ISLAMIC WORLD ACADEMY OF SCIENCES

Newsletter

December 2025 Volume 33 Number 72

THE ISLAMIC WORLD ACADEMY OF SCIENCES CONVENED ITS 26TH INTERNATIONAL SCIENTIFIC CONFERENCE UNDER THE THEME ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY NEXUS

The Islamic World Academy of Sciences (IAS) has convened its 26th international scientific conference online on Zoom on 30 October 2025. The conference was in partnership with the Higher Council for Science and Technology (HCST), Amman, Jordan. The theme of the conference was **Artificial Intelligence and Nanotechnology Nexus.** The conference was an open activity in which local and international participants attended. Among the participants were Fellows of IAS, world-renowned lecturers and experts, local and international scientists from various universities and institutions as well as academics, decision-makers, scientists and researchers.

Conference video available on: https://www.youtube.com/watch?v=0a_SXCzIVB0&t=532s

Prof. Adnan Badran
President, Islamic World Academy of Sciences (IAS), Amman, Jordan.

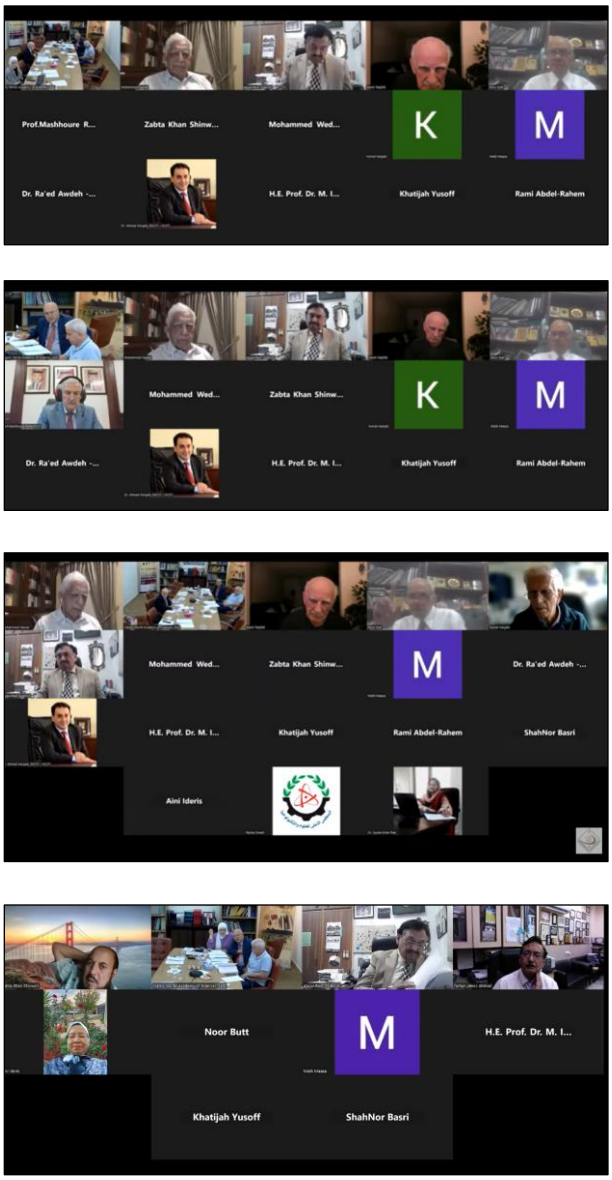
Prof. Muhammad Iqbal Choudhary
Coordinator General of OIC-COMSTECH, Islamabad, Pakistan.

Prof. Atta-Ur-Rahman
International Centre for Chemical and Biological Sciences, University of Karachi, Pakistan.

Prof. Munir H. Nayfeh
Professor of Physics, University of Illinois at Urbana-Champaign, USA.

Prof. Dhiya AL-Jumeily
Chair in Artificial Intelligence/ Senior Member, IEEE, Faculty of Engineering and Technology Liverpool John Moores University, United Kingdom.

After the conclusion of the conference, the IAS held its 47th Council meeting and its 27th General Assembly meeting. Several IAS Fellows attended the meetings. A detailed report was presented by Prof. Adnan Badran, President, IAS on the various activities implemented by the IAS from its headquarters in Amman. It went on to discuss an extensive agenda that included a review of financial statements, election of new Fellows, IAS programs, as well as a number of organizational matters related to the IAS. Prof. Elias Baydoun, Treasurer, IAS, talked in brief about the finances of the IAS.

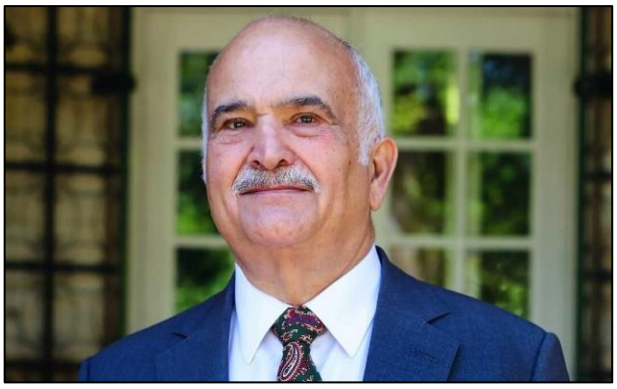


Some participants of the conference.

IAS Council and General Assembly Meetings.

MESSAGE FROM H.R.H. PRINCE EL-HASSAN BIN TALAL[1] PRESIDENT OF THE HIGHER COUNCIL FOR SCIENCE &TECHNOLOGY & FOUNDING PATRON OF THE ISLAMIC WORLD ACADEMY OF SCIENCES

TO THE 26TH ISLAMIC WORLD ACADEMY OF SCIENCES (IAS) CONFERENCE ON "ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY NEXUS"



Excellencies, Distinguished IAS Fellows, scientists and scholars
Ladies and gentlemen,

It is a privilege and an honour to address you today, and to welcome such an esteemed gathering of minds to this important IAS international conference on **Artificial Intelligence and Nanotechnology Nexus**.

We are meeting at a time when science and technology are no longer peripheral to the human story, they are at its very heart. Artificial intelligence and nanotechnology - each extraordinary in its own right - are now converging, forming a powerful nexus that will reshape not only industries and economies, but our very conception of what it means to be human.

Yet the question before us today is not only what these technologies *can* do, but rather: What will we do with them? For whom? And to what end?

In the Islamic tradition, knowledge is an *amanah* - a sacred trust. Science, in its highest expression, is not separate from ethics, but integrated with it. It serves not the logic of domination, but the call to mercy, justice, and stewardship.

It was with this conviction that we established the Islamic World Academy of Sciences, more than three decades ago, here in Amman. The IAS was never intended to be merely a repository of expertise, but a beacon for ethical inquiry, cultural dialogue, and international cooperation. It sought to reinvigorate the great legacy of *ilm* (علم) - of learning - in our region, and to ensure that science remained anchored in values that dignify the human condition.

Today, as we stand at the intersection of artificial cognition and the manipulation of matter at the nanoscale, this mission is more relevant than ever.

Ladies and gentlemen,

The potential of this convergence is vast.

- We speak of nano-enabled diagnostics guided by AI that could detect diseases before they take hold.
- Of precision agriculture that feeds growing populations while healing the land.

[1] *Delivered by H.E. Prof. Adnan Badran, President, IAS.*

- Of energy systems designed at the molecular level and optimized through machine intelligence to sustain our planet.

And yet, alongside this promise, there is peril. These technologies, if left unguided by ethics and equity, may deepen the divides they were meant to bridge. They may serve power, not the people.

Therefore, I urge you to proceed with both imagination and humility. For while we may master the code and the molecule, we must never lose sight of the dignity of the person and the sanctity of life.

It is my belief that the global scientific community must now embrace a broader mandate.

Not only to innovate, but to interrogate - to ask not only "Can we?" but "Should we?" and "For whose benefit?"

We must ensure that the governance of science is not the privilege of the few, but the right of all. That open science, open access, and open dialogue are not slogans, but structures - structures that bind us together across cultures, geographies, and traditions.

And here, I must once again emphasize the role of institutions like the IAS, and others like it, in promoting transdisciplinary collaboration, interfaith understanding, and scientific diplomacy in a world too often fragmented by conflict and mistrust.

Dear friends,

As we gather for this conference, let us remember that we are not merely advancing technology, we are shaping the human face and future.
We must ask:

- How do we ensure that intelligent machines do not erode humanity?
- How do we protect our biosphere even as we redesign it?
- And how do we transmit the values of compassion, mutual respect, and human solidarity through the language of science?

The answers will not come from a single nation, a single lab, or a single worldview. They will come from dialogue. They will come from encounter. They will come, I hope, from rooms like this one, where minds meet in mutual respect and shared purpose.

May this conference mark a new chapter in how we think, create, innovate, and how we care.

I thank you all for your dedication to this noble endeavor, and I wish you a most fruitful and inspiring conference.

Prof. Adnan Badran, President, IAS, delivering the address of H.R.H. Prince El Hassan bin Talal.

MESSAGE OF H.E. ASIF ALI ZARDARI*
PRESIDENT OF THE ISLAMIC REPUBLIC OF PAKISTAN &
PATRON OF THE ISLAMIC WORLD ACADEMY OF SCIENCES (IAS)

TO THE 26TH ISLAMIC WORLD ACADEMY OF SCIENCES (IAS) CONFERENCE ON
"ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY NEXUS"

Assalam-o-Alaikum and Good Morning,

It is a matter of great honor, and an immense pleasure for me to extend my warm greetings all the distinguished scientists and participants attending the 26th International Scientific Conference of the Islamic World Academy of Sciences (IAS), organized under the theme Artificial Intelligence & Nanotechnology Nexus

I would like to express our deep appreciation to His Royal Highness Prince El-Hassan bin Talal for his gracious patronage, and our gratitude also goes to the Higher Council for Science and Technology (HCST), Jordan, for hosting this significant conference and supporting collaborative efforts in science and technology across the Muslim world.

Artificial Intelligence & Nanotechnology, the central themes of this conference, represent powerful tools that can revolutionize multiple sectors, from healthcare to agriculture, from education to energy. Their convergence offers unprecedented opportunities for sustainable development, economic growth, and societal well-being

In this context, the convening of this conference by IAS, in partnership with HCST, is both timely and visionary. I am confident that the deliberations will foster collaborative research, knowledge sharing, and strategic policy recommendations that can help reshape the scientific landscape of the Islamic world.

Prof. Muhammad Iqbal Choudhary, Coordinator General of OIC-COMSTECH, Pakistan, delivering the address of H.E. President of Pakistan.

As the Chairman of the COMSTECH, I urge the esteemed Fellows of the IAS to continue supporting the COMSTECH in its noble mission to accelerate progress in science and technology across the Muslim world. Your expertise, insight, and leadership are vital to charting a brighter and more innovative future for our nations.

I wish you a productive conference and every success in your noble efforts.

* *delivered by H.E. Prof. Dr. Muhammad Iqbal Choudhary, Coordinator General of OIC-COMSTECH, Pakistan.*

ADDRESS OF PROF. ADNAN BADRAN
PRESIDENT OF THE ISLAMIC WORLD ACADEMY OF SCIENCES (IAS)

TO THE 26TH ISLAMIC WORLD ACADEMY OF SCIENCES (IAS) CONFERENCE ON
"ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY NEXUS"

Your Excellencies,
Fellow Scientists and Colleagues,
Ladies and Gentlemen,

It gives me great pleasure and honor to welcome you to the 26th Conference of the Islamic World Academy of Sciences (IAS), convened under the theme: "Artificial Intelligence and Nanotechnology Nexus."
This important event is organized in partnership with the Higher Council for Science and Technology (HCST), a pillar of scientific advancement and innovation in our region.

Today, we stand at the crossroads of two revolutionary fields, Artificial Intelligence and Nanotechnology. Each, in its own right, has reshaped the scientific and technological landscape of our era.

Together, their convergence opens new horizons for discovery and innovation across every field, from health and medicine to water, energy, food security, environmental protection, and advanced materials.

This nexus represents more than a scientific intersection; it is a transformative force that can redefine how we understand, design, and interact with the world around us. It holds the key to achieving greater efficiency, sustainability, and resilience, goals that lie at the heart of our collective pursuit of human dignity and economic development.

The IAS, since its establishment, has served as a beacon of scientific dialogue and cooperation among scholars, innovators, and policymakers across the Islamic world and beyond.

Through conferences such as this, we aim to inspire the exchange of ideas, and contribute to shaping national and regional strategies that integrate advanced science and technology into sustainable development frameworks.

Let us, through this gathering, reaffirm our collective resolve to harness the power of AI and Nanotechnology not only as tools of innovation but as instruments of progress, equity, and sustainability, for the benefit of all humanity.

Thank you, and I wish you a successful and inspiring conference.

CONFERENCE DECLARATION

OF THE 26TH ISLAMIC WORLD ACADEMY OF SCIENCES CONFERENCE ON

"ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY NEXUS"

ADOPTED IN AMMAN, JORDAN ON 30 OCTOBER 2025

The Islamic World Academy of Sciences (IAS) and the Higher Council for Science and Technology (HCST) extend their appreciation and gratitude to His Excellency the President of Pakistan, Patron, IAS and His Royal Highness Prince El Hassan bin Talal, Founding, IAS.

Preamble

Whereas Artificial Intelligence and Nanotechnology are converging to form a powerful nexus capable of reshaping economies, healthcare, education, sustainability, and the way societies solve complex challenges;

Whereas the Islamic world, with its historical legacy of scientific innovation and its contemporary human and intellectual capital, is uniquely positioned to contribute meaningfully to global scientific and technological advancement;

Whereas the responsible and ethical development of emerging technologies must be guided by inclusive governance, shared values, and a commitment to equitable progress for all human dignity;

Whereas the SDGs 2030 call on all countries of the world to enhance scientific achievements and technology towards eliminating poverty and provide new opportunities in the forthcoming industrial revolution.

Therefore, the Islamic World Academy of Sciences (IAS):

Recognizing the transformative potential of AI and Nanotechnology in addressing some of the most pressing challenges facing humanity,

Acknowledging the rich scientific legacy and contemporary responsibility of the Islamic world in contributing to global knowledge and technology for the benefit of all people,

Recalling the mission of the IAS to foster excellence in science and technology through cooperation, capacity-building, and the dissemination of knowledge,

Therefore, we, the participants of the Conference on "*Artificial Intelligence and Nanotechnology Nexus*," hereby:

Recognize that the union of AI and Nanotechnology presents unprecedented opportunities for innovation in the water–energy–food security–climate change Nexus, healthcare, agriculture, environment, materials science, security, and beyond. When combined, these technologies can enable intelligent, autonomous, and highly precise systems capable of addressing complex societal challenges.

Call for the development and application of AI and nanoscience in a manner that is ethical, transparent, and inclusive, guided by human dignity and sustainability.

Urge national governments, regional institutions, universities, and scientific bodies across the Islamic world to invest in education, research, and infrastructure that supports interdisciplinary work in AI and nanotechnology. This includes empowering youth, women, and marginal groups in science and innovation.

Recommend the establishment of international, inter-institutional platforms for collaboration among scientists, policymakers, industry leaders, and civil society actors to jointly shape the trajectory of AI-Nanotechnology research and regulation.

Emphasize that AI and Nanotechnology must serve the SDGs 2030 and be directed toward eradicating poverty, improving health, mitigating climate change, and advancing social equity.

Recommend:

To advance the aims outlined in this declaration, the Conference recommends the following:

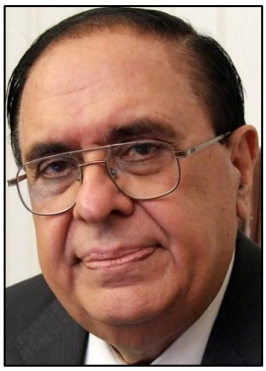
1. **Develop** a network between Centers of Excellence in the Islamic World for training and joint research work and exchange of the delivery of research projects on AI and Nanoscience Nexus to promote innovations and technologies in this new orbit of knowledge and human order leading to peace and development for all humanity
2. **Create national AI and Nanotechnology strategies** across OIC member states, aligned with ethical principles and the SDGs.
3. **Establish dedicated funding mechanisms and research grants** to support interdisciplinary projects in AI and nanoscience.
4. **Develop technology incubators and startup companies** that support early-stage innovations and empower youth-led initiatives in AI and Nanotech applications.
5. **Establish international partnerships** with leading global institutions to transfer knowledge, share best practices, and ensure the Islamic world is engaged in shaping the global governance of emerging technologies.
6. **Promote inclusive public dialogue and ethical awareness**, ensuring that communities across the Islamic world understand both the benefits and risks of these technologies.

THE NEXUS OF ARTIFICIAL INTELLIGENCE AND NANOTECHNOLOGY: DRIVING INDUSTRIAL TRANSFORMATION

ABSTRACT

ATTA-UR-RAHMAN FRS

International Centre for Chemical and Biological Sciences,
University of Karachi, Pakistan



The convergence of nanotechnology and artificial intelligence (AI) is emerging as one of the most powerful engines of technological progress in the 21st century. Nanotechnology provides precision at the atomic and molecular scale, while AI delivers intelligence in prediction, optimization, and autonomous decision-making. Together, these domains are enabling breakthroughs that reshape industries, healthcare, energy, environment, and security, with profound socio-economic implications. In **healthcare**, AI-guided nanomedicine, wearable nanosensors, and nano-enabled diagnostics are revolutionizing disease detection, monitoring, and treatment. In the **energy sector**, nano-engineered solar cells, advanced batteries, aerogels, and hydrogen nanocatalysts, when combined with AI-driven optimization, are extending the frontiers of renewable energy, grid resilience, and electric mobility. **Industry and manufacturing** are being transformed by nanoscale semiconductors, coatings, membranes, and quantum-dot displays, with AI ensuring quality control, defect detection, and predictive maintenance. In **agriculture and environment**, nano-fertilizers, nanosensors, and water purification membranes coupled with AI-based monitoring offer pathways to food security, resource efficiency, and environmental sustainability.

The remarkable progress made by Pakistan under the leadership of the author when he was Federal Minister of Science & Technology and Chairman HEC in these and in other emerging technologies will be presented (1-7).

References

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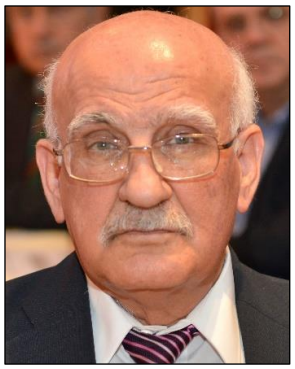
WHEN ARTIFICIAL INTELLIGENCE AND QUANTUM COMPUTING TEAM-UP WITH NANOTECHNOLOGY, A NEW REVOLUTION BREAKS OUT

ABSTRACT

MUNIR H. NAYFEH

Professor, Department of Physics,

University of Illinois at Urbana-Champaign, USA



Artificial intelligence (AI) refers to *computer systems* that can perform tasks that typically require human intelligence, such as learning, problem-solving, and decision-making. It involves creating algorithms and models that enable machines to analyze data, identify patterns, and make predictions or recommendations or take actions. AI systems can learn from experience and adapt to new inputs, often exceeding human capabilities in speed and accuracy for certain tasks.

Nanotechnology, on the other hand, relies on the synthesis of ultrasmall nano materials (1-100nm), characterization, atomistic (individual atom) simulations and and incorporation of those nano structures in advanced devices to model the characteristic behavior of ultrasmall nano materials and derived-device design and operation. But simulating those nano nonlinear systems, which is pivotal to the success of nanotechnology, especially nanos consisting of a very large number of atoms can become prohibitively expensive and time-consuming, making it challenging to carry out simulations and predict behavior. To keep simulations manageable, it is often necessary to limit the size (number of atoms) or to use heavy approximations, which may give misleading faulty conclusions that compromises the work project. But simulation of such transition nano sizes is pivotal for design success because this size regime bridges the gap between the atomic level and the macroscopic bulk properties of materials. The opposing "pair of need and limitation" drives the development of new multiscale modeling techniques and simulation strategies. At the University of Illinois, for example, we have been using atomistic simulation of a system of 29 silicon atoms (1-nm diameter (Si_{29})), but we have not succeeded in doing the same with the larger system of 3-nm diameter nano structure (783 silicon atoms)

A solution has been emerging involving the integration of nano technology with quantum computers and several features of artificial intelligence (AI) including (i) replacement of traditional interatomic potentials which mathematically describe how atoms interact but often struggle with complex scenarios like bond breaking and formation, with machine learning interatomic potentials (MLIPs) which alleviate these problems; (ii) use of neural networks (inspired by the structure of the human brain); (iii) coarse-graining techniques to reduce computational cost; (iv) tuning the computation grid size (mesh resolution or grid refinement) near complex objects to balance accuracy, time, and computational cost; (v) use of super (quantum) computers; and (vi) exploit symmetries of the material when found, as well as (vii) use of standard AI tasks of large data handling. With these advancements, some researchers for example, were able to simulate acute diseases like the protein shell of HIV, involving a very large number of atoms (44 million ~ 100 nm diameter), haemophilia missing protein, tobacco plant virus, and other common biological molecules such as cellulose.

The integration of the three advanced technologies promise to open possibilities for exploring complex materials and phenomena previously inaccessible due to computational limitations, which may enable yet another revolution on top of the nano revolution, leading to spectacular advancements in various advanced device applications. But we should note that present-day quantum computing is still bulky, and flimsy, requiring heavy isolation and cryogenic low temperature conditions, and waiting for a breakthrough to allow the development of laptop-like quantum PC computer. Moreover, while AI can perform specific tasks with great proficiency, it still lacks the flexibility and general knowledge of humans.

HUMAN VERSUS ROBOTS' PERSPECTIVES ON THE EMERGENCE AND FUTURE CHALLENGES OF ARTIFICIAL INTELLIGENCE

ABSTRACT

DHIYA AL-JUMEILY

Chair in Artificial Intelligence/ Senior Member IEEE,
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Artificial intelligence (AI) has invaded our lives today with impact on every single sector from essential to entertainment sectors. AI applications have been popular at governmental, industrial and individual levels. Popularity of AI has been facilitated by many factors relating to individualisation of society, changes in lifestyle, fast moving technologies, robotics, mass production, Internet of Things and globalisation.

The relationship between AI and the aforementioned factors was a two-way benefit. Thus, these factors offered and gained benefits from AI. For example, AI facilitated robots in surgeries that benefited from the AI algorithms in conducting surgeries precisely. More recently, generative AI (GAI) has flourished in synthesising arguments and generating information in diverse forms.

GAI includes both agentic AI and Artificial General Intelligence (AGI) that both use complex and multiple Large Language Models (LLMs) to understand problems. AGI is more powerful than GAI and is still a theoretical concept. Yet currently, agentic AI has shown high accuracy in performance in short time for complex applications such as cancer diagnosis. In the latter application, multiple agents could be used to understand biochemical tests and medical images.

However, this advancement does not come without a cost. Thus, LLMs require high energy and water usage and which impacts sustainability through consumption of environmental resources. Moreover, there is an inclusivity and equitability issue with using LLMs because sufficient water and energy resources are not accessible in all countries equally. Other challenges encountered with using LLMs are related to data security, bias, ethics and regulations.

This talk will highlight the advantages and drawbacks of GAI from the perspectives of humans and robots. The talk will involve a debate with a humanoid robot, Ami, that is based at Liverpool John Moores University (Ami@LJMU). Ami is a desktop version of Ameca, that is the world's Smartest humanoid robot. The talk will shed light about the past, present and future evolution of AI.

SPEAKERS

HIGHER EDUCATION IN THE GENERATIVE AI ERA

ABSTRACT

JOELLE MESMAR[1], **ADNAN BADRAN[2],** & ELIAS BAYDOUN[3]

[1]*Department of Biology, American University of Beirut, Beirut,7 Lebanon.*

[2]***President, Islamic World Academy of Sciences (IAS) & Chairman of the Board of Trustees of the University of Jordan &Former Assistant Director-General for Science and Former Deputy Director-General of UNESCO – Paris.***

[3]*Department of Biology, American University of Beirut, Beirut, Lebanon*

Artificial intelligence (AI) has been around for decades. Particularly, in the last couple of years, its role in higher education has been receiving a lot of attention, with the concurrent increase of AI learning tools. It has been described as a disruptive technology with a transformative potential. Higher education institutions are now faced to adapt once again to a new reality, shortly after the integration of online learning with COVID-19 in the educational process, debating whether to stand in front of the AI wave or embrace it. This chapter aims to present a brief history of AI before addressing where we are going in the context of higher education. This entails addressing opportunities and concerns, as well as future perspectives related to the roles of the different stakeholders involved (the educator, the learner, and the institution) and the relationship dynamics between them. **Keywords** Generative Artificial Intelligence · Transformative technologies · Higher education · Arab world

BRIDGING THE GLOBAL DIVIDE: ENSURING EQUITABLE AND INCLUSIVE ETHICAL GOVERNANCE OF AI AND NANOTECHNOLOGY IN LOW- AND MIDDLE-INCOME COUNTRIES (LMICS)

ABSTRACT

ZABTA KHAN SHINWARI

Vice President, Islamic World Academy of Sciences (IAS) & Distinguished National Professor / Professor Emeritus, Vice Chancellor, Federal Urdu University of Arts, Science & Technology (FUUAST), Pakistan

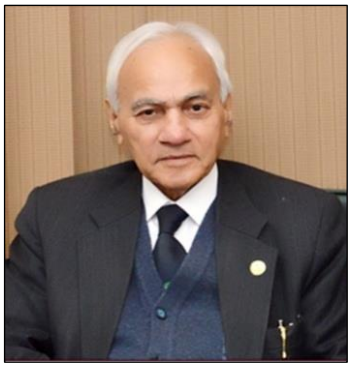
The convergence of Artificial Intelligence (AI) and Nanotechnology promises to address some of the world's most pressing challenges. However, this technological revolution is unfolding against a backdrop of significant global inequality. Low- and Middle-Income Countries (LMICs) face a dual risk: being excluded from the benefits of these technologies while also becoming vulnerable to their unintended ethical and social consequences. This presentation argues for a new, inclusive approach to governance that transcends Western-centric models and actively incorporates the diverse perspectives of the Global South. By examining key ethical dilemmas - from data colonialism and algorithmic bias to dual-use risks - this talk will outline a multi-faceted strategy for building ethical capacity in LMICs. We will explore how to develop culturally sensitive frameworks, foster South-South cooperation, and translate global norms, such as those from UNESCO, into locally relevant policies. The central premise is that ethical governance must be treated as a "global commons" and a shared responsibility. The presentation will conclude with a call to action, urging international bodies, governments, and academic institutions to prioritize equitable access, institutional support, and sustained partnerships to ensure that the future of technology serves all of humanity.

NANOTECHNOLOGY AND ITS NEXUS TO ARTIFICIAL INTELLIGENCE AND THEIR NECESSARY INTER-DEPENDENCE

ABSTRACT

NOOR M. BUTT

Preston Professor of Nano Science & Technology &
Chairman and Dean, Preston Institute of Nano Science & Technology (PINSAT)
Preston University, Islamabad, Pakistan



Nanotechnology in recent years has seen a revolution in industrial applications in almost any type of Industry apart from the development of the basic quantum science and fabrication of Nano-devices which is now well developed as Nano-Engineering. The Industrial applications could be in **Water purification**, **Energy production** and **Storage**, **Space Industry and Air-Defence**, for Lighter and Stronger materials, **Textiles** for antibacterial or bullet proof jackets, **Bird size** or even **smaller Mosquito size drones** for spying/ communications, **Food and Agriculture** for enhanced production or **B**etter packaging for food Preservation and Expiry, and a host of sensors etc., **Defence** equipment or soldier camouflage materials, **Sports goods using Carbon fibre and Graphene**, Efficient enhanced **Oil production** or **Biomedical sensor devices** and **Nano-medicine for Cancer** Diagnosis and Treatment of host of other diseases etc., Nanotechnology is therefore rightly regarded as an **INDUSTRIAL REVOLUTION** and has recently been estimated to have global marketing of Nanotechnology products to the tune of some 1 to 2 trillion dollars with employment estimates of over a million jobs as estimated by the National Science Foundation(USNSF) of USA.

For Nanomaterials, a powder, a wire or a sheet etc., **the properties (chemical, physical, electrical, magnetic or optical) of materials at nanoscale (1-100nm) are very different than that at bulk scale for the same material**. ***This difference in properties is mainly for two reasons, (i) one that the surface to volume ratio is larger for smaller size material than the bulk size of the same material. (ii) the second is that at nano-scale the classical laws of science do not hold and new "Quantum Laws "based on quantum science are applicable***. The nano-devices based on quantum science are doing wonders in medicine, never known before, whether it is **Cancer,** Cardiology, **Tuberculosis** or **Surgical** and **Diagnostic procedures**.

Now with the advent of Artificial Intelligence(AI) to assess its great **Benefits such as:** *Enhanced Safety and Reliability, Improved Efficiency, Advanced Nuclear Security, Accelerated Research and Development, Optimized Nuclear Medicine, Enhancing Human Control, Improved Water Resource Management* **and Limitations of Failures and Risks such as**: *Cyber security Vulnerabilities, Reliability Concerns, Lack of Transparency and Explainability, Potential for Misuse, Job Displacement, Ethical Concerns and High Initial Costs:* **it is necessary to look into** its **interdependence with Nanotechnology, an essential and very important technology for fabrication of AI designed instrumentation for authentic and safe public utility.** This is particularly so in critical areas of **Nuclear Defence**, **Air Defence** digital equipment and for some **Serious Medical /Health areas,** etc.

The basic objective of this presentation is to bring the attention of the young scientists towards the **Wide scope of Nanotechnology and AI and to highlight their mutual interdependence, benefits and limitations, particularly with respect to the critical areas mentioned above.**

(AI) AND MACHINE LEARNING (ML) FOR MATERIALS DISCOVERY WHILE SPEEDING UP THE PROCESS BEYOND CONVENTIONAL TRIAL-AND-ERROR TECHNIQUES

ABSTRACT

MALIK MAAZA

UNESCO-UNISA Africa Chair in Nanosciences-Nanotechnology, College of Graduate Studies, University of South Africa, Pretoria, South Africa &
Nanosciences African Network (NANOAFNET), Materials Research Dept., iThemba LABS-National Research Foundation of South Africa, South Africa

Climate change challenges & the pressure on the earth crust minerals resources require the discovery of novel & frontier-type compounds. These latter should exhibit diverse multi functionalities conjugated to a minimum of energy consumption, both during their conception & usage.

Because the number of compounds that can be created from the elements in Mendeleev's periodic table is practically endless and not restricted by the 63 elements initially classified, it is impossible to provide an exact number. A single element, such as carbon, can be used to construct molecules of varied lengths, while other elements can be combined in almost infinite ways to generate distinct substances. Elements can also form numerous compounds.

By employing algorithms to evaluate enormous datasets, spot trends, and forecast novel material properties, artificial intelligence (AI) and machine learning (ML) are revolutionising materials discovery and speeding up the process beyond conventional trial-and-error techniques. These technologies speed up the process of finding new materials for a variety of uses by enabling high-throughput screening of possible materials, computational design of materials with specific features, and autonomous experimentation.

Using High Performance Computational Capabilities (HPCC), this contribution reports on a set of examples related the Energy-Water-Health-Food security nexus in line with the U.N. SDGs landscape. This includes (i) the conversion of CO2 to multi-functional nano-scaled carbonates [1], (ii) new generation of nanofluid coolants for heat management [2-3], (iii) Smart nanocoatings for green air conditioning [4], and (iv)bio-inspired nanomaterials for water decontamination [5].

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COMPREHENSIVE ASSESSMENT OF ON-GRID HYBRID RENEWABLE ENERGY INTEGRATION FOR SUSTAINABLE ELECTRIFICATION IN THE GAZA STRIP

ABSTRACT

HALA EL KHOZONDAR FIAS

Electrical Engineering and Smart Systems Departments, Islamic University of Gaza, Palestine & Department of Materials and London Centre for Nanotechnology, Imperial College London, UK

The Gaza Strip, part of Palestine, endures chronic energy shortages due to restricted access to resources and the constraining political environment, which severely limits the development of its power sector. Currently, electricity generation is heavily dependent on imported fuels and limited grid supply, resulting in high costs, supply instability, and environmental degradation. Increasing the penetration of renewable energy sources offers a strategic pathway toward energy security, economic savings, and environmental sustainability. This study applies the Hybrid Optimization of Multiple Energy Resources (HOMER) software to evaluate grid-connected and stand-alone hybrid system scenarios for the Gaza Strip. The analysis focuses on optimizing system configuration to achieve high renewable energy integration while minimizing the levelized cost of energy (LCOE), net present cost (NPC), and greenhouse gas (GHG) emissions. Multiple technology combinations were assessed, including photovoltaic (PV), biomass, wind, geothermal, and hydrokinetic systems, with sensitivity analyses conducted to account for local resource variability and operational constraints. Simulation results identify the optimal configuration as an on-grid hybrid system comprising PV, biomass, wind, geothermal, and hydrokinetic resources. This system achieves a minimum NPC of USD 2.86 billion, annual savings of USD 358 million, and a simple payback period of six years. The achieved LCOE is USD 0.0340/kWh, making it economically competitive with conventional generation in the region. Moreover, the hybrid system reduces CO_2 emissions by 52% compared to a grid-only baseline, significantly improving the environmental footprint while ensuring reliable and continuous electricity supply. These results demonstrate the technical and economic feasibility of multi-source hybrid renewable systems for the Gaza Strip. The proposed configuration offers a replicable model for other regions facing similar resource limitations and energy access challenges, combining affordability, sustainability, and resilience in power system design. *Keywords*: Gaza Strip, hybrid energy system, wind turbines, solar, geothermal energy, HOMER.

THE NEH (NAWAZ, ENSCORE, HAM) ALGORITHM AND ITS APPLICATIONS

ABSTRACT

MUHAMMAD NAWAZ

Program Director/ RMIT University, (Retired) Melbourne, Australia

This paper presents a comprehensive overview of the **Nawaz, Enscore, and Ham (NEH) algorithm**, a highly effective heuristic developed 45 years ago, yet still widely recognized as a state-of-the-art solution for permutation flow-shop scheduling problems. We explore its fundamental principles, highlighting the rationale behind its exceptional performance in minimizing makespan, which contributes to its enduring relevance. Furthermore, the paper delves into the algorithm's diverse and impactful applications across various contemporary domains, including its critical role in data processing, the heart of **artificial intelligence**, particularly evident in autonomous vehicle systems, as well as supply chain management, healthcare services, and energy optimization. Through practical examples, we demonstrate the NEH algorithm's versatility and its continued significance in enhancing efficiency and resource allocation in these complex, modern systems. Finally, this work underscores the importance of the NEH algorithm as a prominent and lasting contribution to global operational research, notably originating from the insightful work of a Pakistani researcher, **Muhammad Nawaz**, thereby showcasing the rich intellectual contributions from the **Islamic world to scientific advancements.**

THE APPLICATIONS OF ARTIFICIAL INTELLIGENCE (AI) IN WATER, ENERGY, FOOD SECURITY, AND CLIMATE CHANGE

Adnan Badran FIAS, FAAS
President, Islamic World Academy of Sciences
and President, Arab Academy of Sciences

Introduction

Artificial Intelligence (AI) is increasingly recognized as a transformative force in addressing some of the most pressing global challenges, particularly in the vital areas of water, energy, food security, and climate change.

By harnessing the power of data analytics, machine learning, and automation, AI enables smarter resource management, enhances efficiency, and supports evidence-based decision-making. Its applications range from optimizing water distribution and renewable energy systems to advancing precision agriculture and climate modeling. Through these innovations, AI offers new pathways toward sustainability, resilience, and the achievement of global development goals.

AI Applications in Water Management

Artificial Intelligence has become a key tool in optimizing water resource management amid rising demand and increasing scarcity in many regions.

Main Applications:

1. **Flood and Drought Prediction**
   Deep learning models analyze rainfall, soil moisture, and weather data to forecast droughts or floods weeks in advance, enabling early warning and preventive measures.
2. **Smart Water Networks**
   - AI analyzes real-time consumption data to detect leaks or abnormal usage.
   - It optimizes water distribution according to demand, reducing losses by up to 30%.
   - Utility companies can use predictive models to plan maintenance and investments more efficiently.
3. **Irrigation Optimization**
   AI systems use satellite imagery and soil sensors to determine optimal irrigation schedules, improving crop yields while reducing water use.
4. **Water Quality Monitoring**
   AI-driven image recognition and chemical data analysis detect contaminants in surface and groundwater, protecting ecosystems and public health.

AI in the Energy Sector

AI is revolutionizing the global energy landscape, enabling smarter, cleaner, and more resilient energy systems.

Key Applications:

1. **Smart Grids**
   AI manages real-time electricity distribution by balancing supply and demand, integrating renewable sources efficiently, and reducing losses.
2. **Renewable Energy Forecasting**
   By analyzing weather data, AI predicts solar and wind power generation with high accuracy, improving grid stability and investment planning.
3. **Predictive Maintenance**
   Machine learning analyzes vibrations, temperature, and pressure data from turbines and generators to anticipate failures before they occur, minimizing downtime and costs.

4. **Energy Efficiency**
   Smart systems automatically adjust lighting, heating, and cooling in buildings and factories, reducing energy consumption and emissions by up to 40%.

AI and Food Security / Smart Agriculture

AI is reshaping modern agriculture through data-driven and precision-based solutions that enhance productivity, sustainability, and food availability.

Major Applications:

1. **Aerial and Satellite Image Analysis**
   Using drones and AI-based vision systems, farmers can monitor plant health, detect pests and diseases early, and optimize interventions.
2. **Crop Yield Prediction**
   AI models combine weather, soil, and seed data to forecast crop output, helping governments and agribusinesses plan more efficiently and reduce risks.
3. **Resource Optimization**
   Intelligent irrigation and fertilization systems distribute inputs precisely according to plant needs, reducing waste and improving efficiency.
4. **Food Supply Chain Management**
   AI improves logistics, storage, and distribution by forecasting demand and monitoring freshness, reducing food loss and waste.

AI in Climate Change Mitigation and Adaptation

Artificial Intelligence plays a central role in understanding and addressing the complex challenges of global climate change.

Key Areas of Application:

1. **Climate Modeling and Prediction**
   AI processes massive amounts of atmospheric and oceanic data to improve the accuracy of long-term climate models and forecasts.
2. **Carbon Emissions Monitoring**
   Machine learning algorithms analyze satellite imagery to detect sources of greenhouse gas emissions and track compliance with climate policies.
3. **Environmental Analysis**
   AI systems monitor deforestation, ice melt, desertification, and pollution trends, providing actionable data for governments and organizations.
4. **Climate Adaptation and Resilience**
   AI supports the design of drought-resistant crops, efficient water use systems, and renewable energy solutions that strengthen resilience to climate impacts.

Overall Impacts and Future Opportunities

- **Improved Efficiency and Sustainability:** AI optimizes the use of natural resources and reduces waste across water, energy, and agriculture sectors.
- **Faster Scientific Innovation:** By simulating natural processes and analyzing complex datasets, AI accelerates discovery and innovation.
- **Informed Decision-Making:** AI provides policymakers with predictive and evidence-based insights for sustainable planning.
- **Economic & Environmental Benefits:** It enhances productivity while supporting green growth and environmental protection.

Conclusion

Artificial Intelligence is no longer a secondary tool; it has become a **strategic enabler of sustainable development**.
Its integration into **water, energy, food, and climate systems** creates smarter, greener, and more resilient societies.
By turning data into actionable intelligence, AI empowers nations to balance **economic growth** with **environmental stewardship** — advancing global goals for sustainability, efficiency, and security.

JACKIE YING FIAS

Adnan Badran FIAS, FAAS
President, Islamic World Academy of Sciences
and President, Arab Academy of Sciences

Dr. Jackie Yi-Ru Ying is a globally respected pioneer in nanotechnology and bioengineering whose career spans continents and disciplines. Born in Taipei in 1966 and raised largely in Singapore, she later completed her undergraduate studies in the U.S. at The Cooper Union (B.Eng., summa cum laude) in 1987, and her M.A. and Ph.D. in Chemical Engineering at Princeton University by 1991.

She joined the faculty of the Massachusetts Institute of Technology (MIT) in 1992 and, at the age of 35, became one of the youngest full professors in the department of chemical engineering at MIT in 2001.

In 2003, she returned to Singapore to establish the Institute of Bioengineering and Nanotechnology (IBN) under the umbrella of the Agency for Science, Technology and Research (A*STAR). There, she served as founding executive director and led a large interdisciplinary team advancing research that intersects nanomaterials, medicine, diagnostics, and energy applications.

Dr. Ying's research achievements are remarkable. Her laboratory pioneered methods for synthesizing nanostructured materials mesoporous oxides and stimuli-responsive nanoparticles that have been applied to targeted drug delivery, biosensors, point-of-care diagnostics, and even energy conversion systems. One highlight: her team developed an insulin-delivery system that activates only when blood glucose is high, eliminating the need for external monitoring.

Her contributions have been recognized by numerous awards and honours. She is a member of the U.S. National Academy of Engineering (2021) and the Islamic World Academy of Sciences (2017), and the U.S. National Academy of Inventors, among other distinguished academies. In 2023, she was one of the laureates of the prestigious King Faisal Prize for Science in recognition of her work synthesizing advanced nanomaterials and translating them into health and energy applications. In 2015, she was awarded the Mustafa Prize in Bionanotechnology.

Beyond her technical work, Dr. Ying is a passionate mentor and advocate for science education and inclusion. During her leadership at IBN, she helped launch the Youth Research Programme, engaging tens of thousands of pre-university students in STEM research experiences.

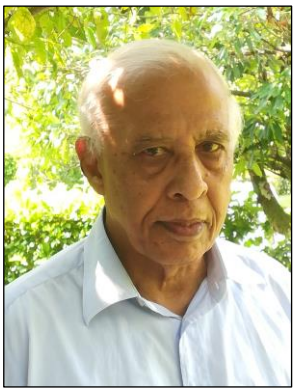
Her personal journey adds further dimension to her story: having lived and studied in Singapore, the U.S., Germany and beyond, she exemplifies a global, interdisciplinary ethos. She is active in mentoring young women in STEM, a reflection of her commitment to both faith and science.

Her work demonstrates how engineering, biology, materials science and entrepreneurship can converge to address real world challenges in health, energy and diagnostics.

As she continues to lead new ventures and research labs, Dr. Ying remains a role model for aspiring scientists and minorities in engineering showing that boundaries can be expanded, and science can serve humanity in profound ways.

JET STREAMS AND POLAR VORTEX

Mohammed Asghar[*] *FIAS*



Abstract
This text defines the phenomenon of Jet Streams, their geographical locations, their blow-speed, their evolution under the ongoing Earth's climatic changes, along with the presence of Polar Vortex on both Earth's poles with the counterclockwise flow of cold air surrounded by their respective confining polar Jet streams.

1. Jet Streams

The main Jet streams are westerly winds flowing from west to east around the globe. They are created by the difference in temperature between the tropical and the polar regions and the Coriolis effect caused by the rotation of Earth. There are polar Jets and subtropical Jets in the northern and southern hemispheres of the Earth, Figure 1.

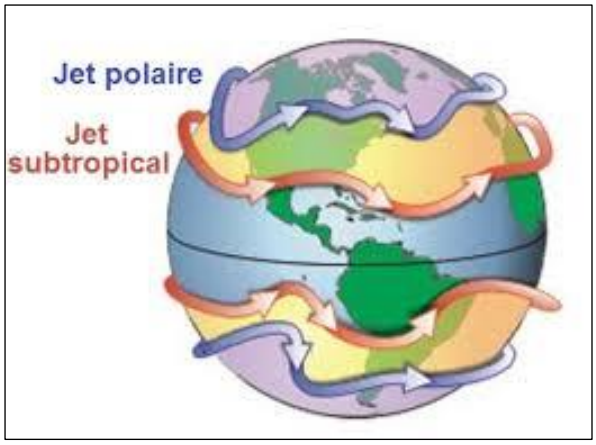


Figure 1. Polar and the subtropical Jet streams in the northern and southern hemispheres of the Earth (1).

At the polar latitudes, their height is around 10km above the Earth, and this rises to 18 km at the tropical latitudes. Wind speed inside these Jet streams is about 200 to 300 km/h, but can exceed 400 km/h.

Jet streams are quite helpful for the airlines when flying in their blow-direction.

Parts of the planet's Jet streams have begun to shift towards the poles over the past few decades. It is most likely that this is a response to global warming due to greenhouse gases. It could exacerbate heat and drought in regions that depend on the high-altitude winds to steer the storms away.

Moreover, the Arctic is warming fast. This means that as Earth warms, the temperature difference between the Arctic and the mid-altitudes is getting smaller. This makes the polar jet stream slower and weaker, leading to lose their orbital stability, Figure 2.

2. Polar Vortex

The polar Vortex is a large area of low pressure and cold air surrounding the Earth's both poles. It always exists near the poles but weakens in summer and strengthens in winter. The term "Vortex" refers to the counterclockwise flow of air that helps to keep the colder air near the poles due to the surrounding and confining polar Jet stream, Figure 1 and Figure 3. Due to the weaker polar Jet stream, the cold air of the Polar Vortex air surges southwards into Canada and USA.

3. Climate evolution and the possible fate of Jet Streams and Polar Vortex

The source of Jet stream and polar vortex is the temperature difference between the tropical region and polar region and the Coriolis effect caused by the rotation of the Earth. Due to the ongoing Earth's climate change, the polar temperature is rising fastest. Sometime in the future this temperature difference between the tropical the polar regions may become small leading to the disappearance of Jet streams and Polar Vortex at Earth's North and South poles.

[*] *12 rue des abeilles, 38240, Meylan, France.*

References: 1. Courtesy Google. 2. National Weather Service, 2025.

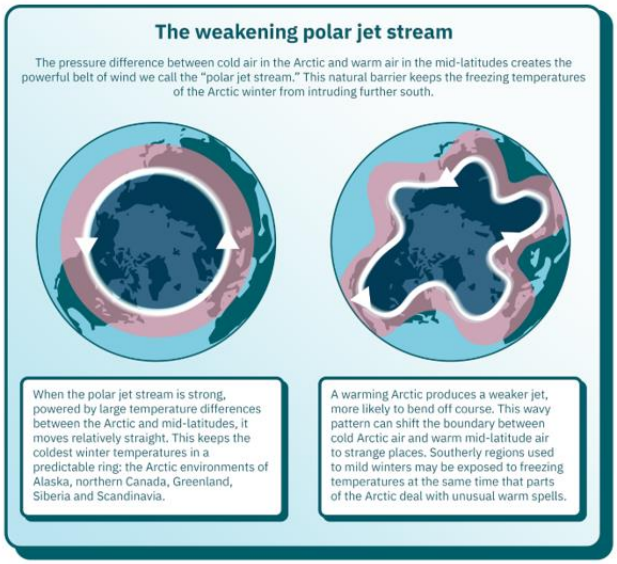


Figure 2. The weakening of the Polar Jet Stream (1).

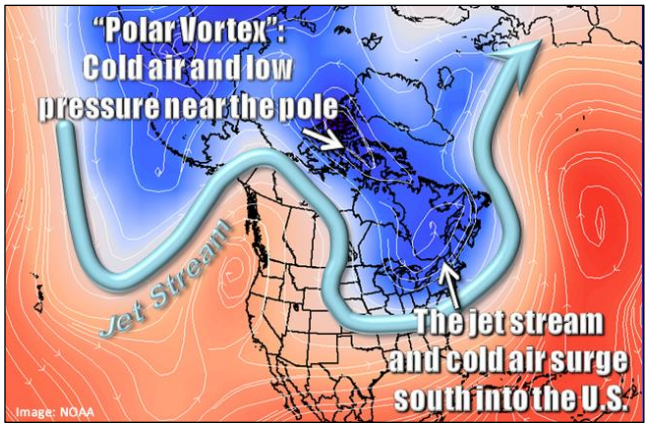


Figure 3. Polar Vortex and the surrounding and confining polar Jet stream. Due to the weaker Polar Jet Stream, the Polar Vortex cold air surges southwards into Canada and USA (2).

References:

1. Courtesy Google.
2. National Weather Service, 2025.

REDEFINING HUMANITY IN THE AGE OF CLIMATE CRISIS

Seyed Kazem Alavipanah
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Global warming and climate change cannot be controlled by laws and technology alone. The modern world urgently needs an awakening of conscience & a redefinition of humanity, one that places dignity, reverence for life, and coexistence with nature at its core.

Recent decades have shown that international agreements, though necessary, often remain ineffective without ethical and cultural foundations. Sustainable transformation requires a shift in human perspective: environmental conscience must become a social value, and intergenerational responsibility must be a fundamental principle of policymaking. Spirituality and cultural awareness must complement law and technology. Practical steps include:

- Environmental ethics education in schools and universities.
- Engaging religious and social leaders to promote moral values.
- Rethinking development policies based on restraint and solidarity rather than greed.
- Redefining the relationship between humanity and nature—from domination to coexistence, exploitation to care, and competition to cooperation.

Global warming is not only a scientific challenge but also a test of humanity's moral maturity. Without awakened consciences, even the most detailed agreements will fail.

COP30 needs to become a platform for this awakening, presenting redefined humanity as a strategy to save our planet.

THE ROLE OF PHYSICS AND R&D IN PHYSICS IN THE DEVELOPMENT OF INDUSTRY AND MANUFACTURING IN JORDAN

PROPOSED SOLUTIONS TO STRENGTHEN THE INTERACTION BETWEEN ACADEMICS/RESEARCHERS AND REPRESENTATIVES OF THE INDUSTRIAL SECTOR

Mahmoud Ismail Jaghoub[1], Iyad Abu Haltam[2], Nabeel Al-Fayoumi[3] & Ayman Ayyash[4]

First: Connection between Physics and industry

Physics drives innovation in industry

Physics is at the heart of modern industry, shaping the technologies and innovations that define our daily lives. It provides the scientific foundation for understanding how the world works and for designing and improving everything from smartphones and medical devices to renewable energy systems and manufacturing tools. By uncovering the principles behind electricity, magnetism, motion, heat, and even the strange behavior of particles at the quantum level, physics drives progress in countless fields. Industrial research and development (R&D) rely on these ideas to create smarter products, boost efficiency, and pioneer advanced technologies such as quantum sensors, superconductors, new high-performance materials.

The sections below highlight the main branches of physics that have strong relevance to industry and innovation.

1. Materials Science and Nanotechnology

Industrial materials like metals, ceramics, polymers, and composites are developed using solid-state physics and thermodynamics.

- **Applications:** stronger alloys, corrosion-resistant coatings, and nanomaterials used in electronics, batteries, and catalysts.
- **Physics contribution:** understanding crystal structure, electron behavior, and phase transitions helps engineers design materials with specific mechanical, electrical, or optical properties.

2. Energy and Power Industries

Physics drives innovation in energy generation, conversion, and storage.

- **Nuclear physics:** in reactors and fusion research.
- **Thermodynamics and fluid dynamics:** in turbines and engines.
- **Quantum and solid-state physics:** in solar cells and battery technology.
- **Industrial relevance:** improved energy efficiency, renewable energy systems, and cleaner production processes.

3. Electronics and Information Technology

Electronics is entirely based on the **physics of semiconductors** and electromagnetism.

- **Applications:** transistors, integrated circuits, sensors, and communication devices, which are the basis for all electronic devices. All such devices rely on the principles of physics.
- **Modern frontiers:** quantum computing, photonics, and spintronics. Such physics-driven technologies shape the future of industries.

4. Manufacturing and Automation

Branches of physics such as mechanics, optics, and acoustics play major roles in precision engineering and automation.

- Examples: laser cutting and welding, non-destructive testing using ultrasonic waves, robotic control based on feedback systems, and metrology (measurement science).

5. Medicine and Healthcare Industry

Medical technologies such as X-rays, Magnetic Resonance Imaging (MRI), Positron Emission Tomography (PET) scans, and radiation therapy all stem from physics.

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2 Board Member of Amman Chamber of Industry & Chairman of Eastern Amman Investors Industrial Association.
3 Vice President for Technology, Royal Scientific Society (RSS).
4 CEO, Arab Mining Company.

- **Industrial significance:** production of diagnostic machines, radiation sources, and safety instruments.
- **Emerging areas:** medical imaging, nanomedicine, and biophotonics (It involves the use of light-based technologies to study biological materials, such as cells, tissues, and molecules, as well as to diagnose and treat diseases.)

6. Environmental and Safety Applications

Physics contributes to pollution control, radiation protection, and environmental monitoring.

- **Industrial use:** sensors for detecting pollutants, radiation shielding materials, and modeling atmospheric processes.

7. Quality Control and Instrumentation

Measurement and testing instruments, from spectrometers to accelerometers, rely on physical principles. Industries use them for **process control, calibration, and product validation**, ensuring consistency and safety.

Second: Reasons for the weak research collaboration between academics /researchers and the industrial sector

1. Weak effective communication between academics/researchers and the industrial sector, which can be traced to several reasons:

a) Lack of regular institutional channels for collaboration between academics and representatives of the industrial sector.
b) Poor coordination in identifying the problems faced by industry that scientific research could provide solutions for it.
c) Few joint meetings and workshops between the two parties.

2. Weakness of mutual trust

a) Some industrialists doubt the ability of academics to provide practical and applicable solutions.
b) Some academics believe that industry is only interested in quick results and does not support long-term scientific research.
c) The industrial sector often focuses on purchasing ready-made technologies rather than investing in scientific research.
d) Industrial institutions usually lack research and development (R&D) units, and even when such units exist, they are often not have adequate budgets to achieve their goals.
e) The absence of transparency and mutual understanding weakens the chances of collaboration.

3. Differences in priorities and objectives

a) Academics focus on conducting research primarily for promotion purposes.
b) The industrial sector focuses on profitability and quick solutions and does not usually wait for research results that may take longer time.

4. Weak culture of entrepreneurship and innovation among academics

a) Some academics do not consider transforming their scientific research into products and instead focus on publishing for promotion and incentive purposes.
b) Lack of university regulations that encourage academics to pursue entrepreneurship and innovation.

Third: Proposed solutions

1. Establish an electronic platform to achieve the following:

i. Build effective communication between academics and the industrial sector.
ii. Inform academics about the needs of the industrial sector.
iii. Inform the industrial sector about the capabilities of academics to provide solutions to the problems they face.

such that:

a) Each academic uploads his research areas that are related to the industrial sector on the platform
b) The names of industrial establishments and the problems each establishment wishes to solve are listed on the platform.
c) The information uploaded to the platform is made accessible to both academics/researchers and the industrial sector.
d) The platform allows academics/researchers to contact any establishment for which they can offer solutions and likewise enables industrial establishments to reach out to any academic/researcher capable of providing solutions based on the information they have uploaded to the platform.

2. **Encourage the industrial sector to establish effective research and development (R&D) units and to support scientific research through:**
   a) Granting government tax exemptions or incentives to companies that fund university research or sign joint development agreements.
   b) Establishing joint support funds between the government and the private sector to finance scientific research related to industry.
   c) Developing clear mechanisms for sharing the revenues generated from patents or industrial solutions.
   d) Establishing joint research and development laboratories between universities and industrial establishments.

3. **Universities should work to achieve the following:**
   a) Establish prototyping centers to test proposed solutions in real-world settings.
   b) Create joint research and development laboratories between universities and industrial establishments.
   c) Amend promotion and incentive regulations to encourage research related to industry.
   d) Develop postgraduate study regulations to motivate students to address problems related to the industrial sector.
   e) Revise university regulations to facilitate the establishment of startup companies.
   f) Recognize industrial consulting as part of the academic promotion criteria in disciplines relevant to this purpose.

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CEO, Arab Mining Company

THE ROLE OF THE HIGHER COUNCIL FOR SCIENCE AND TECHNOLOGY (HCST) IN STRENGTHENING THE RESEARCH SYSTEM IN THE COMING PHASE REGARDING BRIDGING THE GAP BETWEEN ACADEMIA & INDUSTRY

The Higher Council for Science and Technology (HCST)

Reference is made to the study of Evaluating the state of scientific research in Jordan and its impact on the national economy, launched in July 2025, which relied on an analytical methodology including a national survey responded to by approximately 1,500 participants from academia and industry. The study showed that expenditure on research and development (R&D) was 0.07% of GDP in 2016, declining to 0.04% in 2020, a limited proportion compared to developmental needs.

Data also indicate that the government sector contributed 85% of R&D spending, compared to only 15% from the private sector, highlighting the need to strengthen the role of the industrial and private sector in supporting and funding applied research. Given this reality, the study results point to a clear gap in collaboration between academia and industry, necessitating strategic efforts to bridge this gap and transform research knowledge into practical applications with economic impact.

Weaknesses in Academia-Industry Partnership

- Limited collaboration & communication gap: 78.9% of industrial institutions reported no collaboration with academic institutions, while 21.1% indicated limited cooperation in scope and impact, reflecting a clear gap that requires strategic interventions to strengthen sustainable and effective partnerships.
- Challenges in collaboration and differing priorities: 70% of institutions noted differences in priorities, where universities focus on research and scientific publication, while companies aim for quick profitability and practical application, leading to gaps in understanding and coordination.
- Patterns and objectives of research collaboration: 77.5% of institutions considered collaboration in research projects the most effective approach, while 57.9% indicated they conduct research to develop new products.
- Funding and research focus areas: Industrial institutions rely almost entirely on internal funding, with 52.6% focusing on improving product quality and competitiveness.
- Untapped opportunities and government role: 63.2% of institutions see targeted government support as a key untapped opportunity to strengthen industrial research.
- Importance of scientific research and industrial innovation: 100% of participants agreed that scientific research is essential to improve the performance of their institutions and emphasized the importance of establishing a specialized center for industrial innovation as an effective means to enhance innovation and develop sustainable industrial solutions.

- Patents and start-ups: 77.6% of researchers indicated that supporting scientific research and providing funding enhances the registration of patents resulting from academia-industry partnerships. The results also confirmed the need to develop an integrated system including funding, legislation, capacity building, partnerships, incubators, and an entrepreneurial culture to encourage start-up creation.

Recommendations to Strengthen Academia-Industry Partnership

- Updating legislation and procedures: Develop laws and policies within universities and research institutions to encourage research collaboration with the industrial sector, by:
  - Setting clear instructions to strengthen partnerships with the private sector.
  - Including funded projects within academic promotion criteria.
  - Reducing teaching burdens on researchers to allow time for applied collaboration.
- Enhancing applied research partnerships: Direct funding towards research with practical applications that meet industry and societal needs, focusing on supporting joint projects that produce implementable solutions or products.
- Building trust between industry and academia: Adopt long-term strategies for institutional and organizational reform, strengthen research incentives, and intensify communication between parties to build trust and unify visions on research priorities.
- Linking research to the national economy: Strengthen partnerships between universities and industry to connect scientific research with industrial and economic applications, and increase government funding and technical support for such research.

Action Plan to Strengthen Academia-Industry Collaboration Through Practical Programs

- Integrate new researchers into industrial projects.
- Develop digital and physical dialogue platforms, organize joint workshops, and provide incentives for private sector participation, in addition to directing research toward industry needs through specialized studies.
- Offer incentives to the industrial sector to engage in research.
- Align research activities with national industry priorities.

The Higher Council for Science and Technology intends to hold a conference titled "Bridging the Gap Between Academia and Industry" on 8/12/2025 in Amman, with approximately 300 participants from universities, industrial entities, business leaders, policymakers, and international experts.

Conference objective: To strengthen collaboration between academia and industry in Jordan's main economic sectors, align academic research and education with market needs, translate scientific research into practical solutions supporting innovation and economic growth, and develop a highly skilled workforce.

The conference will also showcase best practices and success stories with participation from about 10 international experts, facilitate dialogue and new partnerships, and provide practical recommendations to support entrepreneurship and develop national capacities.

ISLAMIC WORLD ACADEMY OF SCIENCES & ARAB THOUGHT FORUM SIGN A MEMORANDUM OF UNDERSTANDING

Dr. Adnan Badran, President IAS and Dr. Al-Sadiq Al-Faqih, Secretary-General, ATF.

The Islamic World Academy of Sciences (IAS) is pleased to announce the signing of a Memorandum of Understanding (MoU) with the Arab Thought Forum. This strategic partnership reflects a shared commitment to advancing scientific thinking, promoting evidence-based policy, and fostering dialogue on issues of development and innovation across the Arab region. Through this MoU, both institutions aim to collaborate on joint research initiatives, capacity-building programs, and knowledge-exchange activities that support sustainable development and strengthen the role of science in shaping the future.

Group Photo at the ATF.

CALL FOR NOMINATION FOR 2027 MUSTAFA (PBUH) PRIZE

The call for the 2027 Mustafa (pbuh) Prize has been published, inviting institutions and scientists to nominate their candidates for participation in 2027 Mustafa (pbuh) Prize. All nomination documents should be submitted to the secretariat by February 20, 2026. The award ceremony will be held in August 2027.

The works of the nominees will be reviewed in two categories: Life and Medical Sciences and Technology and Basic and Engineering Sciences.

The nominees can only be nominated by renowned scientists or accredited scientific institutions, including:

- Universities and research centers.
- Science and technology associations and centers of excellence.
- Academies of Sciences.
- Science and technology parks.

Laureates may be individuals or groups from among the Muslims worldwide or citizens of the 57 Islamic countries, with no restrictions on age or gender. Each laureate will receive a medal, Mustafa(pbuh) embelm, and a cash prize of USD 500,000.

As a biennial award honoring scientists, the Mustafa(pbuh) Prize has so far honored 22 outstanding scientists from Pakistan, Iran, Turkey, Malaysia, Singapore, Bangladesh, India, Lebanon, and Jordan.

VISITORS OF THE ISLAMIC WORLD ACADEMY OF SCIENCES (IAS)

Several guests were received at the Academy's Headquarters by Prof. Adnan Badran, President of the IAS, where they discussed issues pertinent to the Academy and potential collaboration.

Left to right: Dr. **Al-Sadiq Al-Faqih**, Secretary-General, the Arab Thought Forum (ATF), Dr**. Adnan Badran**, President, IAS, **Dr Maryz Younes**, President, the International Network For Arab Societies Study (INASS) and Dr. **Ziad Abdallah**, Director General, the Arab Institute for Training and Research in Statistics (AITRS).

Mr. **Omar Armouti**, Jordanian journalist, writer, and historian, with Dr. **Adnan Badran**.

Dr. **Sharif Al Zu'bi**, Former Minister of Industry & Trade; former Minister of Justice; former Senator, Jordan's Upper House of Parliament, with Dr. **Adnan Badran.**

Left to right: Mr. **Nael Al Dahleh**, Finance Manager, University of Petra, Dr. **Rami Abdel Rahem**, President, University of Petra, Dr. **Adnan Badran**, President, IAS and Dr. **Elias Baydoun**, Treasurer, IAS.

Dr. "**Moh'd Hussein" "Moh'd Rasoul" Kilani**, General Manager, Naba Hikma for Industrial and Testing Services, Dr. **Adnan Badran** and Dr. **Elias Baydoun**.

Dr. **Mohammed Wedyan**, Director, National Center for Research and Development (NCRD) and Dr. **Adnan Badran**.

Dr. **Najib Saab**, Secretary General of the Arab Forum for Environment & Development (AFED) & Dr. **Adnan Badran**.

Mr. **Abdullah Abu Ghosh**, President, Khadouri Alumni Club Association & Dr. **Adnan Badran**.

Dr. **Omar Zyod**, Director General, Jasmine for Training Courses Association & Dr. **Adnan Badran**.

STRENGTHENING SCIENTIFIC CAPACITY FOR INCLUSIVE GROWTH IN THE OIC REGION

KEYNOTE ADDRESS
ON THE OCCASION OF THE
WORLD SCIENCE DAY FOR PEACE AND DEVELOPMENT 2025

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Excellencies, distinguished colleagues, fellow scientists, ladies and gentlemen

It gives me great pleasure to join you today to celebrate **World Science Day for Peace and Development,** a day that reminds us of the transformative power of science to improve lives, foster innovation, and build bridges among nations.

Science, technology, and innovation (STI) are the engines that power knowledge economies. They are not mere luxuries for wealthy nations, they are the foundation for sustainable and inclusive growth. For the countries of the **Organization of Islamic Cooperation (OIC)**, investing in science is not an option; it is a necessity for achieving economic diversification, food and water security, renewable energy, and resilience against climate change.

Despite remarkable progress in some member states, the overall scientific performance of the OIC region remains below its potential. The region contributes **less than 2.5% of global scientific output**, and R&D spending averages **below 0.8% of GDP**, compared to the global average of around **2.3%**. Furthermore, disparities in scientific infrastructure, education quality, and innovation ecosystems persist across member countries.

To transform these challenges into opportunities, we must focus on building robust scientific capacity, human, institutional, and systemic management of resources, whether human resources or natural resources. This capacity will enable our nations to initiate, create, innovate then disseminate.

The Pillars of Strengthening Scientific Capacity are:

1. Investing in Human Capital that provides sustainability of development. We need to reform educational systems to emphasize inquiry, creativity, and problem-solving. Encouraging young researchers, especially women and early-career scientists, will expand the talent pool and ensure continuity in scientific leadership.
2. Building Strong Institutions and Networks. Centers of excellence, universities, and research institutes must be linked through regional and international collaboration. The Islamic World Academy of Sciences (IAS) plays a catalytic role in bridging scientists across borders, fostering joint research, and promoting knowledge sharing through conferences, publications, and fellowships.
3. Promoting Science for Development must emphasize basic research to provide knowledge which enables technology, innovation and entrepreneurship. If there is no basic scientific research, there is no science to apply. We must align research with national development priorities, such as health, water, energy, agriculture for food security and ecosphere resilience for climate change. Translational research and technology transfer can turn discoveries into market-ready innovations that generate jobs and improve well-being.
4. Strengthening Policy and Governance. Governments should integrate science, technology, and innovation into their national development agendas. Effective science policy frameworks, supported by sustainable funding mechanisms and evidence-based decision-making, are essential for long-term impact.

5. Fostering an Innovation and Entrepreneurship Ecosystem. building bridges between academia, industry, and government will unlock new opportunities. Innovation incubators, start-up accelerators, and knowledge parks can transform research outputs into commercial and social value.

Inclusive growth means that no one is left behind. Science must be used to reduce marginalization of inequality between rich and poor nations, between urban and rural communities, and between genders. This requires technical skills and ethical, transparent, and participatory approaches that empower all segments of society to benefit from scientific advances.

Digital transformation offers vast potential for inclusion, enabling access to education, healthcare, and entrepreneurship through digital technologies. But this potential can only be realized if we close the digital divide through equitable infrastructure and skills development.

At the IAS, we are deeply committed to advance science for sustainable development in the OIC region. Through our initiatives and by promoting dialogue between scientists, stakeholders, policymakers, and the private sector.

The IAS celebrates scientific excellence among OIC scientists and advocates for science-based policy and investment in R&D. In addition, the IAS provides a platform for young scientists to grow and contribute to global knowledge.

Ladies and gentlemen,

Let us remember that science is not merely about discovery, it is about human progress. It is about empowering our youth, protecting our planet, and securing a better tomorrow for all. On this World Science Day, let us reaffirm our commitment to strengthening scientific capacity as the cornerstone of inclusive, sustainable, and peaceful development in the OIC region and beyond.

Let us maintain a healthy planet conserving its mass matter resources and well-balanced ecosphere for us and for future generations.

IAS AND FAUUST CELEBRATE UNESCO'S WORLD SCIENCE DAY FOR PEACE AND DEVELOPMENT

Each year, the World Science Day for Peace and Development highlights the vital role of science in promoting sustainable development and strengthening the foundations of peace.

The 2025 theme, "Harnessing Science for Shared Prosperity," resonates deeply with the shared goals of OIC member states, the scientific community, and international partners working to ensure that scientific progress benefits all societies- especially Least Developed Countries (LDCs) and displaced scholars affected by conflict and instability .In this context, the Federal Urdu University of Arts, Science and Technology (FUUAST), in collaboration with IAS, organized a hybrid webinar bringing together national and international scholars, policymakers, and institutional representatives to discuss how scientific collaboration can foster peace, inclusivity ,and prosperity .Objective :To explore how scientific cooperation, knowledge-sharing, and innovation can serve as powerful tools for peace, development, and resilience-particularly within the Islamic world, the LDCs, and among displaced or marginalized scholars.

Speakers at the webinar were:
H.E. Dr. Adnan Badran, President, IAS.
Ambassador Dr. Jamil Ahmed Khan, Deputy Chair, Senate FUUAST.
Prof. Zabta Khan Shinwari, Vice Chancellor, FUUAST and Vice President, IAS.
Prof. Ilsur Nafikov, Kazan Federal University, Russia.
Prof. Shahbaz Khan, Director, UNESCO Beijing.
The recording of the webinar is available on:
https://youtu.be/imwnNLqneq4

UNESCO GRANTS COMSTECH OBSERVER STATUS AT THE SESAME CENTER

The United Nations Educational, Scientific and Cultural Organization (UNESCO) has officially granted observer status to the Standing Committee on Scientific and Technological Cooperation of the Organization of Islamic Cooperation (COMSTECH) at the International Centre for Synchrotron-light for Experimental Science and Applications in the Middle East (SESAME).

In an official letter from UNESCO's Office of International Standards and Legal Affairs addressed to Professor Dr. Mohammad Iqbal Chaudhry, General Coordinator of COMSTECH, UNESCO confirmed receipt of COMSTECH's letter and stated that COMSTECH's observer status in SESAME had come into effect as of September 26, 2025.

Professor Mohammad Iqbal Chaudhry expressed his appreciation for this development, stating, "We are honored to join SESAME as an observer. This achievement reflects COMSTECH's ongoing commitment to fostering scientific collaboration and supporting advanced research among OIC member states. SESAME is a unique model of cooperation that transcends geopolitical boundaries through science, technology, and innovation. COMSTECH's relationship with SESAME will open new horizons for joint research, capacity building, and access to advanced facilities for scientists in the Islamic world".

He also affirmed that COMSTECH, as the Standing Ministerial Committee of the OIC on S&T, remains committed to promoting international partnerships that contribute to the advancement of knowledge, innovation and sustainable development, in line with the goals of the Organization of Islamic Cooperation.

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* *Source: https://una-oic.org/en/media-coverage/comstec-covers/2025/11/02/UNESCO-awards-the-Standing-Committee-for-Cooperation/*

THE LATE PROF. ZAGHLOUL EL-NAGGAR (EGYPT)

(1933 – 2025)

It is with a sense of sadness and sorrow that the Secretariat of the Islamic World Academy of Sciences (IAS) announces the passing away of the eminent scientist and IAS Fellow, **Prof. Zaghloul El Naggar (Egypt).**

Prof. Zaghloul El-Naggar was an elected Fellow of the Islamic World Academy of Sciences (1988). Prof. Naggar was a member of the Geological Society of London, the Geological Society of Egypt, and the American Association of Petroleum Geologists, Tulsa, Oklahoma. He is a Fellow of the Institute of Petroleum, London.

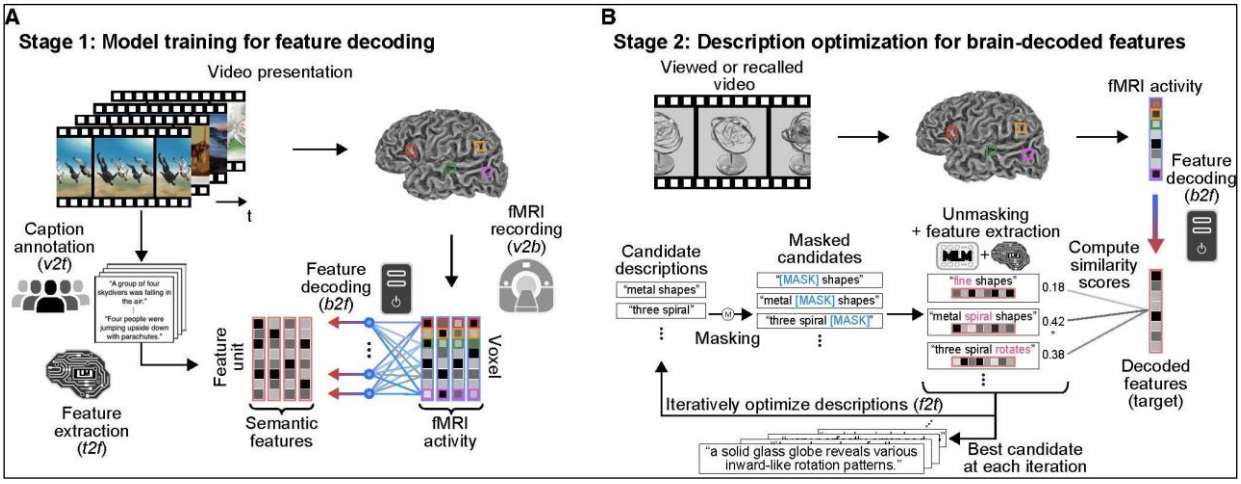
A former professor of Geology at King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia, Prof. Naggar was educated at Wales University in the United Kingdom, from where he obtained his PhD in Geology in 1963.

Prof. Naggar is the author/co-author of several books and more than 40 research papers in the field of Islamic Thought, Geology, General Science, and Education. He was awarded by the Ministry of Education in Egypt the top "Secondary Education Award" as well as the seventh Arab Petroleum Congress Best Papers Award in 1970.

Prof. Naggar taught at Ain Shams University, Cairo; King Saoud University, Riyadh; University College of Wales, Aberystwyth, U.K.; Kuwait University and the University of Qatar in Doha.

PICKS OF THE CHIEF EDITOR

'MIND-CAPTIONING' TECHNIQUE CAN READ HUMAN THOUGHTS FROM BRAIN SCANS*



Reading brain activity with advanced technologies is not a new concept. However, most techniques have focused on identifying single words associated with an object or action a person is seeing or thinking of, or matching up brain signals that correspond to spoken words. Some methods used caption databases or deep neural networks, but these approaches were limited by database word coverage or introduced information not present in the brain. Generating detailed, structured descriptions of complex visual perceptions or thoughts remains difficult.

A study, recently published in *Science Advances,* takes a new approach. Researchers involved in the study have developed what they refer to as a "mind-captioning" technique that uses an iterative optimization process, where a masked language model (MLM) generates text descriptions by aligning text features with brain-decoded features.

The technique also incorporates linear models trained to decode semantic features from a deep language model using brain activity from functional magnetic resonance imaging (fMRI). The result is a detailed text description of what a participant is seeing in their brain.

Generating video captions from human perception

For the first part of the experiment, six people watched 2,196 short videos while their brain activity was scanned with fMRI. The videos featured various random objects, scenes, actions, and events, and the six subjects were native Japanese speakers and non-native English speakers.

The same videos previously underwent a kind of crowdsourced text captioning by other viewers, which was processed by a pretrained LM, called DeBERTa-large that extracted particular features. These features were matched to brain activity and text was generated through an iterative process by the MLM model, called RoBERTa-large.

The team then compared the generated descriptions to both correct and incorrect captions across various numbers of candidates to determine accuracy, which they say was around 50%. They note that this level of accuracy surpasses other current approaches and holds promise for future improvement.

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* *Source: https://medicalxpress.com/news/2025-11-mind-captioning-technique-human-thoughts.html*

Photo credit: Mind captioning. Credit: Science Advances (2025). DOI: 10.1126/sciadv.adw1464

Reading memories
The same six participants were later asked to recall the videos under fMRI to test out the method's ability to read memory, instead of visual experience. The results for this part of the experiment were also promising.

"The analysis successfully generated descriptions that accurately reflected the content of the recalled videos, although accuracy varied among individuals. These descriptions were more similar to the captions of the recalled videos than to irrelevant ones, with proficient subjects achieving nearly 40% accuracy in identifying recalled videos from 100 candidates," the study authors write.

For people who have a diminished or lost capacity to speak, such as those who have had a stroke, this new technology could eventually serve as a way to restore communication. The fact that the system has proven itself capable of picking up on deeper meanings and relationships, instead of simple word associations, could allow these individuals to regain much more of their communication ability than some of the other brain-computer interface methods. Still, further optimization is necessary before getting to that point.

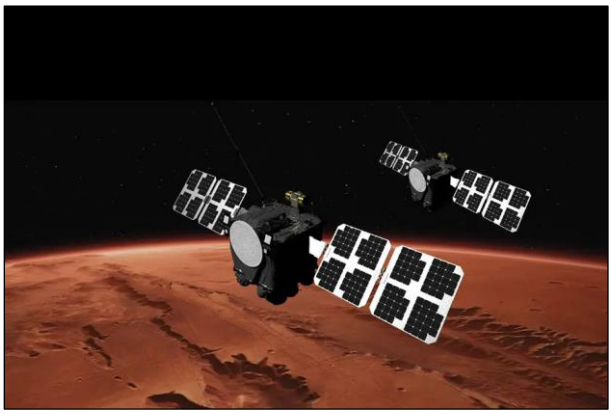
Ethical considerations and future directions
Regardless of some of the more positive applications for mind-captioning devices capable of reading human thought, there are certainly legitimate concerns regarding privacy and potential misuse of brain-to-text technology.

The researchers involved in the study note that consent will remain a major ethical consideration when employing mind-reading techniques. Before more widespread use of these technologies is common, important questions about mental privacy and the future of brain-computer interfaces will need to be addressed.

Still, the study offers up a new tool for scientific research into how the brain represents complex experiences and a potential boon for nonverbal individuals.

'MIND-CAPTIONING' TECHNIQUE CAN READ HUMAN THOUGHTS FROM BRAIN SCANS*

UC Berkeley scientists are in charge of two identical satellites, nicknamed Blue and Gold to honor the university's colors, set to launch for Mars as soon as Sunday.



The goal of the mission is to create a 3D map of the Red Planet's magnetic fields and atmosphere to assist future human communication and survival on Mars. This is the first time UC Berkeley has led a planetary mission.

The data these satellites collect could reveal how Mars lost its atmosphere and the conditions that could impact people who plan to stay on the planet, which has few protections against damaging solar storms. The two spacecraft will zoom around together to capture the magnetic fields, upper atmosphere and ionosphere of Mars.

Previously, spacecraft to Mars could only launch during a short window every two years in order to make a fuel-efficient exit from Earth's orbit into Mars' orbit. The originally scheduled launch of Blue and Gold was delayed last fall during one of these planetary alignment windows. Now, these satellites will travel a new and more flexible trajectory, with the hope of making it possible for spacecraft to depart for Mars more often.

* *Source: https://www.sfgate.com/bayarea/article/uc-berkeley-scientists-launch-nasa-mission-to-mars-21146169.php*

A NEW ONE-TIME TREATMENT COULD WIPE OUT HIGH CHOLESTEROL FOREVER♦

A one-off therapy could be our greatest weapon in the fight against heart disease

Flicking a single switch in people's genetic code could bring their cholesterol under control. Permanently.

In a pilot study, published in the New England Journal of Medicine, a novel gene therapy was able to reduce patients' low-density lipoprotein (LDL) cholesterol – 'bad' cholesterol – by almost 50 per cent, as well as triglycerides by an average of 55 per cent.

If future trials continue to be successful, then the single, one-off treatment could replace the daily cocktail of drugs millions take to control their cholesterol.

LDL cholesterol and triglycerides are fats that our livers naturally produce. If they build up in our blood, however, they can cause fatty deposits. These can lead to cardiovascular disease, which is responsible for 1 in 3 deaths in the US.

"Both LDL cholesterol and triglycerides are associated with major adverse cardiovascular outcomes such as heart attack, stroke or death," Steven Nissen, Professor of Medicine at the Cleveland Clinic Lerner School of Medicine, in the US, told *BBC Science Focus.*

Nissen was part of a group that hoped to reduce people's cholesterol levels by targeting the ANGPTL3 gene, which is associated with LDL cholesterol and triglycerides.

Around 1 in 250 people have a mutation that turns this gene off. As a result, these people have low levels of both blood fats. "Importantly, they also have a low incidence of cardiovascular disease," said Nissen.

Fortunately, who gets the benefit of this mutation isn't solely up to the genetic lottery anymore, thanks to CRISPR, the gene-editing technology.

Using CRISPR, Nissen and his colleagues were able to tailor the therapy to switch off the ANGPTL3 gene in the liver. It was then administered, via an infusion, to 15 patients for an preliminary trial to test its safety.

Within two weeks, the treatment substantially lowered the participants' LDL and triglyceride levels. The study confirmed they remained low 60 days later, but according to Nissen, "These changes are expected to be permanent."

Doctors recommend keeping LDL cholesterol levels below 100mg/dL for optimal heart health. While diet and exercise can help, many people struggle to meet this goal, particularly those with a genetic predisposition to high cholesterol.

Medications can help, but none of them lower both LDL cholesterol and triglycerides simultaneously. As a result, people often have to take multiple daily medications throughout their lives to manage their cholesterol levels.

"The next phase of the trial will begin within a few months and involve more patients with elevations in LDL cholesterol or triglycerides," said Nissen.

If these continue to be successful, then the medication could offer a long-term weapon in the quest to defeat one of the world's biggest killers.

♦ *Source:* https://www.sciencefocus.com/news/gene-therapy-high-cholestrol

ABU AL-QASIM AL-ZAHRAWI*
(936 - 1013 AD)

Abul Qasim Khalaf Ibn al-Abbas al-Zahrawi (known in the West as Abulcasis) was born in 936 AD in Zahra in Cordoba. He became one of the most renowned surgeons of the Muslim era and was physician to King-al-Hakam-II of Spain. After a long medical career, rich with significant original contribution, he died in 1013 AD.

He is best known for his early and original breakthroughs in surgery as well as for his famous Medical Encyclopaedia called *Al-Tasrif,* which is composed of thirty volumes covering different aspects of medical science. The more important part of this series comprises three books on surgery, which describe in detail various aspects of surgical treatment as based on the operations performed by him, including cauterisation, removal of stone from the bladder, dissection of animals, midwifery, styptics, and surgery of eye, ear and throat. He perfected several delicate operations, including removal of the dead foetus and amputation.

Al-Tasrif was first translated by Gherard of Cremona into Latin in the Middle Ages. It was followed by several other editors in Europe. The book contains numerous diagrams and illustrations of surgical instruments, in use or developed by him, and comprised a part of the medical curriculum in European countries for many centuries. Contrary to the view that the Muslims fought shy of surgery, Al-Zahrawi's *Al-Tasrif* provided a monumental collection for this branch of applied science.

Al-Zahrawi was the inventor of several surgical instruments, of which three are notable: (i) an instrument for internal examination of the ear, (ii) an instrument for internal inspection of the urethra, and (iii) and instrument for applying or removing foreign bodies from the throat. He specialised in curing disease by cauterisation and applied the technique to as many as 50 different operations.

In his book *Al-Tasrif,* Al-Zahrawi has also discussed the preparation of various medicines, in addition to a comprehensive account of surgical treatment in specialized branches, whose modern counterparts are ENT, Ophthalmology, etc. In connection with the preparation of medicines, he has also described in detail the application of such techniques as sublimation and decantation. Al-Zahrawi was also an expert in dentistry, and his book contains sketches of various instruments used thereof, in addition to a description of various important dental operations. He discussed the problem of non-aligned or deformed teeth and how to rectify these defects. He developed the technique of preparing artificial teeth and of replacement of defective teeth by these. In medicine, he was the first to describe in detail the unusual disease, haemophilia.

There can be no doubt that Al-Zahrawi influenced the field of medicine and surgery very deeply and the principles laid down by him were recognised as authentic in medical science, especially surgery, and these continued to influence the medical world for five centuries. According to Campbell's (*History of Arab Medicine*), his principles of medical science surpassed those of Galen in the European medical curriculum.

* *Source: Personalities Noble, 2nd Edition, 2000, Edited by Hakim Mohammed Said, published by IAS with permission of Hamdard Foundation Pakistan.*

IAS NEWSLETTER

Published by the IAS Secretariat, Amman, Jordan
The IAS welcomes the submission of short articles for publication in the Newsletter (publication however is at the IAS discretion)

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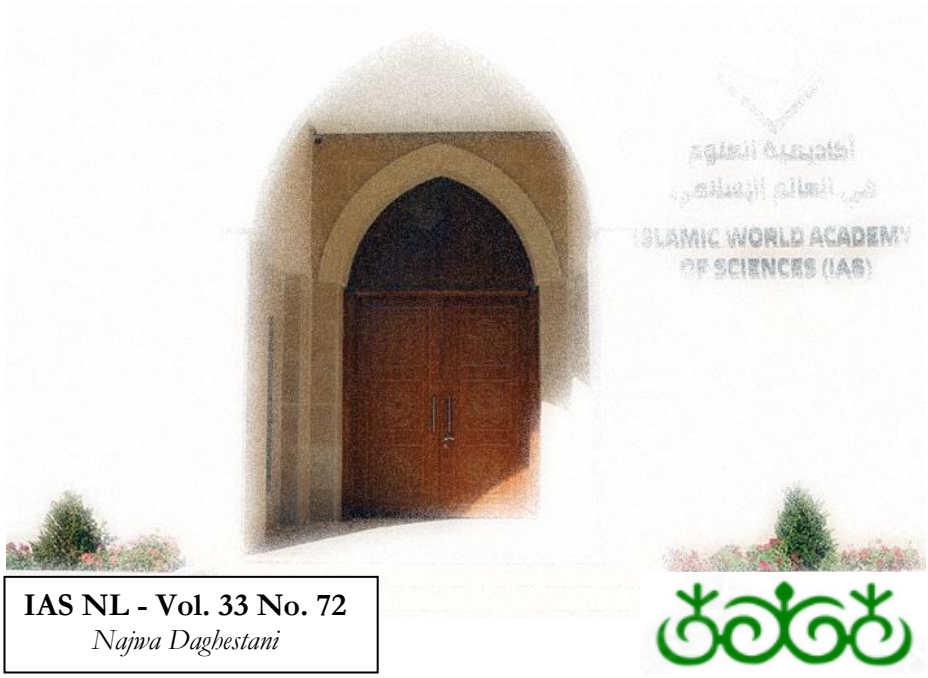

IAS NL - Vol. 33 No. 72
Najwa Daghestani