



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



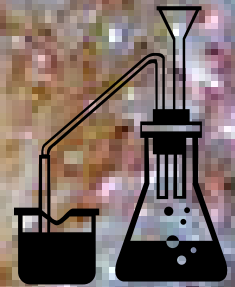
**International Society of Muslim Women in Science
present an e-magazine for women in STEM**

An-Nisa

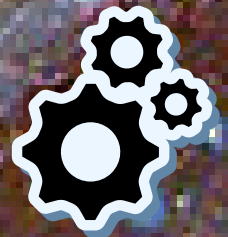
Breaking the Bias

Celebrating the success of Women in STEM

**Wishing all the wonderful women of this world a very happy International
Women's Day, 2022**



$$E = mc^2$$



**Published under the Indo-US APJ Abdul Kalam STEM Education and Research Center of
AMU and OSU**

Aligarh Muslim University, India, and The Ohio State University, USA

March 2022

[/home/deneb/nahar/Desktop/PICTURES/egypt2015/compwksp-cairou15.jpg](#)

INAUGURATION of 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 extraordinary 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

ORGANIZERS:

International Women's Day (IWD): Event organization, An-Nisa compilation and publication

Sponsors: Indo-US STEM Education and Research Center of OSU and AMU,

International Society of Muslim Women in Science (ISMWS)

Program: Dr. Hala, Prof. Sultana N. Nahar

Recongnition: Dr. Hala, Prof. Tauheed, Prof. Pradhan, Prof. S.N. Nahar

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Student members: 30

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Assistant Editor: Dr. Nida Rehmani (Named the magazine)

Design and Format: Prof. Sultana Nahar and Alvia Farheen

Student Editor: Alvia Farheen

Assistance: Dr. Swaleha Naseem

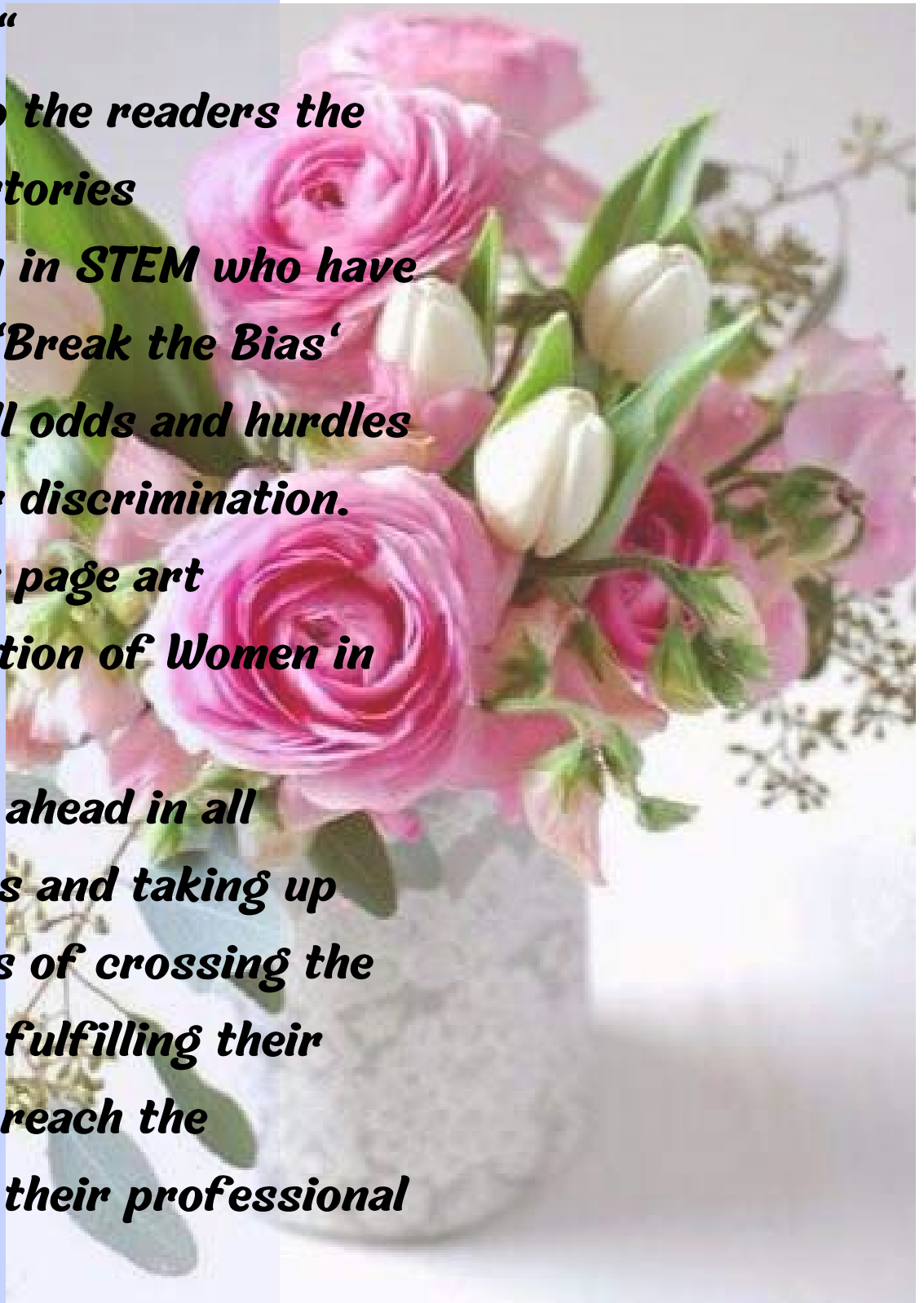
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“An-Nisa”

brings to the readers the success stories of women in STEM who have dared to ‘Break the Bias’ despite all odds and hurdles of gender discrimination.

The cover page art is a depiction of Women in STEM

marching ahead in all disciplines and taking up challenges of crossing the barriers, fulfilling their dream to reach the zenith of their professional careers.



Contents

IWD 2022 and a History since 2014	1
Message of OSU Vice Provost Prof. Gill Latz, USA	2
Message from OSU Director Prof. Anil K. Pradhan, APJ STEM ER Center of OSU-AMU, USA	3
Message from OSU Co-Director: International Women’s Day 2022, Prof. Sultana Nahar, APJ STEM ER Center of OSU-AMU, USA	4
Message from AMU Director Prof. Tauheed Ahmad, APJ STEM ER Center of OSU-AMU, India	5
Editorial Remarks from AMU Co-Director Prof. Farukh Arjmand, APJ STEM ER Center of OSU-AMU, India	6
Message from Co-Director Prof. Ekram Khan, APJ STEM ER Center of OSU-AMU, India	7
Message from the President, ISMWS at AMU Student Chapter, Ms. Alvia Farheen, OSU-AMU, India	8
International Society of Muslim Women in Science (ISMWS), Prof. Sultana Nahar, Founder, The Ohio State University, USA	9
<i>How I became a successful Women in STEM</i>	14
<i>Journey Across the Continents: Lucknow to Washington DC, Dr. Hashima Hasan, NASA, USA</i>	15
<i>The Astounding Astronomy, Prof. Somaya M. Saad, Egypt</i>	17
<i>Women and a Wild (life) Science, Prof. Faiza Abbasi, India</i>	20

<i>My dreams fulfilled treading on unconventional Mathematics as my Career Choice.... Prof. Subuhi Khan, India</i>	24
<i>When I started my MS thesis... Prof. Haseena Khan, Bangladesh</i>	26
<i>FROM PROFESSOR DR.TAHMINA JOY RASHID, Prof. Tahmina Joy Rashid, Bangladesh</i>	28
<i>We All Are Connected A Spiritual Approach towards our Personal Growth, Dr. Khadije Y. Bazzi, USA</i>	33
<i>Biography of Dr. M. JAHANARA, Dr. M. Jahanara, India</i>	36
<i>Poem: "An introduction to Silences", Ms Zunaira Habib Alvi, India</i>	40
<i>My Experience as a STEM Aspirant</i>	41
<i>How my interest in science helped me fulfill my dream of studying in the US, Dr. Zeba Qadri, USA</i>	42
<i>My journey in STEM: A step towards the advancement in Science, Dr. Yusra Zaidi, USA</i>	43
<i>My passion for Science, Ms. Saman Jafri, M.Sc. Biotechnology, AMU, India</i>	45
<i>Moms in STEM – A personal perspective, Dr. Nida Rehmani, USA</i>	46
<i>Artwork: Ms. Maryam, India</i>	48
<i>Let's Talk.... Let's welcome Dr. Qudsia Tahseen, Questioned by Prof. Farukh Arjmand, India</i>	49
<i>In Conversation with Prof. Bushra Ateeq, Questioned by Prof. Farukh Arjmand, India</i>	52
<i>"My Life In Science", Prof. Sultana Nahar, USA</i>	55
<i>Collage of Center events</i>	60



INTERNATIONAL WOMEN'S DAY 2022

By Indo-US APJ Abdul Kalam STEM Education & Research Center (APJAKSTEMERC) of OSU & AMU and International Society of Muslim Women in Science (ISMWS)

March 26, 2022; Time: 7:00 PM (India)/9:30 AM (EDT USA)

Zoom : <https://osu.zoom.us/j/snnahar?pwd=TkJvNnptTzRQSEZ4c3RWZzBDV2pSZz09> (Zoom ID – 6656647991 & Pwd – 330775)
Organizing Committee – Sultana N Nahar, Farukh Arjmand, Hala, Alvia Farheen, and ISMWS team

Invited Speakers				Program	
				7:00-7:02	Introduction by Sultana N. Nahar (OSU, ISMWS, Co-Director of APJAKSTEMERC)
<i>Dr. Subuhi Khan (AMU, India)</i>	<i>Prof. Farukh Arjmand (AMU, India)</i>	<i>Dr. Somaya Saad (NRIAG, Egypt)</i>	<i>Chief Guest Dr. Hashima Hassan (NASA, USA)</i>	7:02-7:05	Telawat-e Quran by Dr. Bazigha Dhuru and Ayesha Syed
				7:05-7:15	Welcome by APJAKSTEMERC Directors
<i>Prof. S. N. Nahar (OSU, USA)</i>	<i>Alvia Farheen (AMU, India)</i>	<i>Dr. Usra Zaidi (Augusta University, USA)</i>	<i>Dr. Fatma Azmi (Al-Azhar Univ., Egypt)</i>	7:15-7:20	Release of e-magazine by Dr. Farukh and Dr. Sultana
				7:20-7:35	Chief Guest, Dr. Hashima Hassan (NASA, USA)
				7:35-7:45	Prof. Somaya Saad (NRIAG, Egypt)
				7:45-7:52	Prof. Farukh Arjmand (AMU, India)
				7:52-8:00	Prof. Subuhi Khan (AMU, India)
				8:00-8:05	Dr. Usra Zaidi (Augusta University, USA)
				8:05-8:10	Prof. Fatma Azmi (Al-Azhar Univ., Egypt)
				8:10-8:15	Alvia Farheen (AMU, India)
				8:10-8:20	Prof. Sultana N. Nahar (OSU, USA)
				8:20-8:30	Recognition By ISMWS (Dr. Hala)
				8:30-9:30	Introduction by Participants (limited to ONE minute)

"IWD 2022 and a History since 2014"

Celebration of the International Women's Day by The Ohio State University, Aligarh Muslim University and International Society of Muslim Women in Science in Aligarh Muslim University

The Ohio State University (OSU) received a USIEF grant, the 21st Century Obama-Singh Knowledge initiative award (2013-2017), for the project of faculty training of postgraduate students in STEM in partnership with Aligarh Muslim University (AMU). Under the project, OSU Associate Director Prof. Sultana N. Nahar initiated at AMU in 2014 the celebration of the International Women's Day (IWD) with sponsors, Physics Department of AMU and International Society of Muslim Women in Science (ISMWS) that she founded at OSU in 2010. AMU has quite a number of ISMWS members. The celebration was in the form of a mini-conference with presentations and recognition of women, teachers, students, researchers who had been contributing significantly to education and research and are inspiration to others.

The tradition has continued to present, 2022 where Physics sponsorship changed to the Indo-US APJ Abdul Kalam STEM Education and Research Center of OSU and AMU since 2018. The program has been an enthusiastic and favorite of many female members of AMU, particularly in STEM and ISMWS.

In 2021, a chapter of ISMWS was founded officially at AMU at the IWD event and a committee of students and faculty members was formed.

In 2022, the IWD celebration introduced the e-magazine An-Nisa which tells the stories of extraordinary women who are not in the books but are making the history in advances by contribution science, technology, engineering, and mathematics.

Message of OSU Vice Provost Prof. Gill Latz



Gil Latz, PhD
**Vice Provost for Global Strategies and
International Affairs**
Professor of Geography
The Ohio State University, USA

As the Vice Provost for Global Strategies and International Affairs at The Ohio State University, I congratulate the success of all who joined the recent observation of International Women's Day organized by the Indo-US APJ Abdul Kalam STEM Education & Research Center, Ohio State & AMU, and the International Society of Muslim Women in Science.

This exciting event highlighted the importance of contributions by women in STEM fields, with attendees from Bangladesh, Egypt, India, Pakistan, Saudi Arabia, and the United States, among others.

Women are now, and have always been, agents of change, and the future of STEM looks ever brighter with the inclusion of brilliant, innovative women involved at all levels.

I offer my best wishes on the release of An-Nisa, the first e-magazine featuring women in STEM.



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**

It is a great pleasure to congratulate the International Society of Muslim Women in Science (ISMWS) for its success in bringing out this e-Magazine and the APJ Abdul Kalam Center for sponsoring it as an integral part of its mission to support women and minorities. The ISMWS founder and President Prof. Sultana Nahar and the AMU Center Co-Director Prof. Farukh Arjmand and their team deserve enormous credit for their hard work and dedication .

The Indo-US APJ Abdul Kalam Center for STEM Education and Research, a joint venture between the Aligarh Muslim University and the Ohio State University, is proud to celebrate the success of women in STEM through this e-Magazine. The Center is especially dedicated to sponsor projects to advance women and underprivileged minorities to attract them to pursue STEM education, leading to higher degrees and career opportunities in India and abroad. The alumni of our programs -- half of whom are women -- are now successfully placed in research and teaching positions in the US and India.

The Center is led by dynamic and highly accomplished women scientists, consisting of Co-directors Prof. Farukh Arjmand and Prof. Sultana Nahar, who are illustrious role models for young women. The e-Magazine is a particularly appropriate forum for dissemination of vital information and advice for aspiring young women from many countries who face daunting prospects in the pursuance of a career, to derive moral encouragement and practical support to bear the dual burden and balance family and professional obligations. Perhaps it is worth noting that it would therefore be helpful to involve men in STEM in this endeavor as well for support, and to publicize such activities widely so that everyone is aware of the problems and challenges women face and how they might be mitigated. Success of women in STEM deserves not only recognition, so well highlighted herein, but also to illuminate the path forward for next generations to follow.

"3.26.22 International Women's Day at APJAK Center and ISMWS magazine An Nisa

Urdu:

Qayam unhi se rahti duniya ki dastaan

Chupchap kayanat sambhalay hain An Nisa

English:

History of the world depends on them

Quietly the women take care of the Universe"



Message from OSU Co-Director: International Women's Day 2022

**Prof. Sultana N. Nahar,
Co-Director of APJ STEM ER Center of OSU and AMU,
The Ohio State University, USA**

Assalamu alaikum.

I am honored for the opportunity to make some remarks on the values that I believe and follow.

- Knowledge is a necessity of life. We are powerless without it.**
- Science is wonderful. It explains the amazing mysteries of nature, the laws that govern them and implements them for the benefits and advancement of humanity.**
- The more we know the universe, the nature, the human functions, living beings, the more beauty we see, the more power and control we achieve to solve problems, and the more we admire Allah and His creations**
- Make a practice in your life to keep some hours everyday regardless what part of the day to detach and nurture and utilize the intellectual power. Detachment is needed for any thoughtful work.**
- In the field of knowledge there is no space for differences in cultures, personal feelings, opinions, believes. As we believe, Allah has created everyone equally and gives each knowledge regardless of any difference.**
- It is very important for Muslims in India to be on par with other groups and contribute to successes.**

- Make your effort and form a united front to support each other.**
- Make a practice of helping or supporting when someone is doing something good or productive, regardless of your opinion of the person. Make only positive comments.**
- If you have zero comments, remain quiet instead of initiating something**
- If you have a negative point to make of someone, be patient and tell yourself "I will not make any comment".**
- Keep your own identity and learn to live with diversity.**
- Islam says that when we die, our Book of Credit is closed. It also says that three things can keep the book open:**
 - i) Leave a good child behind, each time he/she prays or does some good, credits are added to the book**
 - ii) Write a book that gives knowledge to others. Credits are added as long as the book is useful**
 - iii) Leave a trust or mosque behind. Credits are added as long as people are benefited from it**
- May Allah bless every one of you with knowledge, successes and happiness (Ameen).**



Message from AMU Director

Prof. Tauheed Ahmad

**AMU Director, APJ Abdul Kalam STEM-ER
Center of A.M.U, Aligarh, India & OSU, USA,
INDIA**

On behalf of Indo-US APJ Abdul Kalam STEM Education & Research Center and on my own behalf I would like to send my best wishes and congratulate all the women on the globe for this special day of International Women’s Day 2022. This day was recognized by the United Nation in 1977 and in 1996, the UN announced “Celebrating the past, planning for the future” as the theme for Women’s Day. Since then, every year a theme is given to mark the celebrations and this year’s theme is Gender equality today for a sustainable tomorrow”, which aims to recognise women who are working to build a more sustainable future. The campaigning theme is “Break the Bias”. Undoubtedly, in today’s world it is unthinkable to be complete without the enthusiastic support of women. It is worthless to mention that women are contributing equally in every field of the work from STEM education to medical services, research laboratories to space programs, in military to flying the aircraft, virtually there is nothing which women can not do; they are equally competent. We should work together with equal partnership and definitely the future will be more sustainable. In the end I must emphasize with great appreciation that International Society of Muslim Women in Science (ISMWS) is also performing excellent in the field of science and technology. I appreciate all those who have contributed to this e-magazine. My best wishes to all.



Editorial remarks from AMU Co-Director

Professor Farukh Arjmand

Department of Chemistry

Co-Director of APJ Abdul Kalam Centre for STEM ER

Joint Indo-US AMU-OSU collaborative venture

Aligarh Muslim University, India

It gives me immense pleasure to bring out this e-magazine sharing the success stories of women in STEM on the eve of International Women's day, 8th March 22 themed "Breaking the Bias". First of all, I would like to congratulate all the women achievers who in their capacity have contributed big or small as nation builders, mothers and daughters alike who were resilient and dared to resist the hurdles, fathers who gave unflinching support to their daughters and always believed in them, to brothers who think that sisters are not only sugar candy but need to be loved and respected and to teachers, mentors, CEO's and bosses who help to shape the career of women, and give them space to grow under all circumstances.

This year's theme of International Women's day is "Breaking the Bias". So, who will ring the bell? or where do we begin in breaking the bias. It is an important question to ask and to ponder. Most of us would immediately rush to answer this question and reply "School" but friends, in my opinion, it is much earlier than school as it starts from 'Home'. They say a mother is the first teacher of a child but I, on the contrary strongly believe that a father in his capacity as "head of the family" can empower their female child, help her mother to spin the yarn of 'safe nest, stand firmly to liberate her by granting equal rights of education and to cherish her dreams. Having said this, School does not play a smaller role but definitely, it's the second home where especially primary school teachers stamp the young minds with long-lasting impressions of their words of wisdom, teach them the language of love and kindness, and unravel the science of life. We are, therefore, nurtured with STEM (Science, Technology, Engineering, and Mathematics) disciplines as early as childhood and with Nature, being our great teacher.

I still remember being fascinated by the green colour of lush grass lawns in my school and different hues of trees in different seasons and beautiful bright petals of flowers in the beautiful valley of Kashmir which would baffle my young mind and later, in my chemistry classes, I learned that it was a result of charge transfer transitions of electrons from higher energy levels to lower levels on the absorption of light photons. Similarly, I learned quietly about the energy forms of ATP and that it was responsible for driving many important biochemical reactions including signal transduction and stimulation of nerve ends for muscle contractions. Watson and Crick DNA base pair sequencing won the Nobel prize, yet very few know the truth that it was Rosalind Franklin

who produced the first photograph of DNA, unravelling the mystery of life but was discriminated against by ignoring her contribution to the Noble prize. This photo was the missing piece of the puzzle that enabled these scientists to fully understand the life molecule, DNA. With all hype in media on women empowerment, the fact is that less has changed for women and the prejudice and gender discrimination are deep-rooted. Women in rural and far-flung areas are bearing the brunt of this biased social system much more.

The first lesson well-learned should be an open un-discriminative mind, unbiased system defying all conventional norms from all stakeholders of our society. Women need to equally contribute to society and therefore, they should work hard to look for opportunities in lucrative skill-based STEM –disciplines and never remain under-educated / underpaid or tolerate the brunt of gender inequalities. Let women dream “Big” and we all help them to fulfil and turn their failures into success stories....



Message from Co-Director Prof. Ekram Khan

**Indo-US APJ Abdul Kalam STEM Education and
Research Center of OSU and AMU
Department of Electronics Engineering, Aligarh
Muslim University, Aligarh-202002, India**

It is a matter of great pleasure to know that Indo-US APJ Abdul Kalam Center for STEM Education and Research, AMU Aligarh is bringing out an e-Magazine containing the contributions from leading women scientists on the occasion of International Women’s Day. It is a modest effort by the center to celebrate the success of women in STEM through this e-Magazine. Since its inception, the APJ Abdul Kalam STEM center, which is a joint venture between the Aligarh Muslim University (India) and the Ohio State University (US), is motivating women and underprivileged minorities to pursue STEM education, leading to higher degrees and career opportunities in India and abroad. The alumni of our programs -- half of whom are women -- are now successfully placed in research and teaching positions in the US and India. The center is presently led by two dynamic and highly accomplished women scientists and Co-directors Prof. Farukh Arjmand and Prof. Sultana Nahar. I would like to congratulate them and entire editorial team to publish this e-Magazine, which will provide an appropriate forum for dissemination of scientific information and motivation for aspiring young women to pursue their career in STEM education and research.



Message from the President, ISMWS at AMU

Alvia Farheen

President of ISMWS Student's Chapter,

Student Editor: An Nisa

APJ STEM ER Center of OSU and AMU, India

B.Sc. Hons. Zoology at Aligarh Muslim University

Greetings Dear Readers!

Welcome to our first issue of the time, one that celebrates the success of women in STEM. Its my honor as well as pleasure to be confronting with my readers.

For sure, women are the most beautiful creation of God. But trust me this is where the problem begins. The world is full of stereotypical people who have a 100% faith in women that they are no more than a beautiful piece of art which needs to be kept safe at home. It is believed that women are delicate and innocent, and they can't bear the heat of the challenges in the path of an established career, that they can't match pace with the fast-moving world.

However, women have always proven otherwise. They have presented themselves as the strongest being that has ever walked on land, so fierce that no heat could ever bruise them down. Yes, they walk slow because women have to face more barriers than men in regards to career or even choice of a career. But they are persistent and patient. They defy the challenges and succeed.

Scientific studies have shown that there is no significant biological difference between the structure and function of brain, human cognitive development, hormonal effects on performance or even the evolutionary genomics of a male and a female. The global competition is at a hike and in order to continue being a part of the race, a nation needs the maximum of the talent and creativity available. Therefore, it is important that "all" of its people participate, i.e., both men and women. Gender diversity will create room for innovations and development.

Our aim is to put forward the stories of amazing women in the field of science, to celebrate their achievements, to help the world recognize them for their contributions towards science and to inspire young girls to explore and grow their scientific interests.

This magazine cherishes the women scientists of the world who broke all norms, stood firm on their grounds and reached the heights of success.

I salute all the women in STEM and I hope to inspire young girls to develop a scientific mindset and shine.

Regards

Alvia Farheen

International Society of Muslim Women in Science (ISMWS)

Prof. Sultana N. Nahar

Founder and President, ISMWS

Department of Astronomy, The Ohio State University,, Columbus, Ohio, USA

Exactly one year ago, in March 2021, during the celebration of the International Women's Day (IWD), a chapter of the International Society of Muslim Women in Science (ISMWS) was founded at Aligarh Muslim University under the Indo-US APJ Abdul Kalam STEM Education and Research Center of the Ohio State University (OSU) and Aligarh Muslim University (AMU) by the founder and president of ISMWS Prof. Sultana N. Nahar of OSU Astronomy and OSU Co-Director of the STEM Education and Research Center (APJAKSTEMERC). A committee of students and faculty members was formed with Alvia Fahreen, a Zoology undergraduate, as the first president with two other students as treasurer and secretary and the female members of the STEM Center, Prof. Farukh Arjmand, Dr. Hala, Dr. Swaleha Naseem, Dr. Nida Rehmani, Dr. Sabiha Parveen, and Prof. Sultana N. Nahar as the advisors.

COVID-19 pandemic continued inflicting the world, traveling was highly restricted, social gatherings were banned. Alvia had only limited scope for recruiting ISMWS members, but her courage and human side made her to organize a fund raising group to distribute food to the poor in Aligarh, devote to her study, write a research paper, and received a research grant from Frank and Debbie Incubation Center at AMU. She aims pursuing her Ph.D. degree at a US university, but the fees for the required tests for admissions are expensive. ISMWS decided to give a special recognition with an honorarium of Rs. 15000 to Alvia toward her achieving higher degree. This is one example of ISMWS activities.

OBJECTIVES OF ISMWS:

ISMWS was founded in 2010 by Prof. Sultana N. Nahar of OSU with the following objectives and principles:

- form a network of Muslim females for moral support, encouragement for science and research, - exchange information on higher education, jobs, fellowships, and secure grant
- respect the identity of each person, regardless of any regional, cultural differences, and help in self-confidence
- Motto: "Stay in Science (Basic or Applied)"
- Practice: "Keep some hours for intellectual nourishment everyday regardless which part of the day"
- Believe: "The more we use our brain and mind, the more beautiful we look.
- Islam encourages knowledge for both men and women.

NEED FOR A SOCIETY



Figure 1

The need for a society of Muslim women in science was realized by a number of facts. In general, Muslim females scientists face more environmental problems and less resources in carrying out research than others. At her participation in an international conference held in Egypt in 2008 and later connections to Middle Eastern universities Nahar met modest, dedicated, highly motivated and inquisitive Muslim female scientists carrying out their research largely in isolation, with no collaboration with colleagues from developed countries, even in their own countries. They are eager but face difficulties finding and communicating male collaborators who are usually more experienced, and are not even aware of other female collaborators in the field or how to connect with them. The female professor of University of Khartoum in Sudan, who inspired Nahar for a society, in left picture and Prof. Muneera of Dammam University of Saudi Arabia (in the middle of right picture of Figure 1) are such examples. Nahar connected Prof. Muneera to Prof. Burcin of Miami University in Ohio (ISMWS member) for her research interest in laser physics.

They are also aware of the negative criticisms of others arising from cultural differences and find difficulties in becoming strong partners in the modern world. They (including Nahar herself) face criticisms, such as, prayers are quoted as strange gestures, odhu (cleaning before prayer) in the restrooms not welcomed or get non-supportive expression, burqa or abeya covering as forced slavery, fasting as health risk ritual etc. Nahar's Nigerian student told her at the International School of Young Astronomers of International Astronomical Union “I never had a Muslim friend. Muslims don't value education”.

However, they need to know that inside the modest abaya, they are as lively as others, whether she is in India or Saudi Arabia. At Begum Sultana Jahan hall function in AMU, India (left of Figure 2), a girl in abeya but sparking eyes picked up the first prize from Nahar for her fast Bollywood dance before going out to her parents. Highly fashionable Physics undergrad students at Taibah University in Saudi Arabia put on their abeya so they can take picture with Nahar after her lecture (right of Figure 2).



Figure 2

It is not known in general that Université Al Quaraouiyine in Morocco is the first degree awarding and the oldest existing university which was founded in 859 by a Muslim female Fatima al-Fihri (UNESCO and Guinness World Records) (Left of Figure 3). The largest female university is Princess Nora University in Saudi Arabia with over 60,000 students (Right Fig. 3)



Figure 3

There has been progress. In 2009. An American professor, Dr. Conner, at United Arab Emirates University asked her science students to present a modern day female Muslim scientist to the university event and found Nahar. She took special permission for parents of each student on the project so they can stay late to interview Nahar. Their presentation (Left of Fig. 4) concluded “Women are smart” and the student who asked the maximum number of questions, Amira, later became a lecturer of Mathematics. It is the conclusion that all Muslim girls need to believe inside them. After about 11 years, Sarah Al Amiri became the Deputy Program Manager for the Mars Mission of UAE (middle of Fig. 4). Eight years later, Dr. Maryam Mirzakhani received the Fields medal of Mathematics (right, Fig. 4)



F

ig. 4

ISMWS ACTIVITIES

Inspired by ISMWS: Kashmir U, and Women's College, TOP: L and R: Kashmir University lecute 2016, Bottom: Ladhak girl in complete while dress wanted to recite the Quran to express happiness, R: Burqa girl in the middle won the topmost prize in physics.





Fig. 5

Current Activities: i) Lectures,

ii) Networking,

iii) Connecting for scientific

collaboration,

iv) Sharing success news in ISMWS newsletters,

v) Circulate useful scientific news,

vi) Circulate scholarship opportunities and job openings,

vii) Help with information for higher education in the US,

viii) Celebrate International Women's Day,

ix) Give recognition for excellence

Fig.6 Recognition to an Iraqi student, A math female student wrote an outstanding Ph.D. thesis with critical health condition and received recognition from ISMWS.



NETWORKING:



Fig 7.

ACAG5: Prof. Lotfia El Nadi of Cairo University and Prof. Somaya Saad of National Research Institute of Astronomy and Geophysics (NRIAG) with the first female Guest of Honor in the Arab conference of Astronomy and Geophysics. Three together worked on many projects together successfully, R: WSU special women session with Nahar. Three ISMWS members in the group would receive the best Ph.D. thesis prizes, Bazzi is researcher and writer of the book We All are Connected.

IMPACT:

Members: Over 350 from 31 countries

1. USA, 2. Afghanistan, 3. Algeria, 4. Bangladesh, 5. Canada, 6. Egypt, 7. England, 8. Ghana, 9. India, 10. Indonesia, 11. Iran, 12. Iraq, 13. Jordan, 14. Kenya, 15. Kuwait, 16. Lebanon, 17. Malaysia, 18. Morocco, 19. Nigeria, 20. Oman, 21. Pakistan, 22. Palestine, 23. Russia, 24. Saudi Arabia, 25. Somalia, 26. Sri Lanka, 27. Sudan, 28. Syria, 29. Turkey, 30. United Arab Emirates, 31. Yemen

- "ISMWS at Ohio State" is the student chapter at OSU
- ISMWS has a chapter at East Carolina University
- ISMWS has been the topic of research project at Georgia Tech, Florida International University, OSU

ISMWS featured at i) Western Washington University, physics course, Voice of America, American Physical Society, OSU media, public talks, etc.

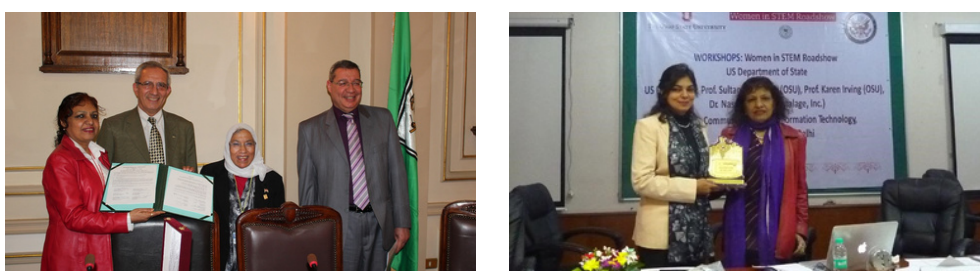


Fig. 8 Left. MOA between OSU and Cairo Univeristy coordinated by ISMWS members Prof. Lotfia El Nadi and Nahar, Right: ISMWS member Prof. Noor-e-Zahra being recognized for her contributions for the Delhi workshop with program director Nahar.

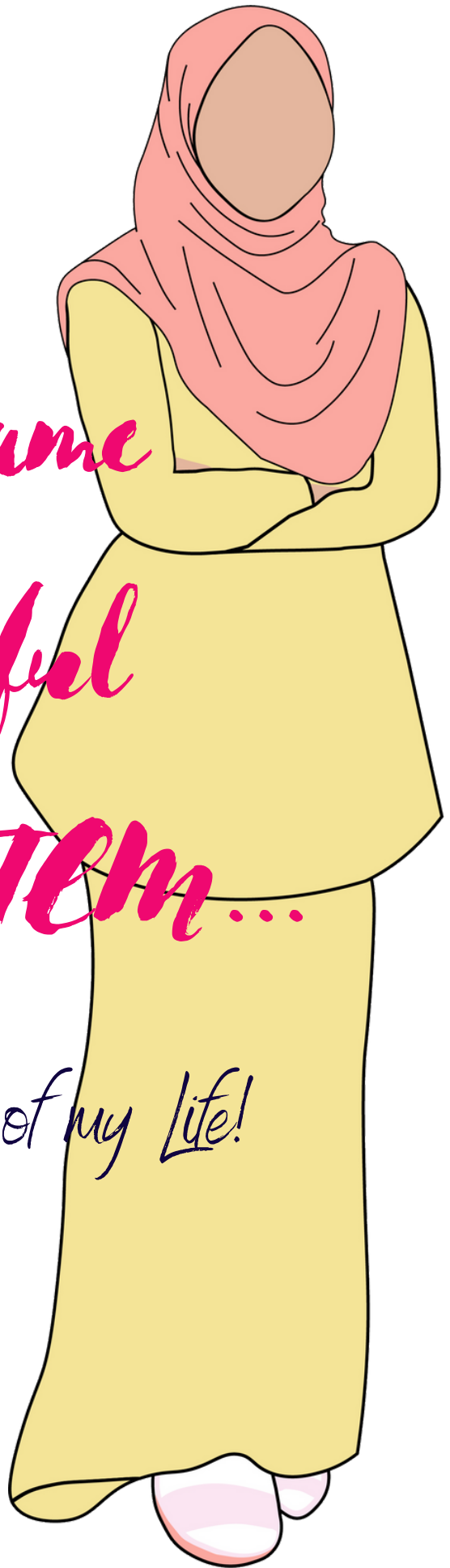


Fig. 9. Left: ISMWS members, since her start of graduate school at Indian School of Mines came to OSU on a prestigious Indo-US fellowship to work with Nahar. She is with Nobel laureate Ketterele at APS conference whose online lectures she used to listen to. Right: Workshop at Kurnool being address by US Cuncelor Muller, Nahar held it with help of ISMWS member Dr. Nasreen Haque, also in the picture. It was the first time that Kurnool was visited by a high US official.

ISMWS network connected Cairo University to make MOA with AMU, connected NIT-Kashmir professor to Dhaka University, introduced research scopes in Bangladesh, India, Morocco, Turkish members

*How I became
a successful
Women in STEM...*

Well, that's the story of my life!





Journey Across the Continents: Lucknow to Washington DC

Dr. Hashima Hasan
Deputy Program Scientist of DWST,
NASA Headquarter, Washington DC, USA
December 2021

What are the odds of a girl child born in the newly formed Republic of India to become a Program Scientist at NASA? I dared to dream against those odds when my Class VI teacher, Mrs. Fernandez, in Loreto Convent, Lucknow, told us that we could achieve what we wanted if we worked hard. Taking her words to heart, I determined to follow my uncle, Dr. Nurul Hasan, his cousins and uncles to Oxford University. The inspiration to pursue space science was born in me when in 1957, my grandmother gathered the entire family in the backyard of our home in the early dawn to watch Sputnik pass by. My great uncle, Dr. Husain Zaheer, Director General of India's Council of Scientific and Industrial Research (CSIR), and later my aunt, Dr. Najma Zaheer, were the scientists whose path I sought to follow. Most of all, I owe it to my mother, who had faith in me and encouraged me to pursue my ambitions.

I completed my B.Sc. at Lucknow University, securing fifth position, and went on to Aligarh Muslim University (AMU), where I completed my M.Sc. (Physics), securing the first position and a gold medal. I started a Ph. D. program under the tutelage of the legendary Dr. Zillur Rahman Khan. I had completed the pre-requisite degree of M. Phil., when one rainy afternoon, I took the bold step of applying to the University of Oxford. With encouragement from Dr. Rais Ahmad, Head, Department of Physics, I applied for a Commonwealth Scholarship, and before I knew it, I was at Lady Margaret Hall, Oxford, U.K. Three years later, with a D.Phil. (Theoretical Nuclear Physics) in hand, I returned to India as a post-doctoral scholar at the Tata Institute of Fundamental Research (TIFR), Bombay. With scholars like Dr. J. V. Narlikar, and Dr. Obaid Siddiqi, TIFR was a haven of intellectual thought. After two intense years at TIFR, I secured a faculty position at the Physics Department, University of Poona, Pune. As one of the only three faculty members in the university from Uttar Pradesh (the others being the Professors of Hindi and Law), I was certainly the odd one out in the Physics Department, being the only non-Marathi speaking faculty member. The atmosphere at Poona University was welcoming, respectful, academic, and idyllic. I greatly enjoyed teaching the post graduate students, and was just completing my first year at Pune, when my family arranged a marriage for me.

My first journey across the Atlantic took me to Raleigh, NC, where I joined my new husband, Dr. Aftab Ansari. I pursued my passion for Nuclear Physics at Duke University, Durham NC, switching gears two years later to Atmospheric Science when I was awarded a Resident Research Associateship

by the U.S. National Research Council. A year later, we were back in India, this time with an infant son. My first experience as a working mother came when I started research in Nuclear Physics at the Bhabha Atomic Research Center, Mumbai, on a CSIR Fellowship. When our second son arrived, we returned to USA. That's when my journey took a turn towards NASA.

Finding myself in Baltimore, I sought research opportunities and was hired by the newly formed Space Telescope Science Institute to write the simulation software for the optics of the soon to be launched Hubble Space Telescope and its science instruments. Never one to turn down a challenge, I once again switched gears from Nuclear Physics – this time towards optics and Astronomy. Little did I know that a few years later I would be using my software to analyze the optical error of the Hubble mirror and would be assigned the responsibility of keeping Hubble in the best focus till a fix was designed. Once Hubble was repaired after the first servicing mission, I took advantage of an opportunity at NASA Headquarters, Washington DC, to work as a Senior Scientist.

Thus started my career in science management. There is never a dull moment at NASA Headquarters. Every second keeps one intellectually on the edge – whether it is involvement in the strategic planning for the next flight mission; the solicitation, review and selection of new technology, research program, payloads on sounding rockets and balloons; the next Explorer mission; direction of the data archives; or management of advisory committees and communication with educators and the public. In the 27 years I have been at NASA Headquarters, I have managed every aspect of Astrophysics.

At this time, I would like to mention just one of my responsibilities – Deputy Program Scientist< James Webb Space Telescope. I have been a part of JWST since the first science conference held in Baltimore in 1989 to discuss a successor to the Hubble Space Telescope.

After joining NASA Headquarters and being appointed the Program Scientist I shepherded the Next Generation Space Telescope (NGST) – later named the James Webb Space Telescope (JWST) – through its early phases when the science requirements were defined, early technology development took place, and the science instruments were selected.

Currently, as the JWST Deputy Program Scientist, my responsibilities included oversight during the mission development phase to ensure that the science requirements were being met, and the best science observation program selected for the operation phase.

Furthermore, I am a spokesperson for JWST to the media, and deliver invited talks to school students. After many years of hard work with its partners, the European Space Agency, and the Canadian Space Agency, NASA launched JWST on December 25, 2021.

This was an exhilarating moment for me, the entire JWST team and indeed the entire world. This amazing observatory is now at its parking orbit 1.5 million km from Earth. Operating in the infrared, its scientific goal is show us the formation of the first stars and galaxies, tell us about exoplanets, the formation of elements that make up life, and much more. Once in operation, JWST will show us wonders of the Universe we have never seen before. We are eagerly waiting for those first science images. I gaze at the night skies at my home in USA with the same wonder that I gazed at it as a little girl in Lucknow – it is the same sky with the same mysteries waiting for us to discover!



The astounding Astronomy

Prof. Somaya M. Saad
Director of Cottamiya Observatory,
Astrophysics at Astronomy Dept. National
Research Institute of Astronomy and
Geophysics (NRIAG),
Helwan, Egypt

I have held many positions, through which I have contributed to the development of scientific plans and policies for the astronomy Department and large telescope at the Kottamia Astronomical Observatory, where I worked for a period as head of the stellar astronomy laboratory and head of the Astronomy Department, which gave me the opportunity to contribute to institutional building in the field of astronomy, providing opportunities for researches and creating an encouraging environment for scientific research and building capacities in the Astronomy Department.

MEMBERSHIPS:

- Member of the International Astronomical Union (IAU)
- Member of the Committee of Space Research COSPAR
- Member of the Arab Association of Astronomy and Space science
- Member of the National Committee of Astronomy (ASRT)
- Member of the Scientific Society of Astronomy and Space Science
- Member of the International Society of Muslim Women (ISMWS)
- Member of the African Astronomical Society AfAS and its Subcommittee AfNWA
- Member of the American Physical Society (APS)

I am reviewer in the Journal of Advanced Physics (JAP) and the NRIAG Journal of Astronomy and Geophysics, and also act as referee for the MSc and PhD theses.

I was a post doctor fellow for one year 2000-2001 at “Seoul National University” Astronomy Dept. South Korea, through it I worked on two research projects, "Distances of Globular Clusters Based on Hippocras Parallaxes of Nearby Sub dwarfs” and “RR-Lyrae Stars in Globular Clusters “. I also was a post doctor fellow for two years 2002-2004 at “the Astronomical Institute of the Czech Republic, Ondrejov”, working in the project of “Physics of Hot Stars and Stellar Systems with hot Components”.

I worked as a principal investigator for two international projects in cooperation’s with Andrejov Observatory, Czech Republic in the physics of hot stars and now I am a member of an international cooperation project with Bulgaria. I also contributed in the establishment of the Kottamia center of scientific excellence in astronomy and space sciences in Egypt funded by the Science Technology Development Fund STDF No. 5217. <https://www.nriag.sci.eg/3187-2/>.

CONFERENCES AND MEETINGS:

1.Participating in the International School of Young astronomer – XXI, ISYA, Cairo, Egypt, 14 - 29 September 1994.

2. Participating in the 1st Joint Astrophysical Workshop, NRIAG, Cairo, Egypt, and Wise Observatory, Taba, Egypt 27-29 Feb 1996.
3. Participating in the "Astro-F Korea-Japan Science Workshop", Seoul, Seoul National University, 22 – 23 Feb, 2001.
4. Participating in the NATO Advanced Summer School in "optics in astrophysics", 16 - 27 September, 2002, Institut d'Etudes Scientifiques CARGESE (Corsica - France). Ref. Dr. R. FOY (CRAL / Observatoire de Lyon - France).
1. Participating in the International Conference, Zdenek Kopal's Binary Star Legacy, Litomyal, Czech Republic, 31 March - 3 April 2004.
2. Participating in the International Conference "Active OB-Stars: Laboratories for Stellar and Circumstellar Physics" Hokkai-Gakuen University, Sapporo, Japan., 29Aug- 2Sept. 2005.
3. Participating in the International Work Shop in " Clumping in Hot-Star Winds" Potsdam, Germany 18- 22 June, 2007.
4. Participating in the International IAU Conference "1st Middle East and African Regional IAU Meeting (MEARIM-I), 5-10 April 2008, Cairo, Egypt.
5. Participating in the International IAU Conference " Binaries - Key to Comprehension of the Universe" 8-12 July 2009, Borno, Czech Republic.
6. Participating 1st Arabic Conference of Astronomy and Geophysics, (ACAG1), 21-23 Oct... 2008 Helwan, Cairo.
7. Participating in the 2nd Arabic Conference of Astronomy and Geophysics, (ACAG2), 25-28 Oct Helwan, Cairo.
8. Participating in the 3rd Arabic Conference of Astronomy and Geophysics, (ACAG3), 8 -11 Oct 2012, Helwan, Cairo.
9. Participating in the International Meeting in " Developing and Extending Einstein's Ideas", 19-21, 2005, Cairo, Egypt.
10. Participating in the International Work Shop in "Stars, Planets and Life: Current Issues on Stellar Astronomy ", Seoul National University, South Korea 20-21 Feb. 2013.
11. Participating in the 1st Shaw workshop, 19 Dec. 2019.
12. Participating in the International WorkShop on Satellite and Space missions, development and applications 4-5 June 2016, Cairo, Egypt.
13. Organized the 40th ISYA between 26 March to 11 April 2018.
14. Organizing the 6th assembly of the "Arab Conference in Astronomy and Geophysics" ACAG-6 between 15-17 Oct. 2018.
15. Participating in the 1st Shaw-IAU Workshop on "Astronomy for Education", 17-19 Dec. 2019, Paris, France.
16. Participating in the Kavli Workshop "Transients 2020", 3-7 Feb. 2020, Cape Town, South Africa.
17. Participating in the online workshop "Astronomical Site Selection "for Egyptian Large Optical Telescope (ELOT), 9-10 June.
18. Participating in the 2nd Shaw-IAU Workshop on Astronomy for Education, 6-9 Oct. 2020, Online.

19. Participating in the IAUS 367: Education and Myitage in the era of Big Data in Astronomy, 8-12 Dec. 2020, Argentine, online.

Participating in the virtual CONFERENCE OF THE AFRICAN ASTRONOMICAL SOCIETY - AfAS, 8-11 March 2021.

I lead scientific research group in the field of stellar astrophysics and supervised seven studies for the master's degrees and four studies for PhD degree. The group also participated in the discovery of star variability, which was published in the website of the American Association of Variable Star Observers AAVSO. <https://www.nriag.sci.eg/kottamia-observatory-discoveries/>.

I am member of the National Committee for Astronomy, affiliated with the Academy of Scientific Research and Technology ASRT, which represents Egypt in the IAU, and served as Vice-Chairman of the Committee from 2015-2018 and then as Chair of the National Committee from 2018-2021 <https://www.iau.org/administration/membership/national/nca/139/>

I am also member of the African Astronomical Society AfAS and its Scientific Committee <https://www.africanastronomicalsociety.org/officers/>. I also member of the African Network of Women in Astronomy, AfNWA. <https://www.africanastronomicalsociety.org/afnwa/>.

I have participated in committees for setting technical specifications for astronomical instruments, participating in astronomical observations, and supervising research and observational plans in the Department of Astronomy.

I have contributed in the simplifying science and wrote a booklet on "The Evolution of Astronomical Observation Tools and Techniques", "Exoplanets and the Dream of Extraterrestrial Life" and on the works of Al-Hasan Ibn Al-Haytham in the occasion of the 1000th anniversary.

I have prepared brochures on the occasion of the 100th anniversary of the founding of the IAU and wrote about the transit of Mercury.

I have written articles on the occasion of the 150th anniversary of Mendeleev's periodic table of the elements, also about the stellar seismology and the astronomical phenomena and events.

Organized and participated in the celebration of the International Astronomical Year IAY 2009, International Year of Light IYL 2015 and the centenary occasion of the International Astronomical Union founded 2019.

I participate and organize workshops and training programs in the fields of astrophysics. I also organize and participates in annual events of the International Day of Girls and women in science, the International Day of Light and the International Day of Asteroids. I also participate in public seminars and lectures.

I am also the local organizer of 40th International School of Young Astronomer ISYA in Egypt 2018. <https://www.iau.org/public/images/detail/isya-egypt2018/> .

I have contributed in the astronomical awareness and education by serving as coordinator with the Office of Astronomy for Outreach OAO in Egypt

<https://sites.google.com/oao.iau.org/iauoaoonews/national-pages/Egypt> , also the Office of Astronomy for Education, OAE Coordinator <https://astro4edu.org/naec-network/EG/> and I

lead a team for this. Recently in 1 Feb. 2022, I have been chosen to manage the OAE Center Egypt, whose focus is on Arabic-speaking countries. <https://www.iau.org/news/announcements/detail/ann22006/>

I have published 55 papers in international journals and have been awarded Dr. Mahmoud Khairy Ali prize from the Academy of Scientific Research and Technology ASRT, for the years 2006 and 2013. I was also awarded the Community Service and Science Simplification prize from the Scientific Forum of the National Research Institute for Astronomical and Geophysical NRIAG in 2020.



Women and a Wild (life) Science

Prof. Faiza Abbasi

Director, UGC HRDC

Aligarh Muslim University, Aligarh, INDIA

Armed with a bachelor's degree in science comprising papers of Botany, Chemistry, and Zoology, I was determined to be a woman leader. This urge found roots in my schooldays. Indira Gandhi was my mother's ideal, I had read Benazir Bhutto's Daughter of the East in high school and had grown up on a staple of stories about illustrious women achievers like the Indian medieval queen Razia Sultan to Nobel Awardee Madame Marie Curie. I remember arguing with my parents if my name could be changed after the Mughal empress Noor Jahan! All this was in the small town of Gorakhpur in the remote reaches of eastern UP where I grew up in my ancestral home. Still trying to make a point of an education in life sciences when I had not opted for med school. Resisted the Indian middle-class big fat family pressure on a girl to become a doctor. Obviously, what else!

Here, at the Aligarh Muslim University, my advent to the Master's program in Botany and domestic life was simultaneous. One monsoon mid-morning, aged 21, when I was expecting my firstborn - this was my first year as an AMU student and as a Faculty wife, our classes were called off. The then chairperson Prof. Wazahat Hussain a plant taxonomist extraordinaire, invited us to attend the 'Salim Ali Memorial Lecture' organized by the then Centre of Wildlife and Ornithology (CWO) in AMU. I met its Dewey-eyed students huddled in a Mahindra Jeep bearing the plate of 'Stork Ecology Project' sponsored by the US Fish and Wildlife Service and I knew, that this transdisciplinary branch of study budded out of zoology was intertwined with my fate forever.

Little did I know that challenges of gender-defined roles, as well as biases, await me by the score. No one in my family supported the idea of quitting the Masters's program I was enrolled in and switching to an M.Sc in Wildlife Sciences. A little known of discipline, though very much in tandem with the changing realities of the time. The devastation of nature and

natural resources in the Anthropocene has caused unprecedented species extinctions. Scientists were lamenting more and more about the environmental catastrophe and the imperiled planet. And post-industrial revolution human societies are indicated as the pivotal causal agents. My love for animals, urge to fight for rights, and innate talent for communication found a calling. Next, I was holding a live snake in my hands on the first day of my classes at the CWO (which is also when I was full-term pregnant), taking bumpy rides on a vibrating diesel Jeep to rescue animals in the field and spending hours peeping through the telescope identifying birds standing in knee-deep wetlands. Also, this small green brigade was more like a family where instead of implementing straight-jacketed schedules and going-by-the-bell timetables, our curriculum grew organically. On-field trips the teachers were more like guides and facilitated hands-on training. Enthusiasm for teaching and learning outperformed the 9 - 5 working hours. The computer lab was important because in the late nineties the students hardly had personal ICT devices. Students, researchers, and staff could make use of the reading room and lab up to the late night. It was not imposed but expected of me and when I could not comply because of my family duties, it was awkward nonetheless. All this was manageable as long as I could get back home in time to breastfeed my newborn. Not that it was easy and smooth in a newly set up nuclear family away from home but with help of ayah (baby sitter) and caretakers I could meet the ends of my satisfaction. Then, came those parts of the curriculum when we had to travel to far-off Protected Areas and spend a few days there. My son was a four-month baby fully suckled on me when I had to leave for Keoladeo National Park in Bharatpur. Again, when I had to spend a week in Ranthambore National Park in Sawai Madhopur, Rajasthan. he was a seven-month baby partially weaned off breast milk. These were highly enriching and invigorating field excursions but much as I am still romanticized by the memory of my first live tiger in the wild sighting or long sonorous walks on the meandering dykes of grassy wetlands while no other sound except the quacking of ducks, laughing of doves and honking of gaggles of migratory geese surrounded, so is my memory punctuated by the sight of wasted breast milk and the long phone calls to home every evening. I also had to opt-out of the two months of fieldwork in Makaibari Tea Estate in Darjeeling for my dissertation as all other classmates proceeded. But I found meaning in working on the status and distribution of grey partridges *Francolinus pondicerianus* in the Gursikran forest near Aligarh. Trying my best to fill in scientific rigor and literary merit to make up for the lack of a study area in the Himalayas, or the Narcondum Island in the Andamans.

I missed the gold medal by a few marks but having completed my master's I was as confident as any professional could be. With my son above two and completely weaned off, I felt ready to take up any job. However, in the Sultanate of Oman where we had moved for a couple of years, the only job I could join was that of a school teacher which I could not continue for more than four days. The children needed to be taught the alphabet before they learned the names of endangered species. And I had neither inclination nor expertise in the former. On a job hunt with the Ministry, I was very clearly told that in field-based work, the researcher should be bilingual and a male. The gender bias started ringing with me when hitting from the outside. I spent two years developing content for websites and freelance writing for

national dailies and came back to India assuming that such gender bias will not have to be confronted in a democracy.

I was wrong. It's just that it was not clearly said in the verbal terms. I joined the doctoral research program with all sincerity of purpose at my call. However, my field area again had to be a place close by. In the initial discussion with my supervisor, I had made it clear that I can only work at a location from where I can get back home by nightfall. The nearby Sheikha Jheel (now notified as to the Sheikha Bird Sanctuary) was most appropriate and I selected the four species of sympatric egrets and herons in the lake to investigate their ecology and biology and conservation threats. Despite no lag in meeting schedules or demerits in making presentations, I felt like an underdog with other research colleagues working in far-fetched difficult field areas. A lake in Aligarh could never be equal to a National Park. Nevertheless, a strong focus on the ecological problem at hand and a strong commitment to nature conservation kept me going and I was awarded a doctorate in wildlife science. Meanwhile, my family had grown and I had a daughter too. This time the pregnancy coincided with my last few months in the field. I remember observing the roost site of emerging egrets in a woodlot near the lake with one hand balancing the binoculars on my eyes and the other feeling the fetus moving in my womb. For the study on roosting behavior, I often left home as early as 3am. Further, my six-year teaching sojourn was deeply satisfying as far as the lectures, tutorials, and student engagement went. It was reassuring to be accepted by the students as valued mentors and resource person. I had lived for it. But as I started to apply for research grants, disappointing responses were met one after another. No funding agency was interested to fund research on expanding basic evolutionary and ecological principles. Funding was meant for the star species, the glamorous locations, and for resolving man-animal conflict in protected areas. Conservation education was my passion but a researcher cannot continue without funding. I had a balanced family and the pursuit of STEM ER with immense struggle but at the end of the day, one wants decent employment. I had gotten into engaging with the IUCN (International Union for Conservation of Nature) Gland, Switzerland lately. Instead of joining a Species Specialist Group of the Species Survival Commission of IUCN, I had found my abilities to be of better use by the IUCN-CEC (Commission on Education and Communication). The CEC featured my work and I am a long-standing member of Commission. Settling for the teaching and academic leadership position at the higher education staff training college of the AMU, was a culmination of three Cs. My calling, commitment to conservation, and above all my circumstances (in this case is clearly defined by my gender). Its been ten years and I have met over 20,000 higher education teachers in India and abroad during their in-service professional development Courses. It is opportune for me to influence their minds and hearts with the scientific concerns of global warming, climate change, and sustainable development. And I never miss these opportunities of generating a public opinion in favor of nature. I have designed and integrated modules on sustainable development and environmental consciousness as prerequisites for higher education leadership. And I regularly publish in scholarly and popular periodicals to raise environmental awareness.

An added paradigm is my bilingual effort as I reach out to the Urdu knowing populace with my Urdu publications and lectures in especially designed training programs for faculty in deeni madaris (Islamic Seminaries). A much-looked-up aspect of my overall job profile is the compulsory paper on environmental studies that I teach regularly. This is in addition to the wildlife and allied electives like biostatistics and evolutionary biology that I enjoy teaching UG-level girls and boys. Further, in the Seminaries). A much-looked-up aspect of my overall job profile is the compulsory paper on environmental studies that I teach regularly. This is in addition to the wildlife and allied electives like biostatistics and evolutionary biology that I enjoy teaching UG-level girls and boys. Further, in the past few years, I have made forays in the new and interdisciplinary stream of Islamic eco-theology. I have designed a master's level paper on Quranic Ethics and Ecology and look forward to supervising some original research. Research the findings which contribute to achieving the goals of nature conservation. If humanity has a chance that is.



Despite facing the limitations of gender-defined roles and the innate gender bias, I continue to strive without any regrets. Will I suggest more girls take up STEM ER in general and wildlife science in particular? Yes. Life is good. So far.



ISMWS members on IWD 2016 at Aligarh Muslim University, ISMWS members at LEAP workshop at the Ohio State University 2019



My dreams fulfilled treading on unconventional Mathematics as my Career Choice

Dr. Subuhi Khan

Professor

Department of Mathematics

Aligarh Muslim University

Aligarh-202001, U.P., India

I was born in a Muslim family from Lucknow, Uttar Pradesh (UP) and luckily my father was a double Post-Graduate Degree holder and worked as Deputy Director at the Department of Industries of Government of India. He always encouraged me to study. We are four sisters and one brother and all of us are well-educated.

I did my early schooling at Kanpur and Moradabad, UP. I always wanted to study Mathematics and it was the computational aspect of Mathematics that fascinated me. I wanted to have a career in Mathematics since my childhood. Although the College in Moradabad did not have Mathematics in Intermediate Course. But on my special request, the College authorities introduced Mathematics teaching in Intermediate Course. My father wanted me to become a Doctor and therefore, I was admitted to PUC from Biology Stream in AMU. Due to my keen interest in Mathematics, I changed the stream from Biology to Mathematics. I obtained degrees of B.Sc. (Hons.)M.Sc.M.phil and Ph.D.(1985-1993) in Mathematics from AMU. I secured good grades throughout my educational career and was awarded Gold Medals for securing First Rank in University in both B.Sc. and M.Sc. Examinations.

After I completed my Ph. D. in 1993, I taught in the Senior Secondary School and Women's College as a temporary Lecturer. Then, I worked as a research associate till I got a temporary appointment as a Lecturer at the Mathematics Department of AMU. However, in 1997, I was selected as a permanent Lecturer. I got married in the same year and my husband was working as a Lecturer at Jamia Millia Islamia, New Delhi. I was blessed with a daughter in 1998. Fortunately, my husband also got an appointment as a Lecturer at the Department of Mathematics, AMU in the same year. Now both of us are working as Professors since 2009. My daughter is studying in the Final Year of M.B.B.S. Course.

I have the honor of being the first Indian Lady Mathematician to receive the Research Fellowship of the Italian National Agency for New Technologies, Energy and Environment (ENEA, Italy). This Fellowship provided me an opportunity to work with the renowned physicist Prof. (Dr.) Giuseppe Dattoli, Research Director at ENEA-Frascati Research Centre, Rome. I am also a recipient of the Mathematics Research Fellowship of the International Centre for Theoretical Physics (ICTP), Italy (2002) and the Senior Research Fellowship of Council of Scientific and Industrial Research (CSIR), India (1990-92). I have received several academic awards and prizes including the Best Research Paper Presentation Prize (2001) of the Indian Mathematical Society, Best Research Paper Presentation Prize

(2004) of the Bharata Ganita Parisad, and Best Research Publication Prize (2003) of the Society for Special Functions and their Applications.

My research interest includes Applicable Analysis, Special Functions Orthogonal Polynomials, and its allied topics. My job responsibilities include teaching, research work, and supervision of Ph.D. students. I enjoy a good reputation among the students and am actively engaged in research activities. I am an active scholar with an impressive and diverse range of publications. I have published 150 research papers in International journals of repute. I have supervised 13 Ph.D. Students, 10 M.Phil. Students and 02 Post-Doctoral Fellows.

I have received Honour of Recognition in 2014 and 2017 for Achievements and Contributions as a Successful Professional by the International Society of Muslim Women in Science (ISMWS). I have received the Distinguished Teacher of the Year Award jointly by ISMWS and the Department of Mathematics in 2017. Apart from being a Council Member of the Society for Special Functions and their Applications, I am also a Life Member of the Indian Mathematics Society, International Society for Muslim Women in Science, etc. I have visited many institutions in Italy, Hong Kong, the Czech Republic, Saudi Arabia, Egypt, the United Kingdom, and the USA for academic pursuit.

I have participated and presented my research work in ca.75 Conferences/Symposiums/Workshops

Besides academic achievements, I have been actively engaged in University Administration in the capacity of the Provost of Halls of residence of girls, namely, Sarojini Naidu Hall (2011-2012) and Begum Sultan Jahan Hall (2015-2017) and presently Begum Azeezun Nisa Hall (2018 till present). Based on my good experience, I was appointed as the Founder, Provost of the Begum Azeezun Nisa Hall in August 2018. I have worked tirelessly to establish this new Hall of residence for girls with a capacity of 1500 seats. I was chosen as a Member of the University Court from 16.12.2016 to 13.06.2021 and was again declared as Member of the University Court from 11.08.2020 till date. In 2019, I have completed the Leadership for Academicians Programme (LEAP), under the Ministry of Human Resource and Development, India.

It is important to mention that I was awarded a Ph.D. Degree in 1993 in Mathematics and the next female student obtained a Ph.D. Degree after a gap of 9 years in 2002 under my supervision. However, at present, the number of female research Scholars has increased and the number of female students taking Mathematics in Undergraduate and Postgraduate Courses has increased to a large extent. I have supervised 8 female students out of a total of 13 Ph.D. students. I tried to motivate the female students to pursue higher education not only in Mathematics but in all other subjects. Besides being a good teacher, I am a motivating personality among my students, especially female students. My main objective is *“to promote higher education in general and Mathematics in particular among women”*.

During the pandemic, I developed an interest in environment-related activities. At present, I am the Coordinator of the Environment Protection Committee of AMU Women’s Club. As Provost of Begum Azeezun Nisa Hall and with the responsibility of the Coordinator of the Environment Protection Committee. I have organized several Plantation Events. An extensive Plantation

Drive (From 0 To 1000 Trees) was initiated on 15th August 2020. At present, the Hall boasts of more than 2000 trees, plants, herbs, shrubs, ornamental plants, etc., all planted during the last two years. We have also developed Herbal Garden, Kitchen Garden, Fruit Garden, and an Open-Air Reading Corner in the Hall.



When I started my MS thesis.....

**Haseena Khan, UGC Professor
Fellow of Bangladesh Academy of Sciences
Department of Biochemistry and Molecular Biology,
University of Dhaka, Bangladesh**

When I started my MS thesis, I never thought it would become such a big part of my life or where it would take me. Also, starting out, I never thought I'd devote so much of my time to research and be happy doing it. I can still remember the excitement of applying things taught in the classes and learned more through my hands-on research than any textbook could teach me.

This was in the mid-1970s, when the discipline of molecular biology was just a few years old, but had already generated the excitement which is still there today. This discipline which allowed one to understand how genes work to give specific traits to a cell, to an organism, be it a human, a tree or a bacterium attracted me immensely and for my Ph.D used it to understand a fundamental question in agriculture; why bacteria but not plants can use the inert nitrogen present in the soil to their advantage. This intoxicating research using genes and its products, led me on my return after my Ph.D to work on jute molecular biology. Jute is our national icon, a symbol of our identity, linked to the adage, Sonar Bangla. It is also linked to our quest for economic emancipation. In the mythical golden Bengal around which most of our folklore is constructed we had these undulating rice fields together with fields strewn with jute fibres drying in the sun, golden in colour. We are blessed to have the best jute grow in Bangladesh. It is one of the most affordable natural fibres and considered second only to cotton in amount produced and variety of uses of vegetable fibres. However, jute is now being pushed into inhospitable terrains where it must cope with many adversities. To have a handle on the crop so that it can be genetically improved it is necessary to study it at the molecular level. When I started work, I did not even know how to extract quality DNA from jute leaves, had no clue how to analyze the same. But what we had and was in fact lucky to have the same is the big germplasm collection of jute in Bangladesh made by the then International Jute Organization. One characteristic of this collection attracted my attention. Some seeds of this collection could germinate below 160 C, whereas the jute plants which we grow for fibres germinate only at temperatures above 200 C. Apart from the traditional uses of jute which requires retting, (a process that allows a jute plant to rot under submerged conditions so that the fibre is released from the stalk) we have

to think of alternate and more value-added uses. Water bodies required for retting are shrinking and farmers have to resort to shallow and stagnant water which robs the fibre of its lustre. Such fibres do not fetch much revenue. However, if green jute is used as a source of paper pulp it would not require any retting. But paper industries would need jute round the year. Since jute is not happy growing even in our mild winters, we focused our attention on the seeds of the germplasm collection which could germinate at low temperature.

Our first attempt was initiated by using DNA markers to find differences at the gene level that make one jute plant grow at 16°C and the other not. However, in the absence of any sequence information we had to use non-specific random primers. We were lucky that these DNA markers worked wonderfully and landed us on an important jute gene which we later understood was helping the plant to germinate at the low temperature. To us it was like hitting the jackpot. Beginner's luck you may think. Luck well, that we had and what we have aplenty is our talented young minds many of whom are females which in many cases make up for our limited resources.

This initial success, small in the context of advanced labs ignited the passion among my students, the passion necessary to carry out dedicated research. The first gene led us to a few more which either worked to ward off pathogen infection or had other important attributes. The stage was all set for understanding the whole jute genome, a collection of all genetic elements within it. In 2010 my team of skilled manpower had a big role in completing the daunting task with ease. The first mega genome project of the country. A book called the 'The Jute Genome' has just been published by Springer, where I am an editor.

I have genetically reduced the lignin content of jute. Lignin keeps a plant upright and acts to defend them against pathogens. However, their abundance makes the fibre coarse and reduces its value as a textile fibre. On a different note, global warming, energy crisis, end of fossil fuel... many reasons why we should consider more environmentally friendly solutions to satisfy the current energy consumption. Biofuel is one of them. Jute with a huge biomass which it reaches within 4 months is considered potential source of biofuel. However, again lignin comes in the way of releasing the energy trapped in the biomass. Reducing the lignin content of jute would therefore help boost our economy with more value addition and product diversification.

Many efforts have been made to cross *C. capsularis* with *C. olitorius* with an aim to combine the desirable agronomic features of both species, but unfortunately, all have been unsuccessful. We tried the in planta, transformation protocol which quickly turned out to be a method of choice for genetic transformation of jute since it is recalcitrant to tissue culture.

I am now working on jute endophytes. I must confess that I was greatly alarmed by my first exposure to the jute microbiome. While analyzing the jute genome we came across bacterial sequences which we initially thought were contaminants. However, I gradually understood how we all are holobionts that is we and all other eukaryotic organisms for that matter are host to millions of microorganisms. We are now finding the jute microbiome to be a pristine source of many valuable natural products, with both therapeutic and agricultural importance. We have recently reported the isolation of a novel lantibiotic, Homicorcin from a jute endophyte.



FROM PROFESSOR DR.TAHMINA JOY RASHID

**Prof. Dr. Tahmina Joy Rashid
Medical Consultant and Medical Educationist,
Dhaka, Bangladesh**

ABOUT ME

PROFESSOR DR.TAHMINA JOY RASHID MBBS, MPH, PhD(UK)

I, Professor Dr. Tahmina Joy Rashid am the elder of the two daughters of my parents. I am a doctor, a professional in Pharmacology and therapeutics and a Consultant in Public health issues and Educationist in Medical Education of Bangladesh. My only sibling, Rukhsana Deepa Rashid is an architect, a talented person in her profession who lives abroad. Our parents are renowned people in their respective fields, my beloved mother Mrs. Anjuman Ara Rashid was known as a famous singer of Nazrul songs and modern songs in our country in both the national radio and television network, and my beloved late father Prof. A.M. Harun ar Rashid, Professor and founder of Theoretical Physics department of Dhaka University was a nationally and internationally famous physicist and scientist and writer in physics and allied fields with numerous accolades to his name. Both my sister and I have been blessed in our academic pursuits with the magnanimous support, relentless sacrifices and diligent care of our parents over the years which has been the greatest inspiration and motivation in our lives.

ALL ABOUT MY LIFE

It is all about” plain living and high thinking”. It is all about “finding truth and wonderful moments of sharing in the ordinary events of life”. It is all about “Never hiding tears when they are needed to remind that life has precious moments in tears and in smiles”. It is all about “Performing at work with best ability without expecting award or reward”. It is all about” Do something good or beneficial for anyone or someone even within constraints”. It is all about” Accepting what is meant to be and accepting what is not meant to be in the journey in life”.

MY MAJOR ACADEMIC HIGHLIGHTS

- MBBS degree from Dhaka Medical College, Dhaka, Bangladesh- 1988. I had positions in the combined merit list in all medical professional exams. Under Dhaka University which awards the MBBS graduation degree.
- ECMG certified under FMGEMS (Foreign Medical Graduates Examination in Medical Sciences) board of USA -1991.
- PhD degree in Clinical Pharmacology from University of Southampton, United Kingdom, under Commonwealth scholarship - 1994. Performed clinical research work in Southampton General Hospital and made presentations of research work at seminars and conferences.

• MPH degree (Masters in Public Health) with major in Epidemiology from State University of Bangladesh, Dhaka, Bangladesh- 2007.

• Diploma degree in French language from Alliance française of Dhaka, Bangladesh- 2001.

MY MAJOR PROFESSIONAL EXPERIENCE HIGHLIGHTS

• Academic teaching and assessment of medical and dental students in the discipline of Pharmacology and therapeutics in the professional capacity extending from positions of Assistant professor to Full professor and also in the capacity of Chairman of the department of Pharmacology and therapeutics at BMC (BMSRI), the pioneer first private medical college and hospital of Bangladesh and also enlisted under World directory of medical schools.

• Research, biomedical data analysis and scientific publications on pharmacology, medical education and clinical medicine related issues in national and international journals. I have had scientific publications in national journals (“Bangladesh Medical college Journal”, “Bangladesh Armed Forces Medical Journal”, “Comilla Medical College Journal” and others) and internationally acclaimed journals like “British Journal of Clinical Pharmacology”.

• Have served as the Chief-Editor of the medical journal titled, “Bangladesh Medical College Journal”.

• Guest speaker and educator at Postgraduate and Government institutes: BSMMU (BANGABANDHU SHEIKH MUJIB MEDICAL UNIVERSITY), IEDCR (INSTITUTE OF EPIDEMIOLOGY, DISEASE CONTROL AND RESEARCH), CME (CENTRE FOR MEDICAL EDUCATION).

• Being a Commonwealth scholar, served as a Guest speaker at British Council for BACSEF (Bangladesh Association of Commonwealth Scholars and Fellows) for mentoring new university graduates and new scholars seeking higher education and employment in UK and elsewhere.

• Teaching French language for short term period at the institute, “Alliance française of Dhaka”.

• Consultant for WHO (World Health Organization)- Writing proposal on Health System and Universal Health Coverage for Bangladesh- a joint health project for WHO and for UNFPA.

• Translator service for WHO (World Health Organization- translated from Bengali to English, the official national documents on National drug policy, drug law and Health service act.

• Management consultant Apollo Hospitals -worked as the management consultant in clinical pharmacology and research head in Apollo Hospitals, Dhaka. Have taught research methodology to the clinical consultants of the hospital for developing research designs.

• Consultant for process documentation for a non-governmental organization in health service program development

• Conduction of postgraduate examinations (oral and written) on pharmacology & therapeutics in different postgraduate certificate courses (e.g., MPhil, MD, MS) of the country.

• Contribution to the national committee on revision and updating and reform of

undergraduate medical curriculum and professional exam systems for pharmacology & therapeutics.

- Training and mentoring of medical teaching faculty members in different academic initiatives and activities for professional development and continuing medical education.
- Training of trainers -Have trained trainers of Midwifery programs held at JPGSPH, BRAC-University under joint program of the Government and BRAC.
- Served as Medical officer after graduation, at a private medical center in Dhaka where I managed patients with medical and surgical issues under supervision of senior consultants.

PROFESSIONAL AFFILIATIONS

- Pharmacology Society of Bangladesh
- Bangladesh Association of Commonwealth Scholars and Fellows
- Alliance Française of Dhaka
- Bangladesh Medical and Dental Council
- Clinical Pharmacology Unit, University of Southampton, UK
- Center of Medical Education, Dhaka, State University of Bangladesh
- World Health Organization

CONNECTING THE ROLE OF MEDICAL SCIENCE WITH THE ALTRUISTIC RESPONSIBILITIES IN LIFE-

I have taught and instructed and mentored medical students for many years when teaching /instructing/mentoring in the field of Pharmacology and therapeutics. I've always felt an inherent strong impulse to convey an important message to my students as I delivered my lectures and instructions and that was to instill a greater in-depth of understanding among the students (the future doctors to be) that they should know how to integrate science with arts and how to associate their roles as doctors with their basic human instincts and humane attributes when providing health services and care for the public, the community. I've always seen the look of immense respect and spontaneous response among the medical students when I used to often reiterate a common saying of mine, "What you deliver is science and how you deliver is an art and if you can produce the best blend of the two then you have developed your natural communication flow in your future professional domain." Our role as medical professionals and educators and researchers does not end with mere presentations and success in our scientific roles but a greater impact emerges from the ability to change the way the younger generation thinks about the connection between roles as medical professionals and humane responsibilities in life.

I used to feel when I stood in front of the lectern on the podium of the lecture gallery that we as educators and teachers and scientists in our respective field are often buried under the tedious tasks of making our scientific contributions in life but ignoring the need for enlightenment of the learners/medical students(future doctors). So I would take moments to state a common saying of mine to all my students, "Today, you are a student ,and tomorrow you will be a doctor but do you know what you will be another day?" They would stare at me with perplexed look in their eyes trying to grasp the likely answer. And then I used to say to them, "One day, you will be a patient". "Thus, if you wish to be treated with kindness and

compassion as a patient then you must learn to do so when you become professionals for sick people/patients/people in need”. The look of reverence and acceptance in their eyes meant so much to me. The essence of any knowledge sharing and education imparting and information dissemination should be to instill the purpose of doing something in good faith in science and education for assuring everlasting benefit to the receiver in the learning environment.

TOUCHING LIVES AND MAKING A DIFFERENCE

Science gives us facts and evidence-based understanding of the world we live in and the world around us with technology providing the armamentarium of tools for working in high tech environment and engineering and all scientific avenues enhancing problem solving skills and mathematics and allied ways building analytical competencies. How does all of that fit into my professional world and translates into my practice in illuminating the students and professionals that I have guided and mentored over the years in their respective professional aspirations? My professional methods of approach in my work avenues have shaped my performance outputs in generating noteworthy outcomes for benefit of those I serve in public health and medical education. Many of my former students are now working in different countries across the globe and many of my junior professional colleagues are endeavoring to make their marks in life and my professional contribution, no matter how small, makes me proud with humility when the wonderful and rewarding feedback from them demonstrates the impact I may have made to a make a difference in their lives and in their professional journeys. “We stand today where we are in our journey in the professional world because of a great teacher/educator and mentor like you”. Hearing such praises is humbling and reaffirmation, by Grace of Almighty Allah, of the ability to touch lives through the work of science that endows the soul with an invisible but everlasting reward.

START WITH AN IDEA AND PROCEED FROM BASICS AND DEVELOP COMPREHENSIVE RESEARCH DESIGN FOR EFFECTIVE AND BENEFICIAL RESULTS

In the course of my professional journey, many a times, I’ve had the privilege and opportunity to mentor and guide professional colleagues in their endeavor to formulate, design and implement research projects as pre-requisite criteria for job promotion and for professional development. Research undertaking is not just a scientific task but an exploration of the environment around us with gained knowledge and rational utilization of technological tools for the acquisition of benefits from analyzed data, and keeping this view in mind, I’ve enjoyed instilling the life long learner attitude and self-motivation for simple research efforts (within limited resource availability) among the people I’ve worked with in the past.

THE BEST TEACHING METHODOLOGY THAT IS ROOTED IN PASSIONATE DELIVERY OF THE CONTENTS

I’ve often heard people say that when I deliver a presentation that I am a “born teacher”. I suppose many a scientists and researchers and teachers/instructors and professionals from

diverse educational background with their knowledge and expertise and years of experience have heard likewise and it's undoubtedly an incontrovertible truth that passionate teaching and learning sessions are reflections of talented or born teachers/educators/professionals. However, sharing a few of my experiences will inevitably illuminate the minds and souls of like-minded people. Years ago, students who came from USA and other countries to study medicine in our country and were my students at the medical college where I taught for a lengthy period, elevated my spirit when they would come up to me and say," Madam, we need more teachers like you in this medical education". Hearing comments and sentiments like " I would like to be a great educator like you , one day". "Madam, you can produce simplified explanations of complex issues with such ease and clarity that it is a great joy to attend your classes". At times I would enter my room back from lectures and find cards of gratitude and appreciation from anonymous students expressing their reverence for me and their joy of learning from me. Many of them are now scattered across the globe in US, Europe, Canada, Australia. To have taught and instructed and evaluated and prepared them with my passion at the core of my professional performance was rewarded with the successes they have acquired in their respective professions.

DOES THE PATIENT WAIT FOR YOU AND YOUR CARE AND SERVICE?

Years ago, just after graduation from Dhaka medical college and when working as a medical officer rendering medical health care services to the patients at a private medical center and dealing with medical and surgical and obstetrics and gynecology cases under supervision of senior consultants, I gathered some wonderful experiences that stay till today with me and I've passed on those precious stories years later to medical students and junior professional colleagues as vehicle of inspiration and motivation. The duty rosters at the medical center work schedule meant we had to perform either morning, evening or night duties. When coming for my duties as per schedule I would be informed by duty staff nurses that many patients at different rooms would wait for my arrival and would crucial medicines and injections only if I were there to administer them and they would wait for my advice and care. I was filled with sense of satisfaction that I've learned to combine skills with compassion and am able to deliver duties and responsibilities with honesty and integrity. Our contribution in science and technology and allied disciplines must not be focused solely on acquisition of fame and fortune but founded on the building blocks of effective skills, thoughtfulness, compassion, empathy, moral strength and robust personality, honest efforts and commitment without any expectations but mainly for changing lives for a better world.

CHANNELING THE POSITIVE ATTITUDES OF LEARNING AND TEACHING FOR IMPACTING LIVES

At any point in time for any professional working in any capacity at any place, I've always thought of it from my understanding that each and everyone of us is a "Teacher/educator and a Learner at the same time when standing anywhere at any moment in life". I've been honored to serve as guest speakers in my professional world where I've educated and instructed senior and junior professional colleagues and received standing ovations from

erudite seniors and junior professionals. When qualified people give standing ovations to qualified peers there is an enormous sense of gratitude and satisfaction that we have learned the values of respecting and inspiring outstanding people making outstanding performance in our ordinary humble existence.

FUTURE PATH/HOPE

I would welcome the challenges and opportunities to work in collaboration with professionals across the globe in reputed international organizations or with renowned University or institute faculty members on academic , research and public health related issues which will encompass diverse topics such as: safe and rational use of medications; behavioral change communications; pharmacovigilance; reform of medical curriculum; professional development in creation and delivery of presentations of professional work; mentoring and training of young professionals; betterment of health services delivery in developing countries; improvement of teaching and learning environment; enhancement of learning experiences; development of health work force; development of committed teaching/educator faculty ; creative skill enhancement- naming only a few.



We All Are Connected A Spiritual Approach towards our Personal Growth

Dr. Khadije Y. Bazzi
General Motors and Central Michigan University,
Michigan, USA

I was born in Lebanon and raised in Beirut. I received my bachelor's degree in physics from the Lebanese University in 2006. Just after my graduation, I immigrated to the United States and settled in Michigan to continue my journey.

I earned my PhD in physics from Wayne State University in May 2014. The dissertation comprised a study of Lithium Iron Phosphate (LFP) as a cathode material for lithium-ion batteries. The dissertation work investigated methods to improve the electrochemical

performance of LFP. I published five research papers during my PhD course of study. After my graduate studies, I worked as a fixed-term faculty for two and a half years at Central Michigan University, where I gained valuable experience leading graduate and undergraduate physics lectures for both science and non-science majors. I joined A123 Systems Automotive Lithium-Ion Solutions in January 2018. I worked as a research scientist for the powder development team for another two and a half years. Currently I am a cell system engineer at General Motors and an adjunct faculty at CMU. At GM, I am working with the cell design, performance, and process engineering team at Warren Tech Center. I am supporting BEV programs as technical specialist as well as leading ATW project.

On Jan 14, 2022, I hold a book signing event for my first self-published book, “We All Are Connected: A Spiritual Approach toward our Personal Growth”. A self-reflection book that encourages each one of us to practice being an authentic human being that sees himself or myself in everyone he or I encounter. It is an opportunity for all of us to take a moment to pause and reflect on our own lives, behaviors, and believes.


Because time is more powerful than God's words, I used the scriptures from the Holy Koran and the Holy Bible to support my arguments. The first part highlights the spiritual connection with God. It explains how this holy connection can help us find the purpose of our essences in this life. It acknowledges how we can achieve inner peace and tranquility regardless of external circumstances. I attempt to bridge the gap between religions and show how God desires for us to find the purpose of our essence, increase our spiritual awareness, and enhance our relationship to spread peace and love among us. I highlight the true meaning of happiness and how to achieve it. By reflecting on the first part of my book, you will touch the presence of God in your daily life and learn how He is constantly taking care of you and listening to your prayers.

After taking readers on a journey of self-reflection that first focuses on our connection with the Almighty God and the purpose of our presence, I then delve into important areas that can help us increase our awareness, develop a balanced lifestyle, and make us a better version of ourselves I concludes my work with a motivational discussion of extending kindness, peace, and love toward others. Although this book is not related to my studies and career field, I am very interested in self-development topics—particularly spiritual growth. I strongly believe that, as humans, we showed up here in this life for a purpose. Through the connection with the Almighty, we can understand ourselves and our real purpose, which in turn can put us on the right path, which brings inner peace, fulfillment, and satisfaction into our lives. I also believe that we all are students in this life regardless of our ages, titles, or statuses. Everything surrounding us, each challenge we face, each mistake we make, and each person we meet can be an opportunity for us to learn from.

On March 10, 2022, I was invited to give a talk at Ohio State University, organized by ISMWS, to introduce my book to students. I was also recognized by ISMWS for presenting that work that unifies all faiths.


As a Lebanese American Muslim, I strongly believe that we all are connected and that it is our responsibility to understand and respect each other. Hence, I decided to spread my

messages to all my brothers and sisters in humanity with the intention of taking one small step toward our unity, healing, and reconciliation.



This spirituality book helps you raise your self awareness and touch the presence of the Almighty God in your daily life.

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CERTIFICATE OF ACHIEVEMENT




PRESENTED TO

DR. KHADIJE Y. BAZZI
 GENERAL MOTORS AND CENTRAL MICHIGAN UNIVERSITY, USA

For her success as a scientist and for presentation of her book
 "We All Are Connected: A spiritual approach"
 Organized by ISMWS at Ohio State, PASA, MSA at OSU
 March 10, 2022


 PROF. SULTANA N. NAHAR
 FACULTY ADVISOR, ISSUES AT OHIO STATE
 DEPARTMENT OF ASTRONOMY


 THE OHIO STATE UNIVERSITY

MOIZZAH AHMAD
 PRESIDENT, ISMWS AT OHIO STATE
 DEPARTMENT OF BIOLOGY





Biography of Dr. M. JAHANARA

Dr. M. Jahanara

**Assistant professor of Zoology
Dr. Abdul Haq Urdu University
Kurnool, India**

DR. M. Jahanara is a post graduate in Zoology from S. V. University, Tirupati, Andhra Pradesh, India with first class and has done PhD in Biotechnology from Guru Ghasidas Central University, Bilaspur, (C. G) India.

Teaching is my passion and research is my thrust... interested to do research in human luckily got PhD admission in Biotechnology and chose research work with the help of research Guide ' Biochemical studies on human serum afflicted with lungs related health problem'.. successfully completed...PhD degree awarded by then President (idol) APJ Kalam... really blessed. After completion of PhD joined in Diploma course in Molecular biology and Genetic engineering in Bangalore University , Karnataka India to improve my skills and got capacity of depth information.

Research provide the chance to learn new things. It test to think new reasons and opportunities, gained more knowledge during research work, it makes me adopt a critical way of thinking. I did more hardwork and focused and devoted specific field. I got U G C project work and did research on " Incidence of cerebral malaria in pediatrics and geriatrics population in Kurnool area". In time submitted my thesis successfully. I have published 17 papers in International journals and Scopus, and presented papers in International Conferences 15,in National level 31 and participated workshops 12.

I gave invited talks for International and National seminars and reviewer for few International journals.. Life member in Asian PGPR Society, ESDA-Delhi, and International Society of Muslim women in Science.. I got Best teacher award in the year 2017. Enlighten the students by taking project work along with the students... organized science expo and towards creating a healthier society by popularizing preventive measures, have been organized health awareness programs on various issues of health and hygiene..one of my students project work ' A study on occupational Health Hazards among women Beedi workers' published in International Journal of Advance in Health Disease as a VII chapter in Nova publications volume 22.(2020). Recently another student project "A study of severity and outcome COVID-19 Second wave" ..yet to publish...

My review articles ' Stem cells research and application- a ray of hope for chronic degenerating disease(IJDB ISSN-2321-7773 vol-6(5) and ' Nanotechnology fights for Cancer and gives new hope for life' (IJLP ISSN2250-0480) vol-3' published in 1-4 pages in International journals.

After my parents running society with their name Momin Fathima Ahmad Hussain society for needy people.. I am doing services for my relatives, orphans old age homes , street beggars and poor students ..



Top to bottom: (clockwise): Like her parents, Prof. Momin is active in philanthropic work: helps old age homess, orphaange, students, street beggars



Prof. Momin engages her students in scientific projects involving the community Pictures show participation in science expo, and study of severity and outcome of COVID-19 impact

Prof. Momin is also a poet. She has included 3 poems, dedicating the following to her mother, father, and Prof. Sultana Nahar.

MY MOM

**My Mom you are the most beautiful person on this earth
You taught me how to work
And you taught me how to live
You have blessed my life in so many ways.....
I will cherish our memories until the end of my days**

**I thought to myself, that space is too small
To write down what she's been, to cover it all**

**There are many more yet the best one to me
She was a best friend and mine forever she'll be
You left me alone and this was not part of our plan
But Almighty's wishes always come before those of man**

**Without you I must travel the path alone
No longer my guide, the way you have shown.**

**Your heart might have been weak, but you were strong
For your loving embrace I will always long**

**God sent you to me as a special gift from above
To teach me life's lessons and shower me with your love
Every second I remember your most beautiful love and smiling
In my heart you will always have a special place
A special bond we shared like no other in this world
For this is possible for only you and me**

**I thanked Almighty for each day we were able to share
But without you in my life it is too difficult to bear**

**Being with Allah, I hope you will find joy and peace
In this I can find comfort and some happiness atleast**

**For my Amma dearest you will always be
My mom so loving and so loved by me
All that I am on hope to be
I owe to my angel MOTHER.
We will meet again on the Great Judgement Day
My MOM**



My Dad!

**Your grit and punctuality ;
Dear Mother your discipline and pleasant nature
O my revered parents your spotless friendliness,your honesty and values are our guiding
light.
Your blessings make me strong.
Ever in your memory
Your patience
Friendly counsel,your Vision and Determination in trying situations,
Your advice are Guiding Light
Forever
For us**

**With Regards
Your Daughter
Dr.M.Jahanara.**

.....

Madam!

**You are the Destiny of Wisdom
You are an Embodiment of Education
You are a constellation amidst the skies" .**

**Grow and succeed!!
Oh ye dear students!!
Think and take step forward-onward strides
Toil is the weapon
Faith is thy armour**

**Glistening like a Beacon light
In the Ocean of Knowledge**

**Being daughter of INDIA
Gaining World wide acclaim**

**Inspired by SULTANA NAHAR
Hand in hand with fellow women**

**I wish you'll ever blossom
In the path of progress**



PEOM

"An introduction to Silences"

By Ms Zunaira Habib Alvi
Class XI ,SSC(Girls),AMU, India

About the author: Ms. Zunaira Habib Alvi, is a 17 year old author studying in senior Secondary School(girls) Aligarh Muslim University. She wrote "Writing has been my escape all this while. My way of resistance and remembrance. I aspire to be the change, that has been long needed, to challenge every limit, every constraint on human potential. Previously, I was published at The Wire, the Times of India and a handful of national and local magazines"



*Amidst forts built magnificent and majestic grandeur of your celebrated past
of battles, sons and names that last,
written with blood and sweat, reeking of dreams unsaid
and sighs unheard
of Sita, of Mary; fighting your holy word.
Your fragile homes
sit atop cemeteries
of maiden names and homes left behind,
of tales you've forgotten to remind;
of a reality you couldn't hear aloud.
Potions of magic, keeping you young and proud.
At parliaments marbled, white and gold
and offices walled with great men from days gone by
of your brave truths and virtues kept high.
Your power, your fight,
your wars and victories
because your mothers and wives never wrote their histories.
Of pain and blood,
and birthing heirs to hectares of territories.
Of your luxuries and their destinies.
Of their shameful testimonies and your humble, mannered lies.
Of your hands, their bodies;
Of waist and thighs, shape and size.
Homes and mansions, walled
for protection, for possession.
Your morality with parameters, your complicit silences, your unaccounted transgressions.
Your sisters and daughters, so gullible and weak.
Influenced badly, poisoned to speak.
Your jokes, their details*



*My experience
as a STEM Aspirant*



How my interest in science helped me fulfill my dream of studying in the US

Dr. Zeba Qadri

Ph.D. (IISER Mohali, India)

Postdoc (Harvard Medical School, USA)

Hailing from an academic family, the idea of a carrier in science & academics was treated with lots of encouragement. Although, there were many professions to choose from, I have always been inspired and motivated by my father who is an academician himself. Hence, my dream of a career in academics began at a very early stage in my life. My initial interest in science was more to do with my own comfort levels with the subject rather than any genuine interest for the subject. Growing up, my comfort levels slowly matured into interest for the subject. After my higher secondary education, I decided to pursue Bachelor's degree followed by a Master's degree specializing in Chemistry. During my Bachelors and Master's program I was exposed to several areas in chemistry and my overall interest for the subject developed. Through my hard-work I was able to bag a First-Class-First position in B.Sc. (Honours) from St. Mary's College, N.E.H.U. Shillong.

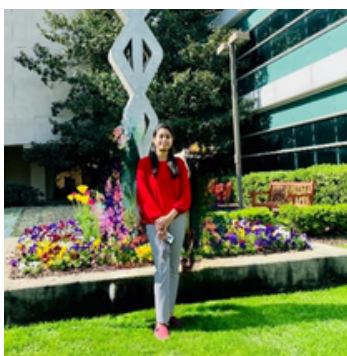
Leaving home for Aligarh Muslim University for pursuing my Masters was a little tough for an introvert like me. Though most of the teachers at the Chemistry department were encouraging but there was indeed something very special about our beloved Prof. Farukh Arjmand. Her persona always inspired us to excel. She always took time out to motivate her students even outside the classroom. It is because of the encouragement of teachers like her which pushed me to work harder and I turned out to be among the very few who qualified the prestigious National Eligibility Test (UGC-CSIR NET-LS) for Lectureship at the very first attempt in December' 2007. Even after leaving AMU I had been in constant touch with her and over the years have developed a special bond. She has mentored me to become a better professional and individual. Even today I seek her advice and help whenever required which she has been kind enough to never deny.

I loved all aspects of Chemistry but specifically, I was intrigued by Quantum Mechanics and Spectroscopy as it had a decent blend of math, physics and its applications in chemistry. To further improve my own understanding and increase my expertise in these areas, I decided to pursue a doctoral program in spectroscopy.

As I read about various forms of spectroscopy my curiosity about the research domains in the Solid state Nuclear Magnetic Resonance (ssNMR) field grew which led my way to the doctoral program as a Junior Research Fellow at the Indian Institute of Science Education and Research (IISER) Mohali, one of the premiere science Institutes in the country under the esteemed supervision of Dr. Ramesh Ramachandran in the year 2009.

IISER Mohali plays a very important role in shaping me as a researcher where the professors and fellow students furthered my understanding of the field, helped me establish my goals as a researcher, equipped me with various research tools, and opened a door for me to the scientific research world.

Later in 2011, I was awarded Senior Research Fellowship in Chemical Sciences. I contributed to the field of solid-state Nuclear Magnetic Resonance through my Ph.D. work entitled “Understanding Cross-Polarization NMR Experiments Using Multi-Mode Floquet Theory”. My work finds application in the design of new and improved pulse sequences and has potential in terms of methodology development. I published my research work in the international reputed ‘Journal of Chemical Physics’. Being a seminar enthusiast I proactively participated in various conferences/symposia held at national and international levels where I presented my research work. I defended my thesis in November’2015 and was subsequently awarded the PhD degree. Being a Research Scholar albeit the realization of the fact that there would possibly be hurdles at various phases of the carrier has never brought my vigor down in the research area. However, it has only helped me to take a notch above the regular observations that rule out various inadequate thought processes which has only come through practice. Also, thankful to my own persevering nature that has never let me down all through the voyage and helped me sail through efficiently and I had the opportunity to join Dr. Tzika’s lab as a Postdoctoral Fellow in an NIH funded grant at Massachusetts General Hospital, Harvard Medical School, USA in 2018 which was a dream come true. Dr. Tzika has been a very supportive PI. Though I could not continue working in the grant for more than a year due to family responsibilities but I managed to a publish with her in the reputed international journal Advances in Molecular Imaging. My association with her continues and we continue to discuss research ideas and working towards publishing many more articles.



My journey in STEM: A step towards the advancement in Science

Yusra Zaidi, Ph.D.
Postdoctoral Fellow
Medical College of Georgia
Augusta University, GA, USA

I was privileged to grow up in a family where both of my parents actively pursued a career: my mother as a teacher and my father as a doctor. This environment, particularly my mother’s passion for work even in her last stages of cancer, was a great influence in my life. She was a multitasker and that’s true for all women around the world.

I am also a mother of little daughter and now juggling between raising kid and doing research and I called it as passionate love for science. This inspired life of my mother further led me to fulfill my dream in a scientific pathway and I chose Genetics for my master’s studies which I scored with gold medal with various recognized academic excellence awards. I continued to a Ph.D. due to my passion for scientific research in the same field. My thesis was based on toxicity screening of promising organometallic complexes as potential anticancer drug candidates which I conducted in Aligarh Muslim University under the

guidance of Dr. G.G.H.A. Shadab and in a close collaboration with a renowned and loving personality of Chemistry department, Dr. Farukh Arjmand, who is also a mother with immense potential to lead in the scientific community. She was and is still to me an inspiring personality who always see women rising in the field of research esp. science. Under her guidance, I published my thesis work in topmost journal of RSC "Metallomics". I also published various articles in prestigious journals like J Physical Chem B, RSC Advances, PlosOne with other collaborators of AMU.

Although initially I really did not like the uncertainty involved in experiments esp. arranging the resources from every department in AMU, but I grew to enjoy research, and this led me to my current position as a postdoctoral fellow in United States of America. A huge career break of 5 years after my daughter was born between my Ph.D. and my postdoc never destroyed my passion for science and I tried hard to get back to the research and I got one. My research career in USA started in Medical University of South Carolina (Charleston) in Department of Cardiology with another leading woman scientist, Dr. Kristine DeLeon-Pennell, with whom I enjoyed the science most. I got the opportunity to learn high-end techniques like flow cytometry and other cell and molecular biology techniques. In her lab, my work was focused on role of immune system in cardiac remodeling after myocardial infarction and we as a team published this work in one of the peer-reviewed journals; APS-Heart and Circulatory Physiology which showcased this article among the best recently published articles in Physiological research of 2021 and acknowledges authors for distinction in scholarship in the AJP-Heart and Circulatory Physiology. I also published a review article in another ranked journal Cellular Signaling. I moved from Charleston to Augusta and now working as a postdoctoral fellow in Dr. Brian K. Stansfield's lab, where I am exploring the role of macrophages in neovascularization in retinopathy of prematurity "a disease of premature infants" who become legally blind in their later stages of life. This study becomes a landmark on my heart. As a mother, I feel the pain of all mothers around the world who are facing this issue of blindness in their infants and as a researcher I am more curious to dig out the reason behind the blindness and hopefully in future "a way to cure."

In last, my advice to young women and girls who plan to start their career in the science or STEM sector is to find out the supportive network of peers and mentors who can support you both scientifically and emotionally as you go through the journey. Because I know not every girl will have someone in their life that encourages them to pursue STEM fields, and many girls may not have a positive view of jobs in STEM. I would encourage young girls and women who faced career break, as I am one among them, to explore as many different fields and jobs as they can be including STEM. Look for role models and mentors that can share their stories and provide guidance on how to reach your goals. You might discover a passion for STEM you didn't know about

"A drive always helps to move forward, and I am sure that perseverance leads to the great results."



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**Chronic Porphyromonas gingivalis
lipopolysaccharide induces adverse myocardial
infarction wound healing through activation of
CD8⁺ T-cells**

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My passion for Science

Ms.Saman Jafri

B.Sc(Hons.)Chemistry,

M.Sc Biotechnology

APJ Abdul Kalam STEM Fellow

Aligarh Muslim University, India

SSGSA Fellowship awardee 21

Warm memories flood my heart, surging through my veins as I sit down to apply for Ph.D. programs in Molecular Biology. The mere thought of my journey conjures up a flood of nostalgia, as my mind flashes back to the most poignant memories of my life. From giving up on life to becoming a successful postgraduate in the STEM field, I've come a long way. My journey has been filled with numerous peaks and valleys, and each of them has played a paramount role in shaping me into the person I am today.

As I contemplate my next steps, let's go back to where it all started. My fascination with science began at an early age. Throughout middle school, I had a diverse set of interests, ranging from learning about space to being fascinated by the workings of the heart to physics theorems, to name a few. During my senior secondary school years, I acquired more knowledge about cell and molecular biology, fundamentals of organic chemistry, basics of mathematics and decided that I wanted to pursue a career in the STEM field. My dream became a reality when I enrolled in the Bachelor of Science program in Chemistry at Aligarh Muslim University. As I immersed myself in the rigorous coursework at AMU, I found myself progressively enamored with the prospects of opportunities in the STEM field. One of the most rewarding experiences of my life was being chosen to participate in an undergraduate STEM research project through an INDO-US collaboration between Aligarh Muslim University and The Ohio State University, Columbus, Ohio (USA). I was given the opportunity to conduct innovative interdisciplinary research while also honing my

professional skills. Later on, I went on to pursue a post-graduate degree in Biotechnology. I also applied for and was selected for the SSGSA fellowship offered by the Sir Syed Alumni Association of North America which offers financial support and personalized mentorships to selected fellows to pursue higher education in the US and Europe.

These experiences have had a significant influence on who I am and how I perceive the world today. From being a nobody to being a recognized individual, STEM has given me an identity. An identity that surrounds me like a protective cocoon allowing me a chance to unravel all the mysteries of Science. As a woman in STEM, I have developed a more positive attitude toward myself by reminding myself of my potential and allowing myself to celebrate my accomplishments. As I continue to focus on the upcoming chapters in my life, I hope my journey as a woman in STEM will motivate more females to pursue a career in STEM. The journey is filled with prolonged exhausting hours of effort, struggles, sleepless nights, and setbacks, but it is all worthwhile in the end.



Moms in STEM – A personal perspective

Dr. Nida Rehmani
Indo-US STEM-ER Fellow, STEM EnCorps
Fellow 2022
Colorado, USA

Hailing from a small town in North India, it was a turning point in my PhD career to get state-of-the-art training for research and teaching in the United States. I was nervous yet enthusiastic on board the first international journey of my life. Being a newly married Muslim girl, I had chosen the road less travelled by, specially, by women in my circles. In case you are wondering, my roots are from that part of the developing world where tying the knot is often synonymous to bidding adieu to career, for women. I, for one, wasn't taken aback by the discouraging comments pouring forth from relatives, family and friends.

The flyer for 21st century Obama-Singh Knowledge Initiative dual degree STEM-ER fellowship, a novel program training the next generation of Indian STEM faculty in US fascinated me.

It was my realization of the American dream as I received fellowship after a rigorous process based on academic merit, interviews, SOPs and recommendations. Apart from cultural shock as an immigrant woman, I felt an inclusive and opportunistic environment in US for learning regardless of marital status, gender or race. But the idea of a married Muslim woman in pursuit of science was still amusing to many people. Quite contrary to people's expectations, I successfully wrapped-up two semesters at the Ohio State University with A-grade and relevant research data for my thesis. As to my dedication, I was often the last person to walk out of the biomedical research tower late night during Spring break &

weekends. I have vivid flashbacks of celebrating my birthday alone in the dark room developing films for western blotting on a chilly winter night!

I embarked on the return journey to India filled with fresh perspectives and renewed passion for education and research. I was weaving plans to implement pedagogical strategies, conduct surveys and publish research papers in my university. I was determined to disseminate my knowledge and training at my home institution, a requisite ordinance of the STEM-ER program. But little had changed with the stereotypical mindset and cultural think tanks of my country folks. They deemed it insignificant that I had gained training in a world-class research lab and earned a Master's in Education (STEM) from US, giving me significant leeway over my peers. I felt that owing to my marital status, my accolades were deemed less worthy than fellow counterparts.

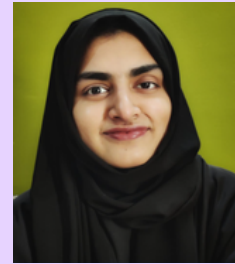
I commenced 2017 by earning a doctorate in biochemistry and the badge of motherhood by end of that year. By that time, I came back to US with my husband who began his postdoctoral research experience. Post motherhood, I faced the conundrum of choosing between family and career in a foreign country. As an immigrant, I lacked the privilege of having extended family or friends offering parental support. I thought that I was going to stay at home or wait for some years to do a full-time job. In the meantime, I wanted to contribute, do something productive, and continue my professional development. Realizing the potential of the soft skills I nurtured during my PhD helped me to contribute, stay in touch with science and expand my network. My volunteer work with international STEM organizations boosted my experience while giving me liberty to stay at home.

Since completing grad school, I have been affiliated with various international STEM organizations, nurturing my professional development. I am a Professional Member, Mentor and Academy Ambassador for the Global STEM Alliance, the 'New York Academy of Sciences' (nyas.org). Being passionate for mentoring, I volunteered as Career Mentor for the 'University of Westminster', UK. For 'LotusStemm.org', I have worked as the Content Editor and Lead Researcher representing South Asian Women in STEM. Another highlight of my outreach career is serving as Pod Coordinator for Denver Pod, '500WomenScientists.org'. I have contributed as a Scientific Editor for 'Bio-services.org'. My passion for STEM advocacy led to my selection as a STEM Advocacy fellow, (Stemadvocacy.org). Recently, I have been selected as an EnCorps STEM Fellow: 2022 cohort, (Encorps.org), USA.

I have experienced that balancing work and life is still an unsolved riddle for moms in STEM. People in or out of science fail to understand that it is not our status as mothers that defines our career choices. Rather it is the unaccommodating environment and inadequate facilities for women in science that hinders them from joining workplace post-motherhood. This is my perspective of #Moms-in-STEM, the challenges behind the hashtag and the elephant in the room!

ARTWORK

By Ms. Maryam B.Sc. Zoology,
AMU, India



About the Artist: Maryam is a final year Zoology student at Aligarh Muslim University. She said, "When I am not buried in studies, I spend my time in fulfilling and relaxing pursuits such as illustrating, sketching and reading. I hope that someday I can use my art to educate, create empathy and bring the change."



What's
inside
her
mind!!!

*It's
everything...
It's beauty...it's
creativity...It's
Science
Technology
Engineering and
Mathematics!*

Let's Talk....

**STEM Professionals countering
our fears
and inspiring young ladies to
hop in...!!!**

**Let's welcome
Dr. Qudsia Tahseen**

**FNA, FNASc, FASc
Professor
Department of Zoology,
Aligarh Muslim University, India**



1. As a STEM professional, what is your biggest strength?
 - My greatest strength as a STEM professional is my love and passion for my subject combined with my commitment to the efficient delivery of knowledge to students to generate curiosity and interest in science.
2. What were the hurdles which you had to overcome to 'Break the Bias'?
 - Mahatma Gandhi said, "First, they ignore you, then they laugh at you, then they fight you and then you win". In our patriarchal system too, it requires mettle to go against the stereotype or to change the mindset of society. Although the perseverance pays and one gets acceptance finally. I too tried to overcome the issues with a steadfast approach, hard work, determination, and passion. I have been the first daughter-in-law in the family of my in-laws to pursue a doctorate after marriage and then to start a career in Zoology as a lecturer, at Aligarh Muslim University. Also, I was appointed as second woman faculty of the Department of Zoology which broke the 33-year-old jinx of the department having only one female faculty out of 25. I struggled to create my own space and became successful too thus paving the way to the entry of other females. While staying within a big joint family, for eighteen long years, I could learn that patience, tolerance, and hard work are still the best virtues that may help you win hearts rather than aggression, haughtiness, or intolerant attitude. I consider the endurance of women to be their biggest strength to face all hurdles.

Dua karo ki salamat rahe meri himmat

Ye ek chirag kai aandhion pe bhari hai

(Pray that my courage remains intact; this single lamp is a challenge to many storms)

3. Would you recommend a career in STEM to young girls?

- **Girls are underrepresented in STEM field; therefore, I would recommend girls a career in STEM to get the maximum opportunities and benefits. The girls are proving themselves in all fields so this important area should too reflect their competence and skills.**

4. What does being professional mean to you?

- **In my opinion, a professional has to be true to her/his profession and demonstrate higher standards of skills and competence in education and knowledge building while adhering to the code of conduct and ethical standards.**

5. What steps would you suggest to bridge the gap of gender discrimination in higher education?

- **Concrete measures have to be undertaken to break the stereotypes. Following the concept, Charity begins at home, the parents should support and assure their children (daughters no exceptions) the freedom to choose their careers out of the wide range of opportunities. Schools should counsel and motivate the passing girl students to opt for challenging fields to outshine and make their mark. During shortlisting of applications for higher classes or interviewing, there should be no bias and the assessment be made purely on merit or performance of the candidate and should not rely on word of mouth or the perception of any colleague. There should be a fair representation of women in the decision process and policymaking too.**
- **Scholarships and grants can help to bring more women into higher education. While assigning challenging research projects, the selection criteria should not focus on the gender of the researcher.**
- **In view of the high dropout rates of girl students at graduation levels, it is crucial that marriage should not be a hurdle in pursuing higher studies. The in-laws, therefore, should be supportive to encourage their daughters-in-law to pursue higher education or a career in STEM. The stigma surrounding flexibility and other family accommodation policies also derail women's careers if at all they continue their jobs. As a result, the women in order to prove their capabilities work twice as hard as their male counterparts.**
- **The work environment should also be safe and supportive to female students/researchers and the use of gender-neutral language should be promoted. There should be a grievance redressal system too for any act of misconduct against women.**

6. What is the role of mentors to enable female students to opt for STEM disciplines?

- **Females are the victims of a vicious campaign deterring them from studying science, engineering, math, etc. Most cartoons and stories depict a genius scientist or superhero as a man who remains unsocial and secluded from society, a character presumably not fit for a woman who ought to be more sociable with family values. Role models of the same gender who have overcome initial difficulties can have a positive effect, can be inspirational, can reduce the stereotyping impact, and can attract young women into**

•

STEM. Interventions to promote women in STEM include programs such as mentoring, organizing gender-specific programs where real-world experts may share their own experiences providing insight into what might be achieved in STEM areas. The role of teachers may also be crucial in generating awareness through proper counselling of the girl students that may generate enthusiasm and motivation in aspirants

7. What is your take on Financial support needed to pursue higher education?

- **Higher education comes with new expenses including high tuition fees, boarding or housing, food bills, books, supplies, etc. Almost all students face money issues that can hamper their academic success and often cause terrible stress or force students to drop out of college. There are scholarships, grants, or fellowships that give some financial respite. Even student loans can be opted for with easy repayment conditions, however, they too need to be dealt with seriously. Many students practice earn and learn policy while working abroad which also exposes them to practical life. Thus, like other skills, financial skills can be learned, to know how to spend less by differentiating between the essential and optional items. However, financial prospects are relatively bleak for girl students as they usually do not get wholehearted**



support from the family for carrying out higher studies while boys, on the other hand, are more likely to get higher education despite financial constraints. Often the reason for this bias is that girls are considered to have temporary status in the house and are supposed to leave on marriage and be of no monetary help. Therefore, the gender gap needs to be bridged by giving girls equal opportunities and chances as for the boys.

8. Your advice to our young STEM aspirants.

- **My advice to young women STEM aspirants is that you all are wondrously made and should carry your sex as a badge of honour. It is a fact that a career has no gender. Your association with STEM will lead to utilizing the intellect and capabilities of the other half of the world population that remained untapped. Your passion and hard work will enrich the field immensely. By overcoming hurdles and by breaking boundaries, you will come out stronger due to your grit, endurance, hard work, commitment, and belief in yourself. Be like an eagle that avoids rain by flying above the clouds instead of looking for shelter like other birds.**

Toofan karraha tha mere azm ka tawaf

Duniya samajh rahi thee ki kashti bhanwar mein hai

[The whirlwind of my determination was raging; the world thought that my boat was in a whirlpool]



In Conversation with Prof. Bushra Ateeq

Professor
Biological Sciences and Engineering,
IIT Kanpur, India

Biosketch:

Prof. Bushra Ateeq is a Cancer Biologist and a Senior Fellow of the DBT/ Wellcome Trust India Alliance at the Indian Institute of Technology Kanpur, India. She earned her PhD from the Aligarh Muslim University, Aligarh. Her research interest involves exploration of the genetic and epigenetic changes that initiate cancer, its progression to metastases and drug resistance.

Prof. Ateeq is the recipient of the highest Indian science award, the Shanti Swarup Bhatnagar Prize in Medical Sciences (2020). She has also received several other prestigious recognitions for her excellence in research, to name a few, Sun Pharma Science Foundation Research Award (2021), N. Ramachandran-National Bioscience Award (2020), Organization of Pharmaceutical Producers of India-Scientist Award (2021), CSIR-Central Drug Research Institute Award (2020), ICMR-Basanti Devi Amir Chand Prize in Biomedical Sciences (2019) and Sayeeda Begum Woman Scientist Prize (2019).

She has been listed as “75 under 50: Scientists Shaping Today's India” a compendium released by the Department of Science and Technology, Ministry of Science and Technology. She is an Elected Fellow of the National Academy of Sciences, India (NASI) and the Indian Academy of Sciences, Bangalore (IASc). She serves as a co-Editor-in-Chief of the Translational Oncology (Elsevier), and a member of the editorial boards of Frontiers in Oncology, Frontiers in Genetics, and Indian J. Biochemistry and Biophysics (NISCAIR).

1. As a STEM professional, what is your biggest strength?

- My biggest strength is having faith in my own capabilities, positive attitude towards life, firm determination and resilience. When you believe in yourself, then you can overcome any challenges and insecurities, have the confidence to take control of the situation, and accomplish what you aimed for. I owe it all to my mother for instilling these qualities in me. She put herself as a powerful role model, her determination and strong faith encouraged me to follow my dreams no matter what obstacles came my way. More so, I am not afraid of changes, whether it's the field of my research or career choices, it's all about venturing out, otherwise you will never know what other amazing things you are missing.

2. What were the hurdles which you had to overcome to ‘Break the Bias’?

- I had my fair share of challenges and hurdles at different stages of my career. However, I am an eternal optimist, and I believe that a healthy dose of challenge may even help in our personal and professional growth. When I was looking for an independent faculty position in India, during my job interview at one of the premier institutions, I was told that I don’t have an “academic pedigree”. At another premier institute, a senior professor advised me to seek faculty position at Aligarh Muslim University as I had studied from there. Such remarks were rather unsettling at that time, but since I knew what I wanted for myself, those incidences only helped me chase my dreams with renewed zeal. Fortunately, I grew up in a very liberal and encouraging environment, my parents never discriminated among us, sisters and brothers, and our household tasks weren’t gender-labelled. I think my upbringing instilled self-esteem and courage, which helped me overcome challenges that came my way, or not to be discouraged by other’s prejudices.

3. Would you recommend a career in STEM to young girls?

- Certainly, all young girls with inquisitive minds must consider a career in STEM. Of late there are many initiatives by the Government of India to promote women or girls in STEM, for example ‘Vigyan Jyoti’ scheme by DST, which is to promote STEM among girl students. I think it should be implemented at the grassroot level so that more girls from remote and rural locations could be benefitted.

4. Is financial independence in your opinion an asset for women?

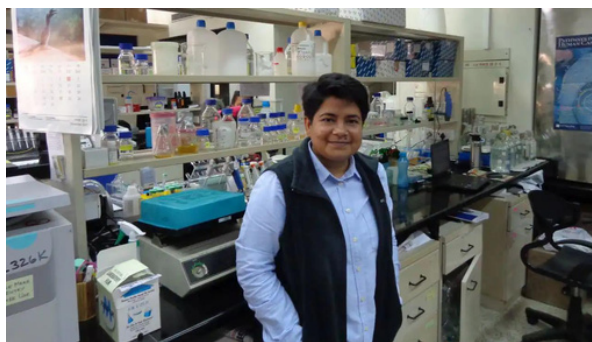
- Yes, definitely financial independence is must for all women today. With financial independence, women could take decisions in their life confidently, and would have the liberty to pursue their dreams and ambitions. I think it’s important for women to be financially secure and also learn how to manage their money.

5. What does being professional mean to you?

- Being honest and truthful are two very important traits for me, and these are also crucial for developing trust with co-workers or subordinates. I believe that having an optimistic attitude and trying to be a problem-solver makes a big difference in your professional growth.

6. What steps would you suggest to bridge the gap of gender discrimination in higher education.

- We need more government policies for implementing gender equality in the recruitment process of both teaching and non-teaching staff at the higher education institutes. Recently, DST sponsored an innovative pilot project, Gender Advancement for Transforming Institutions (GATI), which is currently going on across 30 institutions. The idea behind this initiative is to bring a novel intervention program for promoting



gender equity in science and technology. Basically, GATI's purpose is to nudge institutions of higher education and research towards supporting diversity, inclusion, and the full spectrum of talent for their own success and growth. Majority of the gender-based discrimination that women suffer is because of the personal prejudices or sociocultural myths such as a particular gender is superior to another. I think any positive change in the society comes from the home. especially mothers should come forward, and get involved in gender-neutral parenting, which will change the mindsets of our youth. This will also contribute to creating safer society for females, and will eventually lead to economic independence and empowerment of women.

7. What is the role of mentors to enable female students to opt for STEM disciplines?

- I think we need corrective measures to change this belief that STEM fields are masculine or are more apt for men, it somewhere deters young girls and dampen their interest to pursue STEM disciplines. A mentorship program for young girls is required, which may include interaction with successful women in STEM, so that girls could relate to them, and feel more confident to pursue STEM and become leaders in these fields.

8. What is your take on Financial support needed to pursue higher education?

- Higher education without financial assistance is a burden on parents, and often demotivating for students themselves, especially female students. Many times, family and financial constraints are the deciding factors whether a student (male or female) will go for higher studies or not. These constraints also determine which university s/he is going to enroll in, and it indirectly affects their chances of success.
- There are several opportunities for getting fellowships from the Ministry of Higher Education besides Junior/Senior Research Fellowships from various funding agencies, for example, Prime Minister's Research Fellows (PMRF) Scheme for IITs, IISERs, IISc Bengaluru and some of the top Central Universities/NITs, and Special Scholarship Scheme for Jammu & Kashmir, which enables J&K students to take advantage of the educational institutions outside the state.

9. Your advice to our young STEM aspirants.

- Be curious about everything, and don't be afraid of asking questions. Always believe in yourself, and constantly stretch your boundaries.



"My life in science"

Prof. Sultana N. Nahar

**Department of Astronomy, The Ohio State University, USA,
Co-Director of the Indo-US STEM Education and Research Center
of OSU-AMU**

**UGC Adjunct Professor of Physics, AMU, India
Adjunct Processor Physics, Cairo university, Egypt**

I have been an admirer of science seeing the beauty in it and its impressive power in solving problems like magic, but with logic. My parents were not in science but respected the subject. They spoke about our creator Allah with such happiness and reverence that I started to make connection with Him from my very early childhood and ultimately He became my inspiration in science and my attachment to human beings.

I am the third born on August 14 out of six children of my parents, Moulovi Haji Abdur Razzaq and Haji Shamsun Nahar in Dhaka, Bangladesh. My father received the title Maoulavi from completing all degrees in Islamic education before going to general education and became an excellent lawyer at the Judges and Supreme courts in Dhaka. He was called the "Mobile dictionary of laws" by other lawyers because of his sharp memory of laws needed to deal cases. My mother Shamsun Nahar was a smiling, art loving, very kind but very strong minded person who worked like a man to built homes to rent out for family income. They started their lives together with zero money and needed it as my father was a financially non-demanding lawyer. My mother went to high school after giving birth to six children and studied political science in M.A. and law at law college.

My father took me to Maniza Rahman Girls High School morning session, that operated Class I to V, and admitted me to Class I with a birth date in January, most probably to count age easily for Secondary School Certificate (SSC) exam after Class X. I was taken to the class where other students were sitting and talking. I sat in the last bench and fell asleep. When I woke up, I noticed the teacher was calling students one by one starting from the first bench and had the students count the beads. The unfamiliar environment scared me and I started to cry loud until I went home. I was scared to go back to school. My mother would prepare my two elder sisters, Sultana Lutfun Nahaf and Sultana

Khairun Nahar, and me for school. While both will go to school I would stay behind in the field in front of our house and walk around until my sisters would return and go home with them. My mother later found it out and told her cousin brother Joinal about it. It was a festive day in the school. Joinal uncle had me put on a nice frock, carried me to the school and spoke to the teachers in courteous and respectful manner. But I remained clinging to his neck and he could not put me down. But next day, I got the courage to enter the school with my sisters.

I started to like the school in my Class II. I liked my two friends, Nargis and Anawara,

sitting on the same bench who were gentle and nice. We learned multiplication and division. We got the problem to calculate how long light will take to travel to earth. The 8 minutes travel time shone up as a sparkle that has remained with me till today. My exam scores became known to the whole school and teachers demanded proudly sweets from my parent. It brought my realization of getting 100% in all subjects is a good thing. So for each exam, I would memorize basically everything in all subjects. The materials would remain in my mind so much that I would try to find ways to forget them. I was always the quickest person in math and could solve math that no one could do. Reading math problems, I would figure out how to solve them and stopped. I did not like to write. Not practicing actually on a paper caused problems for me as I would make mistakes in typing numbers in exams. I could write fast but my handwriting was not neat. It also caused problems in my academic life. I wrote 100% full answers, but points were taken off because of bad handwriting. I became interested in becoming a doctor and my parents supported it. However, my introduction to Physics in Class IX brought a new dimension of understanding for me. My eldest sister got married to a very bright Engineering student Abed Uddin Ahmed who used to tutor the best students junior to him. He would speak about them, his ideas, math, and science to us. Listening to him, I started to see science as a giant and graceful intelligent power. I passed SSC with four letters (distinctions) in science subjects but more were expected by my school teachers. My handwriting was the issue. I went to Central Women's College in Dhaka for XI and XII grades. But it did not have good science teaching. After H.S.C. (higher secondary school certificate) exam, I went to Dhaka public library with a student and got two books on space and the universe which brought a deep sense of the vast universe and I felt a very far extension of Allah. I appeared at 6 admissions tests individually for Physics, Chemistry, Mathematics, Statistics, Bangladesh University of Engineering and Technology (BUET), and Dhaka medical college and got acceptance in each subject, and scored the highest in the math exam. My parents wanted me to go to medical school and I liked the novel profession too. I chose to get admission to BUET. But my mind remained fascinated with the universe and I had to find benefits of studying Physics to convince them to let me go to Physics. Physics was tough as I entered late to the ongoing classes for months at the University of Dhaka. I told myself that the exams would not see whether I joined late, or I had any problems, or I was a female but would see only what I answered. With that, I tried to learn without shame or shy. I took B.Sc. Hons final exams. The night before the result would be out, my mother dreamed I stood first, but she did not speak about it. There were quite a number of known bright students in my class. Later in the day when everyone already knew their results, I heard about mine. My mother and I went to Dhaka University where Prof. Qumrunnesa madam told us that I had broken the record of the Physics Department by being the first female to stand First Class First in B.Sc. Hons. exam. I also received the best female student award from Dhaka University. I did my M.Sc. in Theoretical Physics, with a curriculum of 10 subjects compared to 3 subjects in standard M.Sc., with a thesis on nucleon Compton scattering under Prof. Harun-ar-Rashid, a student of Nobel laureated Abdus Salam. I stood First Class First in my Theoretical Physics in M.Sc. I moved to the USA before the results were officially out but kept in connection with Bangladesh Physics by

giving seminars, and lectures, helping in research projects, giving information to students with graduate admissions, etc. I became a Fellow of the Bangladesh Physical Society and a Fellow of the Bangladesh Academy of Sciences.

Although quiet, I could connect to each student in the class. My class teachers were very nice to me. I was selected to be the Class Monitor for most of my school life. At Dhaka University, where I joined late and remained quiet mostly. To my surprise, my male classmates picked me to be a Class

representative and gave me the maximum number of votes. The other selected representative was Lutfur Rahman, a very talented and handsome student, but we almost never spoke before. As Class representatives, we started to talk, then started physics discussions. Talking to Lutfur who could solve and explain math and physics problems with elegance, I felt like a journey in a beautiful space. He was caring and respectful I felt for the first time that I found my best friend. Shortly before leaving for the USA we got married with his initiative and parents arrangement. After years, we divorced after our son Alburuj was born as he felt our feelings were not there anymore. My mother joined me and helped raising Alburuj as my father passed away suddenly from a heart attack.

While in Bangladesh, I had little knowledge about US education system and knew only names of a few universities. Knowing my classmates were writing to US universities I went American Council for information for graduate application with help of Lutfur. In those days, a student had to ask the university to send application materials. However, somehow, unknown to me till now, my name was entered to many US universities and I started to receive application materials from many universities. I took time to understand and filling out application materials and quite a number of them were not complete. However I got offer from 3 universities I went to Wayne State University, suggested by my advisor Prof. Harun-ar-Rashid.

At Wayne State University (WSU) I got Master of Arts in Quantum Optics studying optical nonlinearity of nematic liquid. I did not Ph.D. in atomic theory on formation of positronium, electron and positron scatterings from atoms. I wrote several useful long programs for 6 publication, but did not use them much after Ph.D.. University of Roorkee (now IIT-Roorkee) asked for my program on scattering which they used for many publications. The program has been revised by them and is still being used. At WSU, a graduate student, Jussi Jarinaan from University of Helsinki, Finland became a very good friend as we used to eat lunch together and spoke. He showed me the beauty of science and nature as he would describe his perspectives of observation of physics around us and his research. I learned to teach as a graduate student and received D. Gustafson teaching excellence award. I also received at WSU, Thomas Rumble Fellowship, Knoller Fellowship, and later on Headliner Award from Wayne Women Alumni association for work on x-ray spectroscopy for cancer treatment, and Distinguished Alumni Award for contributions to science.

I did over two years of post doctoralsip at Georgia State University, suggested by Ugo Fano of University of Chicago, where I picked up the research on the atomic process of photoionization, most common in the stars and around us wherever there are light and atoms. But details of the process was not explained anywhere. I learned the background

details from various sources and wrote or extended a program to carry out photoionization in Hartree-Fock method and wrote 2 papers. These helped me to explain the theory of photoionization in our graduate textbook "Atomic Astrophysics and Spectroscopy" (A.K. Pradhan and S.N. Nahar, Cambridge University press, 2011). I wanted to move close to Michigan as Lutfur was doing his Ph.D. at University of Michigan at Ann Arbor. Supervisor at GSU Prof. Steve Manson mentioned Prof. Anil Pradhan at the Ohio State University, next state to Michigan.

I moved to the Ohio State University in 1990 with a University Fellowship award for 3 years and joined Prof. Anil Pradhan (Anil) to study atomic process of astronomical interest under the international Opacity Project (OP), a novel collaboration to solve outstanding astrophysical problems through precise study of atomic processes. OP had about 25 members from UK, Germany, France, Ireland, US, Brazil Etc. and was headed by Michael Seaton (Mike) of University College London. I found theoretical study of photoionization had advanced considerable by Mike's leadership. I started to study the properties of the process and in years of study have established characteristic features of the process which are illustrated in our textbook Atomic Astrophysics and Spectroscopy (AAS). I also expanded the study of another atomic process, called photo-excitation, through introduction of spectroscopic algorithms. With all these I started to study the most complex element of interest at that time, iron. By this time, the team of the Opacity Project had introduced another international project, the Iron Project that included atomic collision process. My one main objective has been to study the Sun by solving the iron opacity problem. My extensive study on iron became known and I was given the title "The Iron Lady" by astronomers. I was entered in the list of Pioneer Women of Bangladesh for being the first female astrophysicist and was in the calendar of pioneer women of Voice of the Voiceless Foundation.

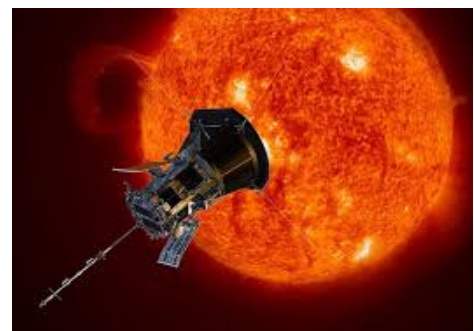
Anil and I introduced a new way, called the unified method, to study electron-ion recombination process, another very important process to study stars and the space in-between. I used the method to study and publish many atomic systems. One person was holding the helm to keep our independent and group research together - Mike. Mike had enormous knowledge and brought a leap to understand atomic process and is known as the father of atomic astrophysics. OP had another member, Dimitri Mihalas, of Los Alamos National Lab who opened the area of Stellar Atmosphere, now well established. They and other team members came to Ohio State in 1992 to attend the special Opacity session of American Astronomical Society conference. I was admirably impressed by Mike as we discussed about electron-ion recombination and I listened to his presentations and leading the group meetings we held. He also showed a down to earth gesture for me. Somehow Mike and I formed a mutual connection which remained intact as long as he lived until 2007. I was the scientific organizer of the conference held at University College London and co-organizer with Anil held at Harvard University that were dedicated to honor Mike. Later on I also had good friendship with Dimitri who became a dedicated reference for me until he passed away in 2013. My work produced lot of results that were used by astronomers, physicists,

engineers. Dr. Carlos A. Prieto of Observatory at Canary Islands created a sample database for my results at the Stellar Astrophysics II conference held in Puerto Vallarta, Mexico in 2007. It became the full fledged database, known as the NORAD-Atomic-Data where NORAD stands for Nahar OSU Radiative. I became a Fellow of American Physical Society (APS) with the citation "For seminal contributions to studies of photoionization and recombination of multicharged atomic systems fundamental to atomic physics and plasma physics and pioneering calculations of remarkable complexity on astrophysically significant processes." I received other recognitions for my scientific contributions.

Our textbook Atomic Astrophysics and Spectroscopy is the culmination of the research findings of Anil Pradhan and myself, as well as those of the Opacity Project and the Iron Project. It is a unique book that bridges atomic physics and astronomy. It is a highly popular textbook used in the USA universities and laboratories as well as all over the world.

In 2004, our OSU group led by Anil Pradhan and myself along with Yu Yan of then at University of Rochester become involved in x-ray spectroscopy of cancer treatment. We proposed a new treatment called "Resonant nano-plasma theranostics" (RNPT) for therapy with much weaker radiation. We developed the theory, carried out numerical simulation to see the effect before lab work, carried out experiment with cancel cell liners, and part of rat experiment, all giving positive evidence. Our work became a highlight of media news "stars to cancer" for couple of years and Astronomy Magazine called it one of the four contributions of astronomy to human life, along with GPS, wireless internet, and eye surgery by laser technology introduced by JWST (Dr. Hashima Hasan's article) which were invented under Astronomy.

I am continuing my research on solar opacity, exoplanetary study for bio-signatures, heavy element spectra produced by the mergers of two black holes or neutron stars.



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