THE Awards Arab World 2025

Research Project of the Year: STEM

Institution Name	New York University Abu Dhabi
Submission title or project name	A bio-inspired approach to tackling water scarcity using UAE desert flora and hydrogels
Nominee / key personnel	Marieh Bassam Al Handawi
URL	https://www.pnas.org/doi/abs/10.1073/pnas.2313134120
Submission	Freshwater scarcity is a growing global crisis, particularly in the Middle East. Fog and humidity are abundant yet underutilised water sources, especially in arid regions such as the United Arab Emirates. In nature, many desert plants and animals have evolved strategies to harvest this atmospheric moisture. These natural mechanisms inspire new technologies that can improve the efficiency of artificial humidity harvesting systems. My research focuses on finding eco-friendly and scalable alternatives to extracting fresh water by surveying the UAE desert and performing intensive fieldwork to search for nature-inspired water harvesting systems. During this exploration, I discovered *Tamarix aphylla*, a recretohalophyte that excretes hygroscopic salts capable of harvesting water from air. These salts crystallise and undergo daily deliquescence cycles, adsorbing moisture even below 50 per cent relative humidity – far outperforming conventional salts such as sodium chloride. This remarkable biological adaptation provides a highly efficient and sustainable model for atmospheric water capture, fog harvesting and low-humidity cloud-seeding applications.

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Research Project of the Year: STEM

Institution Name	The Hashemite University
Submission title or project name	Epigenetic signatures of intergenerational exposure to violence in three generations of Syrian refugees
Nominee / key personnel	Professor Rana Dajani (Hashemite University) envisaged and led the study, collaborating with scientists from Yale University and the University of Florida
URL	https://www.nature.com/articles/s41598-025-89818-z
Submission	A landmark study envisaged by Rana Dajani, a Palestinian-Syrian Jordanian professor of molecular biology and genetics, offers the first human evidence that trauma can leave epigenetic marks inherited across generations. Conducted with researchers from Yale University and the University of Florida, the study followed three generations of Syrian families – those exposed to the 1982 Hama massacre, the Assad regime's violence, and a control group. It identified consistent DNA methylation patterns linked to trauma, even among descendants not directly exposed. This research challenges traditional narratives of victimhood, reframing inherited trauma as a form of adaptive resilience – what Dajani calls "my grandmother's wisdom". Her leadership ensured cultural sensitivity, scientific rigour and direct community involvement. The findings carry urgent implications for global health and refugee policy, especially amid crises such as Gaza. More than a scientific breakthrough, this work is a call to honour lived experience and centre community-driven solutions.

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Research Project of the Year: STEM

Institution Name	Badr University in Cairo (BUC)
Submission title or project name	Haemostatic nanocomposites to address trauma mortality in the Arab region and beyond
Nominee / key personnel	Professor Mahmoud Fahmy Ali Elsabahy (professor of pharmaceutical technology and nanomedicine and vice-president for graduate studies and research, Badr University in Cairo)
URL	https://patents.google.com/patent/US11504341B2/en
Submission	This project presents a groundbreaking innovation in trauma care through the development of advanced haemostatic nanocomposites designed to instantly stop bleeding. The invention provides rapid, non-invasive haemorrhage control, significantly improving outcomes in pre-hospital and emergency settings. Having demonstrated superior efficacy and safety compared with existing products, the technology has been granted European and US patents, and gained publications in leading scientific journals. The device can be used without medical training, making it ideal for inclusion in first aid kits worldwide. With potential to reduce trauma-related mortality – especially in low-resource settings where immediate care is often delayed – this innovation stands to save millions of lives annually, reduce burdens on healthcare systems, and stimulate economic growth through job creation and enhanced public health. The invention is currently in the licensing and manufacturing phase, paving the way for global deployment.

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Research Project of the Year: STEM

Institution Name	Prince Sultan University
Submission title or project name	PERCEVO: transforming mobility for the visually impaired with AI and IoT
Nominee / key personnel	Professor Tanzila Saba; Dr Anees Ara; Haifa Ammar Zeineddin; Aisha Ashworth; Asma Vaheed Khan; Raneem Alsoby
URL	https://www.youtube.com/watch?v=toqsmZJwx2Q&ab_channel=ArtificialIntelligenceandDataAnalyticsLab
Submission	PERCEVO is an innovative AI-powered smart cane attachment developed by a team under the Artificial Intelligence and Data Analytics Lab (AIDA Lab) at Prince Sultan University to empower visually impaired and hearing-impaired individuals. Combining real-time object recognition, distance measurement and multisensory feedback, PERCEVO enhances users' spatial awareness and independence in mobility. With impressive indoor accuracy and user satisfaction ratings, the project offers a cost-effective, inclusive alternative to traditional navigation aids. PERCEVO demonstrates how AI and the internet of things can deliver real-world social impact through accessible, human-centred innovation.

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Research Project of the Year: STEM

Institution Name	King Saud University
Submission title or project name	Smart Shovel
Nominee / key personnel	Osama Jasem Aldraihem (principal investigator and inventor); Meshal Abdullah Alajaji (mechanical engineer and co-inventor); Yazeed Khalid Alsalim (mechanical engineer and co-inventor)
URL	https://onedrive.live.com/personal/6abe7eb420d4622a/_layouts/15/Doc.aspx?sourcedoc=%7B203cde31-6816-4f7f-b949-e6cc8e2db4bd%7D&action=default&redeem=aHR0cHM6Ly8xZHJ2Lm1zL3AvYy82YWJlN2ViNDIwZDQ2MjJhL0VUSGVQQ0FXYUg5UHVVbm16STR0dEwwQjFvejZIMHUwUDlxbklDcG13QnhnWWc_ZT00OlpYemxodCZhdD05&slrid=674197a1-b052-0000-a8b7-487757a3b53e&originalPath=aHR0cHM6Ly8xZHJ2Lm1zL3AvYy82YWJlN2ViNDIwZDQ2MjJhL0VUSGVQQ0FXYUg5UHVVbm16STR0dEwwQjFvejZIMHUwUDlxbklDcG13QnhnWWc_cnRpbWU9TlRsWjRrYUMzVWc&CID=d2b52c25-701e-4901-b1d8-4b6dbc8de675&_SRM=0%3AG%3A202&file=SHOVEL%20Mechanism-Arab%20Award%20(3).pptx
Submission	This advanced shock-alleviation shovel is a revolutionary tool designed to reduce user pain and fatigue and increase efficiency during digging tasks, especially on hard surfaces. It operates with no need for an external power source. Featuring an innovative attachment impact mechanism, this shovel leverages advanced technology for enhanced performance. The key features and benefits include: a powerless impact mechanism that works as a strain reducer on users' shoulders and an amplifier of a digger's efforts; durable construction with a focus on ergonomic design for users' comfort; foot pedal and blade attachment for improved stability and efficiency; designed to dig through all soils effortlessly, enhancing productivity; enables users to work for longer periods with reduced physical exertion. There is a great market potential for this tool in the landscaping, construction, military and gardening industries. It is designed for those seeking high-performance tools.

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Research Project of the Year: STEM

Institution Name	American University of Sharjah
Submission title or project name	Advanced Composite Technologies for Sustainable Structural Rehabilitation
Nominee / key personnel	Dr Rami Hawileh; Dr Jamal Abdalla
URL	https://www.aus.edu/media/news/uae-researcher-develops-fire-resistant-concrete-for-sustainable-construction
Submission	The Advanced Composite Technologies for Sustainable Structural Rehabilitation project at the American University of Sharjah, led by Dr Rami Hawileh and Dr Jamal Abdalla, tackles the urgent issue of ageing and fire-vulnerable infrastructure in the Gulf region. By developing advanced fibre-reinforced polymer (FRP) systems, the team offers innovative, sustainable solutions for strengthening and repairing reinforced concrete structures. Their research combines cutting-edge materials with green technologies to enhance both durability and environmental resilience. Beyond academic achievements, the project has fostered strong collaborations with government agencies such as the Sharjah Civil Defense Authority and private-sector partners, ensuring real-world application of the technologies. In April 2025, the team hosted the first Symposium on Recent Advances in Fire Safety, bringing together international experts, industry leaders and policymakers. This project exemplifies how university research can drive sustainable development and improve the safety and longevity of critical infrastructure.

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Research Project of the Year: STEM

Institution Name	University of Hafr Al Batin
Submission title or project name	Development and optimisation of sildenafil orodispersible mini-tablets (ODMTs) for treatment of paediatric pulmonary hypertension using response surface methodology
Nominee / key personnel	Dr Mohamed Hassan Fayed (pharmaceutical sciences researcher, University of Hafr Al Batin)
URL	https://www.mdpi.com/2189928
Submission	Dr Mohamed Hassan Fayed developed and optimised sildenafil orodispersible mini-tablets (ODMTs) to improve treatment for children with pulmonary hypertension – a rare life-threatening condition that demands age-appropriate, easy-to-administer drug forms. Using response surface methodology, the research optimised a safe, stable and rapidly disintegrating mini-tablet that eliminates the need for water and enhances adherence in paediatric patients. The project overcomes key challenges in paediatric drug delivery and was published in a peer-reviewed journal, highlighting its scientific merit and translational potential. The innovation not only addresses a critical healthcare gap but also offers a model for applying statistical formulation tools to accelerate development. With real-world clinical promise and adaptability to other paediatric therapies, this work showcases how pharmaceutical research can generate tangible public health benefits. The published findings have opened doors to further development, clinical partnerships and potential commercial application.

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Research Project of the Year: STEM

Institution Name	Jouf University
Submission title or project name	Smart desalination with capacitive deionisation: merging energy efficiency and economic feasibility
Nominee / key personnel	Smart Desalination Team – College of Science, Jouf University: Professor Hassan Hassan (project lead); Dr Meshal Alzaid (project coordinator); Dr Ahmed Alsyat (senior technical adviser)
URL	
Submission	This project pioneers an innovative and sustainable approach to water desalination through capacitive deionisation (CDI). This low-energy, cost-effective technology removes salts from brackish water using electrically charged porous electrodes. Unlike traditional methods, CDI operates without high pressure or heat, reducing energy consumption by up to 70 per cent and minimising environmental impact. Utilising locally sourced carbon materials, such as agricultural waste, to fabricate high-performance electrodes promotes circular economy practices and significantly lowers production costs. It is scalable, easy to maintain and ideal for decentralised deployment in water-scarce and rural regions. The project delivers economic benefits through job creation and reduced infrastructure costs, social benefits by improving access to clean water and public health, and cultural value by preserving traditional water sources. With integrated salt collection and potential for ion-selective treatment, this CDI system offers a transformative solution to regional and global water challenges.