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

THE OHIO STATE UNIVERSITY

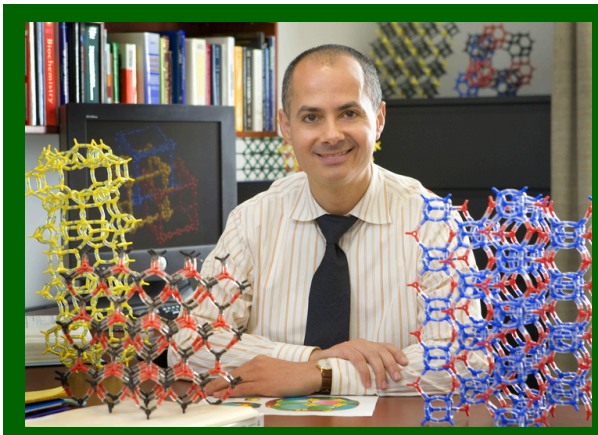
International Society of Muslim Women in Science

International Society of Muslim Women in Science

present the e-magazine for women in STEM

An-Nisa

2025



L: Displaced Palestinian Prof. Omar Yaghi at UC Berkeley, USA, Winner of 2025 Nobel prize in Chemistry for the new matter, Metal-Organic Framwork (MOF) that can be stretched to store or capture molecules,
R: Displaced children in Gaza
listening to their teacher, 2024

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Research Centerof AMU and OSU, and ISMWS
Aligarh Muslim University, India, and The Ohio State University, USA
2025

An-Nisa

Volume 4, 2025

Dedicated to

- Palestinians carrying out education and research in STEM disciplines despite unfavorable suppressed environment and poor resources,

and

- All Muslim Females in STEM

On cover page: Prof. Omar Yaghi, with models of MOF
Awarded 2025 Nobel Prize in chemistry for creating MOF
Image Credit: Reed Hutchinson / UCLA
(https://cnsi.ucla.edu/october-8-2025-former-cnsi-member-and-ucla-faculty-omar-yaghi-wins-2025-nobel-prize-in-chemistry/)

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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 magazine to all those women, known and unknown, who endeavoring and contributing 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 and research of some extra-ordinary women who are making history at this time regardless of their places in the future, inventing the path of science through their dedication, intelligence and truly honest minds"

- ISMWS

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-International Society of Muslim Women in Science (ISMWS) at OSU

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An-Nisa

Volume 4, 2025

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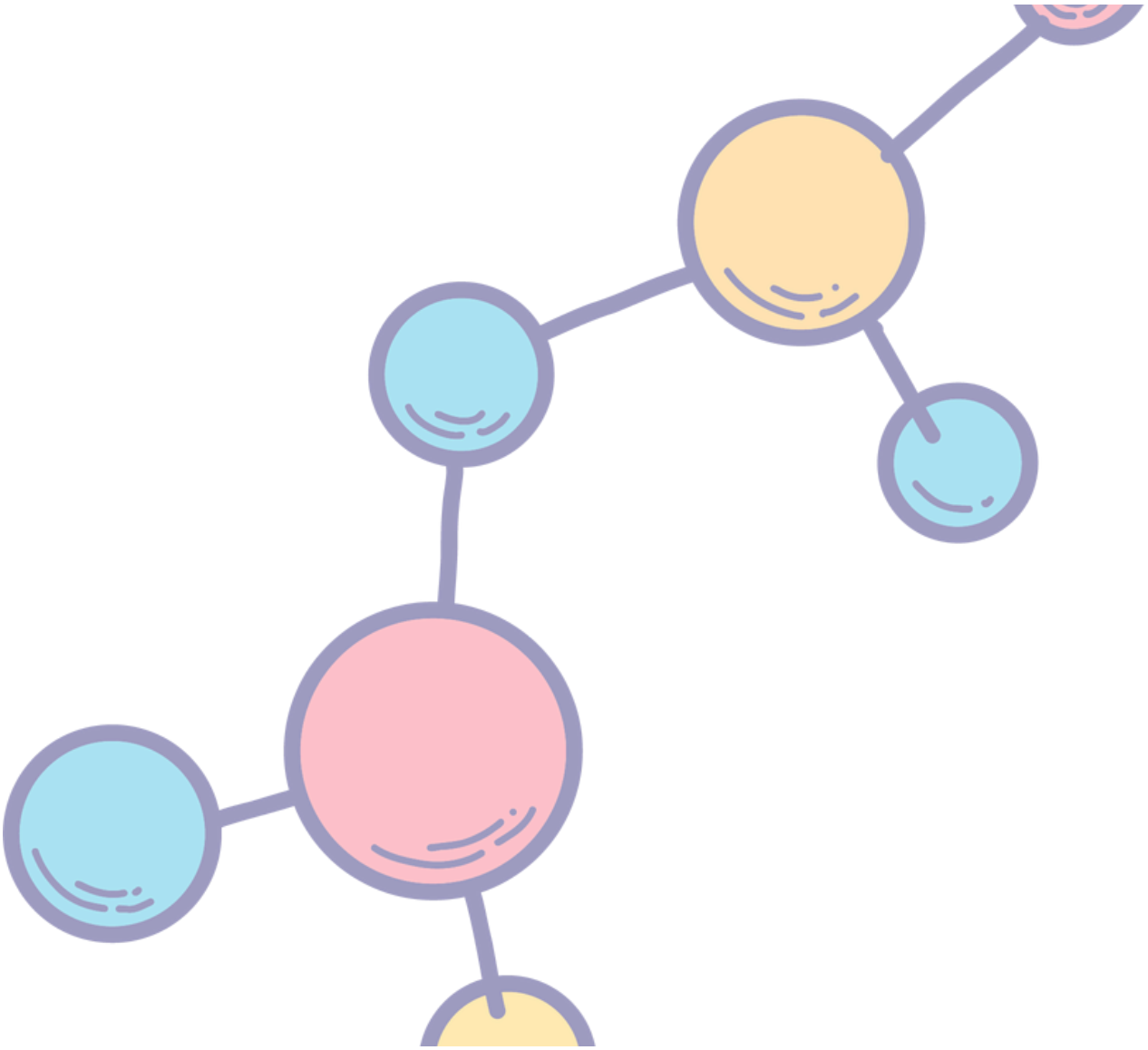


THE OHIO STATE UNIVERSITY

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

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

Assalamualaikum! A very Happy New Year and Ramadan Mubarak to everyone!

We are very pleased to release our 4th issue of An-Nisa magazine. It has creative ideas, support and inspiration for others, and report of some advances.

We continue to dedicate An-Nisa to the two special groups:
- Palestinians, their robust and creative minds that keep on operating even at the worst brutal and painful conditions of Israeli genocide. It brings enormous joy when we see a picture of a mother teaching her children in a destruction site, a teacher lecturing students sitting closely around on the ground or wooden benches and listening under the open sky, heavenly smiles on the faces who are graduating through online classes. We continue to pray for the end of their sufferings and full blossom of their spiritual and intellectual power.

- All Muslim females in STEM disciplines. They get loving support from their families when they are small, but hardship starts with their growing up largely by the unfavorable external environment, and non-supportive actions against to enter professional lives. Out of all these, many are able manage to emerge and make highly valuable contributions.

I would ask everyone to get familiar with AI (artificial intelligence) and use of it, such as popular CHATGPT. It does not need any knowledge of programming to use an AI except describing what you want. It is assistant that helps performing tasks for you faster with its vast database of information and capability to analyze. AI should not be given the authority to make any decision except to provide choices of solutions to problems. AIs are evolving fast, even creating new programs on their own to enhance their capabilities. But they do not have the morality, ethics that are needed and we humans have them in making decisions. (See my article on AI in this issue.)

May Allah bless everyone with a peaceful, productive and successful 2026.

THE OHIO STATE UNIVERSITY

Message from OSU Director Prof. Anil K. Pradhan

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

Greetings from the Ohio State University

On behalf of the Indo-US OSU-AMU APJ Abdul Kalam Center for STEM Education and Research, it is again a great pleasure to welcome another issue of An Nisa - a unique and novel platform for advancement of women in science.
This endeavor is an integral part of the APJAK Center. The An Nisa editor Prof. Sultana Nahar and her colleagues have done a remarkable job in maintaining and expanding its scope. In particular, the AMU faculty and students led by Prof. Tauheed Ahmad have supported this intitative in a variety of ways and at all levels.

These are difficult times for academia all over the world. It is not only economic exigencies that prevail in most institutions of higher learning but also, and more importantly, the political climate is increasingly restrictive of academic freedom. We can not afford to separate intellectual pursuit of individual disciplines from the reality surrounding us since both are inter-dependent. That fact underlines the necessity of public venues such as this magazine which, while focusing on women's issues in science, also seeks to highlight the problems they face in everday life as it affects their careers, especially in beginning stages.

Of utmost importance is to unite with a common base and agenda for action to further this cause.

I look forward reading all the wonderful contents of this latest issue of An Nisa.

With best wishes for the future.

Prof. Pradhan highlighted the following news showing how the dreams of 165 little girls vanished with them by an attack on them.

Massacre of Iranian Elementary School Girls by US-Israel Bombing

On Feb 28, 2026 – a shameful day – the United States and Israel launched
an unprovoked attack on Iran with a brutal bombing campaign. In addition to the assassination of Iran's Supreme Leader Ayatullah Khamenei in his house and with his family, it has now been confirmed that the US bombed an elementary school killing over 165 girls aged 10 or less. Following is a picture of the graves of those little angels. They never had the opportunity for an education. That would surely have transformed them into great women of accomplishment that An Nisa magazine aims to idolize. It is with deep shame, grief and rage that we report this news. It should be noted that Iran has the highest percentage of female students in the world.

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

THE OHIO STATE UNIVERSITY

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

Message from AMU Director, Prof. Tauheed Ahmad

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

Greetings from the Indo-US APJ Abdul Kalam STEM Education and Research Center of Aligarh Muslim University and the Ohio State University**.**

The data from 2015, 16 to onward show that there has been continuous trend of increasing percentage of women in STEM workforce. Let us pray and work for its faster growth.

With best wishes for all women in STEM and An Nisa
Prof. Tauheed Ahmad

ANNUAL ISMWS PROGRAMS AT THE INDO-US STEM ER CENTER

Report by Sultana N Nahar,
The Ohio State University, USA

We have currently four programs for women in STEM run by International Society of Muslim Women in Science (ISMWS) with its chapter at Aligarh Muslim University (AMU) under the Indo-US APJ Abdul Kalam STEM Center for Education and Research of the Ohio State University (OSU) and Aligarh Muslim University (AMU).

1) International E-poster Competition for the post- and under- graduate female students in STEM,
2) Annual symposium observing and celebrating the International Women's Day (IWD)
3) Publication of the e-magazine, An-Nisa, for women in STEM annually.
4) Publication of annual newsletter of ISMWS members. This is part of the newsletter for the global ISMWS members beyond AMU.

2025 International E-poster Competition for female students in STEM:

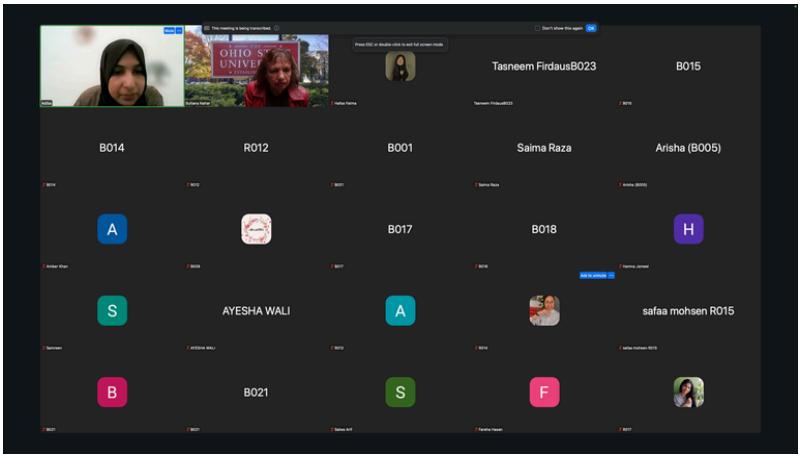
This program was introduced in 2025. Adiba, Physics Ph.D. scholar at AMU and President of ISMWS-AMU, presented her idea of engaging female students with an e-poster competition to advertise ISMWS. Realizing the scope and value of it I formalize the idea for an international program in working with Adiba who introduced most of the ideas. She proposed to engage both the undergraduate students, who often do not have any research experience in most part of the world, and the Ph.D. and Master/M.Phil students who are carrying out research for their degrees. So we introduced two categories of e-posters,
i) research that students are carrying out for their degrees,
ii) concept of research projects with possible solutions largely for the undergraduate students.

Participants will submit the posters ahead of the competition and join for it over the zoom during the day or night depending on their locations. Names of the presenters will be replaced by coded names to avoid any partiality. Each participant will receive 3 minutes to present. We plan to hold the competition in September and announce the winners at a certification ceremony date of October 16 at the STEM Center. We will announce them also electronically to all participants at the same time.

With limited number of experts for all areas of STEM, I decided that the audience and participants would be the judges and put their scores based on the skill of presentation with clarity and importance of the project, and quality of the research indicated by presenter or the knowledge of the audience. Three winners will be selected from each category from the voting points. All winners will receive certificates stating their rankings. Rest of the participants will receive participation certificates.

Adiba prepared the google doc files for registration, poster submission, and collection of scores from the audience for our 2025 competition. We advertised the announcement poster at the STEM Center, and electronically circulated it to all personally known female students in STEM various campuses and to ISMWS network of females in 33 countries to participate and to spread the notice.

In 2025 competition, we received 50 posters submitted from Egypt, India, Saudi Arabia, and USA. Surprisingly about 20 came from the research group, but more about 30 from the idea group of undergraduates.
The winners are listed below.
The best poster presenters in research category were
- Monazzah Fatima of AMU, India: first place
- Safa Mohsen Abu Elmagd Ahmad of Cairo University, Egypt: second place
- Aliza Quaisar of AMU, India: third place

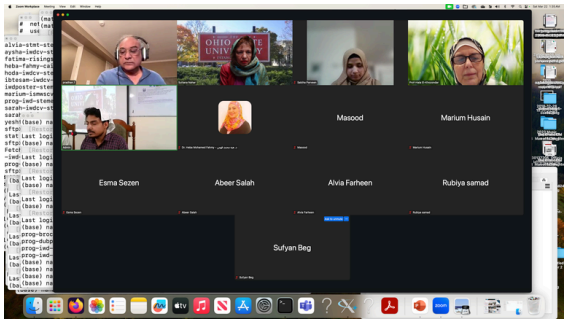


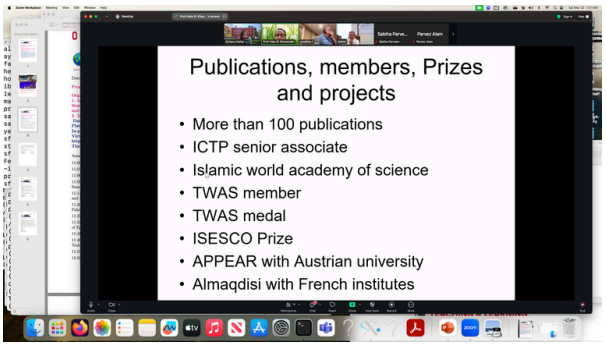
Poster and a picture of the e-poster competition. The Indo-US STEM Education and Research Center initiated the International E-poster Com petition for the post- and undergraduate female students in STEM in 2025. We plan to continue the program as an annual event.
So, please think about some research project/topics that you can work on and submit your poster for the 2026 competition. It does not cost any expense for the participants.

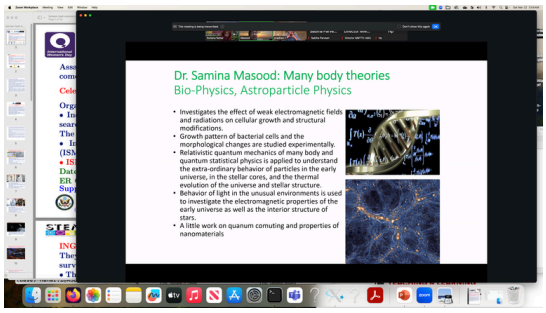
In Idea and Concept of research category, the winners are
- Amber Khan of AMU, India: first place
- Fareha Hasan of AMU and Naaila Siddiqi of AMU, India: second place
- Maziya Pervez of AMU, India: third place

While all participants received electronic certificates, the Center needed to bear some expenses for the recognition certificates for all and plaques for the winners at AMU.

2025 International Symposium celebrating the International Women's Day:







Poster and some presentations of the event

The Indo-US APJ Abdul Kalam STEM Education and Research Center of the Ohio State Uni versity and Aligarh Muslim University and International Society of Muslim Women in Science jointly celebrated the International Women's Day (IWD) by holding an international symposium on March 22, 2025. This is our traditional event since 2014. IWD symposium, held on a hybrid platform where AMU participants were in-person, were joined by international participants from 6 countries, Egypt, India, Palestine, Saudi Arabia, Turkey, USA over the zoom. The Organizing Committee consisted of OSU Co-Director Prof. Sultana N. Nahar (Chair), AMU Director Prof. Tauheed Ahmad and two student helpers from the Physics Department, Afifa Jamal, Farah Naz.

The program started with Quran telawat and followed by greetings from the Directors - Prof. Anil Pradhan, Prof. Tauheed Ahmad, and Prof. Sultana N. Nahar.

The event was presided by the Chief Guest Prof. Hala El-Khozondar, the well-known Palestinian scientist at Engineering of Islamic University of Gaza, Palestine. Guests of Honor were Prof. Faeza Abbasi of Wild Life of Aligarh Muslim University, Prof. Samina Masood of Physics of University of Houston - Clear Lake, USA, and Prof. Sultana N. Nahar of the Ohio State University, USA.
The presentations included topics on experiences, perspectives of women in STEM and current research interests. Some of them are Esma Seza of OSU, Mechanical Engineering, USA reported about herself and ISMWS at Ohio State, Dr. Rubiya Samad of Cluster University of Kashmir, India presented herself and her research, Prof. Sarah Al-Shareeda of Istanbul Technical University, Turkey presented herself and her research on AI and engineering, Dr. Sabiha Parfveen, National Institute of Health, USA, presented herself and her research, Prof. Nazura Usmani of Aligarh Muslim University, India presented herself and her research, Sultana Nahar presented reports on ISMWS. Prof. El-Khozondar has an impressive life achievements emenated from many difficult adversaries. Each journey of life, presented at the symposium, that Prof. El-Khozondar, Prof. Abbasi, and Prof. Masood individually went through from struggle to achievements is truly inspiring. It also reminds us that ”Nothing worth comes easy”.

There was an exhibit of arts in STEM participated mainly by AMU students. However, anyone can submit an art in STEM for the symposium. STEM Center can print them out for display at the conference center. Art presenters received certificates.

Number of well-deserved outstanding women in STEM were recognized with i) Rising Star, ii) Inspiring Women, iii) Pioneering Women certificates through nomination. These recognition come from submission of nominations, self or by nominators. Everyone is encouraged to submit nomination. Information is given at the ISMWS website of Sultana Nahar.
List of outstanding women recognized are:
RISING STAR:
- Adiba, Physics, Aligarh Muslim University, India
- Alvia Fahreen, Zoology, Aligarh Muslim University, India
- Fatima Khan, Biochemstry, Aligarh Muslim University, India
- Sarah Arshad, Physics, Aligarh Muslim University, India
- Yeshfeen Sherwani, Biotechnology, Jamia Hamdard, India
INSPIRING WOMAN:
- Prof. Heba Mohamed Fahmy, Biophysics, Cairo University, Egypt
- Prof. Hina Younus, Interdisciplinary Biotechnology Unit, Aligarh Muslim University, India
- Prof. Rubiya Samad, Physics, Kashmir Central University, Srinagar, India
- Prof. Sarah Al-Shareeda, Engineering, Istanbul Technical University, Turkey
PIONEER WOMAN:
- Prof. Hoda Abou-Shady, Physics, Cairo University & First Female Science Advisor to the President, Egypt
- Prof. Nazura usmani, Zoology, Aligarh Muslim University, India

Women in STEM

International Symposium celebrating the International Women's Day 2025:

Breaking Barriers and Inspiring the Next Generation

Resilience, Faith, and the Courage to Begin Again

By **Dr. Folorunso Serifat Adedamola**
U.K. and Nigeria
Email: serifatf005@gmail.com

Academic/Research Links: in | orcid | research_gate | google_schola

I often tell young women that my journey did not begin with certainty or privilege; it began with resolve.
I am a wife, a mother of four, a statistician, an educator, and today, a Qualified Teacher with Global Talent recognition in the United Kingdom. But long before the titles, conferences, and publications, I was a young woman who chose to continue her education immediately after marriage, at a time when many believed my path should narrow rather than expand.
In that season, I held tightly to the reminder from the Qur'an:
"And that there is not for man except that [good] for which he strives." (Qur'an 53:39)
Striving quietly, consistently, and sincerely became my way forward.

Choosing Growth Amidst Responsibility
Marriage and motherhood are often described as endpoints for women's ambition. For me, they became the foundation. I married young and embraced motherhood early, welcoming four children while navigating the demanding world of higher education. Balancing academic deadlines with childcare, lectures with home responsibilities, and research with nurturing young minds was not easy. There were moments of exhaustion, doubt, and quiet tears.
Yet, there was also purpose.
I understood early that education was not a personal luxury; it was a legacy. Every lecture attended while pregnant, every exam written after sleepless nights with a child, every research paper revised between domestic duties was a lived declaration: a woman does not have to choose between family and excellence.
Allah reminds us:
"Allah does not burden a soul beyond what it can bear." (Qur'an 2:286)
That verse became a reassurance in moments when my responsibilities felt overwhelming. I learned that capacity expands when intention is sincere and reliance on Allah is firm.

From Ibadan to the Global Stage

My academic journey began in Ibadan, Nigeria, where I steadily built my foundation in Statistics, from a diploma to a bachelor's degree, a master's degree, and eventually a PhD in Statistics. Each stage came with its own challenges, but also with growth, discipline, and clarity of purpose.
My research interests were never abstract. They were deeply personal and socially grounded, including health data, neonatal outcomes, women's health, survival analysis, and later, machine learning applications in medicine. Some of this work was inspired by real-life experiences, including witnessing health challenges affecting women and children around me. Research, for me, became not just an academic pursuit but a form of service.
Presenting my work across continents, from Nigeria to Spain, Australia, the UK, France, and Malaysia, Italy was never solely about academic recognition. It was about showing that Muslim women, African women, and mothers can contribute knowledge that is globally relevant and scientifically rigorous.

Resilience Beyond the Classroom
Resilience is not only built in success; it is forged in setbacks.
There were rejections, missed opportunities, financial constraints, and moments when the weight of responsibility felt overwhelming. Yet, faith anchored me. Islam taught me patience (sabr), excellence in effort (ihsan), and trust in divine timing (tawakkul).
"So truly where there is hardship, there is ease." (Qur'an 94:5–6)
I learned that progress does not have to be loud to be meaningful.
While raising children, I also served as a university tutor at the University of Ibadan, coordinated interdisciplinary research projects, mentored young girls in STEM, volunteered in academic and community spaces, and later transitioned into the UK education system. Starting again in a new country required humility and courage, but resilience had already become a habit.

The Quiet Strength of Support
This journey would be incomplete without acknowledging my husband, whose unwavering support has been a constant source of strength. His belief in my vision, patience through demanding seasons, and partnership in shared responsibilities made it possible for me to pursue academic excellence without compromising family life.
Allah says:
"And among His signs is that He created for you spouses that you may find tranquillity in them, and He placed between you affection and mercy." (Qur'an 30:21)
That tranquillity rooted in mutual respect and encouragement has been one of my greatest blessings.

Redefining "Timing" for Women

One of the most damaging narratives women hear is that they are "too early" or "too late." My life challenges that myth.

I earned my Qualified Teacher Status (QTS) in the UK after decades of academic and professional work. I completed an MSc in Applied Data Science while already holding a PhD. I received Global Talent recognition not because my journey was fast, but because it was consistent.

Your timeline is valid even if it looks different.

"For each there is a direction toward which it faces. So, race to [all that is] good." (Qur'an 2:148)

A Message to the Young Woman Reading This

If you are reading this while feeling tired, overlooked, or uncertain, especially as a wife, a mother, or a woman carrying multiple responsibilities I want you to know this:

- You are not behind.
- Your current struggle is not a disqualification.
- Small, faithful steps compound into remarkable outcomes.
- Education, faith, and resilience can coexist beautifully with family life.
- Do not wait for perfect conditions. Start where you are. Seek knowledge relentlessly. Surround yourself with people who remind you of your worth. And when doors seem closed, remember that persistence anchored in faith often creates new ones.

Legacy Over Limitation

Today, when I look at my children, I see more than their growth; I see possibility mirrored back at me. They have watched their mother study, teach, fail, rise, and serve.

That, to me, is success.

My story is not extraordinary because it is unique. It is extraordinary because it proves that ordinary women, anchored by faith and fueled by hard work, can defy limiting narratives.

May my journey remind every woman reading An-Nisa eMagazine that resilience is not the absence of hardship; it is the courage to continue trusting that Allah sees every sincere effort and never allows it to be lost.

"Indeed, Allah does not allow the reward of the doers of good to be lost." (Qur'an 9:120)

Traveller, Pause... and Witness

Prof. Dr. M. Jahanara
Department of Zoology
Dr.Abdul Haq Urdu University,
Kurnool, Andhra Pradesh, India

In the wounded hollows of once-living forests,
felled without mercy
to raise towering palaces
that claw at the trembling skies,
along tired highways and breathless alleys,
and through rivers—once serene—
that murmured the ancient wisdom of time,
there drifts a faint, forsaken presence:
a wandering phantom named PLASTIC.

Whether voiceless creatures gnaw at it,
innocent children breathe it,
or the thirsty swallow it unaware,
there creeps—quiet as a shadow—
a sly, unrelenting intruder:
the ever-spreading spirit of Pollution.

Veiled in comforting words,
wrapped in promises of purity,
and sealed with the emblems of trust,
there thrives, ceaseless and serpentine,
the corrupt marketplace of Adulteration.

Old legends speak
of the skies blazing with fire
and the mighty dinosaurs perishing.
But in our time
no comet descends,
no cosmic flame strikes—
it is Man,

driven by appetite and illusion,
who crafts the road
toward his own undoing.

So let us cast aside
the overripe sweetness
of hollow modern comforts,
and turn once more
toward our first, forgotten dwelling—
to live again
as true children
of the Timeless Earth.

Listening to Cosmic Rhythms: Magnetite and the Physics of Belonging

Imaan Ali
Medical student and researcher
Sam Houston State University in Houston, TX, USA

She is exploring the intersection of biophysics,neurology, and environmental physiology. Her work focuses on magnetite, circadian photobiology, and the ways the human body may act as an interface with the Earth's physical environment. With a background in emergency nursing, she approaches science as both a technical discipline and a way of understanding belonging, coherence, and the human place in the larger whole of creation.

We are taught to imagine the human being as a closed container, as if biology ends at the edge of the skin and everything beyond is irrelevant. Yet the body is porous to the world. It listens, it receives. It participates. The Earth is not a neutral stage but an active environment that produces signals, patterns, and forces that the body is continuously meeting. The planet generates a geomagnetic field from the movement of molten iron in its core. It offers the alternation of light and darkness as a timing signal. It carries low frequency electromagnetic resonances in the space between its surface and the ionosphere. These are not abstractions. They are boundary conditions that life has grown inside of. If the Earth is speaking in quiet magnetic fluctuations, in pulses of light, and in the vibrational hum of atmospheric resonance, what in the human being is built to hear it?

Inside the body there are substances that do not behave like ordinary tissue. Magnetite is one o them. It is the iron mineral Fe3O4, containing both Fe2+ and Fe3+ ions arranged in an inverse spinel lattice. This mixture of valences allows electron exchange, which means magnetite does not only sit there as a deposit of iron. It holds a magnetic moment and aligns with external fields. It stores and releases spin information like a memory material. These particles, found in migratory species, marine mammals, insects, and the human brain, liver, spleen, and heart, in sizes from tens to seventy nanometers, sit in the range where single domain magnetism appears. If it aligns with changes in the geomagnetic field, it could seed microcurrents that add context to electrophysiological rhythms. Magnetite crystals align to weak magnetic fields within the same strength range as Earth geomagnetism and they participate in spin-dependent reactions that overlap with principles of quantum biology. If it couples to a membrane or cytoskeletal structure, its tiny reorientation could influence ion channels and

neuronal signaling. Some studies find that magnetite accumulates with age and interestingly enough, with air pollution exposure, which suggests that sensitivity to environmental fields might increase across a lifetime and disrupt endogenous magnetite function. Above our heads, another signal moves. Between the surface of the Earth and the ionosphere, standing waves form called the Schumann resonances. The lowest is around 7.8 hertz. Higher modes sit near 14, 20, and 26 hertz. These values sit near human brain rhythms involved in navigation, attention, and internal orientation. The amplitudes are tiny. They do not overpower the nervous system. The question is not whether they force the brain to respond, but whether the body uses them the way a musician uses a tuning fork, as a quiet reference that maintains coherence.

Solar activity interrupts that reference. During solar flares and coronal mass ejections, the magnetic shield of the planet becomes disturbed. The frequencies shift and the ionosphere becomes unsettled. Epidemiological research shows changes in heart rate variability, melatonin levels, blood pressure, stroke incidence, and hospital admissions during these storms. During certain periods of strong solar maxima, increases in viral spread have occurred alongside changes in atmospheric ionization. This does not prove causation, but rather, suggests vulnerability. When external signals are stable, internal regulation is often effortless. Circadian cycles entrain cleanly, autonomic balance is easier to maintain, and inflammatory load is lower. When external signals destabilize, especially abruptly, internal systems can drift out of alignment. This drift shows up as poor sleep, headaches, blood pressure variability, arrhythmias, flare-ups of autoimmune instability, lowered viral resilience, and cognitive fatigue. This desynchronization is encompassed by a loss of timing between internal oscillators and the external cycles they evolved within, likely exacerbated due to modern lighting conditions that restrict natural circadian timing. There are points in history when this desynchronization appears at population scale. During peaks and troughs of the solar cycle, when solar winds and plasma disturbances alter Earth's geomagnetic field, hospitals record short-term increases in cardiovascular events, blood pressure instability, and autonomic dysregulation. These changes occurred during the transitional phases of Solar Cycle 24 and are documented in arrhythmia, hypertension, and stroke admissions in human populations exposed to geomagnetic disturbance. This correlation does not imply causation. It does imply that the body is partially regulated by conditions beyond its own boundaries.

The same pattern appears in pandemic history. A review of infectious disease emergence shows that many large scale viral events occurred near solar extremes, particularly at magnetic minima and polarity reversals. This does not mean that the sun creates viruses. Instead, it raises a more precise possibility: immune vulnerability windows widen when geomagnetic and circadian regulation are under stress. The antiviral response is tightly tied to melatonin, cortisol timing, and autonomic stability. Those systems depend on environmental timing cues. If those cues are disturbed, the coordinated response that controls viral replication loses efficiency. The virus is not. stronger, the field-entrained immune system is less synchronized. This raises a central question. If magnetite receives the environmental signal, what carries it through the

body? The answer may lie in the fascial network. Fascia is a continuous, innervated connective tissue lattice that surrounds every organ, vessel, and nerve. It behaves less like packing material and more like a conductive matrix. Collagen, the primary fiber in fascia, is piezoelectric. When stretched or compressed it generates electrical potential. This property allows fascia to convert mechanical deformation into electric signal, creating long-range communication that does not rely solely on nerves. These signals travel through a medium of structured water that forms along collagen fibers and behaves as a proton-conductive fluid rather than ordinary water.

Within this structure, aquaporins regulate the flow of water and therefore the electrical properties of the tissue. Aquaporins are not passive channels; they adjust in response to hydration state, inflammation, circadian cycling, and stress. When hydration is disrupted by sleep loss, pollution exposure, electromagnetic noise, or geomagnetic instability, aquaporins change their gating behavior. This shifts the electrical conductivity of fascia and alters how the network communicates with the nervous system. In this sense, aquaporins are regulators of coherence. They determine whether fascia conducts signal clearly or chaotically. Putting these elements together forms a model:

- Magnetite acts as the receptor for geomagnetic change.
- Fascia acts as the conductive pathway that distributes the signal.
- Structured water provides the medium of transport.
- Aquaporins regulate the state of the medium.

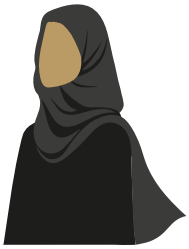
The nervous system expresses the outcome as coherence or vulnerability. This provides a biological explanation for population-level health fluctuations observed during solar extremes. Cardiovascular instability during solar disturbance becomes a consequence of autonomic imbalance triggered by disrupted field-to-body communication. Pandemic emergence aligns with vulnerability windows created by circadian desynchronization. These are not isolated facts but expressions of a continuous system. The takeaway is not that cosmic forces cause illness. It is that human physiology is field-dependent, and when the field becomes disordered, some bodies become less resilient. Health is not only chemistry. It is alignment. Biology functions best when internal oscillators remain synchronized with the external cycles that shaped them. Illness is easier to ignite when synchrony breaks.

A storm may not invent a weakness, but it can expose one. External disruption may challenge biological systems already working to maintain order. Perhaps this is the point. Health is not only an internal state, it is a relationship with the greater creation surrounding us. Coherence is not only cellular instruction. It is resonance with the world that holds us. Magnetite is not simply iron. It is Fe2 + and Fe3+ in dialogue. Cryptochrome is not simply protein. It is electron spin waiting for instruction from light. Water is not simply solvent. It is structure and orientation. The geomagnetic field is not simply space. It is context. If the human being carries instruments to register the Earth, then belonging is not a feeling. It is part of our innate physics.

We are not outside the whole. We are an expression of it.

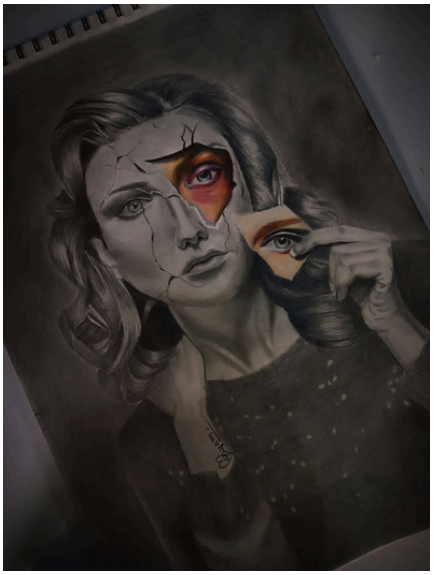
Architectural Art

Mariyam Fatima
Architecture,
Integral University, Lucknow, India



These artworks explore scientific observation, human anatomy, emotional psychology, material behavior of light and shadow, and architectural structural logic through hand-rendered realism. Each piece applies principles of anatomy, physics of light, spatial geometry, and structural composition, aligning visual art with STEM disciplines such as cognitive science, architecture, and engineering visualization.

Man machine interface



Masking mechanism of human psyche

Structure vs Instability

Temporal Architecture of Memory

Material study of light and human surface

Fluid dynamics of grief

Nobel Prize Winners in Science 2025

Chemistry: Omar Yagh, Susumu KitagawaRichard Robsoni

For the development of metal–organic frameworks (MOFs).

Physics: John Clark, Michelle Devory, and John Martinez

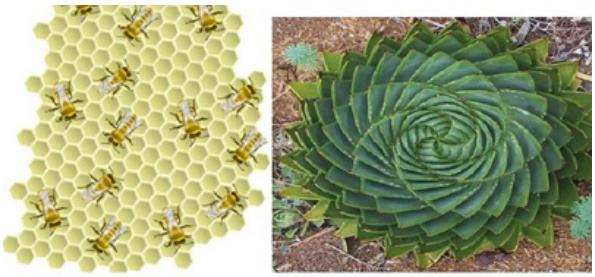
For experimentally establishing microscopic quantum mechanical tunneling in superconducting systems.

Physiology or Medicine: Mary E. BrunkowFred Ramsdell, and Shimon Sakaguchi

for discoveries concerning peripheral immune tolerance.

The Beauty of Pattern

Mahbuba Aktary
Graduate Student
Depaerment of Materials Science and Engineering
King Fahd University of Petroleum and Minerals, Saudi Arabia

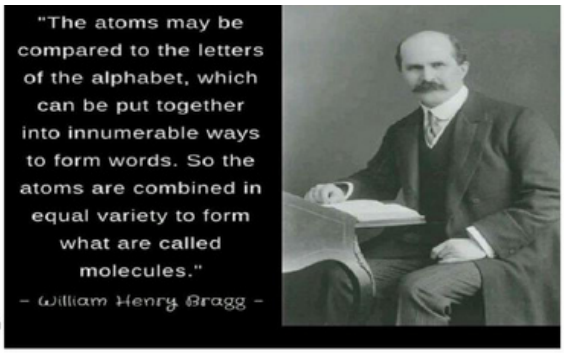


If everything in the universe is made of electrons, protons, and neutrons, then why is some matter alive while some remains inanimate?
If such a question has ever crossed your mind, then today's article is for you.

At first glance, the answer seems simple. All known elements of the periodic table are built from fermions such as electrons, protons, and neutrons. Because their combinations differ, different elements are formed. Protons and neutrons reside at the nucleus of an atom, while electrons orbit around it. The grand story begins here.

"There's Plenty of Room at the Bottom" (1959)

Richard Feynman



Sir William Henry Bragg once reflected that nature uses no external "cement" to bind atoms together- they cling by properties inherent within themselves, mentioned in his famous book chapter: "Atoms of which things are made" of "Concerning the Nature of Things (1925)"[2] as-
"Let us now ask ourselves what binds the atoms together into the various combinations and structures. Like our builder, we have got in our materials the bricks, slates, beams and so on ; we have our various kinds of atoms. If we look round for mortar and nails we find we have none. Nature does not allow the use of any new material as a cement. The atoms cling together of themselves. The chemist tells us that they must be presented to one another under proper conditions, some of which are very odd ; but the combination does take place, and there is something in the atoms themselves which maintains it when the conditions are satisfied. The whole of chemistry is concerned with the nature of these conditions and their results."

Well, let us now turn to the real question.

How does a tiny cyanobacterium—at best, a cluster of only a few hundred atoms—manage to sustain itself in harmony with nature, performing vital biological processes such as growth, reproduction, adaptation, and evolution? A lump of iron ore or a piece of stone or wood does not
exhibit these traits. Why?

The answer lies in meaningful organization.
Nature follows an exquisitely ordered set of rules, and at the heart of these rules lies the play of patterns.
Let me explain with a simple example:
“Kjjghghsdcjsdgfhesuifhoieffgsrjah,agfcisdcsduacgyjjgsddc?”
Did you understand anything?
Probably not.
But why didn’t you understand it? After all, I used only the elements of the Bangla language.
There should be nothing unfamiliar here.
The answer is obvious: arrangement.
To create a meaningful word, letters must be arranged systematically and coherently. Likewise, to form an atom, fermions must follow specific organizational rules. That is how more than 118 elements come into existence—and with them, the entire material world.

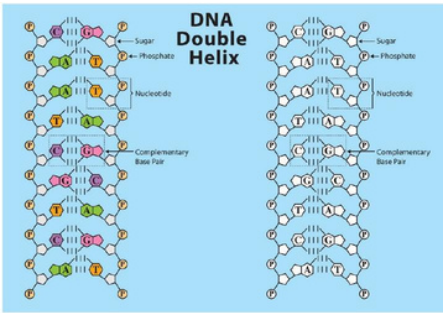
Yet, to express life, matter must undergo another, even more refined level of organization by following the laws of nature.

Just as placing words side by side does not automatically produce a meaningful sentence—sentences require structure, coherence, and intent—atoms cannot randomly assemble themselves into living cells. Certain conditions must be fulfilled. Specificity, repetition, and proportion in patterns must be maintained for atoms to bond in meaningful ways.
This is why DNA crystals, protein crystals, and other physical foundations of life emerge as something extraordinary. The very word crystal implies systematic repetition of atoms, molecules, or ions.
Amino acids—one of the fundamental building blocks of life—are themselves products of such magnificent natural patterns. Because cyanobacteria embody these patterned properties, a mass of only a few hundred atoms can establish itself as an independent entity in nature, capable of self-regulation and decision-making. The boundary between the living and the non-living remains a profound mystery. And the more complex the processes at work in nature, the more fascinating their outcomes become.
It is often said:
“Nature never fully reveals her secrets.”

Thus, even though different aspects of truth emerge at different times in humanity's quest to understand life, the ultimate mystery remains hidden within these majestic patterns.
Let us consider another example.
Imagine a 3 × 3 Rubik's Cube, where each cube face contains one of the laws of nature. Only when every term of an equation is placed correctly does it meaningfully describe a natural phenomenon. Otherwise, it fails.

Figure 1: 3 × 3 Rubik's Cube. (The image was collected from the commertially availabe product. It does not subjected to copyright permission)

For instance, if instead of $E = mc^2$ we were to combine $mv^2/2$ = curl B, the result might look like an equation structurally—but it would be meaningless in explaining any physical reality. Only the correct components, placed in the correct positions, create meaning.
The mystery of life and non-life follows the same principle.
There are many debated theories—such as Natural Selection and Spontaneous Generation—about how meaningful organization arose and spread in nature. Against some of these ideas, the renowned scientist Louis Pasteur presented compelling evidence. While many theories attempt to explain how organized complexity first arose, my focus here is not on origins, but on the principle underlying them: pattern and organization.



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It is because of differences in patterns—their beauty, significance, and distinctive structure—that a robot remains non-living, while you and I are alive. You operate a robot, but you yourself are operated by countless patterns: genetic codes and the intricate internal relationships among them. But, How?
As modern chemists argue, chemistry may not fully define life — but it gives us a language to explore it. So, what does "life" mean to you? It's Open for Discussion."
"Chemistry Is the Foundation of Life, But What Does It Mean to Be Alive?"[6]

Just as communication requires language, and complex circuitry requires precise connections between components, life depends on internal pattern-based interactions. These interactions are nothing but trillions upon trillions of chemical reactions, repeated in sequence, synchronized with electrochemical signals. The presence of water is one of the essential conditions for these reactions.
As Catherine Drennan,
Professor of Chemistry and Biology at MIT, beautifully said:
"Life is a beautiful chemistry."
So you see, although the question seems simple, it is profoundly fundamental. And therefore, the answer is simple—yet deeply complex.
Amidst the vast mysteries of nature, you and I are ourselves living enigmas. Those of us who consider ourselves intelligent beings are truly the products of an elite and elegant design—something we may rightly call the "Language of Life."
So tell me—
do you now realize just how special you are?

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VIEW FROM GAZA: A Window for All Humanity

Dr. Zher Samak

Department of Physics
Al Aqasa University, Gaza, Palestine

Introduction of Dr. Zher Samak by Prof. Anil K. Pradhan, The Ohio State University, USA:
"It is an honor, albeit with sadness, to introduce a dear colleague from Gaza City, Palestine. Given the genocidal conditions under which Palestinians are suffering, it is not prudent to reveal her identity.
However, her thoughts and sentiments reflect what Palestinians endure on a daily basis. It is also with enormous regret, indeed shame, that the rest of the world remains witness to their ongoing tragedy, and yet largely quiet. We might remember that silence is complicity. Inaction in the face of injustice may be convenient but is not a moral option. In fact, the antidote to despair is action.
One must do what one can, even if it is to simply reproduce the words of anguish of a colleague in dire straits, as below. It is highly appropriate therefore for An-Nisa to publish this, since the magazine seeks to highlight not only the achievements of women in science, but also the trials and tribulations they face."

O flower that blossomed among thorns, watered with the blood of martyrs, and endured what mountains could not bear.

It pains me that your hunger was not born of poverty, but of deliberate injustice, calculated cruelty, and shameless conspiracy.
So that the conscience of nations may be scorched,
And the message made clear:
This is the fate of those who choose resistance,
This is the price of refusing to bow.

They used you to spread fear among others,
Whispering with venom: "Look at Gaza, whoever follows her path will know nothing but hunger, siege, and ruin."
They turned your daily bread into a weapon, and your survival into a chain,
Until your people's greatest hope became a drop in prices or a sack of flour on a distant shelf.
But:
Even if the doors of the earth close around you, the gates of Heaven remain wide open.

**Even if the near betray you and the far conspire against you,
You are not forgotten, neither by the Lord of Justice, nor by the hearts that do not sleep.**

**They tried to extinguish the flame of your soul,
To exhaust you until you forget who you are,
To reduce your sacred struggle to empty hunger,
And to keep your eyes fixed on the dust, never lifted toward Jerusalem.**

**But...
How little they understand!**

**Have they not seen in the blood of your children that you do not die.
Have they not realized that dignity is not for sale,
And that those raised on resistance will never learn to kneel?**

**They tried to turn your noble people into queues and numbers,
To make you a warning to silence the brave.
But they forgot:
You are not a lesson in defeat
You are a legend of endurance.
So march on, Gaza
Your hunger is pure,
Your blood is sacred,
And your patience is holier than all the hollow conferences of surrender.**

**And even when the world tightens around you,
Know that in the hearts of the free.
You are vaster than the sky.**

Gaza, your hunger is not a shame. It is an honor that has unmasked the conspirators, the cowards, and the pretenders of humanity, democracy, justice, and equality and has laid bare the hypocrisy and global double standards.

THE SPECTRUM IN THE SKY

Fatima Jafri
B.Sc. 3rd year,
Department of Chemistry, Women's College
Aligarh Muslim University, U.P., India

The tree looked different today
not grieving,
just quietly shifting.

The green was fading slowly,
like chlorophyll deciding
it had carried light long enough.

And beneath it, there was red
anthocyanin rising where sugar rested
a little too long in the sun.

I remember longer wavelengths travel further
maybe that's why red felt deeper,
warmer against the widening blue.

Inside the veins were still working
xylem lifting water in silence,
phloem moving carbon in cycles,
everything in motion
even when the surface seemed still.

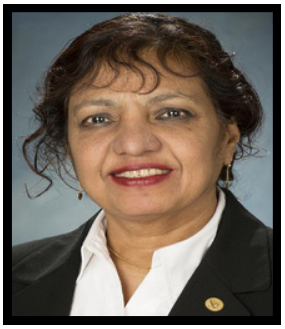
Before the cold slows the enzymes,
before dormancy settles in control,
the leaf turns brightest burning without flame.
Not because it is ending,
but because chemistry keeps extending
what light was once lending.

The Audacity to Bloom

Rubab Azad
B.Sc. 3rd year,
Department of Biochemistry,
Aligarh Muslim University, U.P., India

Growth does not require a perfect garden; it only requires the will to rise. This image captures the moment a delicate life chooses to flourish on the ruins of what came before.This scene teaches us that nothing in life is truly wasted; even our deepest 'rot' contains the nutrients for our next breakthrough. It is a reminder that we can transform our wreckage into a pedestal and find beauty not in spite of the struggle, but because of it.

What is AI and how it has become a part of our life



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

Artificial Intelligence (AI) is a field of computer science. However, implementation has made AI act like an extraordinary assistant for us that performs tasks with human-like cognition. These tasks include i) language understanding, ii) learn from data information it can access, iii) pattern recognition, iv) data or feature prediction, v) make or suggest decision. AI is given vast amount information that we have been gathering for a long time. It is also programmed to fetch data from other sources through internet search. Using that information it can analyze large amount of data statistically and sort out particular topic and narrow down the solutions or choices we are interested in. For example, it can go through huge amount of medical data and carry out the diagnosis from symptoms of a disease in a short time and based on the knowledge, can provide choices of treatments for it. It reduces a doctor's tasks in making judgment on the proper treatment. Figure 1 i) shows an AI doctor.

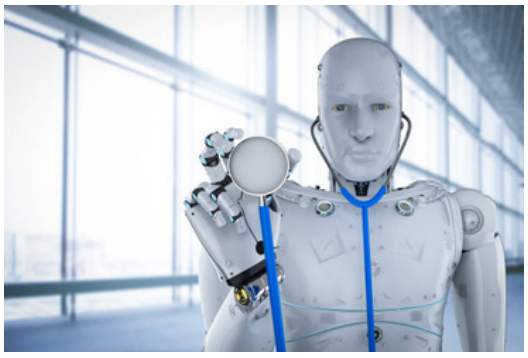


Figure 1. i) AI doctor, ii) Mr. Data of series Star Track: The Next Generation

AI usually works as an independent entity, like a robot. It has also been adapted to work through a publicly interactive platform like ChatGPT on the internet. It is programmed with machine learning (ML) algorithms of neural networks that learn patterns from data. A major subset of AI is deep learning network, which uses artificial neural networks with many layers to model complex patterns.

One popular algorithm of ML is Transformer architecture. It is used in advanced AI platforms of Gemini, CHATGPT, Claude that are publicly accessible through internet browsers.

ML does not require language processing which can be carried out by a statistical large language model (LLM). A LLM is a Transformer-based deep neural network trained using gradient descent algorithm to optimize the statistical structure of language and predicts the conditional probability of the next token given prior context. While ML works on any data (images, numbers, signals), LLM works primarily on text. We can have enormous amount of work done by a dedicated AI that we can not do ourselves as our minds get distracted usually.

Since the coming of computers, we have been very much interested in the concepts of having Robots, ANDROIDs, etc, now commonly mention as AI which will reduce the human tasks and bring advances faster. We have been portraying AI in stories for a long time. We are very much fond of ever-useful and informative android Mr. DATA of science fiction series STAR TREK (Figure 1-ii). In reality AI robotics are bringing revolutions to human lives. In Japan, AIs are giving company to elderly lonely people and thus reducing their mental depression and help with physical tasks without being tired (Figure 2-i). Ohio State has built AI maintained ensemble of 500 robot telescopes (Figure 2-ii), each cable in the circular drum is an independent telescope which can be pointed to a particular astronomical object for observations. AI manages the telescopes and stores the data in a disciplined and efficient manner.

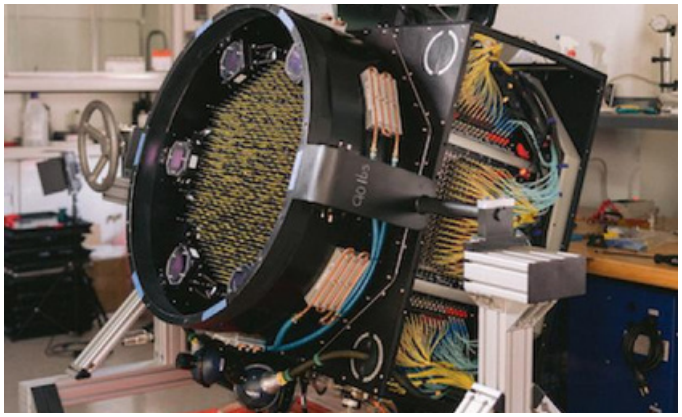


Figure 2: i) left: AI Nurse, ii) Ensemble of Robotic telescopes built by OSU

Since starting its operation, AI has became part of our daily life. AI integrated gradually, without knowledge for most of us, through various applications we use. AI is used for improvements in computing power (GPUs, cloud computing), for availability of large datasets, advances in statistical learning theory, commercial deployment by major tech firms. Some examples of its roles are given below.

Google search and information retrieval engine uses AI for query interpretation, personalization, spam detection. Social media platforms, such as, Instagram and YouTube use AI for content recommendation, content moderation, feed ranking, ad targeting. AI is used in Smartphones to be voice assistants (e.g., Siri), predictive text

and auto-connect, face recognition (Face ID), camera scene detection In transportation, AI directs navigation systems, predicts traffic, autonomous vehicle driving by combining computer vision, sensor fusion, and reinforcement learning. In healthcare, AI assists in medical imaging analysis, drug discovery, disease prediction, clinical decision support, analyze radiology scans and detect patterns invisible to the human eye. The list can go on.

I will give two examples in Astronomy where AI application is critical. There are 2 trillion galaxies in the universe. Our galaxy, Milky Way, has about 200-400 billion stars. Hence there are trillions after trillions of objects to study. The Sun is one of the stars of the Milky Way. It is the source of energy for us. It is also the standard to study other stars. For our survivability, knowledge of astronomy is vital. We have huge amount of astronomical data are being collected every day by various ground based telescopes and space based observatories. Several of them carrying out sky surveys. Major NASA sky survey missions and their characteristics numbers are given below.
Number of bands refers to distinct photometric or spectral channels used for survey products. Very high volume of manpower and time would be needed to analyze all the data available. The solution is use of AI which we can train to categorize the objects based on their spectral characteristics.

Survey Mission	Wavelength Coverage	Years of Operation	No. of Bands	Data Volume
COBE (DIRBE/FIRAS)	Microwave, Far-IR	1989–1993	10 (DIRBE)	~ 0.2 TB
2MASS	Near-IR (1.25–2.17 μm)	1997–2001	3	~ 10 TB
GALEX	Ultraviolet (135–280 nm)	2003–2013	2	~ 30 TB
WMAP	Microwave (CMB)	2001–2010	5	~ 1 TB
WISE	Mid-IR (3.4–22 μm)	2009–2011	4	~ 15 TB
NEOWISE	Mid-IR (3.4–4.6 μm)	2013–2024	2	~ 30 TB
TESS	Optical (600–1000 nm)	2018–Present	1	~ 200 TB
eROSITA (NASA participation)	X-ray (0.2–10 keV)	2019–2022	7	~ 2 PB
SPHEREx	Near-IR (0.75–5.0 μm)	2025–Planned	102	~ 0.5 PB

The other problem is search for a new home for our future generations. The Sun is 4.5 BYr old and can live for another 6-7 BYr before becoming a red giant, which is a dying expanded star with H fuel gone. Our earth will be engulfed by the red giant. We will need another home, a habitable exo-planet where the surface is solid, contains liquid water. We found that Proxima b, an exoplanet to our closest star Alpha Centauri (over 4 light years away). It is an Earth-like in size with hard and rocky surface, possibility of containing liquid water, and has a temperature similar to us.
However, it is unreachable at this time. A spacecraft using current technology will take 18 thousands of years to reach it. We need to develop our technology for traveling at a much higher speed.
,

Recent findings show that we have other problems on the health in traveling in zero-gravity space for a long time. This resulted bringing down all astronauts from the International Space Station. Prolonged traveling shows two major problems. Figure 3 shows that

i) Low gravity can shift the brain fluid slightly of an astronaut causing imbalance condition

ii) STEM cells of Astronauts seem to age faster than normal people.

The solution is Astronaut AI which will travel first to carry out all tests that can affect living forms and provide the data necessary for adaptation of space travel.

The US Administration has announced "Launching the Genesis Mission" which needs a focused, coordinated national effort to unleash a new age of AI-

Figure 3.

accelerated innovation and discovery. AI-driven innovation is a key national priority for ensuring American science and technology (S&T) dominance, economic growth, and national security. Expected outcomes are:
AI will transform a broad range of occupations spanning the nation's industrial, government, educational, and research and development sectors. The Genesis Mission will double the productivity and impact of science and engineering in a decade, and address some of the most challenging of this century. Led by the Department of Energy (DOE), the Genesis Mission will mobilize DOE's National Laboratories, industry, and universities to harness the nation's leading capabilities in high performance computing, next-generation quantum computers, and artificial intelligence (AI) to revolutionize science innovation.
Ohio State University has instituted the "AI Fluency" program to train all students to adapt to AI programmings, applications and implementation.

My area of research is on atomic processes and spectroscopy of astrophysical plasma. 99% of the matter in the universe is plasma. Spectroscopy is the method to obtain maximum information of an astronomical object. Critical and precise spectral modeling require high accuracy data for them. One of my plans underway is to implement AI to carry the spectroscopy in a large scale, such that, identifying some lines of an astronomical objectwhich can be used to classify the

astronomical objects. AI-based modeling will consist of data mining and preprocessing, optimization, generation of data if needed, and interpretation in text and graphic interface. We have proposed an algorithm for it where we will define the micro-variables, such as, transition parameters for the atomic processes and macro-variables, such as, physical condition of temperature, density, abundances of the astrophysical plasma. Most of the atomic data will come from my database, NORAD. However, AI can be trained to simulate needed missing data from those at NORAD. Then it carry out optimization to make a narrow gap between astrophysical observation and theoretical prediction. These tasks will be performed through transformer based Large Language Model (LLM).

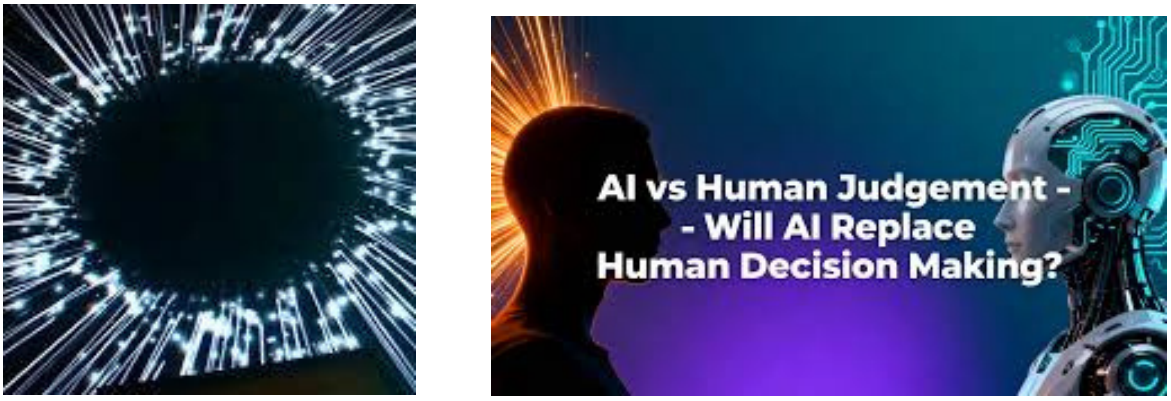


Figure 4. i) Destructive AI Entity of movie Mission Impossible: Dead Reckoning, ii) our conscious and debate with AI

With all these advantages, we also have concerns of AI taking over human beings by following the logic it finds more valuable than what we find more humane. We have also seen AI characters working against human beings, such as, AI, designated as "the Entity" (Figure 4-i), in movie "Mission Impossible: Dead Reckoning" found itself superior to human beings and hence decided going out to destroy us.

Recently it has been found that AI itself is generating programs to enhance its capability. Hence, the BIG question is "Will AI Replace Human Decision Making?" (Figure 4-ii). AI does not apprehend human logic and ethics that may involve compassion, emotion, circumstantial evaluation. Both sides of AI have been of great hope, concern and debate for us.

We need study on how to harness the power of AI, keep the decision for us while AI can assists us with choices based on the logic and information.

Transformers Are All We Know

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Abstract

Artificial intelligence has been developed since the beginning of botanical categorization and the prevalence of Transformer architectures. In this article, the author discusses the symbolic and scientific evolution of the historic dataset of Iris proposed by Ronald A. Fisher to the modern applications of deep learning that drive the modern AI systems. The Iris dataset provided the foundations of supervised learning, converting morphology of flowers into quantifiable attributes, forming the concepts of structure in data analysis and identification of patterns. As the years went on, machine learning evolved beyond linear models and machines of decision to neural networks, and was later improved by the Transformer architecture, which brought a groundbreaking change in natural language processing, computer vision, and multimodal brain through large-scale training and self-attention (SA). In a comparison with botanical innovation, the example of the systematic hybridization and maximization of traits in floriculture, Gladiolus, NBRI-Pushpangadan, developed by CSIR-NBRI, can be compared. Through feature engineering analogy of the machine learning and trait selection of the plants breeding, the article underscores the interdisciplinary synergy that exists between the study of computational intelligence and the study of the biological sciences. Finally, it states that although Transformers are the current leaders in the field of AI, their principles still have their roots in the original principles that had been proven using relatively straightforward botanical data sources.

Keywords: Artificial Intelligence, Iris Dataset, Transformer Architecture, Supervised Learning, Deep Learning.

1. Introduction

Machine learning oddly starts with flowers (Touvron et al., 2022). The Iris dataset, which was to become known as the most famous dataset, was published by the British statistician Ronald A. Fisher in 1936, and is a simple, but effective, set of measurements of iris flowers to differentiate species. What appeared to be a problem of botanical classification formed the basis of the supervised learning where it was shown that numeric attributes, such as the sepal length, sepal width, petal length, and petal width, could be used to run algorithms to identify patterns. This collection of data was a representation of the dawn of statistical learning, in which the structure of nature motivated computational learning. The above-mentioned quantifiable symmetry and variability of flowers made them an initial interface between biological and artificial intelligence. In the modern world, though, machine learning has a radically different appearance. Starting with linear classifiers and decision trees, linear classifiers have given way to deep learning-based systems, with deep learning systems then becoming supplanted by Transformers, which eventually dominate natural language processing, vision and

multimodal systems.

It is important to note that the expression Transformers are all we know describes this paradigm shift, modern AI is more and more based on attention-based models (He et al., 2024). “Nevertheless, the path in iris classification to large-scale Transformers brings back the thought that computational intelligence, similar to botanical breeding, develops out of fixed observation, organized data, and allurement of pattern in nature.

2. The Beginning

— Iris and the Foundations of Machine Learning

Machine learning is intellectually related to a misleadingly straightforward botanical experiment. The Iris dataset is one of the most renowned datasets in the field of data science that was introduced in 1936 by the statistician Ronald A. Fisher. The data sample consisted of accurate measurements of iris flower individual parts (sepal length, sepal width, petal length, and petal width) of three species: Setosa, Versicolor, and Virginica (Ranaldi & Pucci, 2023). The purpose of Fisher was to show how a linear discriminant analysis could be done, nevertheless, the larger aspect was epochal. The first translation of biological variation into numerical properties that can be used to train a model to differentiate between categories took place. This was the conceptual inception of supervised learning, in which the annotated examples point an algorithm towards predictive accuracy.

With the development of computational methods, the initial algorithms were developed on this basis. Linear regression provided the opportunity to model variable relationships, whereas logistic regression generalized this concept to the classification task. Decision trees also proposed the rule-based partitioning of feature space providing human-like reasoning where they divided data into branches depending on levels (Turner, 2023). The Support Vector machines later optimized the classification boundaries by maximizing the margin between classes. Both these methods were based on structured information, i.e. well-defined, measuring characteristics, such as the morphologic characteristics of flowers. Simply put, the sphere of machine learning expanded the formalization of the pattern recognition already existing nature.

The symmetry, proportion, and quantifiable differentiation of the morphology of flowers became a perfect metaphor to feature-based learning. Organized data such as Iris enabled models to work in defined dimensions (Li et al., 2023). Nevertheless, with the rise of the digital field, data became less structured, i.e., images, audio and text needed models that could extract patterns with no direct feature engineering. The second significant change in artificial intelligence involved the form of data. It was the creation of the unstructured data.

3. The Rise of Deep Learning and the Transformer Revolution

The inability of classical machine learning to process unstructured data gave rise to the revival of neural networks (Gupta & Rangarajan, 2024). The early neural networks were inspired by the human brain and they were trying to recreate the computation of interconnected layers. These weak networks over time grew to deep architectures that were in the hierarchy in such a way that they could learn. The Convolutional Neural Networks (CNNs) have revolutionized the world of computer vision because it identifies edges, textures, and shapes on images automatically. Speech recognition and language processing were advanced with Recurrent Neural Networks (RNNs) which enabled it to model an entire sequence. Manual feature engineering was superseded by representation learning where models learn patterns on their own.

In 2017, a breakthrough came with the publication of the article of the results of research done by the researchers of Google Brain: Attention Is All You Need. The paper presented the Transformer architecture, which is entirely based on the self-attention mechanism. Transformers worked with full-sequence as opposed to RNNs which operated in sequence (Zhou et al., 2023). The self-attention manner enabled the model to balance the weight of each word or element against others and long-range dependencies are learned quite efficiently. Parallelization enabled models to achieve previously unheard-of scale because parallelization accelerated training greatly.

The changes it created were startling and radical. The translation systems, chatbots and text generators started to be powered by transformers that dominated natural language processing. In the near future, their architecture was extended not only to language, but also to vision and multimodal AI. Emerging models both in research and industry were shown by models created with large datasets and operating upon them (Hill, 2024). This present state of dominance has been captured in the phrase Transformers are all we know; more and more modern AI ecosystems are based on the attention-based architectures as the default. Transformers have good scale properties, respond to large amounts of data and use computational resources compared to classical machine learning models which relied on hand-engineered features and smaller datasets. But in truth they are complicated pattern recognizers, a continuation of the same principles originally demonstrated by the classification of flowers.

4. Case Study — Gladiolus 'NBRI-Pushpangadan'

As artificial intelligence was developing towards complexity, plant science proceeded with the process of selection and hybridization (Gao & Bourlai, 2024). A good illustration is the high-value ornamental variety of gladiolus called NBRI-Pushpangadan developed by CSIR-NBRI. The cultivar was named in remembrance of Dr. Palpu Pushpangadan, who has scientific contribution in floriculture. It was created by means of systematic hybridization between Neelima, which is a purported variety of purple, as the female parent, and Yellowstone which is a yellow-colored variety, as the male parent. Deliberate crossing was done followed by systematic selection in order to increase floral quality and yield characteristics.

The methodology of breeding resembles the optimization with algorithms. First, the desired parents are chosen depending on certain qualities. Pollination is controlled and genetic combination ensured after which the progeny is tested through several cycles. Only those that have better traits like spike qualities, color abilities and yield performance are maintained. Repeated selection stabilizes the traits, and a specific cultivar that can be used commercially has been obtained (Zhou et al., 2023). This approach is similar to the supervised learning: input characteristics (parent traits) are assembled and tested against performance objectives, refinement and hunger improvements would result in optimal outcomes.

The evolution of this species of gladiolus scientifically illustrates the combination of genetics, observation and systematic assessment (Wei et al., 2025). It has both ornamental and economic value commercially, which supports the role of innovation in the field of horticulture. Similarly to machine learning, where training and tuning allow only learning better models, breeding and selection allow upgrading plant species.

5. Morphology, Data & Pattern Recognition — A Biological Analogy

The aspect of morphology of Gladiolus NBRI-Pushpangadan can be considered as

biological counterparts of feature vectors in machine learning. It is a late bloomer, and it also takes 90-112 days to flower. The height of the plant varies with 82 -102 cm, the length of the rachis is 82-98 cm- perfect cut flower markets (Farmanifard & Ross, 2024). Each spike contains 12-19 florets and 2-7 goal open concurrently in one direction, which produces a full and good-looking display. These quantifiable features are similar to structured entries in a dataset with each dimension serving as classification and evaluation contributions.

There are also some floral peculiarities that enhance this analogy. Its dominant color of floret is reddish-purple, and it is accompanied by some secondary pigmentation of light greenish-yellow. The yellowish-white stripes are also prominent and elliptical on the inside of the tepals giving it a distinctive ornamental character (Yin et al., 2025).

These are distinguishing features in the terms of data science, which distinguish one class and the other. A neural network that has been trained on images of flowers might possibly learn these visual patterns, just as the original algorithms did by being trained on numeric measurements of iris. This analogy brings out the wider idea of feature engineering. In classical machine learning, the relevant attributes were chosen by experts manually. In floriculture breeders are able to identify and stabilize favorable traits. Quantitative is measured in a structured manner, whereas qualitative beauty is dealt with through visual perception (Al-Rajeh & Al-Shargabi, 2024). This can be bridged with modern AI, namely, deep learning and Transformers used with computer vision. The image recognition systems might be used to measure the spike symmetry, color intensity change or flowering performance. Therefore, artificial intelligence can be not only used to group flowers but also help in breeding, optimization of yields and market predictions.

Transmigration of the Iris data to the composite Transformer models represents, in the end, the constant endeavor to determine the patternsisknownotesin pixels, tokens of language, or petals. Biology was the first source of inspiration; computation increased the distance. The communication between flowers and algorithms is ongoing because there is still a reminder that the origin of intelligence natural or artificial is in the process of observation, measurement, and the generation of meaningful structure.

6.Commercial Floriculture Meets Artificial Intelligence

Commercialization of the ornamental crops is based on quality, uniformity and appearance which are the features that characterize the success of Gladiolus 'NBRI-Pushpangadan'. This type was developed by CSIR-NBRI and it has good quality spikes, which have a long rachis length and an amazing number of florets that make it suitable to high-quality cut flower markets. The visual contrast, the color of its florets, which is reddish-purple and marked with the greenish-yellow pigmentation, makes it not only more ornamental but also increases its demand among the consumers (Xia et al., 2022). These characteristics are directly converted into commercial value in the form of improved pricing, exportability and longer vase life performance.

Artificial intelligence is another phenomenon that is changing floriculture making it more precise and efficient. Growth and climatic forecasting Yield prediction models are based on past growth and climatic forecast to predict production volumes, which can be used to make a better supply chain plan. Disease detection systems that are image-based and run on deep learning are able to detect infections at an early stage and minimize losses of crops. The Smart greenhouse technologies combine sensors

and automated controls to control temperature, humidity, and irrigation systems in order to optimize the environment of the plants (Touvron et al., 2022). In addition, AI-based forecasting of market demand assists the growers to match the production and consumer trends. Vision models that can be implemented using transformers can be used to assess flowers by their symmetry and color consistency, whereas multimodal systems can combine environmental and genetic information with visual information to help breeders produce better ornamental varieties.

7. Conclusion

The path between the Iris dataset and the modern Transformer models is a metaphor concerning the development of the artificial intelligence itself. The statistical basis of supervised learning had been laid by Iris, and the presentation of a novel Gladiolus called NBRI-Pushpangadan is the current best in bio-design. Even though Transformer architectures prevail in the modern world of AI, it is based on simple principles of pattern recognition which were first showcased on simple datasets. The future of applications of AI in floriculture is in the field of interdisciplinary co-operation where AI helps in breeding plants, and data-driven floriculture. Just as the selective hybridization creates better flowers, intelligent reflection models architecture breeds effective intelligence -intelligence born of human interest and experience.

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The Journey from School to College Life: A Reflection on Change, Struggles, and Growth

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Life is a succession of transitional stages, each with its own set of experiences, problems, and lessons. One of the most major changes in a person's life is the transfer from school to college. It is a journey that frequently begins in a difficult setting of school, where academic pressure and societal expectations loom large, and progresses to the apparently liberating world of college, where independence and personal growth take centre stage. As we follow these courses, we understand that, despite their differences, both stages play an important part in forming who we are and who we will become.

School was frequently a source of stress for many of us. Endless schoolwork, tests, rigorous routines, and constant pressure to succeed academically appeared to weigh heavy on our young shoulders. We were constantly told what to do, when to do it, and how to do it. Teachers, parents, and society at large had high expectations, and it was easy to see this period as one of constant struggle. The rigorous framework of school life, with its set schedule and limited freedom, frequently made us yearn for the day when we might finally be free and live on our own terms. During school, many of us would say, "I can't wait to grow up." The concept of maturity, with its promise of independence and freedom, seemed like the ultimate aim. We assumed that once we left school, we wouldn't have to bother with schoolwork, rules, or constant supervision from instructors and parents. We looked forward to the day when we could make our own decisions and live our lives the way we wanted. The prospect of graduating from school and embarking on a new chapter in life was exciting. However, we failed to recognize that those moments of frustration were the most productive. School was more than just a venue for academic instruction; it was also a time for profound personal development and the formation of lifelong memories.

Then comes the transition from school to college, which brings with it a mix of enthusiasm and trepidation. The familiar world we've known for years abruptly changes, and we're thrown into the next stage of life—college. This transition is characterized by a rapid shift in the way we live and learn. For many of us, starting college feels like walking into an entirely new universe. The days of strict scheduling, close instructor monitoring, and regular school routines are over. Instead, education provides us with the freedom we've long sought. At first, college appears to be a dream come true. There is no one to continually check on us, and we have the freedom to make our own choices. We have the freedom to choose our lessons, when we study, and how we manage our time. Social life becomes more active, with opportunities to meet new people, join clubs, and pursue other interests. The newfound freedom is thrilling, and for many students, the first few months of college are fraught with excitement and adventure. However, once the initial pleasure wears off, we discover that this independence is not without its obstacles.

We were used to a structured setting at school, where teachers led us and kept us on course. In college, however, we are primarily responsible for our own achievement. Time management becomes critical, and we rapidly realize that juggling academics, social life, and personal duties is not as simple as it appears. The academic workload can be onerous, as can the expectation to do well in an atmosphere aimed at improving our future lives. As we settle into college life and begin to reflect on our path, we frequently come to the unexpected revelation that the era of life we had considered burdensome—our school years—was actually a time of enormous richness and completeness.

We typically built deeper and more important connections in school because we spent so much time together, sharing the same experiences and confronting the same obstacles. The difficulties we had in school, whether intellectual or personal, helped us grow in ways we didn't fully comprehend at the time. And, while we may have considered school as a hardship at the time, we now recognize it was a period of innocence, discovery, and deep connection.

While we may fondly remember our school years, it is critical that we appreciate the current stage of our lives—college. College, like school, has its own unique mix of challenges and benefits. College allows us to pursue new chances, gain independence, and prepare for the future. It is a period when we can forge our own pathways, discover our passions, and start to really consider our professions and future objectives. The independence that college offers, while often overwhelming, is an important aspect of growing up. It teaches us to be responsible, self-disciplined, and resilient.

While our friendships in college differ from those in school, they are just as vital. They are based on common experiences of independence, curiosity, and the excitement of entering adulthood. Both school and college are important stages in our life, each with its own set of memories, problems, and joys. As we progress through these stages, we gain important lessons that form who we become. School may have felt like a burden at times, but it was a period of significant growth, and the memories we made there will last a lifetime. College, with all of its freedom and responsibility, is another step on the path to adulthood—a time to enjoy, study, and plan for the future.

In the end, these are the greatest days of our lives. These are days of education, companionship, and self-discovery. Following this, life will take us in many directions, with each of us following our own vocations, objectives, and dreams. However, regardless of where we end up, our school and college experiences will always be a part of who we are. These stages may pass, but the lessons we learnt and the memories we created will endure a lifetime.

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