radar (SAR) to monitor agroecosystems from space. Beyond an overview of her illustrious career advancing SAR applications, Dr. McNairn provided a nontechnical personal look at the joys, lessons, and challenges of growing an impactful research program as a woman balancing scientific curiosity, career progression, and family life.

While acknowledging women's barriers in STEM, she imparted advice to dream big and lean on mentors and networks—keys to unlocking what may seem impossible. As a scientist, Dr. McNairn emphasized that the field is not an everyday exciting endeavor and is "a bit of a grind involving building one brick at a time, one piece of information, and one incremental step forward." She left the WIA audience feeling emboldened by highlighting how far SAR remote sensing has come in recent decades and where the technology is headed. By enabling rapid, global-scale insights into crop health and dynamics even underneath cloud cover, SAR promises ever-expanding value for supporting food security into the future—an exciting frontier calling women to the field.

Principally, Dr. McNairn emphasized that ambition paired with passion and perseverance can spark personal

FIGURE 4. Flyer for the second WIA webinar series.

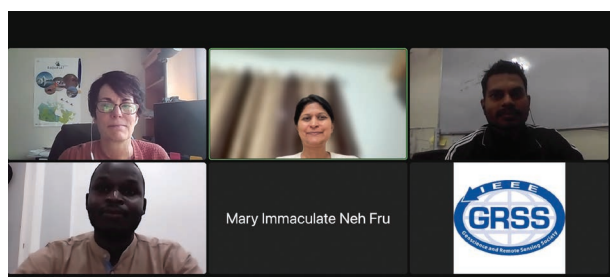


FIGURE 5. Group photo for the third WIA webinar series.

FIGURE 6. Flyer for the third WIA webinar series.



and scientific transformational growth. Her story inspired WIA attendees to embrace their talents and “reach for the stars” to pursue geoscience advances that uplift vulnerable communities across Africa and beyond. She shared lessons with the attendees and encouraged them to follow their passion and learn new skills (hard and soft). She emphasized the need to maintain the earned reputation since “it takes time to build your reputation and it takes a moment to destroy it.” Indeed, the WIA community can blaze trails into an equitably brighter future by boldly supporting each other’s dreams.

### FUTURE OUTLOOK

Riding the momentum of its inaugural webinar series, the WIA initiative is charting an ambitious course to catalyze the next generation of African women, students, and young professionals in geospatial science. With three webinars now amplifying stories of women who have successfully navigated family life to lead in a male-dominated field, attendance continues to rise as word spreads. Each session has armed attendees with invaluable insights and expanded their professional networks. Evaluations reveal that, more than ever, women are leaving inspired, energized, and eager to get involved in geoscience and remote sensing. The WIA calendar is now filled with plans to sustain this community-building impetus. Another webinar is on the horizon, and strategic promotions through social media will ensure improved attendance compared to the previous webinars.

However, virtual events are only the first phase. WIA is now establishing avenues for in-person conferences and mentoring workshops to nurture talent on the ground in African nations. Efforts will kick off in East Africa, led by WIA’s Uganda-based member, Kassim, and then to South Africa, led by Cletah. Other regions will be catered to in the future. By creating touchpoints for women who rarely interact with female scientific leaders from their communities, along with students and young professionals, WIA is building the foundations to elevate African women in the geosciences for generations.

The momentum of the inaugural webinars has made WIA’s mission clear: to empower African women already disrupting geoscience and inspire youth to shape the field’s future fearlessly. With galvanized commitment and vision, WIA’s members, overseen by IDEA cochairs, are determined to realize a seismic shift in capacity and leadership that lifts women across Africa’s geospatial arena.

### ACKNOWLEDGMENT

The remarkable progress behind WIA in such a short time frame would not be possible without the support of the GRSS and the IDEA committee, which have provided invaluable organizational backing and networks to drive WIA’s mission. Thanks to the GRSS’s Zoom webinar and publicity platforms, WIA has hit the ground running with its webinar series and expanded its vision for in-person events. Additionally, IDEA committee

members’ voluntary efforts and enthusiasm in leading coordination, moderation, and promotion have delivered outstanding results, catalyzing African engagement. With enduring appreciation for the GRSS and its member groups’ sponsorship, WIA looks forward to continued partnership, sponsorships, and resource sharing to elevate African women, students, and young professionals in the geospatial arena. Through allies such as these, who dedicate time, expertise, and outreach to support marginalized communities’ dreams, WIA can truly transform and save lives by narrowing the gender gap in STEM fields.

**NANCY ADVISED ATTENDEES TO “ACCEPT THEIR SITUATIONS, AVOID SEEKING SYMPATHY, BELIEVE IN THEMSELVES, BE DEDICATED AND ALWAYS HARDWORKING.”**

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