Indo-US APJ Abdul Kalam STEM Education and Research Center of AMU and OSU

International Society of Muslim Women in Science

International Society of Muslim Women in Science

presents the e-magazine for women in STEM

An-Nisa

STEM is beautiful and a necessity

STEM E.R. RECOGNITION -ISLAMIC UNIVERSITY OF GAZA

Published under the Indo-US APJ Abdul Kalam STEM Education and Research Center of AMU and OSU ,and ISMWS
Aligarh Muslim University, India, and The Ohio State University, USA
December 2023

An-Nisa
2023

Dedicated to

- COURAGEOUS PALESTINIANS,

- COVID-19 VACCINE INVENTORS

Prof. UGUR SAHIN and Dr. OZLEM TURECI

and

- All Muslim Females in STEM

Cover page: Background shows a landscape of Palestine, the pictures are of COVID-19 vaccine inventors Prof. U. Sahin and Dr. Ozlem Tureci, and 2017 awarded faculty and student members in STEM of Islamic University of Gaza, Palestine

AN-NISA

"We pray to Allah to bless us with the intellectual power to solve the mysteries of His creation for the benefits of humanities. We dedicate our inaugurating magazine to all those women, known and unknown, who endeavored and contributed to the same cause. This issue does not contain the stories of the pioneering women that we read in textbooks or history books. It contains stories of some extra-ordinary women who are making history at this time regardless of their places in the future, inventing the path of science through their dedication, intelligence and truly honest minds"

ISMWS

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An-Nisa
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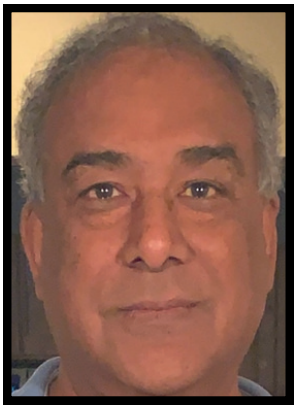


THE OHIO STATE UNIVERSITY

Message from OSU Director
Prof. Anil K. Pradhan

Indo-US APJ Abdul Kalam STEM Education and Research Center of OSU and AMU
Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA

APJ Abdul Kalam Indo-US STEM Center Support for Education and Research in Palestine

Dear Colleagues,

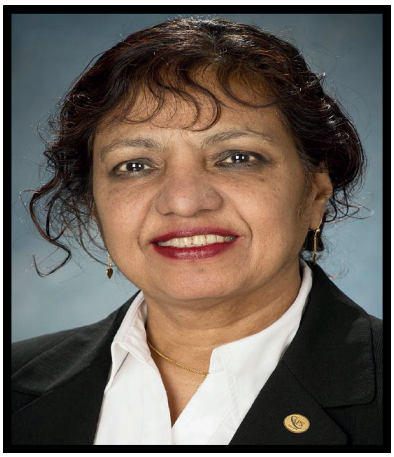
I am honored to contribute to the special issue of the e-magazine An Nisa. As educators and researchers, it is altogether appropriate and our duty to devote as much effort as possible to re-building the destroyed educational infrastructure in Palestine. Nearly three-quarters of the over 20,000 Palestinians killed are women and children. One of the most egregious acts was an Israeli attack on the largest university in Ghaza, the Islamic University of Gaza (IUG) that killed its President Prof. Sufian Tayeh and his family. A graduate of Stanford University, Prof. Tayeh was ranked among the top 2 percent of researchers globally. He was also appointed UNESCO chairperson in astronomy, astrophysics and space sciences in Palestine. In his memory, we propose that the Center initiate the Tayeh Scholarship for a female student from IUG to pursue higher studies in a STEM field including medicine. We plan to negotiate the details with AMU and OSU and establish a fund-raising mechanism. Regrettably, there is not much to celebrate this holiday season. But we should still wish for peace and an end to the suffering of Palestinian people as soon as possible. As an expression of our collective sentiments, I have written a poem displayed herewith.

PALESTINE WILL FIGHT ON

---- Prof. Anil Pradhan,OSU, USA

Bloody weak and all alone
No one coming to their aid
American bombs Israeli planes
Tanks firing on their head
The world watches helplessly
With hollow talk of holocaust

As excuse for another one
Palestine will fight on
Schools mosques and hospitals
Ashes and smoldering ruins
Hunger thirst and massacres
Death hovering all around
Digging in ruins with bare hands
Amidst flames of burning homes
Martyred souls rise to Heaven
Palestine will fight on
Selfish heartless leaders talk
Blind deaf and mindless too
Do not see the mothers cry
Do not watch the children die
But people march in rising fury
Across the globe in every city
Justice thunders condemnation
Palestine will fight on
Asian African Latin American
And all victims of apartheid
Know too well feel the pain
Recoil in horror petrified
Barbaric imperialist terrorists
And Zionists commit genocide
They shall not pass they will not win
Palestine will fight on
Cowards strike from the air
Kill the helpless with no arms
Children women and the old
But Palestinians brave and bold
Will not rest will not sleep
Till murderers face the wrath of fate
With nothing but their courage on
Palestine will fight on
We see refugee columns flee
Carrying wounded dying too
So far yet we feel so near
We promise and solemnly vow
From the River to the Sea
We shall all fight with thee
Palestine will be a nation
Palestine will fight on



THE OHIO STATE UNIVERSITY

Message from OSU Co-Director, Prof. Sultana N. Nahar

Indo-US APJ Abdul Kalam STEM Education and Research Center of OSU and AMU
Department of Astronomy, The Ohio State University, Columbus, OH 43210, USA

Assalamualaikum and a very Happy New Year to everyone!

We are very pleased to release our 2nd issue of An-Nisa magazine. It speaks out and share our thoughts, what we are, and we are doing. This forms a bond of understanding and support among us and forms an united front with strength and dreams to go ahead, seek knowledge, help each other, face challenges and bring advances.
This year, we are dedicating An-Nisa to two special groups:

- Palestinians, the wonderful and sophisticated people of the holy and of Palestine - gentle, caring, and robust, but going through the havoc of a brutal genocide by Israel. They do not and are not allowed to have defence mechanism, freedom to nurture their intellectual growth properly, freedom to expand their research to full fledge, yet they had been growing in education and research, and I feel fortunate to be with them. Now systematically and forcefully, Israel has destroyed their SPIRIT is immortal. Through their robust nature and shining SPIRIT, they WILL rise again. We salute their effort and bravery.
- The team of Prof. Ugur Sahin and his wife Dr. Ozlem Turcei who lead the research of inventing the corona virus vaccine. COVID-19, the varient of corona virus, kept killing human beings all over the world for almost two years under COVID-19 pandemic. The death toll had already reached well over 7 milion lives when Sahin and Torcei tead got the vaccine. The team had been engaged in the research of mRNA vaccine, but expedite the effort, got the COVID-19 vaccine with 95\% effectiveness. The world population was saved from pandemic in 2021. We salute their leadership in research and invention of the vaccine.

As Prof. Anil Pradhan mentioned, we will be setting up a scholarship fund for a Palestinian student to come to AMU for his/her study in STEM disciplines.

May Allah bless everyone a peaceful, productive and successful 2024.

THE OHIO STATE UNIVERSITY

A.P.J. Abdul Kalam STEM-ER Center
(Indo-US collaboration)

Message from AMU Director, Prof. Tauheed Ahmad

Indo-US APJ Abdul Kalam STEM Education and Research Center of OSU and AMU
Aligarh Muslim University, India

It gives me immense pleasure to write a few words about the release of second edition of An-Nisa e-Magazine 2023. This is a joint venture on the platform of the International Society of Muslim Women in Science (ISMWS) and the Indo-US A.P.J. Abdul kalam STEM center of Education and Research. The motive behind this e-Magazine is to highlight the achievements of successful women in their carrier in the field of science and technology. The global participation of the women in the field of science technology engineering and math (STEM) field is 34 percent and in India it is 46 percent, a little better than global average. However, the women empowerment in the work force is only 14 percent. We have to go long way to balance the gender bias. Although, government is promoting and doing its best to boost the women participation in STEM education. On the occasion of International women's day, every year a theme is announced to promote and encourage the women to come forward and have equal participation. This year's theme was DigitAll: Innovation and Technology for gender equality. A survey shows the least participation of women in the field of engineering and architect which is only 16.5% and highest in biological sciences at 46%. It is good news that India is among the top producers of the scientists and engineers globally, with STEM witnessing substantial growth in recent years. The government has initiated several schemes to boost the girl students coming forward and join STEM education like:

Vigyan Jyoti scheme for school girls.
Pragati through the all India Council for Technical Education.
Gender Advancement for Transforming Institution (GATI)
Consolidation of University Research for Innovation and Excellence (CURIE)
Women in Engineering, Science and Technology (WEST) scheme
Indo-US Fellowship scheme.

We should make a habit to work together with equal partnership to make the future more sustainable. The data from 2015, 16 to onward show that there has been continuous trend of increasing percentage of women in STEM workforce. Let us pray and work for its faster growth.

With best wishes
Prof. Tauheed Ahmad

LIFE : SCIENCE

BY MAHWISH MUJTABA

- NAME : MAHWISH MUJTABA
- ALIGARH MUSLIM UNIVERSITY
- BBACHELOR'S 2ND YEAR
- INDIA

IN THE REALM OF ATOMS, SO SMALL AND UNSEEN,
LIES THE WONDERS OF SCIENCE, A MAGICAL DREAM.
FROM THE STARS IN THE SKY TO THE CELLS IN OUR SKIN,
SCIENCE UNLOCKS SECRETS, WHERE DISCOVERIES BEGIN.

NEWTON'S LAWS OF MOTION, SO SIMPLE AND CLEAR,
EINSTEIN'S THEORY OF RELATIVITY, BENDING TIME NEAR.
CHEMICAL REACTIONS, A DANCE OF ELEMENTS BRIGHT,
UNVEILING THE MYSTERIES, IN THE LAB'S GLOWING LIGHT.

FROM THE DEPTHS OF THE OCEAN TO THE HEIGHTS OF THE SKY,
SCIENCE EXPLORES, ASKING QUESTIONS, OH SO WHY?
THE LAWS OF NATURE, A SYMPHONY SO GRAND,
UNRAVELING THE UNIVERSE WITH A CURIOUS HAND.

FROM THE MICROCOSMOS TO THE MACROCOSMOS VAST,
SCIENCE UNCOVERS THE SECRETS, MAKING KNOWLEDGE LAST.
FROM THE TINIEST PARTICLES TO THE FARTHEST STARS,
SCIENCE CONNECTS US ALL, NO MATTER WHERE WE ARE.

SO LET'S EMBRACE THE WONDERS THAT SCIENCE BRINGS,
AND MARVEL AT THE BEAUTY THAT KNOWLEDGE OFTEN SINGS.
FOR IN THE REALM OF SCIENCE, WE FIND OUR PLACE,
EXPLORING THE MYSTERIES OF TIME AND SPACE.

How I became a successful Women in STEM...

Well, that's the story of my Life!

My scientific Journey from Gaza, Palestine

Dr. Hala Jarallah El- Khozondar
Distinguished Professor
Electrical Engineering and Smart Systems Departments
Islamic University of Gaza, P.O.Box 108
Gaza, Palestine

I was born in Gaza City, Palestine on 17th January,1965. My research interests included several topics like sensor technology, renewable energy, solar cells, and electromagnetics studies.
In March 2023, I earned the title of distinguished professor Dr. at the electrical engineering and smart systems departments. To earn this title, I had to go through a long journey of challenges and earn blessings from Allah.

I completed all my schooling in the governmental schools where I was raised in Gaza. Since I first began studying science in middle school, I have been passionate about science and have always wanted to become a scientist. At that age, I also grew more devoted to nature as a powerful indicator of the existence of our Almighty Allah. My career choice was clear science. I started watching every scientific program that was broadcast on TV, but two, in particular, had the biggest impact on me: the shows Explaining the Quran by Sheikh Alsharawi and Faith and Science with Dr. Mostfa Mahmoud. Additionally, I was reading scientific articles published in periodicals or regional newspapers, particularly a Kuwaiti publication by the name of AlArbi.

After high school, I moved to Birzeit, a town in West Bank, Palestine where I earned my B.Sc. in Physics from the science faculty at Birzeit University. Right after my graduation (in 1987), I got a research and teaching assistant position at Birzeit University. It was at the same time as the starting of the Palestinian uprising against Israeli occupation. It was very difficult to move from Gaza to Birzeit during my studies and my work due to the Israeli checkpoints, where we must show permission at every checkpoint. This situation got worse during the uprising. Even though all the circumstances were against me I was determined to follow my dream of pursuing higher education.

In 1990, my mother had a stroke which kept her paralyzed. It was very hard on her as she was a pillar of the house. It was also very difficult for me as I was quite attached to my mother. I used to tell her about all the tiny details of my life. I lost her in 1992 and by that, I lost my closest friend. In the same year, my oldest sister (Ibtesam) brought me the application for a Fulbright scholarship and advised me to apply and leave the rest to Allah. I learned that I got the scholarship just a few days after my mother's death.

I got accepted to pursue my master's in the physics department at New Mexico State University, USA. As my sister told me, Allah played a crucial role and I found myself in the USA. I earned my M.Sc. in physics with full marks (distinguished score). As a result, the head of the department invited me to stay as a research and teaching assistant and follow my path to gain a PhD. It was great news for me. At the same time, I applied to earn a minor in electrical engineering. I earned my Ph.D. in quantum chromodynamics and my minor in optics in 1999. My life in the USA was not easy. I went through a major culture shock, as I grew up in a preservative family. In addition, I faced language barrier challenges. I had to stay at the beginning with a group of girls from a Muslim country, but it did not go well. Thus, I moved to live alone. Things were difficult. I had no friends and no family members who I could share happy and sad times with. However, slowly I gained good friends, and I am still in contact with them today.

In 1999, I earned a postdoc award at the Max Planck Institute in nuclear physics in Germany. I worked there for half a year. Afterwards, I returned to Gaza to fulfil a promise I made to my father when I left Gaza that I would come back after my graduation. During my time in Gaza, I established great links with a group of measurement systems at the University of Munich in Germany. I have a great bond with them. I ran common projects together to support the energy sector in the Gaza Strip. As a faculty member at the electrical engineering department, I published almost 100 referred papers and conference papers.

My research covers a broad spectrum and is aimed at developing technical solutions for the world of tomorrow. For example, I am working on innovative solar system problems, developing optical fibres for faster data transmission, and on optical sensors for more precise diagnosis of diseases. Moreover, I have made major contributions to studying wireless communication, optical communication, nonlinear optics, optical fibre sensors, magneto-optical isolators, optical filters, MTMs devices, biophysics, electro-optical waveguides, and numerical simulation of microstructural evolution of polycrystalline materials.

Further, I am affiliated with several professional bodies: I am an honorary member of the engineering syndicate (number 1), a member of the International Society of Muslim Women in Science (ISMWS), a member of the Organization for Women in the Science for the Developing World (OWSD) and the secretary general of the executive member of Palestinian chapter, and a member of the graduate women's society in the Gaza Strip. I am also a fellow for the Islamic World Academy of Sciences (IAS), ICTP senior fellow and fellow for the World Academy of Science (FTWAS), and the Arab region FTWAS-ARO.

I have demonstrated high leadership and administrative skills by initiating and developing the quality assurance unit and external relations at the Islamic University of Gaza. In addition, I am a member of selection committees for several scholarships and prizes, i.e., Ford, Al Fakhora, and Clinton. I have led several sessions at international conferences and I chaired the scientific committee for several conferences organised by the faculty of engineering at the Islamic University of Gaza.

I received international awards and recognitions, including a Fulbright Scholarship, DAAD short

study visit, Alexander von Humboldt-Stiftung Scholarship, Erasmus Mundus, and Distinguished Scholar Award, the Arab Fund Fellowship Program, Kuwait, 2017. I also earned several prizes including the Islamic University Deanery Prize for applied sciences 2010, TWAS medal lecture 2018 and ISESCO Prize in Science & Technology 2014, and the Dr. Sultana Nurun Nahar and Buroug Arrhman prize for "teachers and student prizes" in engineering 2017, Islamic University of Gaza Vice president office for research and graduate studies prize for having highest score in Gshcolar and RG Score for year 2017 and 2018, and An-Najah university best published paper in 2018 in the scientific journal. I is also coordinator for several projects including TEMPUS for promoting long life learning, and Al-Maqdisi to enhance collaboration with French partners and renewable energy 4 Palestine funded by APPEAR 2017 to promote women performance at electrical engineering department APPEAR funded by Austria.

I would like to say with all the establishments in my life, I have always faced difficulties and losses combined with pain. Life was never easy. As a citizen of Gaza, I had to face a war almost every year. Where Gaza is under severe attacks from the Israeli military with bombs and missiles. In 2010, I lost my dear father whom I could not say goodbye to because I got deported on my way to Gaza from Egypt leading me to not attend his funeral.

I would like to say that I only draw a small portion of my life which I thought might be inspiring for the young females.

Currently, I am a visiting professor at the material department at Imperial college, London. To the female scientist, I want to say, “Trust your skills and abilities, keep moving in the direction you set to fulfil your dreams, and you will either get near to realizing your dream or arrive to a place where you will set off a new dream.

Totally small personally big on my work in Gaza

Prof. Sultana N. Nahar
Dept of Astronomy, The Ohio State University,
Columbus, Ohio, USA
Email: nahar.1@osu.edu

Since October 8, 2023, I have been painfully stressed inside by the Israeli genocide in Gaza with daily loss of lives and brutal persecutions of Palestinian civilians both in Gaza and West Bank day after day for about three months. As I look at the pictures and read the news, I can not stop tears

and pray to Allah to please stop it. These events have damaged my over eight years of effort since 2015 for promotion of research and education in STEM in Gaza. Israel killed over 4000 students including the best female student. I don't know how many were part of my program. It takes considerable effort to get the focus to progress when the environment is insecure and anger from losses has be to suppressed. The impact of loss of my effort is a drop to total loss for the Palestinians, but personally it is a shattering big blow for me.

Being the single Muslim of the Astronomy Department, I am affected the most by the incidents in Gaza. However, I have found two members of Astronomy who are also deeply disturbed by the situation and came forward to express it on their own. Since OSU President's warning after the start of the conflict that no anti-Semitism would be tolerated, OSU has remained silence. DIC (Diversity and Inclusion Club) of OSU Astronomy Department shows extreme support and care for the sensitivity for various groups of diversity and inclusion, however it does not include or discuss on religious diversity, and hence no word has been said on the condition at Gaza at DIC session. I put out some current pictures of Gaza from the news media on the wall outside my office and after consultation with a faculty member of DIC committee, wrote a statement of my involvement in Gaza research and education, and impact on my work in Astronomy email listserv. To my surprise quite a number of Astronomy members responded expressing solidarity with the Palestinians. This report is based on that statement.

I have been quite involved with STEM education and research (ER) in Gaza since 2015. It is not easy to access collaboration with a program in Gaza. Israeli controls its activities. I had communications and a meeting in 2023 with two Engineering faculty members, Casey Harwood and Deema Totah, of University of Iowa, who were trying to go Gaza, get some contacts of Gaza universities, and possibly include me in their team. They along with faculty members of some other universities from the USA, the UK, Australia had started a program to give STEM workshops to students in Palestine. They did it in West Bank but Israel would not give them permission to do the same in Gaza. They wanted to continue the effort for permission. They knew my connection with Gaza from my article on Gaza published in APS newsletter (Vol 26, No 8, p.5, 2017). Gaza has been kept separated from the rest of the world. My student Zher Samak in Gaza told me their belief that the world does not care for them.

I started work with Gaza since 2015 when I met student Zher Samak from Gaza who was pursuing her Ph.D. in Physics in Cairo University with funding saved from her teaching at schools and saving of her parents. Zher enrolled to my course on atomic astrophysics and spectroscopy with computational workshops on R-matrix and SUPERSTRUCTURE codes at Cairo University at which I hold an Ad junct professor position. Zher was very confident, focused to her objectives, beautiful but very quiet with little smiles. She was the only student who would come to lectures and computational workshops with a heavy old laptop which would not connect to wifi. She performed very well even with her fever and I awarded her with some cash for a computer. With years of persecution and instability news in Palestine, I was unaware of any education beyond primary schools in Gaza. From Zher I came to know that education and research (ER) being developed in Palestine. Islamic University of Gaza (IUG) was the only institution which offered research scope and higher education beyond bachelor degree by of fering Masters degree in several STEM areas. Zher did her Master's at IUG. Higher quality research and higher degrees have been growing at IUG and other universities in Gaza.

Zher connected me to IUG in 2015 and I became part Gaza ER since then. I provided $43,000 of my saving to IUG and Al-Aqsa University for promotion of STEM programs in Gaza, and planned to add more. It took time and considerable effort to build up the programs. There is an IUG youtube video at https://www.youtube.com/watch?v=WoQLNGmFN2U
of an IUG ceremony on recognition in 2019 that I founded. Impact can be seen in the vedio where two young students, a male and a female, are describing how much inspiration they felt achieving knowledge and looking forward to working harder and gaining more. This video includes me for my virtual participation. I have been in Gaza newspapers number of times.

Figure 1. L: President Awadalla (2nd from right) and vice presidents with the STEM Recognition poster that I founded in 2015, M) Winners in STEM is being recognized, 2017. Winner with printed headscarf is Prof. Hala El-Khozondar. R) Winnere in STEM in 2019

As the Israeli bombing pounded on IUG, an unusual target for an attack, I wrote to IUG on October 10, 2023, three days after the bombing started on Gaza. Only four IUG members responded. Prof. Rami Morjan of Chemistry Department Wrote
”Dear Sultana
Thanks for your email and your kind feeling and wishes. What is going in Gaza is a real massacre, it is genocide, we lose our beloved every single min and they demolished thousands of homes. Even my home. University has been attacked twice today and their attack caused a huge damage. Please do whatever you can to drag the attention of the supporters of human rights to support my people and help to stop this crazy crimes
Regards Ramy”
Prof. Saeb Iwini of biology sent pictures of research lab shattered by bombing. He wrote
” Prof. Sultana N. Nahar,
Many thanks for your email and kind support. Yes, we are currently living under a severe attack from the occupation. Hundreds of people have been killed and the non-stop killing is on a large scale. The Islamic university has also been attacked and 3 buildings were destroyed..
One major concern in my life is my lab, the tissue culture and cancer research lab, which was damaged as attached in the photos. If we survive after these bad days, we hope to receive your support to resume our work.
Thank you once again for your kind support.
Yours Dr Saeb Aliwaini”
Prof. Hala El-Khozondar wrote:
” Dear Sultans,
The situation is very bad. We need international action to stop what is happening. The Israeli is committing a genocide attack on Gaza. We need your prayer ,
Thanks, Hala”

Pirof. Hala, a distinguished professor of Engineering at IUG, is the President of the ISMWS (Interna tional Society of Muslim Women in Science which I founded in 2010) chapter at IUG. She is a recipient of many national and international awards. Before she could inform her father about a prestigious international award she went to receive, he was killed by Israel.

Israel destroyed IUG with more bombs later. I had communications with two past IUG presidents, but don't know their whereabouts. I did not communicate with the current IUG president, Prof. Sufyan Tayeh, who did Ph.D. at Stanford University and was known as a top researcher within 2% in his field, was killed with his family by Israel on December 3, 2023.

IUG physics department participated in my global online course on atomic astrophysics and spec troscopy. I spent time with Prof. Nahar Ghossain of IUG Physics as he was working on to carry out independent research with his students, and created special account at the Ohio Supercomputer Center for his computations. He has not responded to my two emails. At my second email recently, only one IUG faculty responded. He is safe as he is living in Istanbul now.

I worked with Al-Aqsa University and met President Dr Kamal Al-Shrafi at the Dome of the Rock mosque compound when I went to Israel at the invitation from Weizmann Institute of Science in 2018. We discussed STEM programs. I gave him couple of Astronomy books for Al Aqsa University. I knew and met later Prof. Suleiman Baraka of Aqsa University in 2018. He did his Ph.D. in astrophysics in the USA but went back to Gaza to serve, but could not stay there due to oppressive life and returned to USA with a Fulbright fellowship to work at NASA. His family remained in Gaza. We remained connected for years while he in NASA and later in Canada. Within a year of his at NASA, he told me in a distressed discussion that his brother was shot dead by Israeli soldiers when he was standing 3 feet away. Suleiman worked on solar magnetic field at NASA and published the results. He was very much interested in giving a seminar at Astronomy, OSU and built up his webpage for it. I asked the seminar committee for it, but faculty who is in dynamics of magnetic field in the Sun, commented that Suleiman's research was not of interest to Astronomy Department here. So he was not invited. I have ISMWS members at Al Aqsa University with whom I communicate. I wrote to Suleiman and my other contacts at Al Aqsa University in October and recently. No one has responded.

Fig. 2 a) Meeting with Al Aqsa University President Dr Kamal Al-Shrafi on Dome of the Rock yard, b) Prof. Suleiman Baraka (on my right) of Al Aqsa University in Egypt.

I was part of the organizing committee of a Physics conference in Gaza and gave the ceremonial presentation in 2017. I waited for questions after my video presentation, but internet at Gaza was down. So a Physics professor spoke on my behalf. Al-Azhar University was also involved in the organization of the conference, but I watched a few days ago that Israel destroying

it with bombs. 2017 conference gave me an exposure of research going on in Gaza and I published the news article ”Science Research in Gaza in Palestine” in APS August/September 2017 Newsletter, available at
https://www.aps.org/publications/apsnews/201708/gaza.cfm
The news was highlighted at the APS website. Dr. Aaron Temkin of Goddard-NASA was (passed away several months ago) a strong orthodox Jew, non-compromising to Palestinians, but treated me nicely whenever we met. After reading my APS article he told me ”They (he meant Gaza) are all bad people. But these (he pointed to the article) are good people.”

My latest on-going work was with Dr. Salem Abu Musleh (coordinator for science in high schools) and Dr. Raid M. Suleiman of the Ministry of Education of Gaza for promoting STEM fields for high school students and teachers. My objective is not only promotion of STEM education and research, but also try to bring the anger of suffering of young minds to ER which can bring dignity, security from being attacked and happiness for them. Israel’s night air strikes killing Gazan has been going on for years. Zher told me having brothers and sisters in Gaza is a positive sign and means that even if some of them get killed by night air strikes, some others will survive for the consolation of the parents.

About Zher, I don’t know her current status. At Cairo University, she used to miss her family very deeply. I suggested visiting them once. She did not dare doing it mentioning the hardship she went through to get permission from Israel to go to Cairo University to fulfill her dream of getting the Ph.D. degree. She had doubt of return if she went for a visit. She prepared for the Ph.D. degree by studying in combination of rationed electric light and candle light, living with rationed water, rationed internet with limited news of the outside world and bad sewage system around. However, after a year or so at Cairo University she did go back, and her advisor Prof. El-Sherbani told me that she did not return to complete her Ph.D. I did hear from her once with a physics research question, but delayed to respond since it needed explanation. Later I forgot about it. I would like to go back to paricipate in rebuilding the STEM programs in Gaza.

I pray all Palestinians survive, lead lives that others enjoy, engage in knowledge and contribute, and the generation of children going through the genocide do not suffer from lifelong trauma.

Resetting the mind towards one goal

Noranizan Mohd Adzahan (PhD., P.Tech.)
Associate Professor
Department of Food Technology
Faculty of Food Science and Technology
Universiti Putra Malaysia

It was December 16, 2006. That morning, it snowed heavily. I was boarding a flight from the Big Apple, heading to a final destination on the opposite side of the globe, Kuala Lumpur. Upon arrival, I rested for a bit and reported for duty the next morning.

I am a food technologist who received training at a prestigious university in the United States. I was a dynamite, a person so driven in many ways and was in a 'conquer the world' mode. This mode is typical for those who have just obtained a PhD. I joined a public university as a young faculty, eager to share what I knew - Process X. No one in Malaysia knew Process X at the time and I was the pioneer. I was ambitious, I thought I knew how to spread the X to the local industry and let it be contagious among the people. I secured grants, did research, trained students, published papers, talked to those in the food sector, coached the authorities, educated equipment suppliers, and mentored young researchers, but then I realized that 10 years had gone by. Process X was not far from where it started, it was not a go-to process, and no progress was made. It has the potential to boost the industry but I have missed something and omitted an action to make it a wow factor. My X failed me. Or perhaps, I was not good enough to be heard. I was chasing fame and fame ran away from me. I paused and reflected on everything. I was angry, I cried, I became frustrated, I broke down and I questioned Allah. I questioned Allah and I questioned Allah and I questioned Allah. Bad manners, but Eureka!

There was one thing I did wrong. I questioned Allah, there you go! Who am I to question Allah? I was focusing heavily on worldly matters. I neglected 'wireless' time with Allah, skipped bonding time with my family and never had any me-time for this physical being (body) which was temporarily lent to me to do the greatest good. From that day, onwards I changed my strategy and put in the effort to conquer two worlds instead - this world and the better world after. Another decade passed by. The difference is... this time it was filled with many success stories! Process X is now in demand, alhamdulillah.

Nevertheless, the impact of process X is just like a tiny dot in the sky. Do I feel ashamed? Yes, because I was working hard for all the wrong reasons. This tiny dot in the sky will never match the impact made by the Palestinians. They are the real action-takers, the risk-takers and they are the ones who actually conquered the world. Both worlds, insyaAllah. Let's learn from them, especially from their mindset: istiqamah, persistence, tawakkal.

I have never written a poem in my life before. But let me try. This poem is dedicated to the Palestinians – children, women, men, elderly, the wounded, the displaced.

Distinguished Scholar Award, and the Arab Fund Fellowship Program, Kuwait, 2017. I also earned several prizes including the Islamic University Deanery Prize for Applied Sciences 2010, the TWAS Medal Lecture 2018, and ISESCO Prize in Science & Technology 2014, and the Dr. Sultana NurunNahar and Buroug Ar Rahman Prize for "Teachers and Student Prizes" in Engineering 2017, Islamic University of GazaVice president office for research and graduate studies prize for having the highest score in Gscholar and RG Score for the year 2017 and 2018, and in An-Najah university best published paper in 2018 in the scientific journal. I am also the coordinator for several projects including TEMPUS for promoting long-life learning, Al-Maqdisi to enhance collaboration with French partners, and Renewable Energy 4 Palestine funded by APPEAR 2017 to promote women's performance at the electrical engineering department APPEAR funded by Austria.

I would like to say with all the establishments in my life, I have always faced difficulties and losses combined with pain. Life was never easy. As a citizen of Gaza, I had to face a war almost every year. Where Gaza is under severe attacks from the Israeli military with bombs and missiles. In 2010, I lost my dear father whom I could not say goodbye to because I got deported on my way to Gaza from Egypt leading me to not attend his funeral.

I would like to say that I only draw a small portion of my life which I thought might be inspiring for the young females.

I am a visiting professor at the material department at Imperial College, London. To the female scientist, I want to say, "Trust your skills and abilities, keep moving in the direction you set to fulfil your dreams, and you will either get near to realising your dream or arrive at a place where you will set off a new dream."

There is only one goal
This goal will remain
No matter what comes in the way
The goal remains the same

Iman keeps us sane
It is the guiding light
Keep it close to you
For He knows the best

You have shown us so
What living with Iman means
In our duʿā each day
There you'll be

Phthalate ester plasticizers: a health hazard

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Phthalate ester plasticizers are extensively used in industries. There is widespread human exposure to phthalates which has raised substantial public concern due to its detrimental health effects. Processed and packaged foods are among the major sources of human exposure to plasticizers which migrate from plastic packing. Various food products sold in the market such as grains, dairy products, oils, drinks, fish, sweets, etc, have been shown to contain phthalates contaminants. These plasticizers are commonly found in human body fluids like blood, urine, saliva, amniotic fluid, breast milk and cord blood. Humans are mostly exposed to these plasticizers through the oral route, breathing and cutaneous absorption. Phthalates have been reported to cause toxicity to humans e.g reproductive toxicity, acting as endocrine disruptors, etc. Prior in vitro, studies have revealed that there is a significant decrease in the activities of some enzymes following exposure to phthalates. These plasticizers affect multiple organs by various mechanisms, such as DNA damage, oxidative stress by the formation of reactive oxygen species, lipid peroxidation, disruption of cell function, and also by changing the expression and activity of important antioxidant enzymes.

Research performed in my lab has shown that various phthalate ester plasticizers bind to human salivary aldehyde dehydrogenase (hsALDH) and inhibit its activity to a significant extent (Ahmad et al., 2021). Di-2-ethylhexyl phthalate was the most potent inhibitor among the plasticizers tested (IC50 value: 0.48 μM). They induced structural changes in the enzyme, and computational analysis revealed that these plasticizers bind stably in the proximity of the hsALDH catalytic site. HsALDH is a very important detoxifying enzyme in the body and appears to be the first line of defence against exogenous toxic aldehydes entering the body through the oral route, besides detoxifying the endogenous aldehydes. Since exposure to phthalate plasticizers inhibits hsALDH, these plasticizers are expected to increase the risk of aldehyde-caused toxicity including oral carcinogenesis, and to adversely affect the oral health of an individual. Therefore, there is a need to assess the safety of packaged food items where phthalate ester plasticizers are utilized in the packaging.

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Impact of COVID 19 on Women

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ABSTRACT

We present the preliminary analysis of gender specific impact of COVID on human life. The role of woman in society is an effective cultural parameter to compare and contrast the behavior of various communities. The survival rate of COVID may not be distinguishable in the reported data but considering other cultural factors, the analysis of data requires to incorporate social behavior and cultural responsibilities. Women faced much more family violence, depression due to loss of job and other long-term family issues.

COVID 19 was caused by a type of corona virus, SARS COV 2 and started to spread all over the world in an uncontrollable way. It was so widespread that world entered in to pandemic and the social life was shut down. However it has been under control for quite some time now. We have accepted the presence of SARS2 in our life like several other deadly strains of corona viruses. So we have officially declared that the pandemic is over, whereas some of the preventive SOP are still accepted as a part of our life. It could never be wiped out, though controlled through vaccination and other methods. Additionally, healthy immune system of human beings are able to develop some resistance as well.

COVID can still attack human beings with modified symptoms or unknown effects. It may still be totally unexpected due to its changed symptoms and the understanding of the behavior of virus and its impact on human body is yet incomplete. It keeps on attacking but the related diseased may appear in a different way. SARS 2 infection is sometimes discovered as a surprises and its long term impact on human body is added permanently to medical science. It has been noticed that the pandemic has affected the social structure, family bonding, educational needs and to some extent the approach towards life.

Since all the reported data with different sources from various countries has been compiled and analyzed by various agencies and is available as free internet resources. All this data is comparable in most cases, especially the calculation of death rates for various age groups based on pre-existing medical conditions is comparable to the statistical error. However, the social impact or contribution of social and cultural background is not analyzed so well.

Before looking at the demographic data or getting into its interpretation, it is important to note that the COVID has been spreading out like a wild fire in a particular way (see for example: Masood, 2020) and all data was reported by international organizations. Keeping the details of the information about how it does transmit among human beings, it becomes easier to interpret demographic results. We need to keep in mind social role of men and women and their cultural responsibilities or expectations.

Available data relates the effect of COVID to brain functionality. There are a few reviews on this topic in literature (See for example: Reiss, et al 2023). They have used data from various internet sources (including COVID 19 Research Consortium). United Nations have performed some data analysis based on gender based data from US only. Women study wing (UN Women Study dashboard 2021) has performed some study of data regarding women in United States: including World Health Organization has collected exclusive data (WHO COVID 19 dashboard 2022)

Based on the available data on various websites, a few things can easily be noticed that the women also faced violence during pandemic in addition to disease itself. UN Women study dashboard (UN Women Study dashboard: 2021) has indicated some data on this issue. This small data does not seem to be enough to really derive results. However, we cannot ignore the fact that this data may not be fully reliable everywhere. Several highly populated countries do not report this data at all. In short:

·We do not have clearly specified gender based data from every country, especially ones with distinct cultures.

·We cannot ignore the existence of certain communities in various countries which can always skip to report any information about women, especially their suffering from disease, their treatment or reporting their death.

·Communities with lack of connection with the rest of the world did not get much information to protect from the disease.

·In developing countries, the under-privileged communities did not get enough testing facilities or other preventive efforts.

·These under-privileged communities do not provide the correct data as well.

It is also to be noticed that

·In Muslim communities, women wear hijab and are not exposed to general public on regular basis. On the other hand, they have more chances to get infected while helping their family members suffering from COVID, especially small children.

In villages and in developing countries, women do more work in fields and have more chances of catching the virus in groups, especially due to lack of information or enough education.

·COVID impact is associated with drug use as well. Women have relatively less chances of drug addiction as compared to men in most of the countries

.

Regardless of the above factors, social and cultural responsibilities are not equally shared be all genders, one way or the other. Women generally have stronger family ties and establish a stronger relationship with children. This statement may not be as true as it is for Asia and Africa. Therefore

when COVID hit the male-dominated cultures COVID faced a lot more ignorance, lack of treatment and even family violence a little above normal (Kharroubi and Harake, 2021). This information is related to western societies. Much more than this is expected in the third world countries. We only mention a few points to be incorporated carefully while discussing the impact of COVID on women.

At this point we just bring up a few considerable fact to thoroughly discuss this impact-

·More women have to sacrifice job to take care of their children during COVID and could not get back to work at the same time.
·Women had to fight depression for a longer period due to their family responsibilities. They usually take more stress and get frustrated a lot due to limited support system.
·Lack of information and lack of general education is common in several cultures and ignorance is a part of their culture.
-Increased family violence due to lockdown and frustration brought up by COVID has aggravated while the limitations of support system has additional impact. Cases of violence are not reported everywhere. So the data is not even easily reliable.

It is therefore safely concluded that regardless of physiological differences in different genders and considering the above mentioned points there is a lot more work still to be done in this direction. A more detailed study and the collection of some missing information is needed to be collected locally to even access the relatively reliable data.

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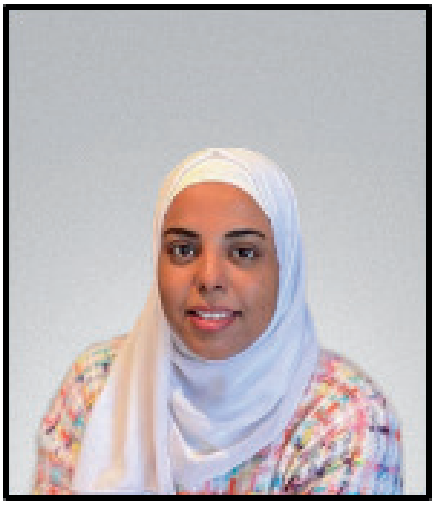

Continuing research without a position and fund

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B.Sc. (Damascus University, Syria)
MSc. (Nuclear physics, Cairo University)
Ph.D. (Nuclear physics, Cairo University)

I will pass to you in this article the three magic words which will keep you in the research field without funds or a job. To pursue scientific research, one must possess two crucial qualities: patience and passion. These qualities should stem from deep inside of you. This depends on your faith and conviction that the effort put forth is a pure dedication to God Almighty, so no one can affect you negatively during your journey. When you believe that you will be rewarded in the afterlife. As a Muslim, it is a continuous duty to strive and persevere.

Since high school, I have consistently been at the top of my class and ranked among the top ten students in Hodeidah city, my hometown in Yemen. Initially, I received a scholarship from the Ministry of Higher Education in Yemen to study pharmacy abroad, but my passion for nuclear physics led me to change my field of study to physics at the Faculty of Science, Damascus, Syria. I excelled during my BSc. studies at Damascus University, which enabled me to apply for a second scholarship to pursue a master's degree in nuclear physics. As this field was not available at Damascus University, I requested the Ministry of Higher Education in Yemen to change my scholarship country to Cairo University, Egypt. Because of my outstanding academic performance and unique expertise, they agreed to change the country to Egypt, where I completed my MSc. and PhD degrees, both in nuclear physics.

I earned a doctorate in nuclear physics in March 2020. Although my financial support ended upon completion, my scientific passion endured. Over the past three years, I applied to over 200 educational and research institutions in and outside Egypt. Despite my impressive resume and published international manuscripts, securing a stable job remained elusive. Nevertheless, I persisted. I maintained strong connections with Frank Laboratory of Neutron Physics, FLNP, Dubna, Russia Federation where I conducted measurements during my doctoral studies and continued working with them in several proposed research relating to my Ph.D. research. I think Now the third word is clear, connections!

I search for institutes that conduct research similar to what I do. I diligently followed the newsletters of these institutions, the announcements of upcoming conferences, calls for proposal submissions, summer school etc. In each call for proposal, I seize the opportunity to apply innovative proposals. Some of them were refused and some of them had been accepted. When

the proposal was accepted, they offered to conduct the measurements in their labs and then the main problem was solved because the experimental measurements were always expensive and the reason behind not proceeding in any experiment.

Through these newsletters, I learned about conferences. Attending those conferences is also another cost, but Partial or total financial support was occasionally provided, although the competition for such support was fierce and reserved for outstanding research. It is crucial to craft compelling research that adds value to conferences. For instance, at a recent conference this year at the Joint institute for Nuclear Research, Dubna, Russia "29th International Seminar on Interaction of Neutrons with Nuclei, May 29th- June 2nd, 2023", I presented a unique follow-up assessment for a previous research in the same studied area. Pursuing such research is both distinctive and vital. As a result, I received financial support covering the conference fees and the accommodation, but I had to cover travel expenses. Attending the conference allowed me to network with scientists and gain valuable knowledge for my job search. You will be surprised how much most of those scientists are humble and ready to help. The benefits of attending conferences are clear: maintaining relationships with scientists and institutions and staying updated on the latest research developments. I also sought out non-profit organizations supporting researchers, and my involvement proved beneficial. For example, I joined the WIN-global organization, a non-profit organization of women working professionally in various areas of nuclear energy and radiation applications. I learned about an upcoming conference in Aswan, Egypt "the 30th WIN Global Annual Conference in Aswan, Nov 12-16, 2023", with limited financial support available for relevant research. I submitted two unpublished abstracts, which were well-received, earning me financial support for the conference, covering my travel and accommodation expenses, along with a discount on the conference fees. Attending this conference marked another milestone in my scientific career, as I connected with professionals in the nuclear energy field, broadening my knowledge and acquainting myself with institutions sponsoring international conferences and offering educational courses. These experiences expanded my understanding, improving my prospects for future employment. Notably, I established connections with WIN members who promoting the COP 28 conference in Dubai, UAE. Although initially I was disinterested, I became eager to attend after learning from them about the planned activities during this global conference. I could not get financial support for this conference but at least WIN-global provided me permission to access the Blue Zone as an observer, Which made a big difference in my future professional career. With my own savings and support from my husband and a dear friend of mine, I attended the conference. During this COP 28 I had the opportunity to attend significant scientific lectures in the field of nuclear energy and interact with esteemed individuals, providing an invaluable academic experience.

My greatest scientific gain was changing the way I search for work. My focus was only on job opportunities in universities and research centres due to my academic doctorate. However, Rafael Grossi, Director General of the International Atomic Energy Agency words influenced and altered my approach. He said, "Nuclear scientists have agreed and now is the time of industry". Thus, I will develop my skills in this field and attempt to enrol in the necessary training courses to fulfil the requirements and be able to work in any nuclear facility. I started by attending INSEP Webinars for International Safeguards Professionals and reading in the field of safeguard professionals. I still do not know where

this will lead, but I know where I should start. I have no problem returning to school, attending classes, and performing assignments to develop myself and achieve my goals. If the pursuit of knowledge is the path of the prophets and their followers, then I am on their path.

Fig L ISINN-29, JINR,DUBNA,RUSSIA,2023 R. COP-28, DUBAI, UAE, 2023,

My Journey and the "New Normals"

Alvia Farheen
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President of ISMWS Student's Chapter,
APJ STEM ER Center of OSU and AMU, India

I am honoured to be a part of An-Nisa and writing to readers from Prominent Scientific Communities. I am a Masters student in Zoology, Faculty of Life Science, Aligarh Muslim University, as well as Bayers-MEDHA Fellow under BCKIC, Bayer Foundation, India (2022-24). Some of my current work (in the year 2023) under Section of Fishery Science and Aquaculture, Department of Zoology, AMU, India include;



Fig.L & M: working in Fishery Science and Aquaculture Lab, AMU R: Induced Breeding in Fish under Skill Development Programme, Department of Zoology, AMU

While I was pursuing my Bachelor's degree, I had no idea that suddenly everything will come to a halt. The COVID-19 pandemic drastically altered the course of our lives. However, it couldn't take away the hope and people found ways to survive and life kept going. Finally, we overcame it and things got back to the old normals.

The greediness of human kind is something that can never be eliminated from the society. We take so much from nature, use it indiscriminately, and ignore the negative impacts that these anthropological activities put on the environment. Considering and reading about these I decided to write a review article that summarized the COVID-19 outbreak, its pathogenicity, and the ongoing anthropogenic activities which kept on harming the environment as well as disrupting the human social setup.

https://www.irjmets.com/uploadedfiles/paper/issue_1_january_2022/18236/final/fin_irjmets1641568011.pdf

An influenza-like disease caused by a group of positive sense single-stranded mRNA known as SARS CoV-2, was given the name COVID-19. Transmission is known to occur via respiratory droplets or microdroplets as the primary transmitters of the virus from face-to-face contact or air, and to a lesser degree via contaminated surfaces.

Although the death rate throughout the globe was similar, developed countries suffered less loss as compared to poor countries in terms of having better infrastructure and emergency service availability and accessibility. Global economy was influenced contributing towards deteriorating condition of nations. It was observed that those who got affected included young children, old age people, unemployed people, or those already suffering from some health ailment or having weak immunity. Withal the mental health of people was severely hit because of the lockdown restrictions and the fear of contracting the disease where lack of awareness was one of the reasons for growing anxiety.

Ecosystem is not left behind from being afflicted with the impacts of COVID-19 related lockdown. Air pollution is brought down, however, microplastic pollution caused as a result of disposal of PPE, surgical masks and gloves has grown posing threats to aquatic life. Though lockdown intended to safeguard people, it failed to protect trees as in the absence of proper management, deforestation and intensive agriculture showed a two fold increase.

The COVID Pandemic created parameters of "New Normal" which the mankind could never have thought about. Similarly, the ongoing situation in Palestine has become another "Normal" for the world in these 81 days and counting. I hope that the people find their strengths and the sufferings of our brothers and sisters come to an end

Success Story of Mahbuba Aktary

Mahbuba Aktary
MS Student
Department of Materials Science and Engineering
King Fahd University of Petroleum and Minerals
Saudi Arabia

In the name of Allah who is the most merciful and beneficent.

I would like to express my gratitude to “The International Society of Muslim Women in Science (ISMWS)" and sincere best wishes to you all with the launch of An-Nisa, presenting wonderful women in STEM.

I graduated in Physics from Begum Rokeya University, Rangpur, Bangladesh in 2022 and am now studying MS in Materials Science and Engineering at King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia.

Since my childhood, I used to think a lot about various phenomena of nature. I used to try to find answers to "What, why, how?". When I started getting into science in high school, I felt that I had found the right place. After that, my experience as a physics student at the university made me more curious. My two teachers have always inspired me despite limited opportunities and many limitations. Professor Ismita Tasnim was the artist who drew the first stroke of paint in my mind to paint my dream. She sowed the seeds of dreams in me. And Professor Md Kamruzzaman was the hero who helped me to materialize the dream. Now I do believe in the power of words. Now I realize how a teacher shapes students’ thoughts and activities. As a student in the newborn department of a developing country (in Bangladesh), I struggled with a lot of issues such as limitations of laboratory instruments and poor research facilities. But I never stopped dreaming. I am learning with global scientific communities and trying to grow up with different organizations. When I attended "Atomic Astrophysics and Spectroscopy" course offered by Professor Sultana N. Nahar of the Astronomy Department, The Ohio State University, USA for global participants in 2021; I was impressed by her personality and was motivated highly to follow up my research Interest. Her course opened a new door for me. I got a chance to build and expand my network with global students and Professors, which is helping me to go ahead. As one of the global students of Professor Sultana N. Nahar’s class, I was inspired to apply to KFUPM in the MS program. Alhamdulillah! I got accepted and I am here now. I am grateful to Allah for opening that window for me. I am grateful to my father too, he is always a supportive and inspiring person to me.

Here I would like to mention some of the organizations with my position:

1. Member of Materials Research Society (MRS)
2. Member of The Royal Society of Chemistry (RSC)
3. Member of American Physical Society (APS) APS Account No. : 62105826

4. Member of the International Society of Muslim Women in Science (ISMWS)
Reg. No. : ISMWS004MA
5. Member and Content Writer at “Jamal Nazrul Islam Astronomy Club, JUST”, Bangladesh
6. Vice-President at Begum Rokeya University Science Club (BRUSC), Rangpur, Bangladesh

I would like to mention the name of the conferences which I have attended

1. "APS March Meeting 2023" American Physical Society (APS). Las Vegas, NV, USA.
“Screen the mechanical and optoelectronic properties of NbFeTe2”: A DFT study: M. Aktary, M. A. Helal, M. N. H. Liton, M. Kamruzzaman, and A. K. M. Farid Ul-Islam
2. "International Conference on Physics-2022" (ICP-2022) - Bangladesh Physical Society, Atomic Energy Commission, Bangladesh. May 2022. Co-author: “A Systematic Study of Structural, Electronic and Optical Properties of MoTe2 in Bulk and 2D Monolayer Structures”: M. Kamruzzaman, M. Khuku Moni, M. Hossain, M. Aktary
3. "International Conference on Physics-2022" (ICP-2022), Bangladesh Physical Society, Atomic Energy Commission, Bangladesh. May 2022. Co-author: “Synthesis and Characterization of Strong Light Absorber Cu2AgS1-xSex Thin Films for Solar Cell Applications”: M. Kamruzzaman, A. J. Pritha, D. S. Popy, R. Afrose, M. Aktary
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5. "APS March Meeting-2022" American Physical Society (APS), Chicago, IL, USA.
“A Comparative Study of Mechanical, Electronic, Optical, and Photocatalytic Properties of CsPbX3 (X= Cl, Br, I) by DFT Calculations”: M. Aktary, M. Kamruzzaman, A. J. Pritha
6. “National conference on Physics-2021” Dhaka, Bangladesh.
“Strategy of improving photovoltage and efficiency of FeS2 based heterojunction solar cell through absorber, buffer and window layers optimization with SCAPS-1D software”: M. Kamruzzaman, M. N. H. Liton, M. A. Helal, R. Afrose, M. Aktary
7. “IEEE Computer Society Bangladesh Chapter Summer Symposium-2021”. “Hole Conductivity Exploration in Multi-functional Zn1−x-ySbxAgyO”: M. Aktary, M. Kamruzzaman, M. A. Helal, M. N. H. Liton, R. Afrose and M. Rahman
8. "International Conference on Physics-2020" (ICP-2020) Bangladesh Physical Society, Atomic Energy Commission, Bangladesh. Mar 2020. "N-type to P-type conductivity insights in Ag and Sb doped ZnO for electronic and optoelectronic applications" : M. Aktary, M. Kamruzzaman, M. A. Helal, M. N. H. Liton, R. Afrose, U. M. Linza and M. Rahman
9. "International Conference on Physics-2020" (ICP-2020) - Bangladesh Physical Society, Atomic Energy Commission, Bangladesh. Mar 2020. Co-author: Comparative Study of the Structural, Electronic and Optical Properties of Cu and Cu-Ag Doped P-type ZnO for Solar Cell Applications: U. M. Linza, M. Kamruzzaman, H. Shaikat, M. A. Helal, M. Aktary, R. Afrose, M. Rahman and M. N. Liton
10. The 3rd "International Conference on Physics for Sustainable Development and Technology" (ICPSDT-2019) - Department of Physics, Chittagong University of Science and Technology, Bangladesh Dec 2019. "Insight into the Mechanical Stability, Electronic and Optical Properties of BaMO3 (M=Ti, Zr) Using First Principle Calculations": R. Afrose, M. A. Helal, M. Kamruzzaman, M. Rahman, T. K. Anam, and M. N. H. Liton, M. Aktary

11. Joint ICTP-IAEA International School on the Physical Basis for Radionuclide Migration (Storage disposal and contamination sites) | (smr 3751) – The Abdus Salam International Centre for Theoretical Physics (ICTP).
12. "Career Development Workshop for Women in Physics | (Smr 3614)" (17 - 19 November 2021) organized by "The Abdus Salam International Centre for Theoretical Physics (ICTP)", Italy.

My research publications:

1. M. Aktary, M. Kamruzzaman and R. Afrose., RSC Adv., 2022, 12, 23704-23717. https://doi.org/10.1039/D2RA04591E
2. M. Aktary, M. A. Helal, M.N.H. Liton, M. Kamruzzaman, A.K.M. Farid Ul Islam, S. Kojima, Computational Condensed Matter,2023, 34, e00788.
https://doi.org/10.1016/j.cocom.2023.e00788.

· **Achievements & Awards:**

1. Winner of the DLS Travel Award, APS March Meeting 2022.
2. Best Poster Presentation Award at 3rd "International Conference on Physics for Sustainable Development and Technology" (ICPSDT-2019) - Department of Physics, Chittagong University of Science and Technology, Bangladesh, Dec 2019.
3. Bangabandhu Merit Scholarship 2020, 2021, and 2022 for academic excellence in Physics.
4. "National Science and Technology" Fellowship Award 2022, Bangladesh.
5. Second position in the research-based course "Atomic Astrophysics and Spectroscopy with Computational workshops on the SUPERSTRUCTURE and the R-matrix codes -II" Lecturer: Prof. Sultana N. Nahar. Global Participation, Support: OSU-USA, OSC-USA, AMU-India, 2022.

Please keep me in your Prayers, Du'a and best wishes. May Allah bless you all in the most beautiful ways. Ameen.

Fast Radio Bursts as Astrophysical and Cosmological probes

Afifa Jamal
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Aligarh Muslim University, India
A Jamal, a recipient of NIUS fellowship, is carrying out this research at GMRT-National Centre of Radio Astrophysics, TIFR, Pune.

Fast Radio Bursts, once considered bogus and comically known as the 'Fake radio bursts' have come a long way to being one of the most promising astrophysical transients for astronomers in

recent times. After its discovery in 2007, the known population of FRBs have only increased at a steady pace and has become one of the emerging posts for further research and discovery in the field of astronomy

With the increase in observations and recent developments that have shed light on new aspects of the FRB phenomenon, FRBs have promising prospects to be used as astrophysical and cosmological probes. India too has achieved great feats in this particular field of radio astronomy with its Giant Meterwave Radio Telescope (GMRT), a state-of-the-art facility established as a part of the National Centre of Radio Astrophysics (NCRA), TIFR. GMRT consists of 30 fully steerable gigantic parabolic dishes of 45m diameter each spread over distances of up to 25 km.

NCRA-GMRT is currently working on the Spotlight project with The Centre for Development of Advanced Computing (CDAC). It is a project for developing an HPC facility with PetaFlop computing capacity for conducting a real-time commensal search for Fast Radio Bursts (FRBs) and pulsars with the GMRT and is funded under the National Supercomputing Mission (NSM). Here at NCRA as a NIUS (National Initiative on Undergraduate Science) fellow, I am currently working on the post-detection part of the spotlight project. We are synthesizing algorithms that would make the analysis of a general FRB pulse completely automated. It includes DM optimization, Spectral RFI mitigation and much more.

Fast Radio Bursts (FRBs) are short-duration astronomical radio flashes of extragalactic origin. They produce immense amounts of energy in a short period of the range of milliseconds. Currently, there are two types of FRBs known, repeaters and non-repeaters. Out of the 600 known FRBs, only 4% of them are repeaters. Repeaters are narrower in bandwidth and wider in time compared to one-offs. FRB pulses show much larger dispersive delays and sometimes show characteristic time-frequency drifts, even after de-dispersion.

Possible sources of FRBs and their emission mechanism are however still under great scrutiny and a field of active research. However, some possible hypotheses have been proposed that are widely accepted.

These include possible progenitors such as star emission (both from isolated and binary systems), winds in ultra-luminous X-ray sources (ULXs), compact object mergers (neutron stars, white dwarfs, black holes), active galactic nuclei (AGN), and superconducting cosmic strings. Among them, only a non-destructive process capable of producing bursts separated by seconds, minutes, and even years can explain repeaters.

Even though the source population and mechanisms are not currently fully understood of FRBs as is the case for the pulsars, they can still be used as powerful astrophysical probes. Following are their key uses and what might be possible in the future.

1. Finding the missing baryons
The exciting potential of a population of radio bursts at cosmological distances as probes of the ionised intergalactic medium were originally predicted before FRBs by Ginzburg (1973). An

important application of such a population would be to carry out a census of baryons in the Universe. As has been subsequently developed, and described in detail in PHL19, by subtracting both the expected Milky Way contribution (DMMW) for a given line of sight and the contribution from the host galaxy (DMhost), each FRB provides a measurement of the electron content from the intergalactic medium along a given line of sight using the Macquart Relation which shows the DM-z(redshift) relation

2. Cosmic rulers

The dependence of ⟨DMIGM⟩ on various cosmological parameters highlights the value of a well-determined set of FRBs with redshift measurements in contributing to precision cosmology. Recently a sample of FRBs was used for a likelihood analysis to measure Hubble's constant H0 = 62 ± 9 km s−1 Mpc−1. It is forecasted that a sample of 500 FRBs with redshift determinations expected to be available in the coming decade will be able to determine H0 to a precision of a few per cent or better.

3. Reionization History of the Universe

After recombination took place in the early Universe around redshift z = 1089, the intergalactic medium was fundamentally changed during the epoch of reionization as free electrons were liberated by ultraviolet radiation from stars and quasars in the redshift range 6 < z < 13 for HI and HeI. Due to the direct relationship between DM and electron density, cosmological FRBs offer new ways to probe these still poorly understood processes.

Fig1. GMRT control room: all the monitors display the coordinates and relevant data of the sources like quasars, pulsars etc. and information on the radio pulses and RFI.

Fig2. **Left**: Antenna C3 of GMRT-NCRA, shows the dipoles and the receiver **Right**: Antenna C4 GMRT-NCRA, shows the entire structure. The base consists amplifiers and modulators.

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Fundamental Building Blocks of Nature-An Introduction to Quantum Field Theory

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What do you think are the fundamental building blocks of Nature?
Some of you might say that everything is made up of atoms, some may conclude atoms are composed of electrons, neutrons and protons.
Some of the perceptive ones among you might have figured out that indeed neutrons and protons can be divided further into more fundamental particles called the quarks.
Whereas, the electrons are indivisible fundamental particles.
We have two types of Quarks—

- **UP Quark**
- **Down Quark**

and we are made up of these fundamental particles—these two quarks and the electron.
The proton consists of 2 Up Quarks and 1 Down Quark, whereas the neutron consists of 2 down Quarks and 1 Up Quark. It turns out that according to the best theories in Physics, which tend to explain most of the real phenomenon around us, particles aren't the basic fundamental blocks of Nature.
Indeed there is something more abstract, which we consider to form the base of everything , that is a—FIELD.

Yes, Quantum Field Theory suggests that everything around us in nothing but just the simulation of field in different possible ways.

Firstly, **What is a Field?**

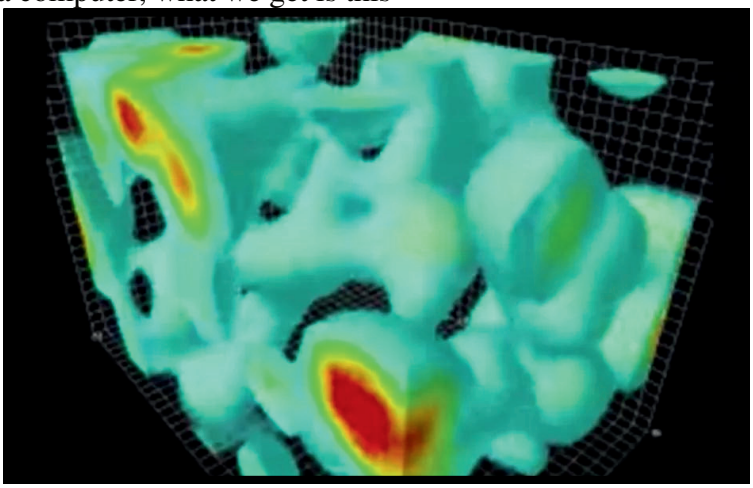
In simple terms, you can imagine it to be a fluid like substance spreading out across space, which has definite values at each point in the space and moreover these values can change with time.

This abstract idea of FIELD was first put forward by Michael Faraday, where he visualized the concept of electric and magnetic fields. I think maybe you are not convinced about the idea how fields could be the basic building blocks of Nature.so, to understand it better, Let's visualize an experiment :-

Suppose that you have a box and you take everything out of it, you completely rip the box off anything that's within it—What's left in the box?

Well, you are left with NOTHING or more precisely you have created a state of VACUUM.

So, we assume that there mut not be anything inside the box , but when we observe the simulation of such a box using a computer, what we get is this-



QUANTUM VACCUM FLUCTUATIONS

This is nothing but the Quantum Field at it's action, even though there aren't any particles inside the box.We call these as Quantum Vacuum Fluctuations, which was even significant before there were any of the particles in the universe. So, electron field is like a fluid that is spreads out across the entire universe and the ripples of waves of this fluid tied up in little bundles of energy, governed by the laws of Quantum Mechanics, is what we call the electron particle.

Basically, particles are nothing but just the manifestation of these fields.

Later on we found out that we have more fundamentals particles(or fields) than we had thought of

There are particles such as muons and tau which have the properties exactly similar to electron, the only difference lies in the point that there are heavier.

A muon is around 200 times heavier than an electron.

Similarly, we have neutrinos, the particles which do not interact much, but play significant roles in some other parts of the Universe such as the SUN. Four of the more quarks were being identified, giving a total of 12 fundamental particles-

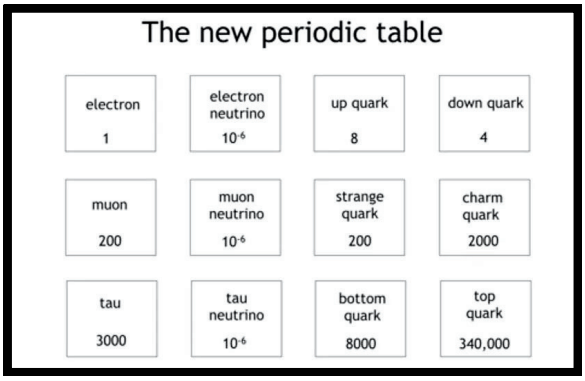
1.Electron

2.Muon

3.Tau

4.Electron Neutrino

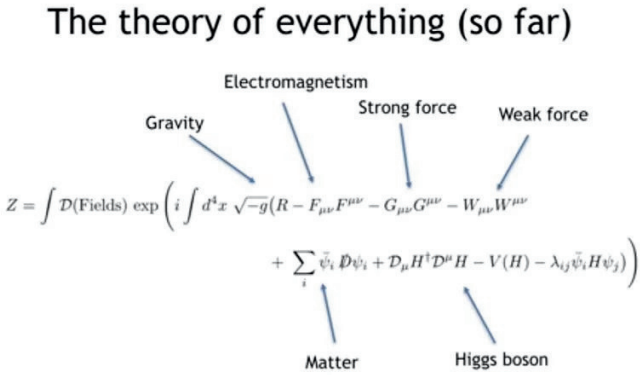
5.Muon Neutrino
6.Tau Neutrino
7.UP Quark
8. Strange Quark
9.Bottom Quark
10.Down Quark
11.Charm Quark
12.Top Quark



These fundamental particles come under the theory of, what is called the Standard Model.
These 12 fields interact with each other through 4 forces- Gravitational force, Electromagnetic Force, Strong Nuclear Forces and the Weak Nuclear Force.
Again, all these forces are associated with field. We are familiar with the two of them- The gravitational field and Electromagnetic field. Then, there is gluon field associated with Strong Nuclear forces and W and Z boson field representing the Weak Nuclear interactions. There have been numerous attempts to unify all these fundamental forces of nature.
Let us see what we have until now-

$$Z = \int \mathcal{D}(\text{Fields}) \exp\left(i \int d^4x \sqrt{-g} (R - F_{\mu\nu}F^{\mu\nu} - G_{\mu\nu}G^{\mu\nu} - W_{\mu\nu}W^{\mu\nu} + \sum_i \bar{\psi}_i \not{D} \psi_i + \mathcal{D}_\mu H^\dagger \mathcal{D}^\mu H - V(H) - \lambda_{ij} \bar{\psi}_i H \psi_j) \right)$$

This equation just right here depicts every possible experiment that we can perform on the Earth. There is no science experiment which we will ever come up with, which cannot be described by this equation. Let's break down the equation-



Solving this equation will provide us with the solutions for all the experiments ever conducted OR could be performed in the history of Humanity.
With all the math we have developed we are not able to solve the above equation.
Moreover, We could possibly explain all the experiments on Earth, but what about the events happening around the Universe.What about the particles which we have no clue. The concepts like Dark Matter, Dark Energy and Why is there more Matter than Anti-Matter keeps puzzling the physicists till date. Moreover, there are no fundamental proofs and evidences in the support of the String theory, which attempts to unify all the fields and forces. There is also the theory of Super—Symmetry.After the discovery of Higgs particle at Large Hadron Collider, physicists expected that we would be able to discover more fundamental particles. But, none of that happened.We are still far behind to achieve something as such called the *"Theory of everything"* We need to go back and look once again at the assumptions and paradigms that we have been holding up for years!

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My Journey of Scientific Passion into the Depths of Neuroscience and Psychology

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The human body and mind has always fascinated me, particularly the mechanisms behind them. I've always been curious about how the brain works and its consequential effect on human behavior. The questions of why we think, feel, and behave the way we do ignited a flame of curiosity within me. To satisfy my curiosity, I turned to the internet and discovered the field of neuroscience. As a young student, I was always drawn to the mysteries that lay within the parameters of the human brain. It was during my biology classes that I first encountered the wonders of the nervous system and the intricate network of neurons that serves as the body's communication system. This was the spark that fueled my scientific interest and set me on a path of exploration into the realms of neuroscience. I became increasingly interested, and science soon became my favorite subject, especially biology. My keen interest in STEM field encouraged me to excel in my studies as well as I began to study my science textbooks even before they were taught in class. It invigorated a sense of perseverance and resilience in me. I started to surf the internet for information beyond my textbooks.

I became increasingly curious about neuroscience; hormones, neurons, and the workings of the brain - everything fascinated me and led me to dig deeper into this field. I got pushed into a rabbit hole when I delved deeper into the subject. Studying about neurotransmitters, Neuroplasticity and the neural network of the brain became my favourite activity. It led me to a path of critical thinking and influenced my thought patterns. As I was growing up, I became intellectually captivated by biology and neuroscience. The complexity of the human brain never ceased to amaze me, and I was always eager to learn more about it. Through my studies, I gained a deep understanding of my actions and behavior and was able to manage my daily life more effectively.

My interest in neuroscience helped me navigate through the intricate human mind and have a better understanding of the complexities of the brain. This was especially helpful during my teenage years, which are often said to be the most formative period of one's life. By learning more about the workings of my brain, I was able to become more self-aware and manage my physical and mental health more effectively. In particular, my interest in neuroscience led me to the field of psychology, which helped me to give meaning to what I had learned. I decided to pursue a career in psychology so that I could use my knowledge to help others manage their lives and thoughts, just as I had done for myself. To this day, I still enjoy reading research papers and articles in the field of neuroscience, as I believe that there is always more to learn about the workings of the human brain

Epigenetics and Cancer

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There have been notable strides in comprehending cancer's biology and molecular pathogenesis. DNA is vital in the processes of replication and transcription, necessitating the maintenance of genetic stability for viability. Even before the discovery of the double helix in 1953, it was established that external agents, including X-rays, ultraviolet (UV) light, and various chemicals, can cause genetic alterations that may foster cancer. Unfortunately, cancer remains one of the primary causes of death worldwide. Mutations are advantageous to evolution as a source of genetic diversity and natural selection. However, genomic instability can have deleterious effects on age-related diseases such as cancer. Mutations may arise from the inactivation of DNA repair pathways or due to genotoxic stress from cellular processes, such as transcription and replication, that overwhelm high-fidelity DNA repair even in a repair-competent environment. DNA-repair pathways, such as base excision repair, nucleotide excision repair, mismatch repair, non-homologous end joining, and homology-directed repair, play an essential role in preserving genomic integrity. Epigenetic modifications entail inheritable yet potentially reversible changes in gene expression due to alterations in DNA methylation and histone modifications, among others, unlike genetic changes that include mutations in the DNA sequence. Tumor cells exhibit various types of genomic instability, including chromosomal instability, such as copy number variation and aneuploidy, microsatellite instability, manifested by the expansion or contraction of repeated microsatellite sequences, and clonal base-pair mutations. Thus, genome instability can be defined as an enhanced tendency for the genome to acquire mutations; ranging from changes to the nucleotide sequence to chromosomal gain, rearrangements, or loss.

New research in epigenetics has shown that cancer cells in humans have a lot of epigenetic abnormalities, as well as genetic changes. These genetic and epigenetic modifications work together at every stage of cancer growth to encourage cancer progression. Although genetic mutations are typically the cause of cancer, recent studies suggest that epigenetic abnormalities may be the key initiating events in some types of cancer. This has led to a worldwide effort to understand the role of epigenetics in cancer initiation and spread. Unlike genetic mutations, epigenetic aberrations are potentially reversible, and epigenetic therapy can restore them to their normal state. This makes such initiatives very promising and therapeutically relevant.

As mentioned before, DNA methylation and histone modifications can work together or independently to alter gene expression during tumorigenesis. These silencing mechanisms create a rigid, repressive chromatin state that reduces cellular plasticity. The discovery of tumour-specific,

de novo methylation of polycomb target genes, which are typically silenced by H3K27me3 in normal cells. During the development of embryonic stem (ES) cells, crucial genes are temporarily silenced by polycomb proteins that establish the repressive H3K27me3 mark. Even after differentiation, these genes remain repressed because of the presence of the polycomb mark on their unmethylated promoters by EZH2. However, in cancer cells, the polycomb mark is replaced by de novo DNA methylation, which could be facilitated by the recruitment of DNMTs through the polycomb complex. This shift from the polycomb mark to DNA methylation is a tumour-specific 'epigenetic switching' process that results in the permanent suppression of vital regulatory genes that may contribute to cell proliferation and the development of tumours. There is hope in epigenetic therapy as a cancer treatment option. This approach targets the abnormal epigenetic changes that take place in cancer cells, intending to restore a "normal epigenome". In recent times, there has been a discovery of several drugs that can reverse the DNA methylation and histone modification abnormalities in cancer cells. DNA methylation inhibitors were among the first drugs proposed for cancer treatment, with drugs like 5-azacytidine (5-aza-CR) and 5-aza-2'-deoxycytidine (5-aza-CdR) found to inhibit DNA methylation, promote gene expression, and stimulate differentiation in cultured cells. These drugs hold great promise in cancer therapy. The use of certain drugs can reduce DNA methylation, which can inhibit the growth of cancer cells by activating tumour suppressor genes that are normally silenced in cancer. The FDA has approved azacitidine (5-Aza-CR) and decitabine (5-aza-CdR) for the treatment of myelodysplastic syndromes and these drugs have also shown promising results in treating other haematological malignancies like acute and chronic myeloid leukaemia.

Researchers are also exploring other improved DNA methylation inhibitors like zebularine, which can be taken orally, for their potential clinical use. The potential toxicity of drugs embedded into DNA is a valid concern for healthy cells. Nonetheless, given that these drugs only impact dividing cells, their primary target should be rapidly dividing cancer cells, with limited effects on slowly dividing normal cells. This viewpoint is backed up by research that illustrates minimal long-term side effects of DNA methylation inhibitors. However, an alternative strategy for inhibiting DNA methylation is currently in development through the creation of non-nucleoside compounds that can effectively do so without being incorporated into DNA.

Over the last few decades, the field of biology has experienced a significant shift, thanks to the epigenetic revolution. This transformation has challenged the traditional belief that the genetic code is the only factor determining cellular gene function and that gene alteration is the primary cause of human diseases. With the discovery of cancer stem cells and the development of more precise epigenetic therapies, we may be able to reset the abnormal cancer epigenome, which could prove to be a crucial step toward finding a cure for cancer. This new understanding of epigenetics has the potential to revolutionize our approach to treating various illnesses and could pave the way for more targeted and effective therapies

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• Project: Epigenome Network of Excellence
• Project: DNA Methylation Society
• Book: The Epigenetics Revolution by Nessa Carrey, 2011

The Scientific Odyssey: Psychology's Transformation Through Psychological Testing

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The evolution of psychology into a bona fide science has been greatly influenced by the development and widespread use of psychological testing. From the early attempts to measure intelligence to the sophisticated assessments employed today, psychological testing has played a pivotal role in transforming psychology from a speculative field to a rigorous science rooted in empirical evidence.

Early Pioneers and Intelligence Testing:
The journey towards psychology as a science began with early pioneers like Alfred Binet and Theodore Simon, who, in the early 20th century, devised the first intelligence tests. These tests aimed to quantify cognitive abilities and assess mental age, marking a critical step toward making psychology a more empirical and measurable discipline.

Standardization and Reliability:
Psychological testing evolved further with the introduction of standardized procedures and the emphasis on reliability. Psychologists recognized the need for consistent measures to ensure that tests produced reliable results. This standardization laid the foundation for the scientific rigour that characterizes modern psychological assessments.

Validity and the Scientific Method:
The scientific method became integral to psychological testing with the incorporation of validity assessments. Psychologists sought to ensure that tests accurately measured what they claimed to measure, emphasizing the importance of valid and meaningful results. This commitment to validity elevated psychological testing to a scientific standard.

Personality Testing and Trait Theories:
The exploration of personality added another layer to psychology's scientific framework. Psychologists like Raymond Cattell and Hans Eysenck developed personality tests based on trait theories, providing a structured and measurable approach to understanding individual differences. These tests laid the groundwork for the empirical study of personality.

Psychometrics and Statistical Analyses:
The development of psychometrics, a branch of psychology dedicated to the measurement of psychological constructs, further solidified psychology as a science.

Statistical analyses became indispensable tools for interpreting test data, ensuring that results were not only reliable and valid but also subjected to rigorous statistical scrutiny.

Advancements in Technology:
Technological advancements in the latter half of the 20th century revolutionized psychological testing. Computer-based assessments, sophisticated statistical software, and neuroimaging techniques added precision and depth to the measurement of cognitive abilities, personality traits, and various psychological constructs.

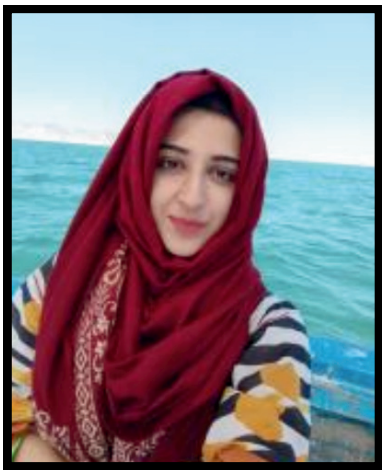
Applications in Clinical and Applied Settings:
Psychological testing's application expanded beyond research laboratories to clinical and applied settings. Diagnostic tools for mental health assessments, aptitude tests for vocational guidance, and personality inventories for organizational psychology became invaluable applications of psychological testing, demonstrating its real-world impact.

Ethical Considerations and Cultural Sensitivity:
As psychological testing matured, ethical considerations and cultural sensitivity became paramount. Psychologists recognized the importance of developing tests that were fair, unbiased, and culturally relevant, ensuring that the science of psychology acknowledged and addressed the diversity of human experiences.

In conclusion, Psychology's transformation into a science owes much to the evolution of psychological testing. From humble beginnings in intelligence testing to the sophisticated, diverse array of assessments utilized today, psychological testing has provided psychologists with systematic tools to measure and understand the complexities of human behaviour and cognition. As psychology continues to evolve, the role of psychological testing remains central, exemplifying the scientific rigour that defines the discipline. In embracing the challenges and opportunities presented by psychological testing, psychology cements its status as a science dedicated to unravelling the intricacies of the human mind.

Reference: psychological testing 7th edition by Anne Anastasia and Susana Urbina.

The Ohio State University



CONQUER YOUR IMPOSSIBLE

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Everyone has different routes to acquire their dreams. Some have long paths, and some have difficult paths. But nobody has an impossible path. Because nothing is impossible. Even impossible itself says **I-M-POSSIBLE**. I am Rimsha Shaikh. I graduated in Physics from NED University of Engineering and Technology, Pakistan with 2nd position. We are five sisters, and I am the fourth one. Unfortunately, in my country some people still feel sorry about the birth of a girl. People assume women are only to look after children and husband. My story is a slap for people with such conservative thinking. After completing BS, I decided to choose teaching. I was very enthusiastic to deliver my innovative ideas and concepts in the simplest way to high school students. I went to different schools and colleges, gave demos and cleared interviews. But I was rejected because some schools preferred male candidates, other claimed that you looked too young to handle boys' class and some of them was demanding experience from fresh graduate girl. This injustice system in my city devastated not only my dreams but many candidates. Instead of hugging defeat, I decided to pursue masters. So, I applied to different foreign universities. Fortunately, I got admission in University of Edinburgh, Scotland, University of Sussex, England, University of Eastern Mediterranean, Turkey. But due to unavailability of fundings, I couldn't become part of those reputable institutes. I didn't stop applying. Fortunately, one day, I got fully funded scholarship from International University of Menendez Pelayo, Spain. I was extremely happy. But ALLAH (swt) had a different plan. Unfortunately, due to COVID-19, flights were suspended, and admissions got cancelled. I got shook from top to bottom. Again, instead of wasting and waiting for a long time, I took admission in MS program in Physics at NED University of Engineering and Technology. Upon completing half a Masters, I got married. People in my surroundings started taunting and demotivating me. They assumed that I would give up my post-graduation due to married life. Because in my country, majority of middle-class women leave their studies and jobs after starting conjugal life. Besides many taunts and demotivation, I successfully completed graduation with 2nd position. During my postgraduate, I appointed as a Student Ambassador in American Physical Society (APSPhysics). I got an invitation to attend the fully funded APS Annual Leadership Meeting in Washington DC. This year my abstract got accepted in the March meeting and APS requested me to chair a virtual session in APS March meeting 2024. Furthermore, APS awarded me Women in Physics (WiP) grant in 2023. My aim was to assist students financially, morally and physically. Because there are many students in my home country who gave up their studies due to negative behavior of teachers, lack of career counselling, less awareness and financial barriers.

To overcome these problems, I, along with my batchmates, arranged online outreaches to accelerate students' interest in Physics. We conducted 1st Interntional Masterclass on Particle Physics in Pakistan with the collaboration of Habib University, Pakistan. We started an underprivileged scholarship program i.e. Hunarmand Scholarship Program to assist needy students at University of Karachi, my Alma Matar. I was a part of a campaign to raise $2000 to build a school in a remote village in Pakistan. Moreover, I am leading organizer of Physics Camp for Girls. The aim of this camp is to encourage women interest in Physics for sustainability of female researchers as well as to motivate them to continue their studies and career even after getting married or having a child. Furthermore, I am working on SDG 4 and SDG 5. I am a Sustainability Leader. The training was completed through United People Global (UPG). It was 10 weeks of intensive training. During this training, I was expected. Despite having nausea, mood swings, fatigue and cramps, I completed my training. The completion of this training was on 8th July, and my due date was mid of July. But I got delivered my baby on the blessed day of Eid-ul-Adha on 29 June 2023. Right after my delivery, I attended classes, breakout rooms, social events, submitted assignments and so on. UPG has awarded Excellent Effort Award (Female) due to my hard working and struggle during the training. My achievements and recognition were not possible without the encouragement and support of my husband and father. This support and encouragement taught me that both genders are important in this world.

Be a girl that the people will regret of not having a daughter

Fig Up: Awarding certificate and bouquet to our judge Dr. Salman Raza. Bottom: Students were demonstrating their project on the 1st day of Physics Camp for Girls held on to 18th November 2023

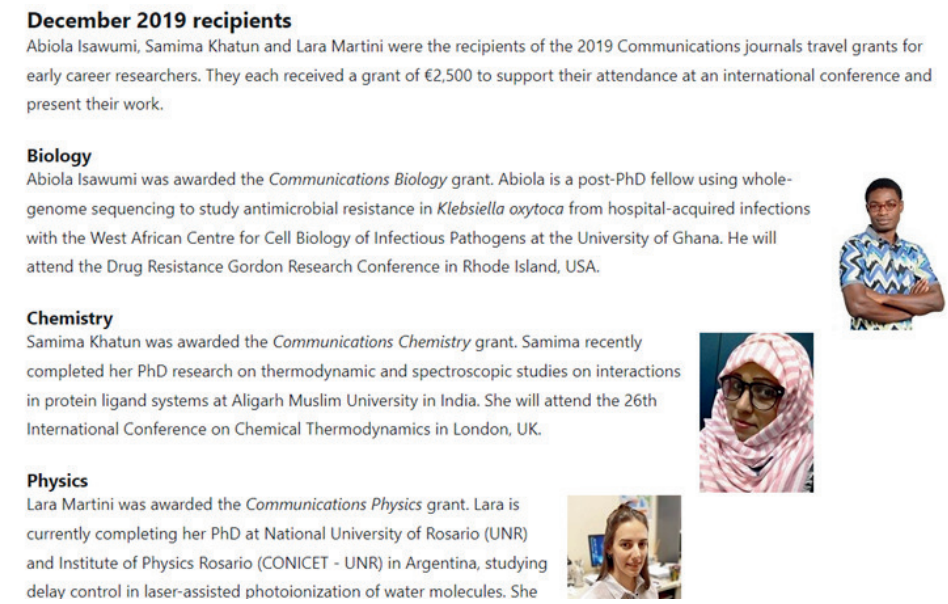
From Al-Ameen-Mission to Aligarh Muslim University – Remarkable Journey of Dr. Samima Khatun

Assistant Professor, Department of Chemistry, AMU, Aligarh, 202002 U.P, India

Dr. Samima Khatun presently working as Assistant Professor in the Department of Chemistry, AMU, Aligarh U.P, India. She completed her B.Sc and M. Sc in Chemistry from the same University in 2011 and 2013, respectively with 1st class in each class. She defended her Ph.D in 2019 on "Thermodynamic and spectroscopic studies on interactions in protein ligand systems", under the supervision of Prof. Riyazuddeen, Department of Chemistry, A.M.U. Her research work mainly enlighten the interaction of ligand with protein induced by conformational change, the mechanism and thermodynamics of interaction, forces involved during the interaction process to examine the physiological significance towards therapeutic development against protein related diseases. This study has importance in drug designing and drug targeting. She also worked with Prof. Pannuru Venkatesu's research group, Department of Chemistry, University of Delhi as Research Associate under CSIR project. She has published several research papers in peer reviewed international journals like New Journal of Chemistry, Journal of Chemical Thermodynamics, Journal of Molecular Liquids, Journal of Thermal Analysis and Calorimetry, Journal of Biomolecular Structure and Dynamics. She was awarded "2019 Travel Grants for Early Career Researchers" from Communications Chemistry, Nature Research which is given to only one candidate all over the world in thefield of Chemistry. The grant was €2,500 (approx. 2 lakhs in Indian rupee) which offers to promising early-career scientists to support the costs of traveling to participate in any international conference. She was also awarded Maulana Azad National Fellowship (JRF & SRF) from 2014-2018 and D.S. Kothari Fellowship, 2021 from UGC, New Delhi. She presented number of papers in national and international conferences and also attended workshops. She played various administrative role in AMU like Warden, floor incharge, food proctor. She also vice president of their own NGO named "United Health and Education Organization" (Regd. Govt. of India), Purba Bardhaman, W.B, India.

Being the daughter of an imam from West Bengal's East Burdwan district, her journey to this stage of achievement was never easy for a girl belonging to a lower-middle-class Muslim family. Her journey is quite inspiring especially to women and to those belonging to her social context. From her early childhood life, she experienced poverty because of her father's unemployment even after being a graduate with a good score, the lack of scope to continue education in a remote rural setup. But the zeal for pursuing her father's dream, her determination for achieving something noble and her parent's insistence to overthrow life's hurdles were then the real strengths for her through which she has reached this success. Dr. Khatun says "My dreams come true partially when my parents sent me to Al Ameen Mission where I got admission with very nominal monthly fees. The Secretary of the Mission, M. Nurul Islam agreed to admit me because of my zeal for study, for my dreams he had been able to read in my eyes. It was because of him that I came to this stage of success". Al Ameen Mission established in 1986, is a minority educational

institute for promoting quality education among the poor and backward class minorities of the society and developing the socio-economic condition of the muslims in WB and in India. It is a residential institute located near Khalatpur, Udaynarayanpur, Howrah, WB, India which now spread across 15 districts with 56 branches. Presently it has 12000 residential students and nearly 16000 alumni passed from here. It gifts significant numbers of doctors and engineers every year to our society. Only due to AAM platform she was able to catch the train for Aligarh. Neither her family, religion, nor her villagers were any hindrances for her education for being a Muslim girl who would stay away from home most of the time of her life. It was because of their support and encouragement, her balancing of being a 'Muslim girl', a practicing Muslim to a modern educated girl is so refined that she has been followed as a role model by the local Muslim girls and by their parents. When asked about her plan, she said, "I want to go back to my home state once I get a government job there. I have many wishes to follow for my community as it is lagging in all sorts of fields, especially for Muslim women whose condition is worst". Her message to the Muslim women, "No one can change your life except your self-respect, hardworking, proper education. So have it, do it, grab it. You women! Change your life by yourself."



December 2019 recipients

Abiola Isawumi, Samima Khatun and Lara Martini were the recipients of the 2019 Communications journals travel grants for early career researchers. They each received a grant of €2,500 to support their attendance at an international conference and present their work.

Biology

Abiola Isawumi was awarded the *Communications Biology* grant. Abiola is a post-PhD fellow using whole-genome sequencing to study antimicrobial resistance in *Klebsiella oxytoca* from hospital-acquired infections with the West African Centre for Cell Biology of Infectious Pathogens at the University of Ghana. He will attend the Drug Resistance Gordon Research Conference in Rhode Island, USA.

Chemistry

Samima Khatun was awarded the *Communications Chemistry* grant. Samima recently completed her PhD research on thermodynamic and spectroscopic studies on interactions in protein ligand systems at Aligarh Muslim University in India. She will attend the 26th International Conference on Chemical Thermodynamics in London, UK.

Physics

Lara Martini was awarded the *Communications Physics* grant. Lara is currently completing her PhD at National University of Rosario (UNR) and Institute of Physics Rosario (CONICET - UNR) in Argentina, studying delay control in laser-assisted photoionization of water molecules. She

Fig Top: Samina's Nature Award News Bottom L: Performing experiment in Research lab R:Making conference presentation

THE TALE OF PERSEVERANCE

Prof. Qudsia Tahseen
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It sounds convincing that after creating man and woman, God chose woman to create a new life, presumably due to her being more powerful, however, on the earth her plight is just reverse due to discrimination, harassment and marginalization largely because of being illiterate, unskilled, socially and economically weak. Since a long time, man in the society has been seen as the bread earner and woman as the house keeper, child-bearer and -rearer who takes care of family members, mainly as daughter, sister, wife and mother. India has been one of the first countries to give voting rights to women; however, ironically the gender equality still remains a fanciful dream. The roles of men and women in society are not biologically but socially determined and often justified as being required by culture or religion.

The auspicious arrival

The status of woman in history has been arguable as on one side she is presented as a victim, helpless in the patriarchal world while on the other hand, she is portrayed as the root of all the problems, disputes largely due to being the subject of man's fantasy. She seems to be targeted in both cases. The story of discrimination for woman starts when she has still not arrived in the world or when the little being is in mother's womb unaware about the aversion of society towards her. Her arrival is usually not celebrated although she needs a celebration if not aborted. I feel lucky that my father celebrated all beautiful milestones of my childhood as he maintained a record of my activities like, the first word uttered, the first sentence spoken, the day I put my first step etc. However, things are not the same in many families where the poor girl child is discriminated and grows learning to be docile and submissive, unlike her male sibling who enjoys more freedom of expression. In poor families, the girl child's life begins to take a tumble. Usually the eldest girl of the family takes over the house chores and mostly the girls make way for their brothers for all opportunities. The girl child loses out on her childhood and takes on an adult role. Also, due to the suppressed and subdued state, she is often malnourished with poor growth, development with increased risk of childhood mortality. It is further disturbing that 25 percent of the 15 million girls born in India do not reach their 15th birthday. The young girls are often vulnerable to sexual harassment which may end up in their murder, suicide or psychiatric trauma.

Taaleem aurton ko zaroori to hai magar, khaatoon-e- khana hon woh sabha ki pari na hon. These verses reflect the guarded approach of the society:
[Education is necessary for women, but they should be house ladies and should not be prominent enough to become the centre of attention].

Quest for knowledge

Girls are mostly deprived of gaining knowledge and skills like boys and likely to be used as child labour inside and outside the house. About two-third of the illiterate adults in the world are females. Even most of the liberal families are of the opinion that girls should have a minimal education so as to be counted literate and qualified enough to raise children. In contrast, despite the financial constraints in the family, the boys are more likely to get higher education. The most likely reason this lopsided approach is that generally girls are considered to have a temporary status in the house who are supposed to leave on marriage and be of no monetary help. If the girl is lucky enough to get a chance to study then people reinforce the idea that boys and girls have different interests and abilities. Even in well-off families in their childhood days, the little boys are given cars and encouraged to build things while girls get dolls to learn housekeeping and family care. Some people believe that girls are better at languages and should opt for arts and humanities while boys have better spatial awareness and should opt for maths and physics. At this point, I find myself lucky to have enlightened parents who believed in my capabilities and supported my decision of pursuing higher studies. My parents never made me gender-conscious and brought me up in a way that my gender was not relevant to what I was capable of achieving. Norms and attitudes not only affect economic opportunities they can also influence women's mobility, security, safety, health etc. Although the trend is changing and there are more female enrolments in schools and colleges, there have been nothing like convergence in the fields of study which men and women choose. Further, the amount spent on the education of a girl child is substantially less than that spent on a boy. It is unfortunate that the general mindset does not easily accept women for the top positions, or in the policy-making bodies. Among several problems and issues which hinder women to get their due, the most important are the society-induced psychological and emotional issues. People often are so sceptical and critical that they don't hesitate calling an aggressive girl hysterical whereas an aggressive boy is simply labelled as strong or daring. A woman, therefore, needs to develop a very strong sense of self and not to allow other people's ignorance change her. Many young girls are forced to marry at a young age and lose the opportunity of schooling. Over 60% of child brides in developing countries have no formal education and girls in rural areas can be married as early as 7 and in most instances before17 years of age. Likewise, 1 in 20 girls between 15-19 years age group experiences forced sex in her lifetime.

The lifetime commitment

As per the norms of the society, the young girl grows with the feeling that she has to leave her house to be with a man or with his family after getting married and as a preparatory measure she has to follow the advice of parents and elders to be a subservient and obedient being. Dowry is another demeaning practice associated with marriage across all regions and socio-economic classes that make the girls less wanted by the parents. It involves a cash or in-kind payment from the girl's family to the groom's, at the time of marriage. The dowry amount can often be a substantial part of a household's income that may lead the girl's parents penniless and devastated. Marriage, one of the most important decisions in a lifetime and a serious commitment, is often arranged by parents/ family members without taking the consent of the girl. I consider two things worth mentioning that mine was an arranged marriage with no dowry and as per my father's

advice my parental house holds a big name plate with my father's name on the top followed by the names of all of us (my name and my two brothers' names) in a hierarchical manner indicating an equitable treatment for all of us. The reason for most of the marriages to be going, is due to the tolerance and forbearance of the woman by and large and not the man. Most of the families treat the woman as an entity who is there to keep the family intact. Although during this sacrifice she earns love and respect too, lately but mostly she receives the credit on behalf of her husband. However, in unsuccessful marriages or strained relations, it is the woman who is at receiving end besides the emotional trauma and dejection from the society causing insomnia, hypertension, anxiety, irritability, fatigue, energy-loss etc.

The tireless performance

With finances taking the central position, the married women in an attempt to lessen the financial burden may take up a job with the consent of spouse or in other case under any accidental calamity. The working woman is not spared with traditional household chores including cooking, childcare etc. which drastically increases her total hours of work at the expense of her leisure time. The disintegration of joint families and development of nuclear families often put heavy stress on her, particularly when dealing with infants or preschool children. Even after realizing its significance, due to lack of enough and sufficient time working women belonging to elementary occupations may face health issues due to lack of proper nutrition and regular physical exercise. The urban working women face problems like sexual and mental harassment, promotion issues, discrimination based on gender, workplace discrimination and prejudices, safety and security issues besides family care issues. Due to the plethora of problems, 1 in 4 girls in the age group of 15-19 years are neither employed nor in education or training compared to 1 in 10 boys.

With changing times, more women are breaking the traditional barriers of caste in education and employment. However, many working women consider lack of family support as major problem in participating in income-earning activities outside. The support and share of husbands in household chores is almost insignificant in Indian system. The problem of single unmarried woman or divorcee is much graver. The social system cannot accept the new roles of women who end up feeling misunderstood and distressed. People make particular perception or draw conclusion about characters of working women. Often females are highly judgmental about other female colleagues. Those women who end a toxic or abusive relationship find themselves isolated and trapped. It is, therefore, a fact that women are under real pressure to save a marriage and are mostly not supported by society in their decision to divorce in case of turbulence. The general perception is that man will be man and the woman has to change or adjust. Even after the death of her spouse, a hell gets loose on her. Although Sati system has been abolished, the widow is still not liberated as her living style and actions are viewed with suspicion as she is supposed to lead the life of a chaste and virtuous person. There is no respect for widows in some parts of the country, and they are considered worthless in the society. It is a classic example of inequality between men and women, as men are treated well in all odds.

Surveys suggest that women are responsible for two-thirds of the work done worldwide, yet earn only 10 percent of the total income and own 1 percent of the property. The difference in the working style of men and women, and the 'invisibility' of work that is not included in national lowering their concentration, memory, alertness etc.

Root cause of problem and its solution

A man and a woman are like two wheels of a cart. The cart can only move fast and safely when both of them are equal and pull it in the same direction. Hence no developing country or society can afford to ignore the role of women, if they are to progress. The grave problems women are faced with i.e., female infanticide, dowry, child marriages, sati, honour killing, rapes and childbirth mortality have to be resolved so as to stop humiliation, harassment and exploitation of women in the society and to empower them.

Men are usually more aggressive and physically stronger compared to women who are subtle with embodied inner dignity. People confuse subtlety with weakness which is also reflected in nicknaming them as weaker sex. In fact, in a real gender-equal society, the word 'gender' does not exist and there everyone can be themselves. The society, not biology, assigns males and females, the masculine and feminine character profiles. This kind of concept promotes gender inequality. Such differentiation can initiate a culture of discrimination in which one automatically gets involved in a process of judgment. There is no concrete evidence that any gender is inferior despite some scholars' claim about men and women having asymmetrical cognitive capabilities. However, notwithstanding the prevailing concept, the women show greater endurance in tackling with the psychological and emotional issues compared to men.

Females are also the victims of a vicious publicity which has deterred them from studying select subjects like science, math etc. Most cartoons and stories depict genius scientist, crazy inventor, or super hero as a man. There is a stereotypic perception that scientists are unsocial and prefer to be lonely or secluded from the society, a character not fit for woman who ought to be more sociable with family values. Such false portrayals deter many naive and gullible girls from opting science and math and depriving them to contribute to the advancement of science and technology. Therefore, it is important to tackle this issue right from a child's early age by encouraging gender-neutral play, educating about female achievers and by exposing them to books and films that demonstrate science as fun, interesting and doable.

Also the tales of wars and bravery are linked with men while females have been projected as the harbingers of reconciliation and sacrifice. This tricky philosophy prepares them to tolerate violence to keep the family intact and to be counted as the great martyrs. Some lines by Dr. Wasim Barelvi well depict their stand:

Koi bataae ye uske guroor-e-beja ko
wo jang main ne ladi hi nahi jo haari hai

(Someone should tell that complacent man that the battle he considered to have won, was never fought by me)

Women of poorer and weaker sects do not have a voice because of being so beleaguered and oppressed. Such submission of the women towards transgression is the biggest cause of their miserable status when they are taught to observe silence and respect fear more than themselves.

Even due to fear of defamation or embarrassment, the relatively better off urban women too fail to report harassment and molestation at work places.

Another serious problem lies within women themselves who consider their status inferior and feel embarrassed about their sex. The women should be made to realize the fact that they are all wondrously made and should carry their sex proudly as a badge of honour. Doing the things men do, will never make the women equal. Women have their own identity they should be proud of, however, they should enjoy the social and cultural and human rights like their male counterparts. Gender equality, historically has been predominantly a women's movement for women where they should show strong solidarity to support each other and must comfort each other irrespective of status, education and wealth. They should also be aware about the existing laws i.e., legal rights for access to children, legal protection from violence, to achieve gender streaming and equality in the workplace etc. although some laws need reforms in the current scenario. Still, husbands can legally prevent their wives from working in as many as 18 countries whereas there are no laws protecting women from domestic violence in 49 countries of the world. However, the changing picture is not so bleak as women have made important inroads into the politics which is likely to be a game-changer. It is a good initiative that more than 100 countries have budget allocations based on gender equality now.

It is time the society as well as women themselves should be aware of their needs and capabilities so they may contribute effectively in social, economic and political life. Despite the progress made in the direction, much remains to be done through sensitization programs to protect women's rights, promote women leadership enabling positive change in women's lived realities. A notable character that the women need to quit for the success of their joint effort, is jealousy towards each other. However, the most disturbing fact in gender equality mission is that an overwhelming percentage of men do not recognise the problem, or do not believe in equal opportunity. Such mindset poses hurdles in achieving the goal as such practise is emulated by the children and is passed on to generations. Some men are also apprehensive that women empowerment will come at the expense of men. This is due to the fact that the impact of gender inequality and its effect on men has not really been addressed. There is need to sensitize men on the traditional male stereotypes in society and their consequent impact on women and to educate how their social roles may impact gender equality. Equality will not come if law is framed giving equal rights to men and women but when the mindset of the society considers them equal.

This is a difficult task that often invites friction but as per the saying, the three ways to ultimate success are, to be kind, to be kind and to be kind. Therefore, in my opinion a firebrand approach is not required in public to fight against inequality. The term 'Women empowerment' looks distasteful to male chauvinists and it receives a callous response from most men although in the current time it seems synonymous to 'Human empowerment' Alienating themselves from men and coming out in a rebellious way may suppress the problem of women for a while but will lead to more anguish and antagonism. How can one fight against her father, brother, husband and son who are an integral part of society and also are men? Hence a tactful approach for winning the support of people from other gender sounds more pragmatic and stable. This may appear to be a far-fetched dream or seemingly not workable but believe me, this is the long-lasting solution which will make the society so civilized and amiable. The charity begins at home so each one of us has to be passionately involved in the mission and should consciously contribute to its fulfilment through our approach and actions whomsoever we come in contact with every day. In the family too, we

have to be non-discriminatory towards sons and daughters and follow the norm of respecting and supporting females, promoting enhanced visibility of men's parenting and care responsibilities in efforts to achieve joint household control,
encourage men's involvement in female education programmes, livelihood and poverty alleviation policies. Children should be encouraged to read moral stories emphasizing gender equality. These are the actions which should supplement the rules and legislations towards women empowerment. The solution may not be achieved instantly and events may happen in the way as stated by Mahatma Gandhi: First, they ignore you, then they laugh at you, then they fight you and then you win. But we must be steadfast in our approach and should never give in as also expressed in the following couplets of Dr. Waseem Barelvi

Dua karo ki salaamat rahe meri himmat
Ye ek chirag kai aandhion pe bhaari hai

(Pray that the lamp of my courage sustains as it can challenge several storms)

The current picture

Though we have miles to go, still, let us celebrate each milestone of our success. It is satisfying that due to continuous campaigns and conventions, the women are made aware of their status and place in society and have started showing their presence in all disciplines. Women with local leadership have given promising results and look more confident in reporting crimes. Female leaders by serving as role models have enhanced educational and career aspirations for girls; participation of women in labour market and professional training has risen; the negative stereotype eventually is disappearing with minor backlashes by men in some instances. The marriage and child-bearing ages have increased with a drop in desired number of children. A change in the attitude of women is evident with the passing time. Today the women are more confident, graceful and brave with their responsibilities increased manifold. They have to keep a balance between the family and work. In delegation of this very difficult task, she appears patient, calm, stronger in conviction and perseverance.
The COVID-19 pandemic, made the conditions more grueling for women. The lockdown adversely affected the efforts made on gender equality and women's rights. Women played gigantic role during pandemic, from frontline healthcare workers to care takers at home. UN Women wing also developed a program to redress standing inequalities in multiple areas of women's lives, and build a more just and resilient world. Although the women have not acquired the position they rightly deserve, they have not given up. The women of today are breaking boundaries and are now emerging as the stronger and not weaker sex due to high tolerance and endurance in difficult circumstances. Finally, I close with the following couplet of Dr. Waseem Barelvi.
Toofan karraha tha mere azm ka tawaaf
Duniya samajh rahi thee ki kashti bhanwar mein hai

(The whirlwind of my determination was raging; the world thought the boat was in a whirlpool)

Happpiness and Success

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O "All about Happiness''- A Poem

Happiness is an enduring state of mind
Happiness is a sense of well-being
Happiness is the key to success
Happiness is the secret to all beauty

Happiness is the which everyone longs
But so few of us actually get
Happiness is that which rights all wrongs
And leaves us without regret
'Does Happiness depend upon comfort?
The answer is definitely a big, 'NO'
Happiness lies in not comforts alone!
Happiness is not a static quality of the human mind, body and soul

Life could become boring and monotonous, when happiness is prolonged.
Even the pauper can be happier than the prince.
Even the beggar smile and sleeps well, despite much strife.

Happiness is a frame of mind that's dynamic in nature;
Happiness is all within;
Happiness is in sharing;
Happiness is in sacrificing for the other's sake;

Happiness is in giving up your chance to someone, who most needs it;
Happiness is in doing acts of charity;
Happiness comes when human realize his oneness with Almighty;
Happiness is when you've led a righteous life.

Key for success -inspire yourself

--Dr. M.Jahanara Momin

"One percent inspiration, 99 percent perspiration" Edison's definition of genius has often been quoted to define success. Even before Edison, the rigors of success were described by painter Michelangelo thus."Achieving success is almost like finding God, the destination is the same, but the roads are as varied as the seeker. All you need to do is choose your path

But what is success?

Success may be described as the realization of an aim and for the realization of any aim hard work is essential. Hard work helps us to develop our potential to the maximum and strive for excellence in any field. Hard work makes us better prepared to face adverse situation. Hard work helps an athlete to preserve in a race and win it; it helps average students to become extraordinary, it helps to transform destinies.

"Success is basically about how you can turn adverse situation in your favor"

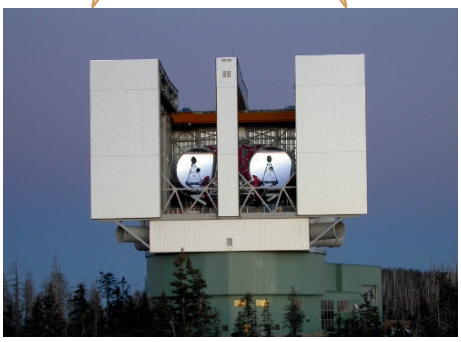
So, focus your energies in a concentrated manner on your goal and then start perspiration for it. The choice of the goal and the effort taken in reaching it are complementary: if you want to achieve something for the love of it, and not because it is the done things, no amount of hard work would tire you. As De Bono puts it: "Successful people do often enjoy their work that it does not seem like work." According to a recent survey, success earned through hard work was the foremost factor responsible for a contented life.

"Success consists of going from to failure without loss enthusiasm."

Behind every human effort lies a hope for success. So keen is his desire for success that he fails to see any value in failures. But one must remember that failures are the pillars of success. They provide us an opportunity to realize our shortcomings so that we can constantly strive to improve ourselves.

Sincere efforts, untiring will and positive attitude that have enabled you to succeed in your endeavors.

Success never waits but it does come to you need is a never say die attitude and that where success lies, so rise up, hold your nerve and go get it!!



Large Binocular Telescope (LBT)

Remotely Mentoring Students at Aligarh Muslim University 2023

Dr. Hashima Hasan
AMU Alumni (Physics Department)
Aligarh Alumni Association, Washington DC, USA

In December 2022, I took up the challenge to start a pilot program to remotely mentor students at Aligarh Muslim University (AMU) via Zoom. The Aligarh Alumni Association, Washington D.C. (AAADC) operates a scholarship program (http://www.aligarhdc.org/amu-scholarship/), whereby students at AMU are selected annually, based on a merit-cum-means basis. We polled the new batch of students selected in 2022 for interest in mentorship and selected a group of 15 from those who expressed interest.

At the first meeting, I laid out the goal of the program which was for the all-round development of the students, so that they could achieve their life ambition and be leaders of their families and communities. The mentorship program was being conducted for the first time, with a view to assist the students in this endeavor. I would work with the students to design and develop the program so that it could be beneficial to them. I encouraged the students to find supplement the program by finding local mentors at AMU, who could provide them guidance. I would be happy to respond to their e-mails, but it would be more practical and helpful to have a local mentor – such as a teacher, a senior student, family member or trusted friend. I also encouraged them to interact with each other as a group, either in person at the AMU campus or via a virtual platform. I stated that at this first meeting, I would be doing most of the talking, but at subsequent meetings, I would expect the students to take the lead.

I provided broad guidance to students on how they could enrich and strengthen themselves as they prepared for the future. Student years are the best years because this is the time one has, to concentrate on self-development and enjoyment. Students do not have the responsibility of earning their living and raising families like their parents; at the same time, they are young, healthy and physically strong, and unlike the senior-most and physically weaker individuals of society, have the energy to accomplish their dreams. I encouraged them to develop good communication skills particularly in the English language by reading well written books on a subject of their interest; practicing public speaking either by organizing debates amongst themselves and/or peers, or giving talks. I emphasized the importance of writing good resumes when applying for jobs and for preparing for job interviews, since a first impression can be created only once. I discussed the importance of personal qualities such as aiming to be an achiever, adaptable, competent, dependable, efficient, innovative, taking initiative, self-motivated, organized, proactive, being a good team builder/player. I reminded them to take care of their health by eating healthy, wholesome food and exercising regularly. I suggested that they participated in a sport of their choice, as AMU .

offered many opportunities. I also asked the students to think of the benefits of the scholarship program and how it could be improved.I requested the students to be conscious of their social responsibilities in creating a safe environment for everyone. I reminisced of the time when I first left my hometown, Lucknow, to join M.Sc. at AMU, and how intimidating it was for me as a young girl. I hoped it was somewhat easier for female students today.However, I appealed to the male students that they ensure a physically safe environment for female students as nature had made females physically weaker than males. At the same time, females were emotionally stronger than males, so female students should be careful with the language they use and not be nasty or hurtful. Intellectually, there was no difference between males and females, and each had the intellectual ability to achieve their goals.

We continued the meetings at the cadence of approximately once per month, with a gap for Ramadan and summer vacations. At the request of students during 2023, we were able to widen the horizons of the students by conversations with five invited speakers. The first one was Ms. Shahana Pagen, an engineer of Bangla Deshi origin, at NASA Goddard Space Flight Center. Ms. Shahana briefly described her work on NASA's James Webb Telescope, the challenges she faced as a female from the Indian subcontinent and as a working mother. She nevertheless succeeded, and she encouraged the students to pursue their dreams.She gave pointers to students on the various careers they could undertake with an engineering degree.

Our second guest, Mr. Alok Ranjan, a distinguished I.A.S. officer (Retd.), was invited by popular demand from the students who wanted advice on Civil Service examinations conducted by the United Public Service Commission (UPSC) of the Government of India. Mr. Ranjan started by giving a brief introduction of the Civil Service, cautioning the students that it was not the bed or roses it may appear from the outside.Only those who were committed to make the sacrifices required of public service should attempt to join it. He advised the students that they should be prepared to spend a whole year dedicated to preparing for the exam. At the same time, they must have a backup plan as the success rate for the exam was low. He stayed on to answer several specific questions from students and ended on an encouraging note. He gave his contact information and offered to follow up with any student who wished it.

I was the third guest, invited by the Olympia Academy, a small Mathematical and Physical Society run by undergraduate students at the Physics Department, AMU. They were particularly interested in my path from AMU to Oxford and NASA, my struggles, scholarships I applied for, and any guidance I could provide them. At AMU, I was one of three female students in the M.Sc. (Physics) class, and after obtaining first position and gold medal for Physics in the final exam, I joined a Ph.D. program in Theoretical Nuclear Physics under the guidance of Professor Dr. Zillur Rahman Khan. AMU offered exceptional opportunities, such as being one of the first universities in India with a computer. That gave me the edge to apply for and get admission at the University of Oxford, U.K. I competitively won a Commonwealth scholarship to attend Oxford. My path to NASA took many turns, which included crossing the Atlantic three times, working in leading institutions in India and the U.S., changing research fields from Nuclear Physics, to Environmental Science, to optics, to astronomy and finally science management at NASA Headquarters.On the way, I got married and raised two children as a first-generation immigrant in USA, and became a U.S. citizen.I shared with them my role as the Telescope Scientist for the Hubble Space Telescope, and as the Program Scientist for the James Webb Space Telescope.

Our fourth guest was AAADC member and AMU alumni, Mr. Aslam Azad. He shared his extremely inspirational success story from a 10+2 student at Aligarh to where he is today. He faced many challenges on the way and navigated them skillfully. He shared his experience of preparing for and appearing in the UPSC exams, as that topic was of prime interest to the students. He gave valuable advice on networking, widening horizons, UPSC exam preparation tips. He answered student questions and generously offered to answer follow-up questions by leaving his e-mail address and telephone number on the Zoom Chat for the students. He also mentioned the value of AMU alumni associations both in providing an emotional and cultural platform to those in a foreign environment, and one which can work to advance the careers of AMU students by providing scholarships.

Professor Dr. Zubair Amir, Chair, Department of Languages and Literature, Benedictine University, Lisle IL, was our last guest for the year. The main goal was to offer valuable guidance to participating students and address their inquiries. Dr. Zubair acknowledged the difficulties encountered pursuing a Ph.D. program but emphasized the existence of opportunities. Discussing the changes in student's life post-COVID, Dr. Zubair highlighted the challenges of social isolation, a kind of helplessness & inability to advocate for themselves. Dr. Hashima encouraged students not to fear making mistakes. Asked about opportunities in literature, Dr. Zubair shared insights from his non-linear career path, encouraging students to explore different options. To develop critical thinking skills, Dr. Zubair recommended strategies such as active reading and note-taking, while to excel in creative writing, he provided guidance on how to make writing a daily habit, seeking feedback from other scholars, but at the same time having a backup plan. On the do's and don'ts in literary studies, Dr. Zubair suggested avoiding fixed boundaries in reading, communicating doubts with teachers, and focusing on thoughtful writing with multiple drafts. The meeting delivered valuable insights into the challenges and opportunities within not just literary studies but also for the students of diverse fields.

The following quote from one of the students is a fitting assessment of the experiment. “The guidance from Dr. Hashima and Dr. Zubair were highly appreciated by the students and sincere thanks were said to Dr. Hashima for hosting the event and arranging the meeting with Dr. Zubair Amir and Dr Zubair for sharing his knowledge. Looking forward to hearing from such great mentors in the future.”

I am truly encouraged with the response of the students and mentors I was able to recruit for this program. I am also grateful to the larger community that helped make this happen. My special thanks not only to our special guests, but also to educationist, Dr. Amrita Das, and to AAADC member and AMU alumni, Dr. Syed Amir, who helped me in this endeavor.

STEM: Integral part of our lives

Prof. Sultana N. Nahar
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We are advancing forward with more knowledge in and application of STEM (science, technology, engineering, mathematics). We are also finding issues with lack of our knowledge in solving many problems, cope with suvivability, harness our own creations, etc. All these emphasize the important role of ISMWS members to be more involved in scientific research, contribute in solving problems, and enrich our knowledge for various applications. We need to think in what capacity we can be part of the effort. Most of problems we are facing are multi-disciplinary that require connections of areas of knowledge we are working on and form a joint effort. Examples of some of the long standing problems we have been currently in are given below. I would ask particularly the students and researchers to find how these problems are relevant to your area of STEM.

1. COVID-19 Pandemic:

We have went through a big dip of loss of lives during COVID-19 pandemic when it emerged as a highly contiguous, life threatening disease It started in Wudan, China in 2019 and ran a devastating killings spree until the break came in 2021 with the invention of mRNA vaccine. These viruses have spikes called the S-proteins sticking out of the surface which hook up to human body cells easily. As these viruses entered human bodies, they spread fast, weakened the immunity systems, and put the lives on death threat, and introduced COVID-19 pandemic. The whole world went to isolation confined to their own houses, would work from home, put on masks when out or are with others, sanitizers production jumped up. During COVID-19 pandemic, over 7 million people in about 200 countries died.

With our knowledge of Sara virus, a basic form of COVID-19, causing typical of cold or flu and the curing medicine, treatment seemed meaningless as we were not able fight back. The vaccine typically means introducing a small amount of virus into the body which will lead to generation of large number antibodies that will enable fight the intruder virus. The method simply did not work. Intense research started in 2020 at dozens of labs all over the world where scientists com municated and shared their experimental findings. It turned out that the solution was hidden in use of non-virus vaccine, mRNA or messenger RNA, which were under investigation in the lab of Prof. Ugur Sahin and his wife Dr. Ozlem Tureci for cancer treatment in Germany. The nature of mRNA was studied extensively by Drew Weissman and Katalin Kariko who received the 2023 Nobel prize for their work. Sahin realized the capability and impact of use of mRNA and announced in a conference its curing capability in the event of a pandemic even before COVID-19 pandemic came. He explained how mRNA injected in a body instructs generation of of S-proteins

which would form a barrier on immunity and fight off the S-proteins of the intruder virus. Their intense research during the pandemic led to invention of the vaccine which was found to be 95% effective. They collaborated with Pfizer for large scale production of the vaccine to save the lives on the earth.

Moderna lab also produced the vaccine soon after Pfizer. Work needs continuation as COVID-19 virus can muted itself to a different variant, often a stronger one. This is one most precious example of continuing research regardless of visibility of immediate impact. In addition, mRNA is showing characteristics that can be implemented in solving many difficult diseases, including cancer.

Fig 1. a) Corona virus with spikes, b) greeting during COVID-19 pandemic - mask on and hand shake changed to elbow touch, c) Prof. Ugur Sahin and Dr. Ozlem Tureci.

2. Industrial age impact: Global warming and long lasting waste

As we are live the conveniences of he industrial age, research is far from complete in harnessing it. Climate has been one most concerned long standing problem after we started to see the impact of our industrial age which is our earth being warmed up largely due to increase in CO2 in the atmosphere. Two phrases have been common in the news: i) ”IP CC (Intergovernmental Panel on Climate Change) report”, which gives comprehensive assessment reports about knowledge on climate change, its causes, potential impacts and response options, and ii) UN’s annual Climate Change Conference called ”COP”, such as, ”COP28” the 28th one that took place in Dubai in 2023, where world leaders meet and make decisions on how to control the global warming.

The atmospheric molecules, CO2, H2O, N2O, CH4 absorb radiation from the Sun, but hold on it some before releasing it back. During this time the radiation warms up the atmosphere which we need. This warming up process is known as the ”greenhouse effect” (Fig. 2a) and these atmospheric molecules are known as greenhouse gases. CO2 can absorb more radiation than the other molecules. Fig 2a gives the details of amount of solar radiation, 235 W/m2, entering the earth, being distributed in the atmosphere and earth’s land, going through energy cycles and Greenhouse effect that keep the earth at 14◦ on the average, and being transmitted back to space. Before our industrial age began in around 1850, the balanced atmospheric composition absorbed solar radiation and emitted it back in equal amount. With all factories and chemical processes going on under our industrial age, we have been producing more CO2 creating an unbalanced amount of it in the atmospheric composition and amount of radiation absorption has been exceeding that of radiating out, thus retaining some radiation energy. As a result the earth has been slowly warming up, known as the global warming. As the Fig.2b shows, the earth’s current temperature has risen by 1.2◦ relative to the pare-industrial age of 14◦ . The impact of this 1.2◦ rise has been enormous for our climate and nature.

Snow caps, ice sheets, ice bergs, glaciers which hold the reservoir of our sweet drinking waters are melting, and slowly moving to the salty water of the seas. We can not drink salty water. So we are loosing drinking water. - Sea water level has gone up by 8-9 inches (about 0.22 m, Fig. 2c). It has submerged lands under 2 water, has been breaking shore lines by the battering waves.

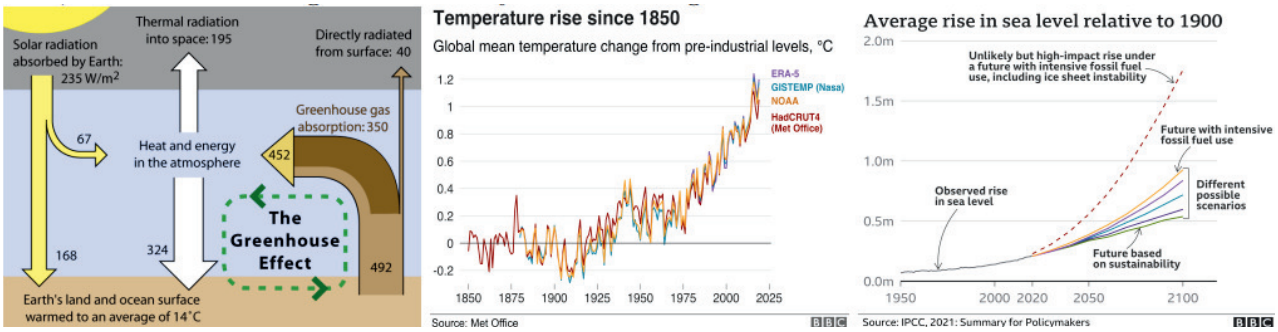

Fig 2. a) Greenhouse effect, b) global temperature rise by 1.2∘, c) sea level rise by 0.22 m by global warming.

The impact is extensive in various forms. Fig. 3a shows crack in ice berg causing the ice sheets moving away toward the sea. It may seem counter intuitive, but we have been seeing more snowfall during snowstorms, blizzard because a warmer planet is evaporating more water into the atmosphere. We are also having more of the much stronger hurricanes (Fig. 3b) than those about 100 years ago. There are more and stronger wild fires, such as that took place in Canada in 2023 and spread in the atmosphere over US states (Fig. 3c). As trees rub each other in the warm dry air, the friction ignites the wild fire. Warmer earth is also causing less rain in various regions intro ducing droughts, such as that in China in 2023, or more monsoon rains resulting in floods, such as in Pakistan, Europe in 2023 highlighted in the news. The objective of COP has been finding ways limiting the rise of temperature up to 1.5∘ by various methods. Suggestions are cutting down use of fuels by electric power in vehicles, factory emissions by using wind turbines, solar powers, less use of coal, cow dung, process the land dirt with microbes or other compounds that absorb CO2

Fig. 3. Impact of global warming: Top: a) Crack in the ice Berger, b) a strong hurricane. Bottom: c) Wildfire in Canada from dry air, d) drought in China

We pile up huge amount of wastes daily, largely from various industrial products. A large part of 3 them are discarded into landfills or burned in incinerators. Our environment is being polluted by their emissions, and also factory emissions in to the atmosphere and dumping of harmful chemicals in the water. A big concern has been for plastic products whose long chain molecules do not degenerate in the dirt. Another deadly risk is radioactive waste from nuclear power plants that remain dangerous to human health for thousands of years. Although designed to confine them, they do spill over as accidents happen. For example, radioactive contaminants released in to surrounding in Fukuyama nuclear power plant hit by a tsunami in 2011 is still not danger free after a decade cleaning and filtering. We need remedy scheme of wastes. All these require extensive research.

Fig. 4 a) Waste burning in an incinerator, b) Fukuyama Dacha Nuclear power plant was by a tsunami in 2011 went throng nuclear meltdown

3. Earthquakes:

Earthquake has been with us from the beginning. It is a natural event and can cause a havoc. We don't have any control on it except to face often devastating catastrophe caused by it. We can not predict when it is coming. Although architecture exists, particularly in Japan, for sustaining buildings by absorbing and resonating with the waves of an earthquake, it is too costly to make general earthquake resisting buildings everywhere. An earthquake is initiated when there is a movement of tectonic plates on a fault. The fault is a crack or joint of earth's tectonic plates and is a weak point which is vulnerable to any build up pressure underneath it. These faults in tectonic plates is typically long and making them fault-lines. Built-up of an underneath pressure slides the plates releasing intense energy which travels out as waves shaking the earth. This causes destruction of structures, land slides, etc if the fault is on surface, a tsunami if it is under water, eruption of hot lava if it is in a mountain.

There are some symptoms, not necessarily exact, and ways which are often used for predictions of an earthquake, but the timing is very short. As an earthquake is initiated, two types of waves are generated, P- or pressure wave and S- or shear waves. P-wave travel faster than the S-wave. P-wave can show some symptoms of the earthquake. Some animals can sense the P-waves and show usual behavior which can be treated as prediction. But, the time difference between the two wave is less than to over a minute, usually not enough for moving to a safer location. We need to find ways to protect ourselves. There could be a dedicated satellite as well as earth surface detectors installed along the fault lines, which can do continuous monitoring and programs to analyze for any slight variation. Present technology probably does these, but no way to predict or fusing the pressure.


Fig. 5. a) Destruction of a building and b) rescuers searching for trapped people inside a shattered building in the aftermath of the earthquake at Marrakesh, Morocco, 2023

4. Artificial Intelligence (AI):

One most extraordinary tool we have invented is artificial intelligence (AI, Fig. 5a). It is now part of our lives. We can have enormous amount of work done by a dedicated AI that we can not do ourselves as our minds get distracted. An AI is given vast amount information hat we have been gathering for a long time. Using that information it can analyze large amount of data and sort out particular topic and narrow down the solutions or choices we are interested in. For example, it can go through huge amount of medical data and carry out the diagnosis from symptoms of a disease in s short time and based on the knowledge, can provide choices of treatments for it. This helps a doctor in reducing his/her tasks and making judgment on the proper treatment. In Japan AIs are giving company to elderly lonely people and thus reducing their mental depression. Fig.5b shows AI is maintaining 500 telescopes built by the Ohio State University, each cable in the circular drum is an independent telescope which can be pointed to a particular astronomical object for observations. AI manages the telescopes and stores the data in a disciplined and efficient manner.

With its capability there is also a fear of its taking over human beings by following the logic it finds more valuable than what we find more humane. It does not apprehend human logic and ethics that may involve compassion, emotion, circumstantial evaluation. We need study on how to harness the power of AI and not providing it the power of decision.

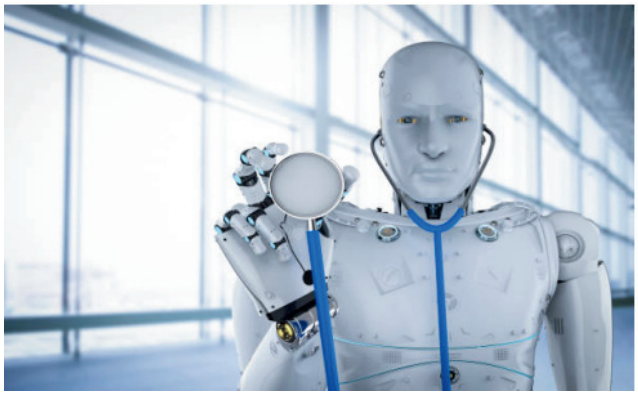
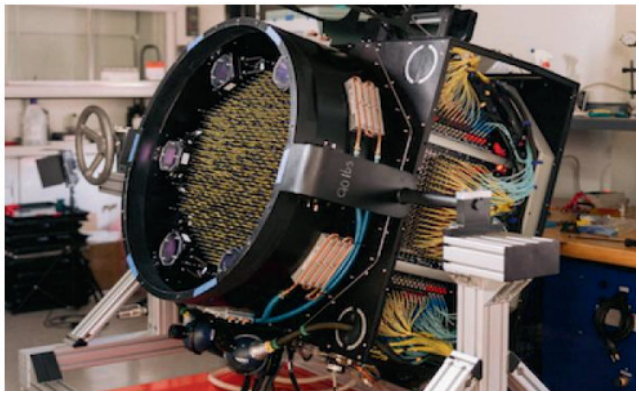

Fig.6 a) An AI acting as a physician, b) a built-in managing AI in the set of 500 cable telescopes, each making observation of independent of each other.

5. Impact of an asteroid to our earth:

Asteroids, meteors have been bombarding our earth from the beginning. While meteors, often described as smaller asteroid, typically are more common and get burned in the atmosphere on their way toward the surface. However, asteroids have been hitting the earth time to time, and

often they are unnoticed as they fall in different places withoutmuch population. The most well-known asteroid is the one which came about 65 million years ago and depleted all forms of dinosaur. Most recent meteor was a huge one which exploded in the atmosphere to a fireball in December 2018, and blew up with 10 times the energy released by the Hiroshima atomic bomb over the Bering Sea of Russia. Lake Karakul on the high Pamir mountains of Tajikistan was formed by a meteorite that struck the Earth some 25 million years ago. There is no vegetation in the salty water of the lake.

NASA has satellite Scout to detect objects coming toward the earth. Recently we had asteroid Bu passed by the earth. Bu has orbit around the Sun and it will come back, and there is high prospect it will ultimately hit the earth. We have two issues with most of the objects coming towards the earth, we do not i) detect them early enough and ii) have the technology to deflect them.

Fig. 7. a) Asteroid BU was close but did not fall on the earths as it passed by in 2023. b) Lake Karakul in Pamir mountains formed by a huge meteor hit 25M years ago.

We have idea on deflecting the incoming asteroid, but hot sophisticated one. In Star Trek series, an asteroid will be deflected by a laser beam. A slight change of angle is good enough for defection as there is no gravity to counter the force. However, we do not have the technology for the laser tractor beam. NASA has a program called DART in which scientists tested successfully in deflecting asteroid Dimorphus's path by hitting it by a DART satellite. This appears to be a crude method as it requires quite a bit of time for the collision to take place for observing the asteroid for a relatively long time to know its trajectory, for preparing and launching of the satellite, in traveling an elliptical orbital with gravitational push for the satellite. But it is an achievement since once the goad of defection was achieved, we can always figure out how to make things more efficient and effective.

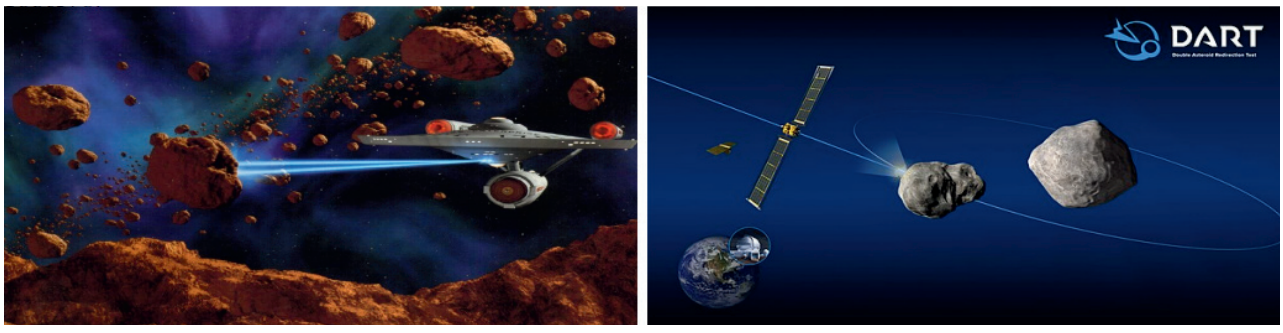

Fig. 8. Deflection of an asteroid from its path: a) Star Trek idea for quick shooting with a laser tractor beam, b) NASA strategy to smash a satellite with an impact.

6. Lifetime of our Sun and Searching for a home:

Our star the Sun is a typical star that was born about 4.6 billion years ago, is going through its life, and will die in about 6-7 Byr. It will then turn in to a huge Red Giant which will engulf all planets. Fig. 8a shows the small orange Sun with its current size and large orange Sun with its size of Red Giant. Hence for continuity of human race, we need another home to move to, a habitable exoplanet. Any planet which does not belong to the Sun but to another host star is known as an exoplanet. We have detected over 5,500 exoplanets in 4,089 planetary systems. An exoplanet could be solid or gaseous, hot, cold or in-between.

We need a habitable exoplanet which is not gaseous but a rocky one that we can walk on, has water, oxygen, and is not too close to the host star for exposure of large amount of stellar ultraviolet radiation. With 200 billion stars in our Milky Way galaxy, 11 billion exoplanets are expected to habitable. We have found that our nearest star Alpha Centauri (actually a binary stars system) has a habitable exoplanet. (Fig. 8b). It takes over 4 years for light generated at Alpha Centauri to reach to our earth, which means it will take over 4 years for us traveling at the speed of light to reach the exoplanet. With current technology a spacecraft will take 18 thousands years to go to the planet. Hence for survivability, we need to develop much more advanced technology and keep exploring for exoplanetary search.

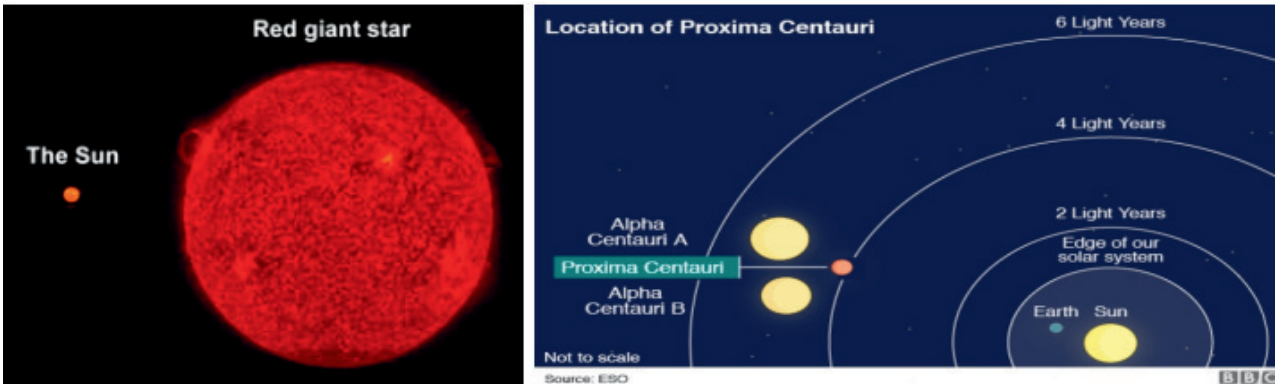

Fig.9 a) The Sun (smaller one) today and will be a red giant (bigger one) after depletion of all hydrogen fuel, b) our nearest star Alpha Centauri has a habitable exoplanet

7. Multidisciplinary research: astronomy and medical treatment:

Astronomy deals with all ranges of photons that are emitted from objects in space. For example, a black hole, Fig 10a, can be detected by the X-rays emitted around it. Fig.10 shows existence of a black hole in the blue color region representing the most energetic x-ray source in Centaurus A galaxy. Other colors represent low energy radiation. X-ray spectroscopy is needed to study black hole. The other sign of the black hole in Fig.10a is the jet of materials shooting out of the center. Fig. 10b shows x-ray set-up in a medical facility for diagnosis. X-rays are created when electrons from anode travel to cathode under a high voltage between them and hit cathode and decelerate. Although x-rays from these machines are less energetic than those around the black hole, they follow the same physics, and thus x-ray is the connection between the two fields. Typically a radio-sensitive agent with heavy elements is inserted in a body and the carrier deposit it

in the malignant area. When x-rays are shone on the area, the heavy elements interact with the x-rays and eject electrons. The bad cells are killed when these electrons get bind to them. We can predict through spectroscopy at what x-ray energies there will be maximum number of ejected electrons for most efficient cell destruction. Based on this idea we proposed a method ”Resonant Nano-Plasma Theranostics” or RNPT (Pradhan, Yu, Nahar et al 2007). RNPT drew considerable attention at the novelty of method when we presented the results. The Astronomy Magazine in the US published an article ”What has astronomy done for you lately?” it listed 4 items which are contributions of astronomy for use of general populations and our proposed method RNPT is one of them. The other three are GPS, wireless internet, optics of laser eye surgery using that of the James Webb Space Telescope all of which were invented under Astronomy.

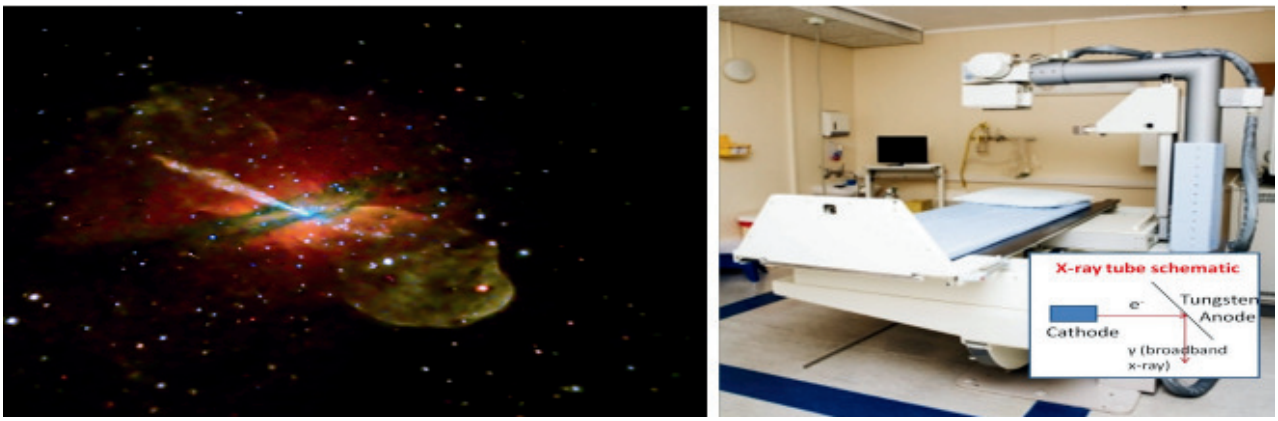

Fig. 10 a) High energy X-ray emission in the blue circle area from around a black hole. b) X-ray machine for diagnosis in the medical facility.

Editorial Sessions for An-Nisa 2023 :
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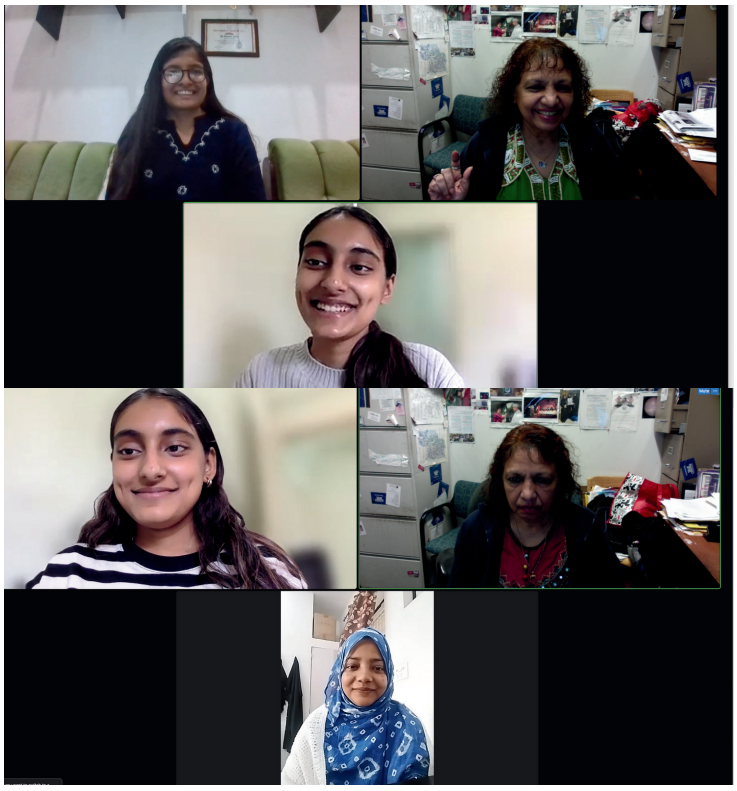

COLLAGE; INAGURATION OF THE APJAK STEM ER CENTRE, KASHMIR AND EGYPYT CHAPTERS OF ISMWS