



## Science, Technology, Engineering and Mathematics (STEM)

**Women in STEM:** Across the world women are underrepresented as STEM professionals. Women make up only 8.7% of STEM professionals in the United Kingdom and only 27% of all computer science jobs are held by women in the US<sup>8</sup>. On the continent of Africa, the majority of STEM professionals are men, with women making up 15% of technology jobs and about 25% of science researchers. For example, in Kenya, only 15% of STEM jobs are filled by women and only 2% of registered Engineers are women.<sup>9</sup>

### *Why are there so few women in STEM?*

- Historical bias toward girls' academic abilities
- Social expectations of balancing home and career
- Low performance of girls in mathematics, science & technical subjects
- Career decisions on subject choices made at an early age without students knowing the impact
- Lack of interest in science subjects (Mathematics, Physics and Chemistry) by many girls
- Lack of mentors and role models for girls
- Lack of career counsellors or gender biased counsellors

In the early part of the 19th century, an argument against the involvement of girls in science was put forward by highly respected educationists. The prevailing attitude was that girls are born biologically inferior in many respects, including their capacity to participate in academic pursuits. This "fact" was published in respected academic journals which stated that girls should not be taught science because the expenditure of nervous energy in the mastery of analytic concepts is harmful to their health.<sup>10</sup> The current situation of women in STEM cannot be disconnected from this biased thinking.

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<sup>8</sup>Huhma Heather R.(2012). STEM Fields And The Gender Gap: Where Are The Women?.Forbes Magazine.

<sup>9</sup>Kenya's Engineers Registration Board membership as at May 2012

<sup>10</sup>Andoh P, AntwiBosiakoh T, Afranie S. (2012). Motivation and career aspirations of female students studying science, Center for Policy Studies, Accra, Ghana

## Women in STEM

### DR. SAHWA ADIL NOUREIN, MEDICAL DOCTOR, SUDAN<sup>11</sup>



Dr. Nourain specializes in the study of diseases prevention with a focus on diseases that affect women. She encourages girls to study science and keep their career options open. She is also the recipient of the Prestigious UNESCO International Fellowships Program for Young Women in Life Sciences (2013) and through this award is able to further her studies.

### FRANCISCA NNEKA OKEKE, PHYSICS, NIGERIA<sup>12</sup>

Professor of Physics at the University of Nigeria at Nsukka, Professor Okeke has recently received the UNESCO Women in Science Award for her contribution to research on climate change. Okeke emphasizes that girls need encouragement and we need to let the guardians and parents know the importance of women participating in science.



Two other Nigerian scientists have won this prestigious international award:

- Grace Oladunni L Taylor (1998) Biochemist
- Adeyinka Gladys Falusi (2001) Molecular genetics

### DR. EUCHARIA OLUCHI NWAICHI, ENVIRONMENTAL BIOCHEMIST, NIGERIA<sup>13</sup>



Dr. Nwaichi says she always did well in mathematics and physics. Her parents encouraged her and sent her to a high school that specialized in science. She works at the University of Port Harcourt where she researches methods for removing toxic waste from the environment. Her research focuses on the use of two local plants to that can be used for cleaning up polluted land in the Niger Delta so that it can be used for much-needed food crops.

<sup>11</sup> <http://en.starafrica.com/education/sahwa-adil-nourain-for-the-health-of-mother-and-child.html>

<sup>12</sup> UNESCO.(n.d.). Inspiring Youth: Professor Francisca NnekaOkeke, <http://www.unesco.org/new/en/natural-sciences/special-themes/science-education/inspiring-youth/inspiring-youth-francisca-nneka-okeke/>

<sup>13</sup>[http://www.africanoutlookonline.com/index.php?option=com\\_content&view=article&id=6352:2-female-nigerian-scientists-bag-unesco-loreal-2013-awards&catid=99:outlookscroller](http://www.africanoutlookonline.com/index.php?option=com_content&view=article&id=6352:2-female-nigerian-scientists-bag-unesco-loreal-2013-awards&catid=99:outlookscroller)

**CAPTAIN IRENE MUTUNGI, PILOT, KENYA<sup>14</sup>**

An airline captain is the ultimate position for a professional pilot. Of Kenya Airway's 340 pilots, 26 are women (4 captains, 22 co-pilots). Irene is the first female commercial airline captain in Kenya and Africa. She was inspired to become a pilot by her father who was also a pilot and encouraged her career aspirations!

**CATHERINE MAHUGU DIRECTOR OF TECHNOLOGY AND INNOVATION AT SHOP SOKO, KENYA<sup>15</sup>**

Catherine studied computer science at the University of Nairobi with a focus on internet technology (IT). At only 25 years of age she is a proprietor of Shop Soko. Shopsoko.com is a website that provides artisans with a location to promote and sell their products locally and internationally. Catherine says, "Don't be your own barrier. Remove the notion that you cannot do what the men are doing in IT."

**SARAH WANDAI AUTO MECHANIC, KENYA<sup>16</sup>**

Sarah has been a mechanic for 10 years. After she completed Form Six, she attended Mombasa College to study business. However, she did not enjoy this course and had a passion for mechanics. She dropped her business course to become an auto mechanic. Like many women, Sarah is a working mother and says she wakes at 5:00 AM to get her child ready for school and to get to work on time. Sarah is working at a mechanic site located at White House area, a few meters away from Nakuru-Nairobi highway. She says she really enjoys her work and is accepted in her role as mechanic.

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<sup>14</sup> <http://www.freesun.be/news/index.php/kenya-airways-doubles-capacity-to-juba/>

<sup>15</sup> <http://girlsinct.org/profiles-of-women-in-ICT/catherine-mahugu>

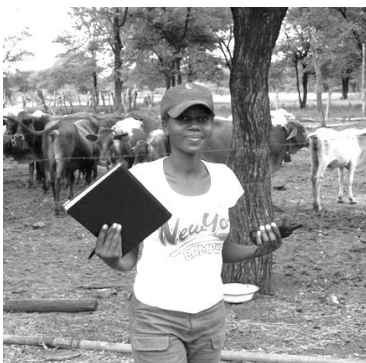
<sup>16</sup> Giatau, Bernard. (Feb 14, 2012). News 24 Kenya: <http://m.news24.com/kenya/MyNews24/Photos-Iron-lady-20120214>

**DR. MARIAN EWURAMA ADDY, BIOCHEMIST, GHANA<sup>17</sup> (1942-2014)**

Dr. Addy is a well-known biochemist who also hosted a TV show *Brilliant Science and Maths Quiz*. She worked as a senior lecturer in Biochemistry at the University of Ghana for much of her career. She is quoted as saying that when she attended school in the 1950s there was a general trend to discourage girls from pursuing science. She said, “Girls were mostly in girls’ schools where there weren’t many good science teachers, and if they were in mixed schools it was not feminine to have an interest in science. You were encouraged to do the proper thing, history or some other course like that.”

**REGINA AGYARE, COMPUTER SCIENCE, GHANA<sup>18</sup>**

Agyare graduated from Ghana’s Ashesi University in 2005 with a degree in Computer Science. She was one of the top software developers in her class. After graduation, Regina was hired by a prestigious international bank in Accra as the first and only woman in the IT department. After six years in the banking/technology industry, Agyare decided to follow her passion and founded her own company, Soronko Solutions. She has a passion for promoting an interest in technology among girls and women and people living with disabilities.

**FADZAI ZENGEYA, AGRICULTURAL SCIENTIST, ZIMBABWE<sup>19</sup>**

Fadzai is an Agricultural Scientist. Her research focuses on the movement of cattle and buffalo. Her work will increase knowledge of livestock movement, landscape selection and grazing preferences. This will not only aid farmers in acquiring knowledge on how they can better manage their livestock, but also help promote conservation management by examining their movements near wildlife preserves and developing strategies to ensure that the natural habitat is not endangered by livestock movement.

<sup>17</sup>Ministry of Education.(2001). Gender and Education SourceBook.Girl Child Education Project, WUSC/UNICEF.

<sup>18</sup> <http://www.aspeninstitute.org/policy-work/global-health-development/our-breakthrough-solutions/new-voices-fellowship/agyare>

<sup>19</sup><http://www.rp-pcp.org/training/phd/on-going/fadzai-zengeya> (Photo credit: © A. Caron)



## Women in Leadership

### *Power and decision-making*<sup>20</sup>

Women are underrepresented in leadership and decision making across the globe.

### *Women in Government and Private Sector*

- 19.5% of parliamentarians are women.
- 17% of the world's Ministers are women.
- Of the world's heads of state/heads of government only 18 are women.
- Of the 500 largest corporations in the world, only 13 have a female chief executive officer.

### **Country specific examples of women in parliament**<sup>21</sup>

Rwanda: 56.3%, Ghana: 8.3%, Kenya: 19.48%, Nigeria: 6.8%, United States: 16.8%

### **PRESIDENT JOYCE BANDA, MALAWI (APRIL 2012 - 2014)**<sup>22</sup>



President Joyce Banda became president of Malawi following the sudden death of President Bingu wa Mutharika. She was Malawi's fourth president and its first female president. President Banda is known as one of Africa's most influential women. She has long fought for the rights of women and children and has a particular interest in supporting young women leaders. She says she is influenced by Nelson Mandela and his power of forgiveness and love. She says "I learned that leadership is about falling in love with the people that you serve and the people falling in love with you."

<sup>20</sup>United Nations.(2010).The World's Women:Trends and Statistics, United Nations. New York. N.Y. USA.

<sup>21</sup>United Nations.(2010).The World's Women:Trends and Statistics. Table 5.a. (Percentage of parliamentary seats in Single or Lower chamber).New York: United Nations

<sup>22</sup> Banda, Mabvutor. (Feb 2014). How Malawi's President Joyce Banda Lives Mandela's Legacy. Inter Press Service News Agency. Malawi



## EXECUTIVE PRESIDENT ELLEN JOHNSON-SIRLEAF, LIBERIA<sup>23</sup>



Ellen Johnson-Sirleaf is the 24th President of the Republic of Liberia and the first elected female Head of State in Africa. She is serving her second term as president after winning the 2011 presidential election. After decades of fighting for freedom, justice and equality in Liberia, in 2011 President Sirleaf shared the prestigious Nobel Prize for Peace with two other women – fellow Liberian Leymah Gbowee, and Tawakkul Karman of Yemen. They were recognized for their non-violent struggle for the safety of women and for women’s right to full participation in peace-building work. President Johnson-Sirleaf says, “The size of your dreams must always exceed your current capacity to achieve them. If your dreams do not scare you, they are not big enough.”

### *Women as leaders in legal enforcement<sup>24</sup>*

- Globally, women average 27% of judges and 26% of prosecution staff.
- In a review of 84 supreme, constitutional and regional courts, women make up 23% of justices and hold the role of Chief Justices in 12 courts.
- On average only around 1 in 10 police officers in the world is a woman.
- Sub-Saharan Africa has some of the highest numbers of women police officers, with 12% being women.

Remember you **do not need to be a politician or a president to lead the way**. Many women lead in their daily lives by breaking down barriers and opening doors for women and girls.



In Wajir, Kenya Bishara Farah is not only the youngest team member of Wajir’s emergency department, but also the first and only woman to drive an ambulance. She travels extensively over long distances to pick up patients with different medical needs, including pregnant woman, victims of animal attacks, and road accidents. Bishara then rushes them to the hospital for medical care. "My job involves saving lives and this requires me to be alert the whole day. Sometimes I have to speed to ensure I get to people in need of help." Bishara does not want to discourage other women and girls by telling them how tough her job is, but rather focuses on one thing that motivates her - saving lives. She is a great role model, leading the way for all girls and

women to believe they can do anything they set their mind to even if they are the first to do it!<sup>25</sup>

### *What can teachers do?*

- **Supplement your curriculum:** Highlight the success stories of woman as leaders in various areas such as politics, law, journalism or business.
- **Avoid tokenism:** Do not present women as tokens of female success. Make it the norm!
- **Highlight leaders in your community:** Invite women and men from your community who have succeeded as leaders to visit your class. Ask them to talk about their path to success, their challenges, how they dealt with their challenges and so on.

<sup>23</sup><http://www.emansion.gov.lr/2content.php?sub=121&related=19&third=121&pg=sp> (photo credit : Emansion)

<sup>24</sup>UN Women.(2012). Progress of the World’s Women Fact Sheet. UN Women New York, N.Y. USA

<sup>25</sup> Story adapted from: <http://www.bbc.com/news/world-africa-34468546>