

SCi planet

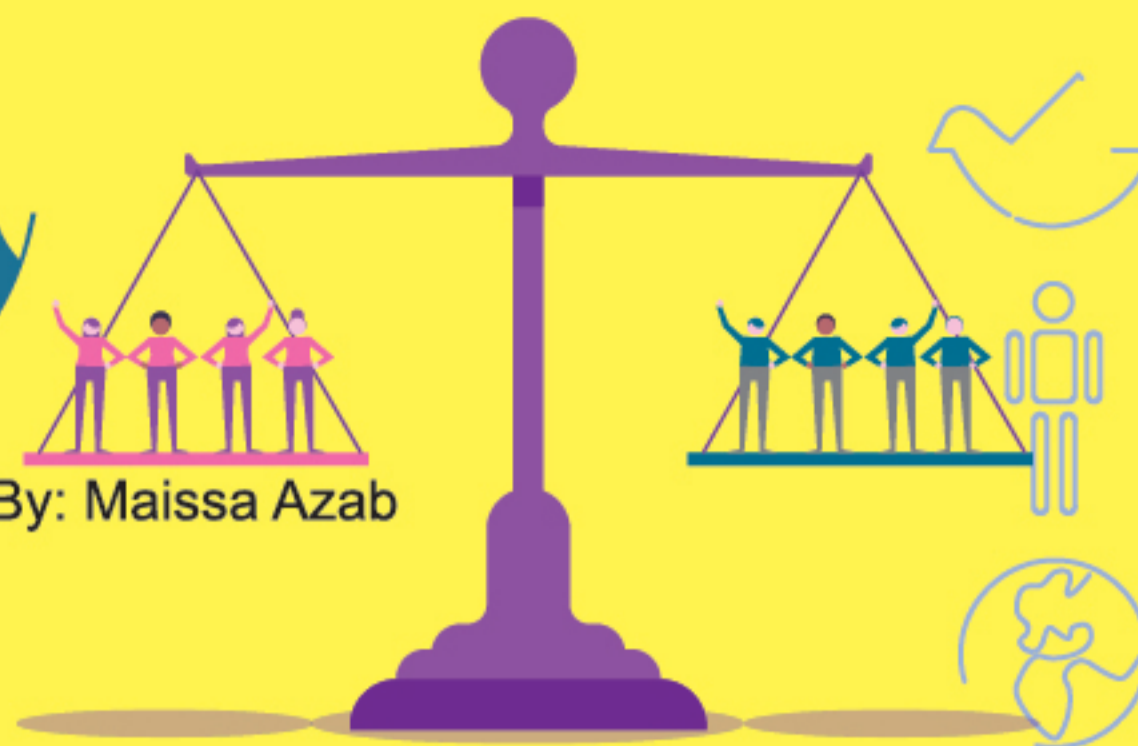
EYE ON SCIENCE

SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY 	2 ZERO HUNGER 	3 GOOD HEALTH AND WELL-BEING 	4 QUALITY EDUCATION 	5 GENDER EQUALITY 
6 CLEAN WATER AND SANITATION 	7 AFFORDABLE AND CLEAN ENERGY 	8 DECENT WORK AND ECONOMIC GROWTH 	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE 	10 REDUCED INEQUALITIES 
11 SUSTAINABLE CITIES AND COMMUNITIES 	12 RESPONSIBLE CONSUMPTION AND PRODUCTION 	13 CLIMATE ACTION 	14 LIFE BELOW WATER 	15 LIFE ON LAND 
16 PEACE, JUSTICE AND STRONG INSTITUTIONS 	17 PARTNERSHIPS FOR THE GOALS 			

Sustainability Means Equality

By: Maissa Azab



IN THIS ISSUE!!!

- 3 Sustainable Development and Youth in Developing Countries
- 4 Sustainable 6: On the Road to a Sustainable Planet
- 6 A Sustainable Loop: From Linear to Circular Economy
- 7 Green Transportation
- 8 Save the Planet: Plant a Tree
- 10 She Set It: Women of the Periodic Table
- 12 Women's Contribution to Scientific Discovery
- 13 The Psychology behind the Gender Pay Gap
- 14 Technology and the Gender Gap
- 15 Language and Women Empowerment
- 16 Pioneering Women Architects
- 17 Nobel Prize Laureates for Peace: A Tiny Ray of Hope
- 18 Ageing in the Age of Inequality
- 20 Designing towards Sustainability
- 21 The Most Famous Human Rights Charts
- 22 March 2019: A Month of Competitions and Awards

It is neither a secret nor a surprise that our life on Earth, let alone its continuity through future generations, is facing challenging calamities that are mostly the result of our own doing, and that can only be resolved by our own doing. That is why many world leaders driven by throngs of concerned people have come together to commit their nations to a global partnership to combat these calamities and attempting to reverse their consequences. First, there were the Millennium Development Goals (MDGs), the deadline of which was 2015, and now there are the Sustainable Development Goals (SDGs).

As mentioned in our first issue of this year, SCiPlanet will be tackling the SDGs throughout the year. All 17 Goals interconnect; they cover issues that affect us all and involve us all to build a more sustainable, safer, more prosperous planet for all humanity. As such, the Goal 17, Partnerships for the Goals, is a goal that is covered in all our issues. We started in the first issue, Winter 2019, with the goals most related to the basics of life on planet Earth: Life on Land, Life below Water, Climate Change, Affordable and Clean Energy.

In this issue, we tackle goals that affect the quality of human life. To begin with, there is the elephant in the room: Gender Equality. It is amazing that, in the 21st century of the Common Era and after millennia of human life on Earth, we are still struggling with inequality issues; not just for females, but also discrimination based on age, race, and disability, among other human differences. These inequalities are tackled by the goals of: Reducing Inequalities, as well as Peace, Justice, and Strong Institutions.

Of course, to maintain a healthy and progressive human lifestyle, we need to secure a sustainable lifestyle; one that we and our successors need and deserve. In addition to previously mentioned goals, this requires Sustainable Cities and Communities. Individual efforts are essential, but without a proper and inclusive framework, these efforts can be undermined. Hence, group efforts are necessary; the bigger the group, the better the results.

Last but certainly not least, in our section dedicated to celebrating the International Year of the Periodic Table (IYPT 2019), the feature *She Set It* covers the significant contributions of female scientists to the Periodic Table and thus to chemistry and physics. Enjoy the new issue, make sure to check out SCiPlanet Online for more articles, and do not forget to subscribe to our monthly e-newsletter.



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Sustainable Development and Youth in Developing Countries:

By: Ayman Elsayed
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How to Start?

Citizens of developing countries usually consider sustainability studies and environment preservation as the rich countries' duty; it is not considered an issue of priority to them.

This requires a variety of programs to introduce them to the concept of sustainability, from various points of views, with the main focus on young generations. The youth have to learn to picture the world as a system; a system that connects space and time, which is a requirement in all definitions of sustainable development. This target is tackled through a diverse range of activities about energy and the environment, aiming to generate a societal impact, to demonstrate new ideas and initiatives for a cleaner, eco-friendly development, with focus on ecosystem preservation and renewable energy resources.

Poor countries are always facing more problems than rich countries, even if most of these problems are initiated by the activities of rich countries. These problems can be categorized in main categories: survival needs—such as food, education, and health; dilapidation of valuable natural resources; and low living standards.

In the 1980s, former West German Chancellor Willy Brandt proposed the “Brandt Line” concept, which is a visual depiction of the North–South divide. It is an imaginary division that has provided a rough way of dividing all the countries in the world into a rich north and poor south. Even though the proposition of the Brandt Line is no longer widely used, we can always make comparisons between the efficiency of global actions between countries above the visual line, and those countries below it.

The Sustainable Development Goals (SDGs) are a collection of 17 global goals set by United Nations General Assembly in 2015 for the year 2030. The SDGs are part of Resolution 70/1 of United Nations General Assembly “Transforming our World: the 2030 Agenda for Sustainable Development”.

Going back to the definition of rich and poor countries, it was very obvious, after five years, that the performance of countries in regards to the SDGs is not equal globally. Developed countries, mainly those countries above the Brandt Line, are performing more positively in most of the SDGs, compared with the same indicators to developing countries.

Activities in Science Centers and Museums

In science centers and museums, it is always important to provide a human face to environmental issues. Centers and museums are mainly working to empower the youth to become active agents of sustainable development, and to promote an understanding culture to change attitudes towards environmental issues. Museums and science centers fulfill their goals by encouraging curiosity, imagination, and creativity through diverse activities, each of which approaches science in a different manner that is relatively unconventional to the local community.

To have an effective global prospective, science centers and museums are targeting SDGs through addressing major environmental challenges facing local communities, with emphasis on natural resources and adverse human impact. They enhance the public understanding of the threats facing endangered species, with a main focus on the local environment.

Talking to the age category of youth, it is important to target sustainable lifestyles through education and dialogue, and to involve youth as partners, either in discussions of present challenges, monitoring or proposing solutions. Such activities mainly developed to calibrate individual habits, awareness of human intervention and its negative effect on biodiversity. Meanwhile, activities can introduce global strategies affecting the local citizen, and the importance of maintaining the Earth's natural resources, to continue to provide a home for humans and all life forms.

Conclusion, it is very important to understand that we live in a global world, where the consequences of punctual actions affect the whole system. The developed world should help the developing countries to a more sustainable world. The developing countries have to know that they are an important part of the world, even if they lack resources and power factors. Only youth are able to solve this complicated equation; using their spirit and energy, we can dream of a better world.



By: Sara Khattab



SUSTAINABLE
6



ON THE ROAD TO

A SUSTAINABLE
PLANET



Today, cities around the world host more than half of the population and the number is expected to increase in the coming years. The search for a better life, job opportunities, and economic growth in cities accelerate rural to urban immigration. Due to the rising city population, cities are suffering from many problems that affect their citizens' welfare; such as traffic congestion, inadequate urban infrastructure, environmental degradation, and lack of basic services as water supply, sanitation, education, and waste management. These challenges make cities vulnerable in facing climate change related disasters.

Stockholm, Sweden

Stockholm was the first city to be named a "European Green Capital" in 2010. With population growth challenges facing the city, the Government is taking action with emphasis on creating a safe and environmentally friendly city, aiming to make Stockholm fossil-fuel-free by 2025. As part of the Government's plan to maintain sustainability, it is working on expanding and developing the city's infrastructure, including: streets, power lines, and public transportation. The Swedish capital succeeded in encouraging residents to use public transportation, which is available and accessible. The residents also use bicycles as a means of transportation, as there is around 760 km of bicycle lanes located between sidewalks and car lanes to protect the riders.

The Government generates biofuel from sewage and they are available at petrol stations around the city. Taxis and cars are already using biofuel regularly and

Although cities occupy only 3% of the world, they consume 60%–80% of the energy and are responsible for 75% of CO₂ emissions. Among the targets of Goal 11 of Sustainable Development is that cities have to ensure access for all residents to adequate, safe, affordable, and sustainable housing, basic services, and transportation systems, in order to maintain a sustainable planet.

The good news is that many cities around the world are already working hard towards sustainability. A city is considered sustainable based on some features; such as: access to public resources, urban renewable actions, reduction of CO₂ emissions, ethical consumption, reducing, reusing, and recycling.

Copenhagen, Denmark

Copenhagen is one of the most eco-friendly cities on Earth; it was the European Green capital in 2014. It also aims to become the world's first carbon-neutral capital by 2025 as a part of the CPH 2025 Climate Plan. This Climate Plan includes specific goals within four areas: energy consumption, energy production, green mobility, and city administration initiatives. Since 2009, the Danish Government is working on many initiatives to lower the city's CO₂ consumption and production.

As a leading city in sustainable design and infrastructure, the Government obliges every new building to have a green roof that cools the city, absorbs rainwater, and soaks up CO₂. It is also expected to plant

100,000 new trees by 2025 to increase the green areas in the city, which will also be accessible to all the residents. The city encourages transforming transportation to be green by switching diesel buses to electric; it started by creating the necessary infrastructure, such as charging stations for electric vehicles.

Copenhagen is also famous for its biking culture; almost 50% of the residents of the city ride a bicycle to work or school. The Government is committed to making the city more accessible to cyclists and pedestrians. By 2025, the city requires almost 75% of all journeys to be made by foot, bike, or public green transportation.



the city is aiming to expand to vans and trucks. The buildings in the capital city will also contribute as a smart solution to reduce the need for energy, water, and pesticides, in addition to providing demands for food. The plan is to build vertical greenhouses on buildings.

The city worked with many developers, planners, architects, engineers, environmental specialists, in addition to the public, to develop urban neighborhoods, such as Hammarby Sjöstad, which is Stockholm's largest urban construction project. This city is expected to host over 25,000 people where they will live and work; the aim is to create a residential environment based on sustainable resource usage, where energy consumption and waste production are minimized by maximizing resource saving and recycling. Heat is extracted from treated wastewater, which is used to produce district heating and uses the leftover product of this process to produce district cooling.

Singapore

One of Asia's most sustainable cities, Singapore has established some long-term goals to be the world's greenest city. Following Singapore's independence, the city teemed with slums, where rivers became open sewers, and the Government was struggling to find decent jobs for the residents. In a period of 50 years, the Government succeeded in transforming the city to a clean and modern metropolis, with a diversified economy and reliable infrastructure. Singapore's environmental sustainability attracted many regional and international investments to the country.

As a step towards sustainability and the prosperity of residents, the Government obliged any construction for school, commerce, retail, or business to plan to ensure inhabitants have appropriate places for walking and cycling everywhere. On the other hand, Singapore's National Agency is working to ensure water supply by collecting every drop of water, reusing and desalinating it. The Government also took advantage of the country's tropical climate and the most reliable renewable source, the Sun, to improve the city's energy production. As such, Singapore is working on producing energy from the Sun through the world's largest floating solar photovoltaic test-bed.

Although Tokyo's population has reached more than 12 million inhabitants—which may assume that it is an unsustainable metropolis—on the contrary, Tokyo has shown the world how a city can become a pioneer in smart city planning.



Vancouver, Canada

Vancouver is one of the sustainable cities in North America due to its social, environmental, and economic sustainability efforts. The city is following the Greenest City Action Plan, which is a strategy released in 2012 and set a number of goals to be achieved by 2020. Among the goals is decreasing community-based greenhouse gas emission.

The Canadian city has already lowered greenhouse gas emissions, and has the lowest emissions of any major North American city. According to studies, in 2007, Vancouver had annual emissions of 4.9 tons of CO₂ equivalent per capita; however, by 2012, it had dropped to 4.4 tons per person. The Government is still working hard to reduce these emissions by encouraging residents to leave their cars, and cycle or walk instead. In 2015, Vancouver announced that almost 50% of the trips within the city are made by sustainable transportation.

The city is also committed to produce 100% of its energy from renewable sources by 2050; currently, energy use is 31% renewable. The city also makes efficient use of its waste; it has a target to reduce solid waste going to the landfill by 50% by 2020. To achieve this goal, the Government is raising awareness of what to be thrown away; for example, ensure small appliances are recycled and food waste composted.

San Francisco, California, USA

San Francisco is home to some technology innovations that work on improving energy efficiency in buildings and enhancing its transportation system; this promoted it to be a leader in sustainability and clean energy. The city has been named the greenest city in USA and the Cleantech Capital of North America; it hopes to be 100% sustainable by 2020. San Francisco Government offers online tools and applications that can help reduce wastes and increase access to recycling and composting in order to achieve the goal of sending nothing to landfills by 2020.

If you walk down the streets of the city, you will find hybrid-electric buses that can help reduce carbon emissions. The aim is that all buses transform to hybrid diesel or electric by 2020. California has faced serious droughts, which pushed the Government towards encouraging residents to cut their water consumption. San Franciscans have reduced their consumption to around 185 liters of water per day; the average was 300–400 liters per day.

Tokyo, Japan

For most people, Tokyo is the city that fosters technologies of tomorrow. Although Tokyo's population has reached more than 12 million inhabitants—which may assume that it is an unsustainable metropolis—on the contrary, Tokyo has forward-thinking environmental conservation plans and initiatives. Since 2002, Tokyo has shown the world how a city can become a pioneer in smart city planning. The city's strategies focus on improving infrastructure, local power storage, electric vehicles, and enhancing overall smart urban development that can make the city strong to fight against future climate changes effects and increasing population.

In order to reduce carbon dioxide emission by 2020 to 25%, the Government set a target for every sector to limit their emissions; it imposes taxes on companies that do not achieve the required target. The Government set rules and laws that all buildings should install solar panels and plant trees and herbs on rooftops. The city has also increased green areas by planting half-a-million trees, and the Government started transforming large landfills in Tokyo Bay into a wood sea forest.

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A SUSTAINABLE LOOP FROM LINEAR TO CIRCULAR ECONOMY

By: Maissa Azab



The currently dominant linear economy is hardly sustainable. Within linear economy, resources are extracted to produce products that are used until they are discarded and disposed of as waste. Value is created by maximizing the amount of products produced and sold. Linear economy relies on a wasteful “take–make–dispose” flow, which is detrimental to the environment, cannot supply the growing population with essential services, and leads to strained profitability. Elements of a plausible solution have been around for decades, but they have only recently been compiled into the conceptual framework of circular economy.

The core ideas of circular economy are elimination of waste by design; respect of social, economic, and natural environments; and resource-conscious business. Within a 3R approach (Reduce–Reuse–Recycle), material extraction is reduced where possible by using less material. Products are made of reused parts and materials; after discarding a product, materials and parts are recycled. Value is created by focusing on value retention; by keeping material streams as pure as possible during the complete value chain, the value of this material is retained. Pure material streams can be used multiple times to provide a certain functionality or service, while only making one investment.

In linear economy, sustainability is improved by focusing on eco-efficiency. This entails maximizing the economic gain that can be realized with a minimized environmental impact. The negative impact per economic profit gained is minimized in

order to postpone the moment at which our system is overloaded. In a circular economy, however, sustainability is improved by enhancing the eco-effectivity of the system. This means that the focus is on maximizing the positive impact of the system by radical innovations and system change.

Eco-efficiency, or zero emission, seeks to reduce the negative consequences of production and consumption. Eco-effectiveness and cradle-to-cradle design, however, focus on the development of products and industrial systems that maintain or enhance the quality and productivity of materials through subsequent life cycles. They provide a practical framework to create products and industrial systems in a positive relationship with ecological health and long-term economic growth.

The transition to eco-effective industrial systems begins with the elimination of undesirable substances and call for the reinvention of products by reconsidering how they may optimally fulfill the needs they are intended for while being supportive of ecological and social systems. This process necessitates the creation of an eco-effective system of “nutrient” management to coordinate the material flows amongst actors in the product system.

The main difference between eco-efficiency and eco-effectivity lies in the quality of reuse. Within linear economy, reuse is mainly seen in down-cycling practices: part of a product is used for a low-grade purpose, which reduces the value of the material. This complicates the reuse possibilities of the material in a third life; for example, concrete is shredded and used as road filament. In circular economy, however, reuse is as high grade as possible. A residual stream should be reused for a function that is equal or of a higher value than the initial function of the

material stream. This ensures that the value of the material is retained or enhanced; for example, concrete can be grinded into grains that are used to create a similar wall as before, or even a stronger constructive element.

According to the Second Law of Thermodynamics, matter has the tendency to dissipate. This is why there will always be value losses; the quality of materials and energy reduces when it is extracted and used. For example, one kilogram of gold that is molded in one piece can be used directly, and is more valuable than one kilogram of gold distributed over microchips in mobile phones. Localizing, separating, and melting the gold out of these microchips into one pure stream of gold is not easy. It increases the risk of material losses, decreases the quality and functionality of the material, and costs money and labor. There will always be a loss of value, which means the need for new input remains necessary.

A 100% closed loop circular economy is not possible; this does not mean that the economy has to remain linear. In our current linear economic model, many elements are already made circular. These include reduced raw material extraction, increasing recycling, changing business models from product to service and other methods of financing. By circulating matter and energy through the economy, the demand for “new” input decreases and the speed of entropy increase is delayed.

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By: Fatma Asiel

We live in an era where the dangers of environmental pollutants are undeniable. During the past century, the environment suffered tremendously by pollutants such as fumes, gases, and wastes, all of which resulted in serious problems: global warming, extinctions, and disease outbreaks. The quest for clean alternatives has become an inevitability. This is where the need for environmentally-friendly means of transportation has risen from; known as sustainable transportation, these means are among the environmental solutions that have gained international support. Traditional means of transportation are notorious for emitting toxic fumes and gases into the air. They also contribute to raising the average temperature of the Earth, in addition to spreading maladies.

Some people might think that the idea of sustainable transportation emerged recently, and that it is all about cars that run on electricity or solar energy; in fact, the traditional bicycle is an environmentally-friendly means of transportation. It is simpler than many of us might think; if you choose to walk or ride a bicycle to work instead of using your car, which runs on gasoline, you have used an environmentally-friendly means of transportation.

Also, you can agree with your work colleagues to share one car each day, instead of everyone using his/her own car everyday. Carpooling has several advantages; it causes less harm to the environment, lessens traffic congestion, and saves fuel money. Using public transportation instead of personal cars has the same advantages.

Although switching to sustainable transportation is currently merely an option for several countries, it will become a necessity in the near future due to its importance. Sustainable transportation protects the environment, eliminates the use of fossil fuels, and saves money. The main reason behind switching to

sustainable means of transportation is that they do not harm the environment, unlike traditional means of transportation, which rely on oil products, such as gasoline and diesel fuel, which produce toxic fumes.

The world realized a long time ago that fossil fuels will eventually deplete; hence, the onset of switching to renewable energy sources, such as solar energy, hydrogen energy, and wind energy, among others. Although many renewable sources of energy are suitable for operating vehicles, there are some economic challenges that hinder mass operation around the world; yet, they are being worked on.

Last but not least, sustainable means of transportation save much of the expenses wasted by traditional vehicles, which depend on costly oil products. Using bicycles, for example, is an excellent option for going to near places; it saves money, protects the environment, and promotes a healthy lifestyle. To follow are some examples of modern means of sustainable transportation:

The Electric Car

The electric car is one of the simplest vehicles in terms of design and technique; it is equipped with a rechargeable battery that operates it for one day. An advantage of electric cars is that they are not costly at all; however, they are small-sized in comparison with traditional cars.

Environmentally-Friendly Trucks and Buses

Statistics have shown that trucks and buses are the main source of contaminating fumes. This is due to their big sizes and powerful engines, which burn large quantities of fossil fuels; consequently, they produce large quantities of toxic fumes. As such, several countries have turned to environmentally-friendly buses that run on bio-fuel or electricity. This transition has a positive economic impact thanks to the low cost of biofuel and electricity, which leads to lowering transportation costs.

Hybrid Cars

Hybrid cars are another type of environmentally-friendly cars that invaded the markets in the past years. These cars depend on both fossil fuels and electricity; they include an electric engine, as well as a small gasoline engine. The main advantage of hybrid cars is that they can be charged while standing still; however, they are not 100% clean because they still use fossil fuels.

The Electric Bicycle

Although the traditional bike is one of the best environmentally-friendly means of transportation, introducing some modifications to it can make it more effective. The electric bicycle is the enhanced version of the traditional bicycle, equipped with a small electric engine that makes it faster. A disadvantage of electric bicycles is their complex design, which makes them difficult to fix.



Our duty is to protect the environment in every possible way; one way is using environmentally-friendly means of transportation. We do not have to own hybrid cars or electric bicycles; alternatively, we can resort to simpler options, such as walking and riding traditional bicycles as much as possible.

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SAVE THE PLANET PLANT A TREE

By: HEND FATHY



The color green is usually associated with positive connotations; it universally symbolizes nature, environment, growth, and fertility. If you were born in the 1980s, then you mostly remember that famous song by Safaa Abo-Elsaud, associating the green color of plants with the concept of good and provision. Green trees have also been stated as a facet of nature's beauty in Louis Armstrong's iconic song *What a Wonderful World!*

Indeed, what is more beautiful and peaceful than sunny mornings in the countryside? Yet, 55% of the world's population nowadays inhabits cities, with 15% more expected to move from rural to urban areas by 2050. As such, the increasing populations of cities are in need for more green elements to break the dullness of concrete, brick, steel, and asphalt.

Ideally, cities should comprise three types of infrastructures: (1) Grey, representing buildings, roads, and parking areas; (2) Blue, representing rivers, ponds, and water channels; (3) Green, representing grass, trees, and shrubs in streets, gardens, and parks. According to urban designers and landscape architects, the interaction between the three is essential to face different urban challenges.

BENEFITS OF URBAN TREES

Since the financial value of investing an area in grey infrastructure makes easy money, many cities—especially in developing countries—ignore the much higher value of green infrastructure. In fact, urban trees have much to offer to the environment, climate, biodiversity, human health, economy, and quality of life as a whole. They also play a crucial role towards achieving the UN Goal 11 of sustainable development: "Sustainable Cities and Communities".



Environmental Benefits

Trees have numerous environmental benefits, providing what is known as ecosystem services. Most importantly, they absorb CO₂—the notorious greenhouse gas—and produce oxygen, directly contributing to combating climate

change. According to the Food and Agriculture Organization (FAO), a healthy tree can absorb up to 150 kg of CO₂ per year; trees also cast shade and release water vapor, contributing to reducing temperatures. As such, they mitigate what is known as the Urban Heat Island (UHI) effect, which causes changes in weather patterns. UHI are urban areas that are significantly warmer than their surroundings due to human activities.

Trees also help cities be more resilient to the devastating effects of climate-change-driven catastrophes. They slow down the movement of storm water, contributing to lowering the total runoff volume, soil erosion, and flooding. Leaves, branches, and trunks intercept rainwater, some of which evaporate back into the atmosphere and some soak into the surrounding ground. This also prevents storm water from carrying pollutants to the ocean and other water bodies.

Besides addressing climate change, trees help flourish urban biodiversity. Not only does planting diverse types of trees and shrubs promote biodiversity, the trees themselves also provide shelter, food, and protection to numerous species including birds, bees, and squirrels. Moreover, trees save freshwater, the world's most precious commodity nowadays; they

increase groundwater recharge, which the paved areas in cities significantly reduce. Moreover, trees' shade slows down water evaporation from grass in parks; and as trees transpire, they increase atmospheric moisture.

Cities are generally associated with higher pollution levels, marking some of the most polluted areas around the world; trees fight different types of pollutions. First, they improve the quality of air by trapping urban pollutants and fine particulate matter generated from burning biomass and fossil fuels. The particulates are trapped and filtered by the leaves, stems, and twigs, and washed to the ground by rainfall. Second, trees contribute to purifying rain and underground water, allowing lesser amounts of chemicals into freshwater bodies. Third, they mitigate the noise of cities through absorbing sound waves, creating a more peaceful setting.

Health Benefits

Trees play a significant role in environmental health; a branch of public health concerned with the effect of the surrounding environment on human health. They improve physical and mental health, and promote wellbeing and relaxation.

Studies have shown that people tend to go outdoors and exercise when their surroundings are greener. As such, urban trees encourage physical activity and reduce the levels of obesity and obesity-related diseases in cities. Urban parks provide opportunity for physical fitness, and have become increasingly popular as places to walk, run, bike, and hike.

Additionally, children who are more exposed to natural settings develop better concentration skills, and are less likely to develop Attention-Deficit/Hyperactivity Disorder. Trees also relieve what is known as Nature-Deficit Disorder; a condition resulting from spending excessive time indoors, particularly with no view of the outdoors through windows.

The above-mentioned ecological services trees offer cities also reflect positively on the health of their inhabitants. Without trees, harmful particulates and gaseous emissions would find their way into people's lungs, exposing them to asthma conditions, as well as several respiratory and even cancerous diseases. Moreover, the strategic placement of trees in cities can cool their temperatures by 2°C–8°C, which can help mitigate the strikes of heat waves, which kill tens of thousands of people around the world annually.

Not only do trees prevent health risks, but they also speed up recovery phases

and increase the average lifespan. For example, it has been found that patients whose rooms have a view of trees have shorter post-operative stays in hospitals. Also, a study conducted by Harvard researchers found that females surrounded by the least vegetation had a 12% higher non-accidental death rate.

Economic Benefits

Although they usually go unnoticed by many people compared to other benefits, urban trees do have significant economic benefits. First of all, they provide hundreds of job opportunities, for trees require trained personnel for planting, watering, pruning, pest management, and so on. Second, urban trees can provide wood to be used in heating or cooking; they can also provide food products, including nuts and fruits, or beautiful flowers. Third, trees save energy; according to FAO, trees that are properly placed around buildings can reduce air conditioning needs by 30% and save energy used for heating by 20%–50%.

Now, let us do some money talk! It has been found that trees can increase real estate properties value by 20%; neighborhood greenspaces typically increase the value of properties located nearby. Apartments, offices, and hotels surrounded by trees are sold/rented more quickly, have higher occupancy rates, and tenants stay for longer periods. Furthermore, customers tend to shop more when the stores are located in areas with large numbers of shade trees.

Last but not least, trees also have their toll on businesses and human resources. Research has shown that employees without a view of nature from their desks reported 23% more instances of illnesses than those with a view of greenery. Moreover, the latter are more productive and have reduced absenteeism level.

Social Benefits

Trees can form friendships and stop crime! Studies have established a direct link between the amount of trees and grass in specific community common spaces and the social interaction between its dwellers. As per a study conducted in 1996 at the University of Illinois, parks and trees offer a place for neighbors to meet and get to know each other. These friendships later develop into networks of support, and eliminate the level of fear in a given neighborhood. Similarly, other studies concluded that urban resident areas with more trees witness less violence and crime occurrences than their barren counterparts.

Specific kind of trees can serve as cultural and historical landmarks of a given area, contributing to shaping its identity, and serving as a source pride to its residents. In 2017, the enlightened citizens of the Egyptian Ismailia Governorate defended a historical rare banyan fig tree when a construction company opted to remove it to complete one of its projects. In response, the Government took action to protect the tree that dates back to the Khedive Ismail era, specifically during the digging of the Suez Canal. The same tree hosted the speech of French leader Charles de Gaulle, when he visited the city in 1940, and President Sadat gave instructions to preserve the tree during the reconstruction process of the city following the 1973 War.

Now that you know all that, my advice is to take immediate action. Cooperate with your neighbors or colleagues and plant a tree. You might need the help of some experts to choose the correct location taking into consideration existing underground infrastructure utilities, as well as the best types to be planted in a specific location.

Urban trees are much more than elements of landscape beautification or a luxurious setting for elite housing projects. They can achieve a lot of progress towards sustainably. They can save lives and can literally save our planet.

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She set it WOMEN of the Periodic Table

By: Shahenda Ayman

For centuries, science and stereotypes have been intimately linked. The Periodic Table is a set of stereotypes of how atoms of elements behave; some are more reactive than others, and it is all related to where they exist on the Table. Periodic Table stereotypes are acceptable in science; however, bias against females and under-represented groups in science is not.

In 1869, Russian scientist Dmitri Mendeleev discovered the periodic system; however, scientists classified and predicted elements before and after Mendeleev's framework, and many more worked to find and explain these substances. Females participated effectively in the completion of the Periodic Table as we know nowadays. As *SCIplanet* is celebrating the International Year of the Periodic Table (IYPT 2019) in parallel with our overarching annual theme, the Sustainable Development Goals, I could not find a better occasion to shed light on the contributions of female scientists to the Periodic Table.

Born on 25 February 1896, in Germany, Ida Noddack was one of the pioneering females to study chemistry and obtain a doctorate. She is famous for her discovery of rhenium together with her



husband, Walter Noddack, and Otto Berg. They hypothesized that the missing element 75 should have properties similar to its horizontal neighbors—molybdenum not manganese—which was the common belief at the time.

In June 1925, the team of three scientists discovered rhenium and named it in honor of the Rhine River. This new element filled one of the two spots that were vacant at that time in the Periodic Table below manganese. Rhenium is one of the rarest elements in the Earth's crust

and can be found today in metal alloys that are used to build jet engines.

The team also tried to fill the other vacant spot above rhenium; they claimed they have discovered it, but the experimental outcomes were not fruitful and the findings were dismissed. Despite this disappointment, Noddack continued focusing on chemistry; she challenged a widely-believed theory by Enrico Fermi at that time, arguing that elements could be broken down into smaller fragments, but the argument lacked experimental proof. Yet, with time, her arguments were proven correct and the concept she proposed later became known as nuclear fission; Noddack is acknowledged as the founder of this branch of chemistry.



Following Ida's footsteps in the nuclear fusion experimentation, Austrian physicist Lise Meitner was part of the team who examined the experimental data found earlier on nuclear fusion; her reasoning and calculations helped in

forming the theory of nuclear fission as we know it today. She and her team proved by experiment that the atomic nucleus could be split into smaller nuclei and these findings were published in 1939, regrettably without Meitner's name on the paper.



In 1944, the team's work was awarded the Nobel Prize in Chemistry; surprisingly, the sole recipient, Otto Hahn, did not mention Meitner's contribution to the discovery, even though her calculations were the reason behind discovering the phenomena. In honor of her contribution to radioactive science, a later-discovered element was named meitnerium after her.

In 1897, Curie was exploring radioactivity for her PhD on uranium rays; she was not aware that her studies will lead to the discovery of a new element in the Periodic Table. She discovered an ore with a very strong radioactivity that she could not explain by uranium alone. The discovery made her suspect the presence of other elements; she asked the assistance of her husband and together they identified spectroscopic lines of two new elements: radium and polonium. They spent more than three years to grind, dissolve, boil, filter, and crystallize tones of the mineral to extract just 0.1 gram of radium compound.

In 1911, Marie Curie won the Nobel Prize for discovering polonium and radium, and for the isolation and study of radium. Nowadays, polonium is used to power many space crafts and rovers sent on exploration missions in outer space. When the element decays, its temperature reaches around 500°C; it acts as an energy source for space technology. As a result of her contributions in the field of chemistry and to honor her legacy, scientists named another radioactive element that was discovered years after her passing away curium.

When the Periodic Table was primarily proposed in 1869, Mendeleev left gaps for the elements that were not discovered yet, but predicted to exist. In 1939, Marguerite Perey's filled one of them with a new radioactive element that she named

francium after her home country, France. The lifespans of radioactive elements are difficult to determine, since they are so unstable and the process is random. Instead, scientists can estimate the half-life of an element, which is the time taken for the radioactivity of an element to have decreased to half its original value. Francium is so intensely radioactive that its half-life is only 22 minutes.

Francium is the only element that was discovered solely by a female scientist without the assistance of any male. Perey was also the first female to become the Chair of Nuclear Chemistry at the University of Strasbourg and the first female to be elected as a corresponding member of the French Academy of Sciences. Sadly, like others working with radioactive elements before her, she died of radiation-related causes.



Female contributions to chemistry and to the Periodic Table are not restricted to past centuries only; their research and experimentation continues to amaze the scientific community. In 2016, chemist Dawn Shaughnessy and her California-based team, in collaboration with the Joint Institute for Nuclear Research in Dubna in Russia, discovered three new elements in the Periodic Table with atomic numbers 115, 117, and 118. The three elements were classified as "super heavy", and they were created through using particle accelerators to shoot beams of nuclei at other, heavier, target nuclei.

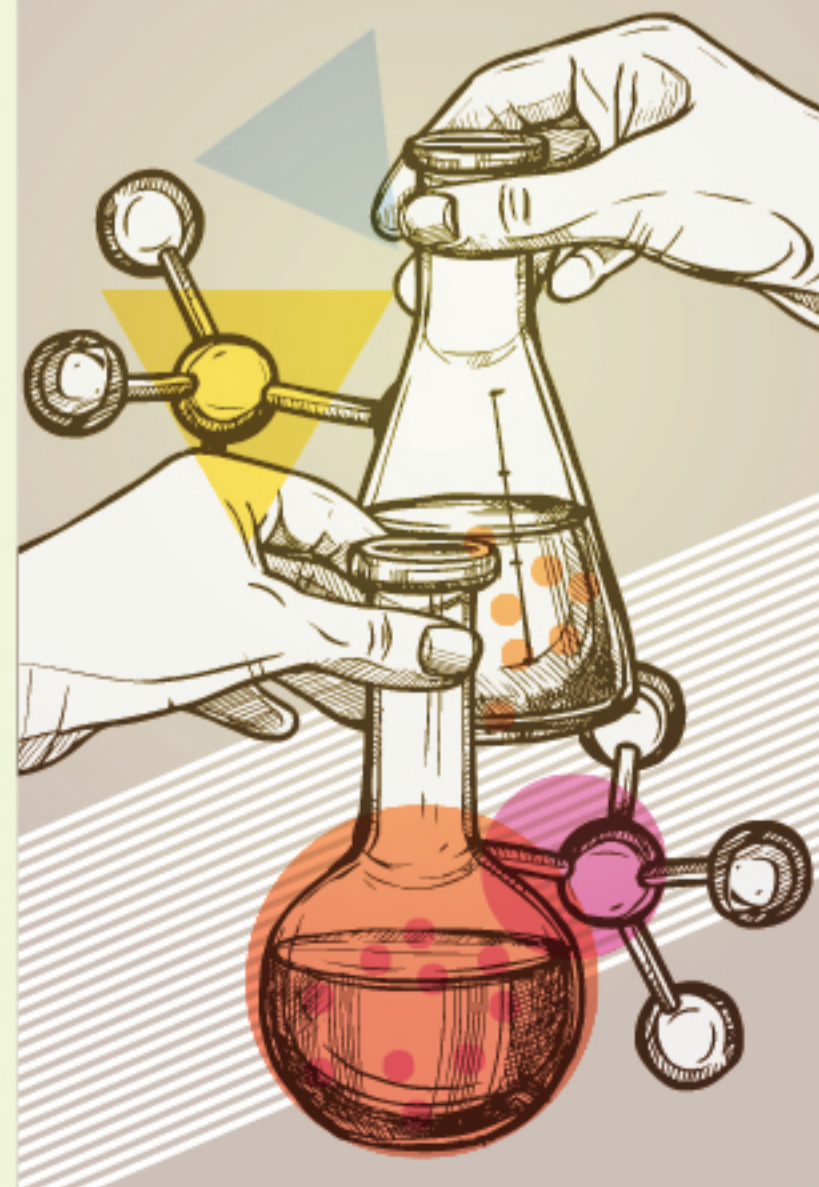
Shaughnessy benefited from the technological advances in electronics and detectors during her experiments; she stated that, without these technologies, her experiments would have not been completed. Some of the newly-discovered "super heavy" elements exist for less than a thousandth of a second; "a new element is created by fusing two lighter elements together" she explains. "We do not see the actual element, because it is too short-lived but we do see its radioactive decay particles and can then link those back to the original element we created."

Shaughnessy, became interested in chemistry in high school and received both a BSc and PhD in nuclear chemistry from University of California, Berkeley. Currently, she is the Principal Investigator at Lawrence Livermore National Laboratory.

Females showed deep interest in chemistry throughout history. Though historically discriminated against and marginalized, they are deeply rooted in every scientific field even when their contributions are made invisible by terms like "and colleagues" or "and co-workers". During this celebratory year of the Periodic Table, let us remember and celebrate the female scientists who contributed to shaping it and discovering the elements that we all, men and women, benefit from. It is crucial to acknowledge the contributions of all scientists regardless of their gender or any other discriminating factor; this is the only way towards a better and sustainable future.

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By: Rokaya Samir



WOMEN'S Contributions to SCIENTIFIC DISCOVERY

Scientific invention and discovery are often perceptually associated with men without any attempt at finding out the actual person behind an invention or discovery. As a matter of fact, when a new scientific discovery is attributed to a woman, it usually raises signs of astonishment! However, many women have made significant scientific discoveries that have contributed to changing the course of science and clarified issues that science had failed to solve until they were resolved by these women.

This is because some of these women scientists were not given credit and their discoveries were attributed to men, often due to social obstacles; such as, customs and traditions prohibiting women from learning or giving their name to any scientific discovery and accrediting them to their husbands or fathers. Nevertheless, despite all this, women did not surrender, making the most outstanding scientific discoveries and achievements that have changed the life of mankind.

1) Communication Flares

Long before the discovery of wireless communication, seamen faced many difficulties in communicating with other ships at night, in addition to the weak visibility of flags and lanterns that produced little light. While going through the papers of her late husband who died in 1848, Martha Coston coincidentally found a sketch of a flare; it inspired her to design a "pyrotechnic night signal and code system" to be used by ships in communicating at night.

Even though she had not received any formal education, she worked on that invention for nearly ten years. One day, she was inspired to incorporate fireworks within her main idea of developing a night signaling system, and ended up designing flares in red, white, or blue, to attract the eye and capture the attention. She was successful and soon the army bought her invention to use it in creating colorful signals to communicate with each other at night.

2) Anti-fungal Drugs

Anti-fungal drugs are among the most widely used drugs in our daily lives; they have saved the lives of millions around the world. These drugs came to be thanks to two women, Elizabeth Lee Hazen and Rachel Fuller Brown, who collaborated across a distance of 240 Kilometers between the New York and Albany.

Although penicillin was discovered in 1941, the development of anti-fungal drugs was very slow. Hazen and Brown came up with the first anti-fungal drug, named Nystatin, which originated from the *Streptomyces noursei* germ. Nystatin was named in honor of the State of New York; the two letters NY are the initials of the State and the city, while Statin is the functional group.

Nystatin chemically affects the main component of the cytoplasmic membrane of fungal cells, known as the ergosterol. It causes holes in the membrane, resulting in weakening it in resisting external factors; eventually leading to the inhibition of cell growth and death. Nystatin is also known to have a strong effect on many fungi, yeast, and candidiasis; it is considered safe to treat oral and intestinal infections.

3) Whooping Cough Vaccine

Pertussis, or whooping cough, is one of the most common respiratory bacterial infections in children, especially infants less than one year old. It can be fatal; as a matter of fact, it killed more than 6000 children a year in the 1930s in the United States alone.

Two American bacteriologists, Pearl Kendrick and Grace Eldering, worked together on developing a vaccine for pertussis. They also worked on reinforcing international vaccine standards by visiting sick children and taking samples from them day and night within the low budget allocated for scientific research until the First Lady of the United States, Eleanor Roosevelt, adopted the research financially; thus, allowing it to materialize and save the lives of millions of children around the world.

4) The Modern Electric Refrigerator

Although we all use the modern electric refrigerator all the time, only a few of us know who invented it, converting useless old containers into refrigerators that we cannot dispense with.

American scientist, Florence Parpart, invented the modern electric refrigerator in 1914. Her husband helped her design the intricate electrical circuits with high accuracy. Not only that, Parpart was already an experienced entrepreneur; she was very successful in marketing and selling refrigerators, developing advertising campaigns and managing production. We can say that Parpart was a pioneer woman entrepreneur and talented inventor.

Last but not least, if women compose half of the society, they are also half of science; thanks to them, some discoveries have changed the course of humanity and put us on the path of progress to modern technology.

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THE PSYCHOLOGY BEHIND THE GENDER PAY GAP



By: Inas Essa

There is no doubt that the gender pay gap has always been a problem in many countries, even developed ones. This problem is not only a warning about inequality; it is obvious evidence that we do not have gender-equal societies, globally.

This problem hits the core of society as this pay gap indisputably affects the whole family, and not just females, as it has been proven that many families rely on female's income. Whether she is the sole breadwinner or supporting the family financially, female's lower wages in many cases affect the educational opportunities the children receive, the food they eat, and the healthcare they receive. It also places females at a greater risk of poverty following retirement as this gap affects their savings.

Why Does the Gender Bias Exist?

Needless to say, there are many factors contributing to the pay gap; some seem real, while others can be considered myths. Reference to a psychological research that highlights some of these myths, which generally put the blame on females, the gap is due to the following reasons:

1-Women are not performing equal work

Actually, there are many reasons that push females to choose part-time work; such as having children and taking care of them. Children also may change what females want from a job; females tend to work flexible hours, or work from home, and complete a project outside a tight schedule.

2-Women do not ask for what they want

According to the myth, this is often attributed to the perceived lacking of negotiation skills in women compared to men. However, this is not true; the research also shows that, when females do negotiate for a better salary, they receive lower offers—from both men and women—than men.

3-Women do not have as much education or experience as men

Studies show that women earn less than men, even after accounting for their prior work experience. Moreover, they hold the majority of undergraduate, Master's, and doctoral degrees.

4-Women tend to enter lower-earning occupations

Females tend to choose administration, care, and social fields, which tend to be of lower pay. They still are less paid while

doing the same work as men, even within stereotyped feminine jobs, such as nursing.

However, a societal research reveals some deeper explanations for this imbalance and that this gap is not caused most of the time by female's work efficiency or education level. In fact, there are psychological reasons contributing to this problem, which widen the gap even more.

The research shows that these myths about female's work has been shaped and nourished since an early stage of our lives by some concepts rooted in our minds. Getting older, it becomes very difficult to detach our behavior, and in many cases, our identity from information that has been made so implicit by our mind.

First, it shows that gender stereotypes, gender roles, and gender socialization prepare men and women for different types of jobs, as well as affect employers' perceptions of who is appropriate for a certain job. Most of us also seek training, education, and jobs consistent with our gender role, and receive encouragement from others to do so.

Moreover, the research shows that, in many societies, characteristics generally associated with masculinity—such as assertiveness, independence, power, and self-reliance—hone men for higher paid jobs in higher paid sectors. On the other hand, characteristics associated with femininity—such as nurturing, warmth, caring, etc.—prepare females to act in more sympathetic ways. As a result, females seem to face a choice of being seen as likeable or as competent, but not as both, and that affects her career dramatically.

What Can We Do about the Gender Wage Gap?

Researchers offered three suggestions that may help in the way organizations can eliminate the wage gap:

- Organizations must provide equal growth opportunities, and offer accurate feedback for females by identifying and eliminating barriers.
- Organizations must take action toward implementing better work/life balance, by encouraging women and men to take time off, and also consider flexible schedules, remote work, and/or job sharing.
- Organizations must provide ongoing training; they should have females represented across all levels of the organization. Moreover, employees should be educated to behave in non-sexist ways.

The gender pay gap is a global problem that has been aggravated over years because of unreal reasons, which females should not be blamed for. To eliminate the gap, organizations must provide training, support, and opportunities for growth for both men and women, and discontinue dealing with this pay gap as something that cannot be changed.

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Gender inequality does not only affect females; when half the population is denied their full potential, the world, as a whole, is at great disadvantage. Access to technology, control of it, and the ability to create and shape it, is a fundamental issue of female's human rights. Although there is an increase in awareness in this regard, progress has been slow; yet, there is an optimistic case to be made for the future, as technology provides tools to tackle gender inequality and empower females.

TECHNOLOGY AND THE GENDER GAP

To begin with, while there are many explanations for the gender pay gap, one major contributing factor has been the role of females as caregivers. The emerging contingent workforce—a labor pool hired on an on-demand basis, consisting of freelancers, independent contractors and consultants—is providing a much-needed solution to this problem by breaking down physical, geographic, and social barriers. Remote work platforms allow millions of females to work from anywhere in the world for anyone in the world, allowing them to access remote, but exciting opportunities.

On the other hand, female scientists are accounted for only 29% of assigned talks and 27% of invited speakers in conferences. Speaking engagements can often play a pivotal role in career development, and this lack of female representation means fewer females are offered the opportunity to share their ideas and inspire others. Digital platforms that aim to solve this problem act as visibility bureaus for entrepreneurial, technical, and innovative female leaders.

However, technology is not just an important tool to be used by females; it reflects the people who create it, so females need to be able to have a significant role in shaping it. Females earn only 28% of computer science degrees and hold only 25% of computing jobs; they also hold only 11% of executive positions at ICT companies. The lack of females in technology roles contributes to a vicious cycle where younger females are deterred from entering the industry due to lack of inspiration and role models.

Educational organizations are starting to address this by approaching girls from a very young age. Nevertheless, it is not enough for young females to simply gain competitive technical and soft skills; they need support systems, mentorships, and networks that will allow them to truly accelerate their careers.

Different Challenges—Diverse Solutions

It is important to recognize that, while females in some parts of the world are fighting for equal opportunities, females in other regions are fighting for very basic rights. Closing the global gender gap involves recognizing the diverse needs of females in different parts of the world.

Technology is used to address the needs and challenges of females in developing or high-risk regions. For example, a recent Hackathon, co-organized by UN Women and Innovation Norway, brought together technology innovators to derive solutions for challenges faced by refugees or displaced individuals. One such solution is VIPICash; an application that uses blockchain to allow secure money transfer among female entrepreneurs to offer them access to and control over their own money, independent of the male members of their families.

On average across the developing world, nearly 25% fewer women than men have access to the Internet, and the gender gap soars to nearly 45% in regions such as sub-Saharan Africa. Even in rapidly growing economies the gap is wide; nearly 35% fewer women than men in South Asia, the Middle East, and North Africa have Internet access; and nearly 30% in parts of Europe and across Central Asia. In most higher-income countries, women's Internet access only minimally lags that of men's, and in countries such as France and the United States, in fact exceeds it.

Females earn only 28% of computer science degrees and hold only 25% of computing jobs

Studies show that women in the developing world have significantly lower technology participation rates than men; a result of entrenched socio-cultural attitudes about the role of women in society. Without access to the Internet, females lack access to its tools, resources, and opportunities. When those females are able to engage with Internet technology, a wide range of personal, family, and community benefits become possible. The key to these benefits is online education, the access to which sets up a positive feedback loop.

Although access to the Internet is spreading rapidly in developing countries, women are nearly 25% less likely than men to be online. This gender gap—which today prevents a staggering





LANGUAGE AND WOMEN EMPOWERMENT

By: Rania Abdel-Meguid
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There is a commonly-held belief that women are not treated fairly in our world. It is justified because women are subject to various forms of discrimination in several countries—if not all. Many women are subject to violence and harassment on daily basis; several have to work hard to provide a decent life for their children. Many forms of violence women face are primarily associated to the society's view of women. Throughout the ages, women have often been regarded as of less value than men; this view is clearly reflected in the language we use in our daily life.

According to the Sapir-Whorf hypothesis, the language used in our daily life shapes our thoughts and perception of things and communities; like many other languages, this is the case in the Egyptian colloquial. For example, if we look at some idioms, we will find that those associated with men are often positive, while those associated with women are negative. Curiously, women themselves use expressions such as “a man's word” to demonstrate commitment to a promise, while expressions such as “women's talk” reflect gossiping, as a typical female characteristics.

On the other hand, Nancy Henley, a psychologist interested in feminist studies, states that language patterns that demean women contribute to deepening negative traditional perceptions. For example, women are considered indivisible entities from men; the woman is a man's daughter, sister, or wife. In the Egyptian colloquial language, women are often referred to as “Miss” or “Mrs.”, indicating that the most important framework to define women is marriage. Meanwhile, men are often addressed with the title “Mr.”; a neutral title that does not indicate marital status.

Women's empowerment has several facets; yet, women's political, economic, and social empowerment demands changing the society's view towards women. Since the language reflects this view, language users may need to change expressions demeaning to women first in order to view them as human beings first and foremost.

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200 million women from participating online—is projected to continue. A dedicated and coordinated effort by the public and private sectors is urgently needed to accelerate the pace of progress to bridge this gap.

A Fairer Future

Studies demonstrate that Internet access and usage boosts female's income and income potential; the web is used to search and apply for jobs, in addition to earning additional income. Moreover, accessing and using the Internet increases female's sense of empowerment. More than 70% of Internet users consider it “liberating” and 85% say it “provides more freedom”; it also increases female's sense of equity.

Without any concerted action, new female Internet users will go online simply as a result of organic growth in Internet penetration; however, progress can be accelerated to double the number of women and girls online. Doubling the women and girls online is ambitious, but it is an opportunity worth urgently pursuing, because the faster the Internet gender gap is closed, the sooner women, their families, communities, and countries will realize the significant socio-economic benefits that can be unlocked through access to the Internet.

The global gender gap is not just a debilitating problem, but also a massive opportunity. The arguments for closing the gap are not only morally motivated, but also economically incentivizing. Advancing female's equality could add trillions to global growth and technology, in all its shapes or forms, can provide us with the much-needed tools to tackle this global challenge.

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Pioneering

Women Architects

Let us be honest and admit that whenever we think of the profession that is “architect”, we immediately think of a male architect. As a matter of fact, learning that the architect of an impressive structure is a female, would sadly more often than not surprise us. In reality, women have proven their passion and talent for design and architecture in this male dominated profession.

By: Maissa Azab

Even in the 21st century, architecture can still be a challenging career path for women, and gender inequality continues to be a concern. In many parts of the world, more women have architecture degrees than men; yet, this has not translated past university into the working world, as women continue to be underrepresented across nearly all levels of practice. A recent *New York Times* article stated that: “to get a sense of the state of opportunity for women in architecture, consider that the firm getting the most high-profile architectural commissions in the world right now has just two female principals”.

There is no single, or simple, explanation for this; nor is there an easy fix. Even today, assumptions that women would quit to marry, that they would be unable to command authority on job sites, or even that their creativity is not up to par, still persist, resulting in unequal pay, recognition, and access to opportunities. However, and against all odds, fierce female architects have succeeded in etching their names in the history of architecture. Let us recognize here just a handful of female architects who have paved the way for modern-day architects, both male and female.

American architect, **Sophia Hayden** (1868-1953), was the first female to receive a degree in architecture from the Massachusetts Institute of Technology (MIT). At the age of 21, she won a competition to design and execute the Woman’s Building of the 1893 World’s Columbian Exposition in Chicago. Although construction was not an easy process, the building received an award

for “Delicacy of style, artistic taste, geniality, and elegance of the interior”.

An artist and one of the first licensed female architects in the world, American architect **Marion Mahony** (1871-1961) also graduated from MIT. Described as the “greatest architectural delineator of her generation”, she contributed as a designer to the development and dissemination of the Prairie School, which revolutionized American architecture. Throughout her life, she maintained an outspoken position on environmental and planning matters; her pursuit of democratic ideals in architecture and community planning has been significant.

Neglected for most of her career, **Eileen Gray** (1878–1976) is now regarded as one of the most important furniture designers and architects of the early 20th century. Her work inspired both modernism and Art Deco; she developed an opulent, luxuriant take on the geometric forms and industrially produced materials used by International style designers. Most notably, she worked with Jean Badovici on the construction of the house known as E-1027 on a steep cliff near Monaco. Facing the challenge of designing and living in a compact home, she developed space-saving devices such as the foldable S-Chair.

Brazilian modernist architect, industrial designer, historic preservationist, journalist, and activist, **Lina Bo Bardi** (1914-1992) defied conventional categorization. She designed daring idiosyncratic structures that merged modernism with populism. In 1950, she started the magazine *Habitat*, and in 1951 designed her home in Sao Paulo, the Glass House, considered one

of the paradigmatic works of rationalist art. In 1957, she began construction of the new home of the Museum of Art Sao Paulo (MASP), where she suspended the building above a 70-meter-long square. Her portfolio included several other emblematic projects.

African-American architect **Norma Sklarek** (1928-2012) graduated from Columbia University. While everything seemed to work against her, she sure was a woman of firsts: first African-American woman to be elected fellow of the American Institute of Architecture (AIA) and first to earn a license. She co-founded Sklarek, Siegel, and Diamond; the biggest female only firm in the country. She was well known for her excellent executions and projects construction, completing huge constructions on time and under budget, including LAX Terminal one, the US Embassy in Tokyo, and the Fox Plaza in San Francisco.

Things have certainly changed for females in all professions, including those traditionally male dominated; it is thanks to brave women who fought hard against injustice. However, there is still a long way to go, and it is my belief that it is up to us women to make sure we steer the world to a path of equity towards the future. I cannot think of a better conclusion to this article than this quote from Norma Sklarek: “In architecture, I had absolutely no role model. I am happy today to be a role model for others that follow”.

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A TINY RAY OF HOPE

NOBEL PRIZE LAUREATES FOR PEACE

HOPE

By: Basma Fawzy

Hope can take any form or shape. Sometimes, it is disguised as organizations that regard all human beings as equal and decided to help them without worrying about their nationality, race or religion. In a world full of conflicts, disease, devastation, and death, they provide help and support to those in need. Today, we discuss some of the organizations that have been awarded the Nobel Prize for Peace. In line with Alfred Nobel's will, those organizations deserve the Prize for their efforts for all humanity.

Most of us have heard of the Red Cross and its role in helping the victims. Yet, not many people know anything about the founder of the Red Cross, Henry Dunant. Henry Dunant, a Swiss businessman and a social activist, witnessed the aftermath of the Battle of Solferino in Italy in 1859, between the allied French Army and the Sardinian Army against the Austrian Army, which was part of Italy's struggle for Independence. Dunant was touched by the horrors of this Battle and the fact that no one was helping the wounded. He organized groups of women to help the wounded, bought the material needed, and convinced the nurses to help everyone, because all are human beings.

Dunant later wrote a book entitled *Memory of Solferino*; in it, he brought the attention to the need for a neutral organization to help wounded soldiers. He gave his book to many political figures and travelled to spread his ideas. His ideas were merely that until Gustave Moynier, President of the Geneva Society for Public Welfare, discussed the book in a meeting. Not only did the Geneva Society discuss, they also created a committee to put it into reality. Nowadays, the date of the meeting,

17 February 1863, is considered the founding date of the International Committee of the Red Cross (ICRC). For his ideas and humanitarianism, Henry Dunant won the first Nobel Prize for Peace in 1901.

Not only the Founder of the ICRC who won the Nobel Prize for Peace, the organization of the ICRC won the Nobel Prize for Peace three times, in 1917, 1944, and 1963. In 1917, the Red Cross won for their support of the war prisoners of World War I and ensuring they keep in touch with their families. In 1944, among many who nominated the Red Cross for the Prize were Hjalmar Hammarskjöld, Chairman of the Swedish Nobel Foundation Board, and Birger Ekeberg, President of the Court of Appeals in Stockholm. The Red Cross won for their humanitarian activities during World War II.

In 1963, the Red Cross had been founded for 100 years; out of gratitude and appreciation of their efforts, Anders Daae, a former war prisoner, started a campaign to convince others to nominate the Red Cross. He wrote an article and contacted prisoners; his campaign was successful and the Red Cross was nominated for the Nobel Prize for Peace and received it.

Two other organizations have helped humanity, and for their humanitarian activities, they have also claimed the Nobel Prize for Peace. United Nations High Commissioner for Refugees (UNHCR), a humanitarian organization founded in 1951, won the Prize twice. In 1954, they won for helping many refugees in Europe following the War; in 1981, they won for providing help and protection to those seeking asylum. Their role continues to grow as more refugees flee war-stricken areas in search for safety. United Nations

International Children's Emergency Fund (UNICEF) was founded in 1946; it aims to help children and ensure that every child is healthy and safe. In 1965, it won because it "has fulfilled the condition of Nobel's will, the promotion of brotherhood among the nations," as stated by the Nobel Committee in its Award Ceremony Speech.

To date, these organizations continue to support those in need irrespective of their race or religion. In spite of the hardships they face, they spread love and hope wherever they are. No one works alone; they continue to work because they receive support from people like us, people like you. You can check their websites to see how you can make a difference. Their outstanding work proves that all deeds no matter how small matter.



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Ageing

By: Esraa Ali

in the Age of Inequality

Younger people often associate growing older with sadness and health problems, which may explain several risky behaviors associated to younger people; such as poor diet and fitness, and smoking, to name a few. Young people simply “live it up” assuming that growing older will not be fun anyway; however, studies show that growing old should be a happier experience than we imagine.

Contrary to common belief, older persons actually enjoy life more as long as they look after themselves; as the famous quote goes: “It is not the years

in your life that count; it is the life in your years”. Well, this sounds great; returning to reality, however, consider you have taken care of yourself, you still come face to face with ageism. Several studies have confirmed a correlation between ageing and inequality; inequalities in older age limit participation, economic growth, and social cohesion.

More occasionally, older people lack good healthcare benefits and family support, especially those living in secluded areas. Improper services, transportation, and infrastructure hinder the elderly from performing simple

If you ask me about my greatest fear, I would answer without thinking “Growing old”! Being in my thirties, I am always haunted by this idea; I worry more when I think that the prime of my life has already passed me by. They always say that life begins at forty, fifty, sixty, or whatever; yet, I fear ageism and the unfairness associated to it in every single domain of life at a later age.

everyday tasks; including, but not limited to, visiting a doctor, registering official documents, paying bills, or even purchasing their own basic needs. For example, over 200 studies have drawn a link between poverty and sickness, where older patients skip their doctor’s visits or purchasing medications due to their excessive costs, or an inability to afford a health insurance. Simply, they have to face the agonizing choice either to stay hungry or stay sick!



Financial inequalities do not only exist between older persons and the rest of the population, they also exist among older persons themselves. This forms a stress on them as they are excluded from care services, resources, prosperity, and decent work, amongst others. Several older persons are legally required to retire at the age of 60 years and to rely on pensions and family support. Even those lucky enough to receive pensions usually find them inadequate to afford life.

This does not mean that income is the whole story. As per United Nations, only a minority of the global population accumulates enough savings or assets for economic security in old age. Yet, there are other factors that limit older people's ability to participate fully in the society, such as discrimination, access to care services, mobility, to name a few. As a result, more older people worldwide live in poverty in both developed and developing countries.

Turning Back the Clock

Enjoying a good later life is a right that we should expect for everyone. For several communities, however, the aging experience is both difficult and challenging. Population aged 60 years old and above is globally growing faster than all younger age groups. The "World Population Prospects 2017" prepared by the United Nations showed that the number of people aged 60 years old and above will increase drastically in the following decades. Between 2017 and 2030, the number is expected to increase from 962 million globally to 1.4 billion; by 2050, the number is expected to increase by more than double to 2.1 billion, and this number is likely to increase by more than triple reaching 3.1 billion in 2100.

All the same, the number of older people in the world represents a relatively high percentage of the total population to be neglected or to face discrimination. Studies show that the number of population aged 60 years old and above is expected to outnumber children, adolescents, and youth; 1.41 billion versus 1.35 billion children under the age of ten years in 2030, and 2.1 billion versus 2.0 billion of adolescents and youth at ages 10–24 years in 2050.



These statistics indicate that the populations that will be affected more by inequalities will be where more older people live and where an aging population is projected. Moreover, as women show a longer life expectancy than men and more often suffer discrimination, several older women will be most affected. Now, the question is no longer about whether we should address inequalities or not, but rather how to address them. We are talking here about a whole society issue, the existence of which hinders world countries from developing and progressing. Without implementing major changes of policy, inequalities are likely to continue in the future.

Stakeholders—including governments, academic institutions, and decision-makers—work hard to address the needs and interests of older persons, by finding more innovative and immediate solutions. An attempt to confirm a commitment towards improving the services and care offered to the ageing population, including housing, health care, employment, and other forms of intergenerational solidarity.

An Age-Friendly World

These changes shall by all means help in fulfilling the adopted 2030 Agenda for Sustainable Development that "no one will be left behind". The 2030 Agenda provides attention to promoting equality and inclusion, and the Goal 10 of the Sustainable Development Goals (SDGs) aims to reduce inequality within and among countries to ensure equal opportunities, eliminate discrimination, and empower inclusion of all, among other aims.

The inequalities experienced by older people are indeed an ethical challenge before being an economic or a political one. Determining the quality of our later lives must be irrespective of age, gender, disability, origin, religion, economic, or other status. There is a need to develop and maintain a functional process that fosters healthy and active ageing. An age-friendly world—as termed by the World Health Organization (WHO)—shall remove barriers and develop policies, systems, and services across the human life course.

This world shall foster age-friendly practices that enable older persons to meet their basic needs: learn,

grow, and make decisions; be mobile; build and maintain relationships; and contribute to their societies and the whole world. Tackling inequalities could suggest providing pension coverage to ensure income security for all, ensuring affordable and accessible social services. It also implies supporting initiatives that facilitate the participation of older persons in the labor market, counter negative perceptions of older workers, and prevent discrimination against older persons.

Nothing Is Inevitable—Except Getting Older!

To grow old is inevitable; it is also a privilege. If you are not getting older, you are simply dead, or there is a possibility that you are a zombie! Getting older brings greater inequality, unless policy, action, and appropriate intervention are employed. In an increasingly ageing world, older people have a significant role to play within their communities, and a reduced inequality should be applied in all countries for the benefit of present and future generations.

Addressing inequalities in later life is never too late. People and communities can make changes and improve behaviors at any age; decision and policymakers can do the same. These positive changes will indeed bring benefits at any age; always remember that "there is life left to be lived".



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Designing towards SUSTAINABILITY

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Sustainable development is “meeting the needs of current generations while sustaining the ability of future generations to meet their needs”. Similarly, sustainable design involves new methods and strategies for design and construction that take into consideration environmental and economic challenges of the age. New buildings are designed and constructed according to advanced methods and technologies, which minimize the environmental impact and reduce costs. They also provide a rural environment that is comfortable and safe on the environmental, economic, and social levels, which all interact.

A sustainable future for people and the environment is achievable through technologies that make major changes in the patterns of production. These changes require combating economic and social challenges, and a change in energy usage. To meet the increasing demand on energy and sustain climate within safe limits, we need to change the methods of energy production and eliminate the emissions of carbon and other harmful chemicals. Sustainable development cannot be achieved without making major changes in

architectural design and construction, using natural biological material.

Today, architects and designers opt to build flexible and sustainable buildings using local natural materials. The field of sustainable biological materials revolves around using local renewable natural resources to produce innovative materials and bio-energy in a sustainable way. Bio-design is a mixture of science and engineering that can eliminate stress, enhance creativity and wellbeing, and speed-up recovery. As the world's population increases in urban areas, these elements have become more important.

Architects and designers must follow a biomimetic approach and learn from the obvious patterns in ecosystems. They need to have a new vision into nature that would inspire them with ideas for creative design. Continuous search and contemplation of the impressive patterns of nature's compositions, including diverse repetitive geometrical patterns, give depth to the design.

The world consists of beautiful natural and practical patterns that make beautiful and practical designs. If understood, they can be used to design and construct diverse, strong, flexible, and effective systems in terms of energy. A pattern is a clear systematic unit, repetitive or sequential, used to produce a repetitive design; creating a pattern requires a unit to repeat and a base to repeat it on.

As such, designers nowadays are attempting to explore the physical and chemical reasons behind the amazing visual structures in the living and non-living world. A key pattern is the snowflake; this six-fold symmetry, however, seems to have an

infinite set within it. Snowflakes are formed through a simple process: water vapor in humid air gets frozen, somehow forming a pattern of unbelievably beautiful details.

Even in the old ages, humans understood the strength and attraction of patterns. Natural patterns such as fractal and the Fibonacci Sequence are suitable for every age and inclusive until today. Recurrent geometrical patterns repeat in different measurements and relieve stress. A study conducted in 2006 realized that using fractals in architecture decreases fatigue; other researches found that recurrent geometrical patterns can decrease fatigue by up to 60%.

There is an increased need to make products “greener”. Renewable resources, such as wood and other biological material, offer a natural means to design and fabricate creative sustainable products for the future. Sustainable material and technologies inspire designers to create and treat renewable natural materials, mostly plant-based. Some of the patterns that have been recently discovered in architecture and interior design are made using computer, artificial intelligence, and biology. Architects have realized that patterns are not decorative elements, but are related to nature and what humans make. Computer-Aided Design (CAD) and Computer-Aided Manufacturing (CAM) technologies allow patterns to include a wider set of constructional, programming, aesthetic, and physical impacts.

Patterns offer great potential to imitate and analyse fine details; they form a crucial part of the natural world. As humans, we aim to communicate with these patterns on the instinctive level. Using patterns in architecture and design—specifically natural patterns as those of wood and bio-material—has an effective impact on people, making them happier and more productive. They also contribute to saving energy and maintaining a safe and sustainable environment.



Spirals

Ripples

Branching

Spots

Stripes

Cracks

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It is suggested that the term "Human Rights" has appeared in Europe during the 17th century, yet not in the same universal sense that we comprehend today; but rather in the national and international dimensions of man's relation with his country, and the relation of the citizen with his rulers. However, circulating the term "Human Rights", even though not directly used, has begun long ago. First of all, all heavenly laws mention human rights; heavenly religions set many rules to define rights, norms of transactions, individual and societal behaviors. The term "duties" always follow the term "rights"; the two go hand in hand.

When societies developed, many of them were transformed from tribal to urban, later becoming dependent on State entities. Different governments followed one after the other, varying according to the different countries, customs, and beliefs. As a result, problems of governing regimes among groups of relations emerged. The most prominent of these relationships was the relationship between the ruler and the citizen, the relation of the citizen to those in the ruler's circle and his institutions, in addition to the relationship between the citizens themselves, between them and their country, including their rights and their duties towards it. The answers intertwined and complicated over time; human needs increased, surpassing material needs to emotional, spiritual, cognitive, and mental needs. This manifested in their quest for unlimited knowledge, freedom of expression and ideas.



There was an inevitable need for clear legislation, most of which aimed at preserving the stability of the society, preserving the rights of individuals and institutions, and preserving the public system and the prestige of the State. The Magna Carta, or the Great Charter, issued for the first time during 1215 in Britain, was the first legislation governing the complication of relationships, rights, and duties; first and foremost, the authority of the ruler represented in Britain by the King who had absolute authority and will. The Magna Carta was issued to limit this absolute authority, and stipulated that certain freedoms should be granted; it



also stipulated that a "free man" should be punished under State law only. Although the Magna Carta was not an ideal text, it was inspiring over hundreds of years to several constitutional texts that were subsequently drafted in different countries, most notably the Constitution of the United States.



The theory of the "Social Contract", which was launched by the great French thinker and philosopher Jean-Jacques Rousseau (1712–1778) in his book that has the same name and was published in 1762, comes in a unique and clearer formulation of the relationship between the ruler and the citizens, and the relationship between the citizen and his country. The main idea of this theory is that law and the political system are established by Man; therefore, they are simply considered as means to achieve a higher goal, which is the benefit of the individuals covered by the social contract. This contract derives its legitimacy from the commitment of all its members to what they have agreed upon; thus, Rousseau made the citizen a partner of the ruler and his contractor. In his era, this idea represented a great revolution in comparison to the prevailing thought of the rule by divine right, the absolute authority of the King, and the religious authority supporting it. The *Social Contract* publication was one of the main sources of inspiration for the outbreak of the French Revolution in 1889, eleven years after the passing away of the book's author.

From the French Revolution, the first Declaration of Human and Citizen's Rights was issued by the National Constituent

THE MOST FAMOUS HUMAN RIGHTS CHARTS

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Assembly on 26 August 1789. It is considered one of the basic documents of the French Revolution and one of the main references in the world for the drafting of future human right texts. This Declaration defines the individual rights of citizens and the collective rights of the nation. The Declaration ensures the human right to liberty and to live under the rule of law, as well as the dual rights and obligations, which emerged clearly with this Declaration.

The Universal Declaration of Human Rights with its 30 articles, adopted by the United Nations on 10 December 1948, is considered a text coronating the long human struggle through centuries, during which people suffered from the lack of rights, injustice, and oppression. Man's knowledge developed and his desire for affirming his rights and freedoms has flared up; he sought to assert and protect his humanity from every intolerant aggressor. It is not a surprising fact that the structure of this declaration depended mainly on the British Magna Carta and the French Declaration of Human and Citizens Rights.

Yet, people are still striving for their rights in every part of the world, and humanity continues to seek the assertion of the rights to freedom, dignity, and peace.

MARCH 2019



A Month of Competitions and Awards

By: Rania Farouk
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The Bibliotheca Alexandrina (BA), in collaboration with the Ministry of Education, celebrated together on Monday, 18 March 2019, the Closing Ceremony of the BA Science and Engineering Fair 2019, which covered Alexandria and Upper Egypt Governorates. The Closing Ceremony followed eight local fairs, in Alexandria, Marsa Matruh, Gharbia, Dakahlia, Port Said, Damietta, and Kafr Elsheikh; 5100 students participated in the fairs with a total of 3400 projects; 228 students were qualified with a total of 157 projects from the local fairs to the final fair at the BA.

During the ceremony, the top five projects were announced; these projects will participate and represent Egypt in the Intel International Science and Engineering Fair, which will be held in Phoenix, Arizona, USA, 12–17 May 2019.

“A New Membrane for Healing Wounds Applications” was the name of the project by Fares Alaa Fathy and GannatAllahAtef Khidr who won the First Place Award; the Second Place Award was awarded to “An Unpolluted Life” by Asmaa Shawky Abdel-Salam and Amany Awad Abdel-Khalek. The Third Place Award was awarded to “Computic Vision to Control the Computer Index” project by Gasser Mohamed Galal and Moustafa Ahmed Abdel-Mohaymen; the “Zero Drop Wasted” project by Abdel-Rahman Mohamed Hanafy and Salma Fawzy Latif won the Fourth Place

Award; and finally, the “Improving Algae Biotechnology” project by Romay Ashraf Tamer was awarded the Fifth Place Award.

The BA has been participating in the Intel International Science and Engineering Fair since 2008; the winning students are encouraged and supported by the BA to travel and participate in the International Fair, which is held in the United States annually during the month of May. The Egyptian Team won grand awards in the Fair since 2013 to 2017.



Moreover, the PSC participated in the First Lego League for Seniors; the Competition’s theme this year was “Space”. All teams worked on solving some problems that astronauts may encounter during their journey to outer space. Such problems they could encounter in their everyday life; such as recycling food remains or energy saving. Other problems include those making scientific discoveries, or any other problem the participants choose. Their mission is to find creative solutions to the problems at hand, or use solutions previously used but in a different manner.

The PSC has participated with two teams, “PUBG” and “Space-Time”, each consisting of ten boys and girls aged 10–16 years old who were trained at the Center for several months before the Competition. The Competition was held 16–17 March 2019 at the British

During the month of March, the Planetarium Science Center (PSC) organized and participated in several competitions in various scientific fields. Many awards were distributed by the PSC, which also won several awards through the Center’s teams.

University; the “PUBG” team won the First Place Award in the presentation skills, and the “Space-Time” team won a Special Award. The PSC has become a strong competitive in the robotics education field for juniors.



Also, the Center has participated in the jury of the RoboCup Junior Competition, which was held at the Smart Village Information Technology Institute, 21–23 March 2019. The RoboCup Junior Competition was first held in 1997 with the aim of “developing a Robot Soccer Team before 2050 to be able to defeat human champions at the FIFA World Cup in the coming years”.

“RoboCup Junior” is an educational initiative that supports local, regional, and international robotics for young students. It is designed to introduce RoboCup to primary and high school students, as well as college students who do not possess the needed resources to participate in the advanced leagues. The youth league’s main focus is education.

More than 400 teams participated in the Competition, which is held for students aged 9–20 years old. The Competition is divided into several categories; the winner has to achieve at least 60% in each category to be able to participate in the two international competitions: Sydney RoboCup 2019 and Asia Pacific RoboCup 2019. The Center has partaken in the Competition’s jury previously for several years based on its experience in scientific competitions and fairs.



History of Science Museum

Opening Hours

Sunday–Thursday: 9:30–16:00

Guided Tours Schedule

Sunday–Thursday:

10:30, 11:30, 12:30, 13:30, 14:30, 15:30

Fees: EGP 2.- for non-audience of the Planetarium

ALEXploratorium

Discovery Zone

Opening Hours

Sunday, Monday, Wednesday, Thursday:

9:30–16:00

Tuesday: 9:30–12:30

Saturday: 12:00–16:00

Guided Tours Schedule

Sunday, Monday, Wednesday, Thursday:

10:00, 11:00, 12:00, 13:00, 14:00, 15:00

Tuesday: 10:00, 11:00

Friday: 14:00, 15:00

Saturday: 12:00, 13:00, 14:00, 15:00

Fees: EGP 10.- (EGP 5.- for students)

Listen and Discover

Fees:

DVD shows: EGP 4.- (EGP 2.- for students)

3D shows: EGP 20.- (EGP 10.- for students)

12D shows: EGP 20.-

Available Planetarium Shows

The Secrets of Gravity; 45 min.

Two Small Pieces of Glass; 22 min.

The Future by Airbus; 27 min.

Enlightened Mind; 19 min.

The Mission; 24 min.

Kaluoka'hina:

The Enchanted Reef; 33 min.

Stars of the Pharaohs; 35 min.

Seven Wonders; 30 min.

Oasis in Space; 25 min.

For schedule and fees, please visit the Planetarium Science Center's website:

www.bibalex.org/psc

The Bibliotheca Alexandrina Planetarium Science Center (PSC) invites its visitors to spend a day of fun learning, where they can enjoy amazing scientific shows that cover a diverse variety of scientific fields and are suitable for a wide range of groups at the **Planetarium Theater**.

Visitors can also enjoy tours of the **History of Science Museum**, which highlights scientific discoveries throughout three eras: Pharaonic Egypt, Hellenistic Alexandria, and the Golden Age of Islam.

Moreover, visitors can enjoy a collection of interactive exhibits that targets children and adults, workshops, DVD and 3D shows at the **ALEXploratorium** as well as shows at the **12D Theater**.



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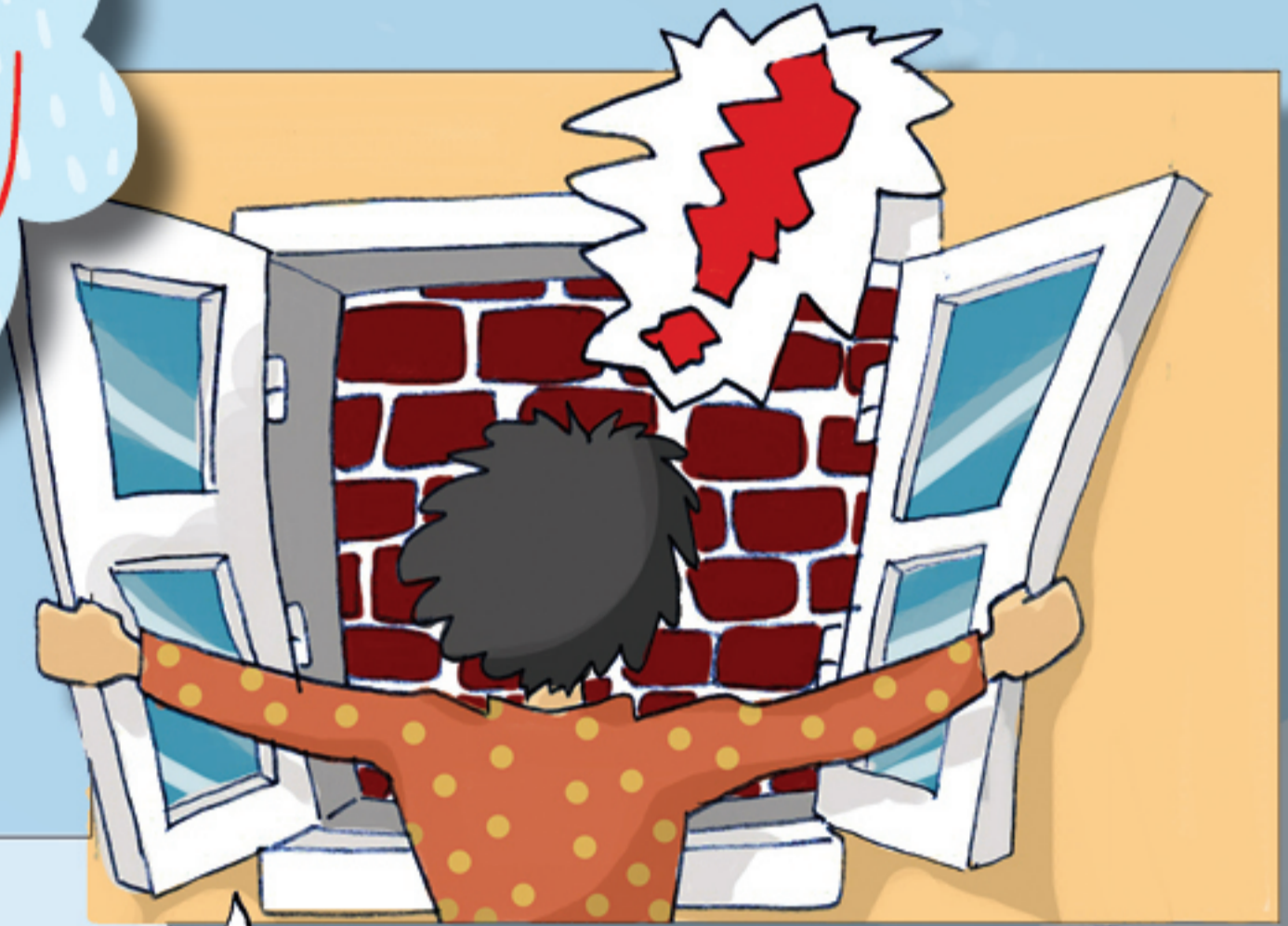
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BAPSC



I have
a
Dream



To know the Dream's story, check the article on page 8.
Illustrated by: Mohamed Khamis

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