WORLD QUANTUM DAY
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Saudi Arabia
Centre for the Fourth Industrial Revolution

World Quantum Day 2025

Wrap Up Report

Executive Summary

Saudi Arabia joined the global celebrations for World Quantum Day (WQD) 2025 on 14 April with an event hosted by the Centre for the Fourth Industrial Revolution (C4IR) Saudi Arabia, in partnership with King Abdulaziz City for Science and Technology (KACST), at Riyadh's The Garage.

Held under the theme **"Discovering Quantum Possibilities: A Day of Exploration and Inspiration,"** Saudi Arabia's WQD 2025 event brought together policymakers, industry leaders, and researchers from around the world. In a series of keynote speeches and moderated panel discussions, these discussions highlighted key quantum technology issues, opportunities, and applications in areas such as healthcare, cybersecurity, computer science, education, and telecommunications. They explored the importance of governance, education, and investment strategies in guiding national and global efforts in quantum transformation.

Throughout the venue, carefully designed interactive quantum awareness installations further illuminated key quantum themes, topics, and challenges for the audience. These were supported by workshops focused technical sessions hosted by the Saudi Quantum Computing Association (SQCA), which explored advanced concepts in quantum computing – most notably, the concept of "entanglement swapping" and its expanding applications.

The event saw the conclusion of the Quantum for Society UpLink Challenge, a collaboration between C4IR Saudi Arabia and the World Economic Forum's UpLink platform, to connect entrepreneurs with the partners and resources they need for the acceleration of their growth, with the selection of 10 top innovators from 100 global submissions. In addition, WQD 2025 saw the announcement of "Quantum Valley," an initiative by KACST, Aramco, and the Saudi Data Artificial Intelligence Authority (SDAIA), to operate the first quantum computer in the Kingdom through a partnership with Pasqal and IBM.

This report offers a summary of WQD Saudi Arabia 2025's insights, announcements, and next steps as C4IR Saudi Arabia and its partners continue to strive to ensure a sustainable, responsible, and equitable quantum future.

Key figures

23
speakers

11
expert-led speeches and discussions

338
guests

362k
online audience

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01 Introduction to World Quantum Day

Worldwide, World Quantum Day is celebrated annually on 14 April to reflect the first three digits – 4.14 – of Planck's Constant, the fundamental constant governing quantum physics.

The rapid advance of quantum science and technology promises transformative shifts across economies, societies, and policies, influencing sectors including healthcare, logistics, cybersecurity, and economic planning. Given the scope and scale of these anticipated impacts, it is vital that countries, businesses, and civil society prepare for the quantum era. WQD offers a platform for all stakeholders to engage in meaningful discussions on the opportunities and challenges of quantum technologies.

Launched in 2021, WQD functions as a decentralized, bottom-up initiative, overseen by the World Quantum Day Organization. It enables individuals and institutions engaged in the application of quantum science to develop, organize, and host activities that broaden public awareness and deepen understanding of this critical field and its implications for society, economies, and global governance.

In 2025, WQD coincided with the UN's International Year of Quantum (IYQ). IYQ marks 100 years since the advent of quantum mechanics with Werner Heisenberg's seminal 1925 paper, "On Quantum-theoretical Reinterpretation of Kinematic and Mechanical Relationships." This foundational breakthrough – followed by key contributions from Heisenberg's contemporaries – shaped our understanding of quantum theory and laid the groundwork for the real-world applications we are now beginning to see.

Speakers

Dr. Basma AlBuhairan

Managing Director
Centre for the Fourth Industrial Revolution Saudi Arabia (WEF Affiliate Centre)

Dr. Talal AlSedairy

Senior Vice President
Research and Development, King Abdulaziz City for Science and Technology (KACST)

Arunima Sarkar

Head of Frontier Technologies
Centre for the Fourth Industrial Revolution, World Economic Forum

Abdullah AlHarbi

Head of Innovation and Commercialization
Saudi Accelerated Innovation Lab, Saudi Aramco

Prof. David E. Keyes

Senior Associate to the President for Strategic Projects
King Abdullah University of Science and Technology (KAUST)

Sadaf Hosseini

Head of Growth Partnerships and Innovation Ecosystems
UpLink

Eng. Hani AlHemsi

Director of Technology Development
Ministry of Communication and Information Technology (MCIT)

Prof. Mohamed Bourennane

Professor of Physics
Stockholm University

Freeke Heijman

Founder and CEO
Heijman Consultancy

Dr. Abdullah AlDahlawi

Consultant to His Excellency the President
Saudi Data and Artificial Intelligence Authority (SDAIA)

Muhammad AlSaiyari

Quantum Valley Lead
Saudi Aramco
Chairman
Saudi Quantum Computing Association

Ilyas Khan

Founder
Vice Chairman and Chief Product Officer
Quantinuum

Dr. Alejandro Marti
CEO and Co-founder
Mitiga Solutions

Shreyas Ramesh
Global Lead
Quantum Systems Integration
Accenture

Rebecca Krauthamer
Co-founder and CEO
QuSecure

Dr. Muhamad Felemban
Assistant Professor
King Fahd University of Petroleum and Minerals (KFUPM)

Dr. Mariam Nouh
Vice President
Economies of the Future Sector
King Abdulaziz City for Science and Technology (KACST)

Ibrahim Neyaz
CEO
National Technology Development Program (NTDP)

Dr. Stefan Leichenauer
Vice President
Engineering
SandboxAQ

Dr. Raneem AlSelaimi
Deputy Managing Director
Centre for the Fourth Industrial Revolution Saudi Arabia (WEF Affiliate Centre)

Chune Yang Lum
CEO and Co-founder
SpeQtral

Dr. María Fernanda González
CEO and Co-founder
Planetai Space Group

Kyle Hardman
CEO
Nomad Atomics

Acknowledgements

C4IR Saudi Arabia extends its gratitude to the partners instrumental to the success of WQD 2025. The progress of quantum science relies on collaboration, and its effective, equitable, and responsible application will depend similarly on such partnerships – an ethos that was central to the success of WQD 2025. We look forward to continuing to build and strengthen partnerships as we expand our global quantum community of purpose.

Partners

KACST
مدينة الملك عبدالعزيز للعلوم والتقنية

aramco

SQCA
Quantum Computing Association

02 Keynotes and Panel Discussions

Welcome Remarks

> Together we can build an inclusive and sustainable quantum future – one that fosters prosperity and resilience for generations to come. Let us shape the future, together.

Dr. Basma AlBuhairan
Managing Director
Centre for the Fourth Industrial Revolution Saudi Arabia

Dr. Basma AlBuhairan, Managing Director of C4IR Saudi Arabia, set out the global quantum context of "immense and expanding opportunities," fueled by more than $40 billion in public investment and the national quantum strategies launched by over 24 countries, including Saudi Arabia.

Quoting Werner Heisenberg - "what we observe is not nature itself, but nature exposed to our method of questioning" – Dr. AlBuhairan explained that this insight reminds us that our approaches to challenges shape the discoveries made. On this basis, she issued a call to action to all participants to embrace the diverse perspectives of the event's international line-up of contributors. She emphasized that this diverse and collaborative approach will enable the navigation of quantum science and technology's complex challenges, opportunities, solutions, and transformative potential to shape an inclusive, prosperous, and resilient quantum future for all.

In her remarks, Dr. AlBuhairan thanked C4IR Saudi Arabia's partner in hosting WQD 2025, King Abdulaziz City for Science and Technology (KACST), and acknowledged the pivotal leadership of H.E. Dr. Munir AlDesouki, President of KACST and Board Chair of C4IR Saudi Arabia, and welcomed his commitment to advancing a collective quantum future.

Keynote 1 - Empowering National Innovation: A Vision for the Quantum Era

> The future is not a distant dream. It is being coded in KACST laboratories, debated in NEOM innovation hubs, tested in garage startups, and with academic institutions such as KAUST and KSU turning the theoretical into breakthroughs.

Dr. Talal AlSedairy
Senior Vice President
Research and Development, King Abdulaziz City for Science and Technology

Dr. Talal AlSedairy, Senior Vice President for Research and Development, King Abdulaziz City for Science and Technology (KACST), highlighted the new "Quantum Valley" initiative, a groundbreaking collaboration designed to position Saudi Arabia at the forefront of quantum technology.

Quantum Valley will see KACST, Saudi Aramco, and the Saudi Authority for Data and Artificial Intelligence (SDAIA) work together to develop the Kingdom's first quantum computing facility through alliances with IBM and Pasqal to enhance its quantum capabilities.

Dr. AlSedairy spotlighted the transformative potential of quantum innovations, from molecular-level disease detection to energy-efficient grids, and emphasized the shift from theory to real-world applications, as seen in the 2022 Nobel Prize recognition of quantum entanglement.

Looking to the future, Dr. AlSedairy stressed the importance of collaboration and strategic planning in unlocking new quantum possibilities, affirming the Kingdom's commitment to a human-centered quantum economy that shapes innovations for the benefit of society.

Keynote 2 - Shaping the Intelligent Age

> As we delegate more decisions to algorithms, if the systems are designed without fairness and inclusion, we risk intensifying the social divides.

Arunima Sarkar
Head of Frontier Technologies
Centre for the Fourth Industrial Revolution, World Economic Forum

Arunima Sarkar, Head of Frontier Technologies at WEF C4IR, argued that we are no longer in the Fourth Industrial Revolution but transitioning into "The Intelligent Age." She emphasized that this new age is set to reshape society and requires agile, responsive global governance frameworks that also uphold core human values.

The Intelligent Age is powered by AI, quantum science and technologies, robotics, and biotech deeply embedded across physical, digital, and biological environments. These systems are influencing everything from how cities function to how people work and live. Noting that quantum technologies are moving rapidly from theory into practice, Sarkar cautioned that, with such rapid change, the true challenge for global governance and regulation is ensuring that technologies are leveraged to service human advancement, ecological sustainability, and social equity.

Acknowledging Saudi Arabia's leadership role in facing these challenges, Sarkar noted C4IR Saudi Arabia's Quantum Economy Project as a concrete example of how national strategies can align with global frameworks like the WEF's Quantum Economy Blueprint to respond to emerging regulatory demands.

Keynote 3 – Quantum Horizons:
Saudi Arabia's Vision for Technological Leadership

We know that the quantum revolution is not a solo effort. It requires collaboration, cooperation, and a shared commitment to progress to achieve this goal, and strategic initiatives need to be launched aiming at driving progress in this field.

Abdullah AlHarbi
Head of Innovation and Commercialization
Saudi Accelerated Innovation Lab, Saudi Aramco

Abdullah AlHarbi, Co-founder and Head of Innovation and Commercialization at the Saudi Accelerated Innovation Lab (SAIL) at Saudi Aramco, outlined Saudi Arabia's national vision for advancing quantum technology, urging the integration of quantum science into the education system through specialized university-led research centers as a strategic priority.

AlHarbi also highlighted the role of international collaboration, public and private sector investment, and entrepreneurship in building a robust quantum ecosystem, emphasizing that investing in local talent is essential.

In conclusion, AlHarbi stated that the three pillars of education, global partnerships, and entrepreneurship will form the foundation of Saudi Arabia's approach to becoming a global hub for quantum innovation.

Keynote 4 – Quantum AI:
A Powerful Fusion that Might Change the World

> Imagine a drug customized for your genetic configuration. Imagine a smart city where traffic lights adjust in real time based on traffic conditions. Imagine using quantum AI to discover a new material that can be used to produce new batteries that last a hundred times longer than the current ones. These are some of the potential breakthroughs of using quantum AI.

Dr. Abdullah AlDahlawi
Consultant to His Excellency the President
Saudi Data and Artificial Intelligence Authority (SDAIA)

Dr. Abdullah AlDahlawi, Consultant to His Excellency the President of the Saudi Authority for Data and Artificial Intelligence (SDAIA), offered insights into quantum AI – a fusion of quantum computing and artificial intelligence systems with the potential to lead to breakthroughs and scientific discoveries in areas including healthcare, material science, finance, logistics, and cybersecurity.

Dr. AlDahlawi emphasized that quantum AI algorithms are currently only running in a hybrid mode where the data-intensive element of the process is handled by classical computers, while quantum computing is leveraged for the most computationally intensive part of the process. He predicted that only when quantum computing is sufficiently advanced to handle both elements of the process will the truly significant breakthroughs emerge.

Panel 1 – Global Quantum Strategies: Current Approaches and Insights

The panel offered insights from Arunima Sarkar, Head of Frontier Technologies, Centre for the Fourth Industrial Revolution, World Economic Forum; Prof. Mohamed Bourennane, Professor of Physics, Stockholm University; and Freeke Heijman, Founder and CEO, Heijman Consultancy. The discussion was moderated by Eng. Hani AlHemsi, Director of Technology Development, Ministry of Communications and Information Technology.

The experts discussed how the world can manage the coming transformation collectively through governance and regulation, long-term investment in education and research, and comprehensive national strategies. The panel concluded that with the science of quantum now being established, greater focus is needed on how to ensure its responsible and inclusive application.

Key Contributions and Takeaways

- Eng. Hani AlHemsi framed the quantum revolution as a defining leap into "The Intelligent Age," urging a shift in mindset from simply understanding what quantum technologies are to asking what they are for—and for whom. He called for a globally inclusive approach to adoption, where innovation is shared, iterative, and collectively beneficial.
- Arunima Sarkar emphasized that conversations over governance and regulation need to start as early as possible. She stressed that every nation must consider the intent behind developing quantum technology, in particular the core values and guiding principles that will inform its national quantum agenda. She highlighted the WEF's Quantum Computing Governance Principles as a model for balancing innovation with accountability.
- Professor Bourennane highlighted the need for long-term investment in education and research through national quantum strategies. He emphasized that these strategies must create centers of excellence and quantum hubs with funding in place to support research, innovation, startups, and the broader ecosystem.
- Freeke Heijman, drawing from the Dutch Quantum Delta ecosystem, called for a combination of top-down and bottom-up approaches where strategic visionaries can shape both the strategy and the technological roadmaps accelerated by national programs.

Panel 2 – Real-World Applications: Demonstrating Impactful Uses Across Key Sectors

The panel offered insights from Dr. Alejandro Marti, CEO and Co-founder of Mitiga Solutions and Chairman of the United Nations International Telecoms Union (UN-ITU) Focus Group on AI for Natural Hazards; Rebecca Krauthamer, Co-founder & CEO of QuSecure; Ilyas Khan, Founder, Vice Chairman, and Chief Product Officer at Quantinuum; and Shreyas Ramesh, Global Lead, Quantum Systems Integration at Accenture. The discussion was moderated by Muhammad AlSaiyari, Quantum Valley Lead at Saudi Aramco and Chairman of the Saudi Quantum Computing Association.

The experts explored how quantum technologies are transitioning from theoretical promise to practical impact, highlighting use cases across cybersecurity, healthcare, finance, and energy. There was broad consensus among the experts that quantum has reached a tipping point – where tangible business value is now being realized across multiple sectors – but that significant challenges remain, with education and governance needed to enable progress.

Key Contributions and Takeaways

- Rebecca Krauthamer emphasized that post-quantum encryption in cybersecurity is no longer conceptual, with encryption methods today able to be adapted without needing quantum computers, effectively flipping the common narrative.
- Muhammad AlSaiyari echoed the sentiments that quantum technologies have passed a critical threshold from theoretical promise to practical, real-world impact and the next challenge lies in translating these advancements into tangible value for industry and society.
- Ilyas Khan highlighted how healthcare is poised for a breakthrough, with expectations that 2026 could see the achievement of 100 logical qubits at a minimum of four lines of fidelity, reaching the point needed to discover new drugs and materials.
- Dr. Alejandro Marti shared how climate resilience is being radically reimagined, citing a 10,000-fold improvement in biomethane production enabled by quantum technology – a breakthrough that will enhance climate simulations and improve impact forecasting.
- Shreyas Ramesh highlighted the need to equip young people through education, while also working to ensure regulatory readiness through broader international cooperation.

Panel 3 – Bridging Academia and Industry:
Turning Research into Practical Solutions

The panel offered insights from Chune Yang Lum, CEO and Co-founder of SpeQtral; Dr. Stefan Leichenauer, Vice President of Engineering at SandboxAQ; Dr. Mariam Nouh, Vice President for the Future Economies Sector at KACST; and Ibrahim Neyaz, CEO of the National Technology Development Program (NTDP). The discussion was moderated by Dr. Muhamad Felemban, Assistant Professor at King Fahd University of Petroleum and Minerals.

This discussion focused on the structural and cultural gap between academic research and industry adoption of quantum technologies. Acknowledging that academia remains the "wellspring of foundational knowledge," panelists agreed that breakthroughs often stall without sustained, cross-sector collaboration. The panel concluded with a clear message that real-world innovation in quantum will require sustained, structured collaboration between both researchers and industry users, supported by long-term talent development.

Key Contributions and Takeaways

- Dr. Felemban noted that research labs cannot work in isolation but must link up with industry to achieve impact.
- Dr. Leichenauer observed that new collaboration models to facilitate knowledge transfer and intellectual property (IP) sharing are needed to bridge the differing timetables of academia and industry.
- Ibrahim Neyaz highlighted the importance of initiatives like the Next Era platform - a National Technology Development Program (NTDP) initiative that incentivizes collaboration between research institutions and startups to ensure the successful development of real-world applications.
- Chune Yang Lum emphasized the need for clarity in partnerships through clear IP frameworks that allow industry to properly interact with academia. He shared that SpeQtral is actively advancing quantum-safe communications, with its first satellite-based quantum key distribution system launching in 2025.
- Dr. Nouh stressed the urgency of long-term talent development systems to support quantum science, calling for workforce strategies spanning early education to leadership training, as well as substantial infrastructure investment and international partnerships.

03 UpLink Challenge

Quantum for Society UpLink Challenge

The Quantum for Society UpLink Challenge – a collaboration between C4IR Saudi Arabia and UpLink, WEF's early-stage innovation ecosystem – connected entrepreneurs with the partners and resources needed to accelerate their growth.

The challenge called for impactful, scalable quantum solutions that support a sustainable future in alignment with the UN Sustainable Development Goals (SDGs). Entrants used quantum technology to address critical global needs in climate, materials and manufacturing, healthcare, agriculture, food systems, and freshwater access.

At WQD 2025, C4IR Saudi Arabia and its partners recognized the Top 10 Innovators selected by an international panel of philanthropists, practitioners, and industry experts from 100 submissions to the challenge.

Each of the selected innovators was awarded a trophy by Dr. Basma AlBuhairan and Dr. Talal AlSedairy.

The full list of Top 10 Innovators can be seen on the next page.

UpLink Quantum for Society Challenge

SDG impact areas

Ecosystem Partners

accenture aramco HCLTech KACST مدينة الملك عبدالعزيز للعلوم والتقنية

جامعة الملك عبدالله للعلوم والتقنية
King Abdullah University of Science and Technology

وزارة الاتصالات وتقنية المعلومات
MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

البرنامج الوطني لتنمية تقنية المعلومات
National Technology Development Program
ntdp

OQI Open Quantum Institute

PASQAL SANDBOXAQ

Top 10 Innovators

planqc **(Germany)** - Building quantum computers specially designed to address computational challenges across industries, such as optimizing supply chains, discovering new materials, and advancing drug development.

algorithmiq **(Finland)** - Developing quantum computing solutions for healthcare by leveraging a middleware platform to integrate quantum and classical systems. Their innovations aim to accelerate drug discovery and improve treatment personalization.

Quantum Dice **(United Kingdom)** - Enhancing solution time and energy efficiency in computational optimization processes by developing algorithms that utilize their quantum-based probabilistic computing hardware.

Xairos **(USA)** - Developing quantum time transfer technology to provide a resilient global timing service with better accuracy for commercial telcos, data centers, financial networks, and power grids.

Qnity **(Brazil)** - Utilizing an advanced electrochemical sensor made of a gold monolayer, designed to detect molecular interactions with unparalleled sensitivity to accelerate drug discovery and the development of new therapies.

Nomad Atomics **(Australia)** - Enabling high resolution and long-term visualization of underground dynamics, providing a pathway for the implementation of gravity as a viable, cost-effective MMV tool for CO_2 storage.

Planetai Space Group **(Spain)** - Harnessing Quantum Machine Learning and Satellite Technology via the QUANTUM-AQUA initiative to detect and prevent the depletion of underground water from space.

Quminex **(Canada)** - Employing quantum machine learning to discover new ore deposits, focusing on critical metals. Their unsupervised learning approaches aim to overcome challenges in mineral exploration data analysis.

Quantasphere **(Saudi Arabia)** - Leveraging quantum computing to revolutionize healthcare, particularly in genomics and precision medicine. The company aims to solve critical issues, like the integrity and security of medical records.

Quantum Mads **(Spain)** - Optimizing wastewater treatment processes using quantum computing. Their innovative approach reduces energy consumption and enhances operational efficiency in bioreactors, promoting sustainable waste management practices.

UpLink Challenge Keynote and Fireside Chat

Following the presentation of trophies to each of the Top 10 Innovators, the WQD 2025 audience gained deeper insight through a speech and subsequent fireside chat from the UpLink Challenge's leadership, stakeholders, and participating innovators.

Keynote

Sadaf Hosseini is a senior executive at the World Economic Forum, currently serving as Head of Growth, Partnerships, and Innovation Ecosystems at UpLink. Her work focuses on forging strategic, value-based partnerships and implementing initiatives to accelerate early-stage, impact-driven startups that create positive change for people and the planet.

> Innovation needs pathways, people, enabling platforms, and investments. In other words, it requires an ecosystem. That is exactly why UpLink was born five years ago.

Sadaf Hosseini
Head of Growth, Partnerships, and Innovation Ecosystems
UpLink

Sadaf Hosseini, senior executive at WEF and Head of Growth, Partnerships, and Innovation Ecosystems at UpLink, detailed the context, goals, and impacts of the UpLink Quantum for Society Challenge. She issued an invitation to all partners, stakeholders, and innovators to "continue to build together... and shape a future where quantum technology doesn't just advance science, but it strengthens resilience, equity, and opportunity for all."

As the world faces compounding crises and rapid transformations – including climate change and digital acceleration – she emphasized that quantum-powered solutions have the potential to keep pace with the scale and speed of emerging issues.

Hosseini also highlighted the economic opportunities presented by quantum, with McKinsey estimating that quantum computing alone could create $1.3 trillion in global value by 2035. She argued that enabling innovators to fulfil this potential requires ecosystems like the UpLink Challenge to continue driving investment, noting that UpLink has now accelerated over 500 startups and enabled more than $2.3 billion in follow-on funding.

Fireside Chat

The UpLink Quantum for Society Challenge session was hosted by Professor David E. Keyes, Senior Associate to the President for Strategic Projects at King Abdullah University of Science and Technology (KAUST), and featured UpLink Quantum for Society Challenge innovators Dr. María Fernanda González, CEO and Co-founder of Planetai Space Group, and Kyle Hardman, CEO of Nomad Atomics.

The fireside chat offered a deeper dive into Planetai Space Group and Nomad Atomics' applications, partnerships, and future plans. Summing up, moderator Professor Keyes emphasized the importance of public-private partnerships, as well as synergies between academia, industry, government, and startups, to ensure that a new generation of talent is equipped with the skills needed to seize the opportunities presented by quantum technologies.

Key Contributions and Takeaways

Dr. María Fernanda González, CEO and Co-founder of Planetai Space Group, explained how the startup:

- Uses satellite data to analyze vegetation and soil in 10-by-10-meter sections of land to discover underground water reserves and ascertain pollution and contamination levels.
- Works with indigenous groups, particularly in the Amazon Rainforest, to protect the natural resources.
- Collaborates with governments and private sector entities to ensure that oil, gas, and mineral extraction minimizes environmental impact.

Kyle Hardman, CEO of Nomad Atomics, detailed how the startup:

- Builds quantum sensors for gravimetry and accelerometry with immediate, real-world applications – not innovations limited to the distant future.
- Uses quantum sensing to bring new levels of detail and monitoring accuracy to carbon sequestration, a key tool in combating climate change.
- Forms partnerships with private sector companies that showcase the economic potential of quantum sensing.

04 Technical Sessions

Beyond the Qubit: Entanglement Exchange

As part of the WQD 2025 celebrations under the theme “Discovering Quantum Possibilities: A Day of Exploration and Inspiration,” C4IR Saudi Arabia and the Saudi Quantum Computing Association (SQCA) co-organized a dedicated series of technical sessions titled “Beyond the Qubit: Entanglement Exchange.”

These sessions were open to the public and designed to deepen technical understanding, foster knowledge sharing, and stimulate collaboration across the quantum computing ecosystem. The program featured expert presentations, panel discussions, and focused technical sessions that addressed foundational topics, emerging use cases, and key challenges in advancing quantum technologies.

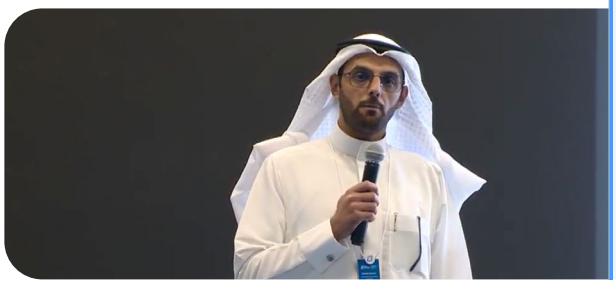
Through diverse technical discussions and interactive activities, the sessions aimed to raise awareness, support skills development, showcase practical applications, and strengthen community ties within Saudi Arabia’s growing quantum ecosystem.

The technical sessions at WQD 2025 successfully brought together experts, researchers, students, and industry professionals to engage with the latest advancements and challenges in quantum science and technology. The sessions’ focus on practical insights, educational strategies, emerging applications, and community building underscored the importance of structured collaboration and technical excellence in driving quantum innovation forward.

Session 1
The Role of Technical Associations in Advancing the Quantum Ecosystem

This session offered insights from Abdullah AlSalman, Executive Director of the Saudi Quantum Computing Association (SQCA), and highlighted technical associations’ important role in supporting the growth of national quantum ecosystems.

The session outlined how such associations act as platforms for collaboration across academia, industry, and government. The discussion also called for broader participation from professionals and researchers and stressed the need for more specialized associations focused on topics such as quantum error correction and quantum networking.



Key Contributions and Takeaways

- Abdullah AlSalman emphasized that SQCA and similar bodies, operating under national guidance, help align innovation efforts with Saudi Arabia’s broader strategic goals. From advancing policy discussions to supporting talent development, these associations are key enablers of ecosystem maturity.
- The session also called for broader participation from professionals and researchers and stressed the need for more specialized associations focused on topics such as quantum error correction and quantum networking.
- AlSalman further noted that specialized associations and collaboration between industry and academia are essential for accelerating innovation and deepening expertise across Saudi Arabia’s emerging quantum landscape.

Session 2

Panel: Integrating Quantum Computing Tools in Education

This panel session offered insights from Dr. Sumayah Madkhali, Assistant Professor in the Department of Physical Sciences at Jazan University; Khulud Almutairi, Lecturer at King Saud University and Co-founder of the Saudi Quantum Technology Association; Eng. Hassan Al-Jeshi, Solutions Architect at Amazon Web Services; and Abdulhadi Alzaidi, Lecturer, Department of Computer and Information Technology, Jubail Industrial College, bringing together experts from universities and the tech industry to discuss how quantum computing can be introduced and scaled within educational systems.

Panelists emphasized the importance of early exposure, hands-on learning, and strong links between academia and industry to prepare students for future careers in quantum technologies. The conversation also addressed tools like Qiskit, skill development in programming, and the need for agile curriculum updates. Panelists agreed that preparing a quantum-ready workforce requires collaborative efforts across sectors and a long-term commitment to embedding quantum literacy into education at all levels.

Key Contributions and Takeaways

- Dr. Sumayah Madkhali and Khulud Almutairi shared how lab-based projects and updated curricula are helping students engage with quantum concepts.
- Eng. Hassan Al-Jeshi highlighted the use of Amazon Braket in classrooms to simulate quantum systems without hardware.
- Abdulhadi Alzaidi underscored the role of industry partnerships in bringing real-world relevance to the learning experience.

Session 3

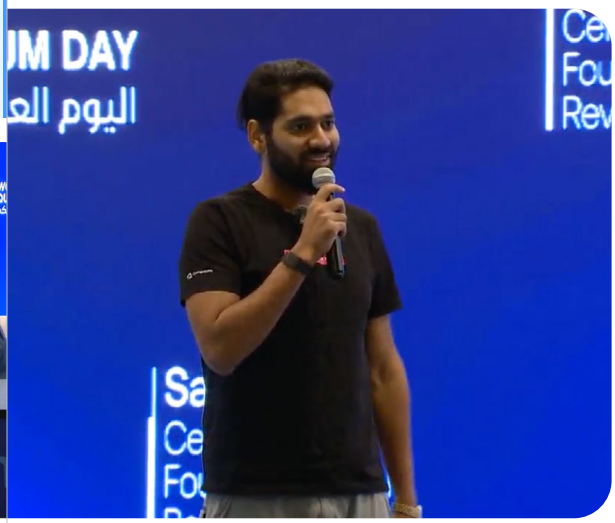
Building a Quantum-Uncrackable Decentralized Future

The session offered insights from Kapil Dhiman, Co-founder and CEO of Quranium, focusing on the growing intersection of quantum computing and cybersecurity.

Kapil Dhiman introduced Quranium, a blockchain platform with built-in quantum resistance, and unveiled DeQUIP, a new protocol aimed at helping decentralized systems remain secure in a quantum-powered world. The discussion centered on the looming risks quantum computing poses to conventional encryption and the necessity of adopting Post-Quantum Cryptography (PQC) to safeguard digital assets.

Key Contributions and Takeaways

- Kapil Dhiman warned that current cryptographic methods may soon be obsolete, making proactive transition to PQC vital.
- Quranium was presented as a pioneering quantum-safe blockchain platform built for long-term resilience.
- Kapil Dhiman explained that the newly introduced DeQUIP protocol is designed to help decentralized ecosystems remain secure in the face of quantum threats.
- The session made a compelling case for the urgent adoption of quantum-safe technologies in cybersecurity frameworks.



Session 4

How Quantum Computing and Networking Generate Global Value

The session offered insights from Diego Heinrich, Senior Director at IonQ, and explored how combining quantum computing and quantum networking can unlock new possibilities for science and industry.

Diego Heinrich discussed technological advancements in high-fidelity qubits and modular systems, highlighting their role in making quantum solutions more scalable and practical. The session also presented real-world applications in areas such as materials modeling, drug discovery, and secure communications.

Key Contributions and Takeaways

- Diego Heinrich shared examples of how hybrid quantum-classical approaches are already being used in areas such as materials modeling, optimization, and drug discovery.
- The session also highlighted advances in quantum networking, including secure communication systems and real-world testbeds for entanglement distribution.
- The developments discussed showcased how integrated quantum technologies can drive powerful, secure, and efficient solutions for the future.

Session 5

From Classical Controls to Quantum Gates

This session offered insights from Ibraheem AlYousef, Physicist and Research and Development Engineer at the National Company of Telecommunications & Information Security, who began by explaining key quantum concepts like superposition and entanglement before moving into the physical structure of superconducting circuits.

The session effectively bridged theory and practice, showing how precise control enables reliable quantum computing.

Key Contributions and Takeaways

- The session focused on practical calibration methods, including fine-tuning X and X/2 gates.
- Participants were introduced to the calibration of superconducting qubits, which is crucial for accurate quantum operations.
- The session also utilized the QuTiP simulation tool to model and test these techniques.

Session 6

Focused Technical Session: Tech Community Convergence

Facilitated by the Board and members of the Saudi Quantum Computing Association (SQCA), the concluding session of the technical program was an interactive workshop focusing on “Tech Community Convergence.” This session was designed to foster collaboration and active engagement among participants, creating a platform for dialogue, exploration, and the exchange of innovative ideas within the quantum technology community.

05 WQD Quantum Awareness Experiences

WQD 2025 was designed to reach a broad audience beyond experts, partners, and stakeholders by providing essential historical context and showcasing the profound impact of quantum discoveries.

Three engaging awareness experiences at WQD 2025 ensured visitors gained a clearer understanding of quantum science. Through these informative activations, visitors explored the key figures and historical foundations of quantum science and technology, with breakthrough moments alongside incremental progress, and the balance between theoretical foundations and practical applications.

Quantum Timeline Tunnel

The Quantum Timeline Tunnel provided an immersive, chronological journey through a century of quantum science. Visitors were guided through the history of quantum mechanics, learning about key milestones, foundational concepts, and pivotal experiments through visual narratives and timelines from the early 1900s to the present day and beyond.

Quantum in Action

Quantum in Action used interactive screens to showcase ten real-world applications of quantum technology, curated from the World Economic Forum's Quantum Applications Hub. Trained student volunteers guided visitors through the experience, demonstrating a use case based on each visitor's interest – such as using quantum computing to remediate Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) chemicals or optimize supply chains. This interactive, personalized approach helped demystify quantum science and demonstrated its tangible impact across industries.

Quantum Nobel Prize Winner Lightboxes

Complementing the Quantum Timeline Tunnel, the Quantum Nobel Prize Winner Lightboxes celebrated the individuals behind the science. Through a series of interactive lightboxes, visitors were introduced to a selection of Nobel laureates, whose groundbreaking work significantly advanced quantum science. Each lightbox detailed an individual's prize-winning contributions and explained their significance and connection to major quantum breakthroughs.

06 Wrapping up and Moving Forward

Closing Remarks

As the largest economic powerhouse in the region, and as a nation energized by innovation, the Kingdom under Vision 2030 can truly lead the quantum movement. Above all, it will be an inclusive revolution built by the many and for the many.

Dr. Raneem AlSelaimi
Deputy Managing Director
Centre for the Fourth Industrial Revolution Saudi Arabia

Dr. Raneem AlSelaimi, Deputy Managing Director of C4IR Saudi Arabia, concluded the event with a call to action for all participants and stakeholders to build on the connections made throughout the day's discussions and to collaborate to "turn the promise of quantum mechanics into global prosperity."

Dr. AlSelaimi recapped some of the industrial, technological, and economic opportunities offered by quantum science, noting as she did that, "the more we uncover, the more we realize we're barely scratching the surface."

She echoed the statements made throughout the day by speakers that national strategies and global regulatory collaboration must ensure that quantum science and technology benefits society as a whole through solving complex challenges across energy, healthcare, financial sustainability, and climate change.

Next steps

With the 2nd edition of WQD Saudi Arabia complete, C4IR Saudi Arabia is looking ahead as it works to achieve national quantum objectives, shape the global transformation conversation, and build a collaborative community of purpose.

C4IR Saudi Arabia will continue to champion the Kingdom's leadership in 4IR by leveraging quantum technologies to drive economic growth, support sustainability, and enhance quality of life. In particular, the Centre will remain focused on supporting the development of the Kingdom's national quantum strategy by establishing a foundational roadmap to build a robust quantum ecosystem, aligned with the World Economic Forum's Quantum Economy Blueprint.

Looking towards 2026 and beyond, C4IR Saudi Arabia will focus on expanding quantum awareness and literacy throughout society. Key initiatives will include launching simulated hackathons, developing practical toolkits to integrate quantum principles into education from early stages, and producing accessible, high-quality quantum science materials for the public. These concrete steps aim to nurture talent, spark curiosity, and empower citizens across the Kingdom, building the essential human capital for Saudi Arabia's thriving quantum future.

C4IR Saudi Arabia invites all partners, stakeholders, and members of the broader community to join them in shaping a responsible and equitable quantum powered future for all.

07 Media Coverage

The event garnered significant attention across various media platforms, ensuring broad coverage on quantum technology's potential and impact.

WQD 2025 saw the announcement of the "Quantum Valley" an initiative by KACST, Aramco, and the Saudi Data Artificial Intelligence Authority (SDAIA), to operate the first quantum computer in the Kingdom through a partnership with Pasqal and IBM. The announcement was covered by SPA, The Quantum Insider, Leaders MENA, and Arab News.

Figures

31
Media mentions

17
English mentions

14
Arabic mentions

The 2025 event garnered a total of 31 media mentions—17 in English and 14 in Arabic—reflecting a focused, yet high-quality reach. Media coverage was strategically centered around key milestones, including the launch of Quantum Valley and the outcomes of the Quantum for Society UpLink Challenge. The balanced bilingual distribution highlights sustained engagement from both local and international audiences.

Press Conference

C4IR Saudi Arabia hosted a press conference at WQD 2025 for a select audience of journalists from international, Saudi, and sector news outlets to highlight the objectives and outcomes of the Quantum for Society UpLink Challenge.

The press conference featured:

- **Dr. Basma AlBuhairan** - Managing Director, Centre for the Fourth Industrial Revolution Saudi Arabia (WEF Affiliate Centre)
- **Arunima Sarkar** - Head of Frontier Technologies, Centre for the Fourth Industrial Revolution, World Economic Forum
- **Prof. David E. Keyes** - Senior Associate to the President for Strategic Projects, King Abdullah University of Science and Technology (KAUST)
- **Sadaf Hosseini** - Head of Growth, Partnerships, and Innovation Ecosystems, UpLink
- **Kalyan Kumar** - Chief Product Officer, HCLSoftware
- **Diego Stone Aires** - CEO, Qnity

Media Interviews

As part of C4IR Saudi Arabia's efforts to elevate public awareness and understanding of WQD 2025 and quantum technologies, Dr. Basma AlBuhairan participated in two high-profile media interviews. These conversations highlighted key developments in the quantum landscape, as well as C4IR Saudi Arabia's vision, initiatives, and national impact.

SPA

In an interview with the Saudi Press Agency (SPA), Dr. AlBuhairan underscored how quantum technology supports Vision 2030 by accelerating economic diversification, fostering innovation-led growth, and positioning Saudi Arabia as a leading global center of technological excellence.

She emphasized that investments in quantum are not symbolic, but serve as structural foundations for long-term national leadership – enabling the Kingdom to move beyond traditional industries , attract international talent and partnerships, and build a resilient, knowledge-based economy. These efforts, she noted, are critical to strengthening Saudi Arabia's global competitiveness in the evolving technology landscape.

Asharq Al-Awsat

Dr. AlBuhairan offered insight into the objectives of WQD 2025 and C4IR Saudi Arabia's strategic priorities for the year ahead. She emphasized that through projects, initiatives, and events like WQD 2025 and the upcoming third Saudi Forum on the Fourth Industrial Revolution, the Centre is reinforcing the Kingdom's position as a responsible leader and global hub for 4IR and quantum technologies.

She also spotlighted key initiatives such as AVIATE, Smart City, and the Peer-to-Peer Sandbox, as well as C4IR Saudi Arabia's new Critical Minerals and Digital Media in Education projects. Dr AlBuhairan emphasized the importance of the Centre's collaborations with its partners such as KACST, the Ministry of Communications and Information Technology, King Fahd University of Petroleum and Minerals, and Saudi Aramco.

Through this interview with a leading international Arabic-language newspaper, Dr. AlBuhairan further supported the goals of both C4IR Saudi Arabia and WQD 2025 of reaching new audiences and raising awareness of 4IR-driven technological advances.

Media Coverage Samples

ARAB NEWS

Saudi Arabia rich in potential for quantum research, experts say

وكالة الأنباء السعودية SAUDI PRESS AGENCY

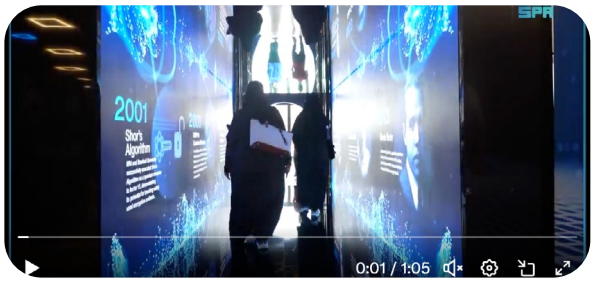
وكالة الأنباء السعودية SAUDI PRESS AGENCY

C4IR Saudi Arabia to Host Global Experts in Celebration of 100 Years of Quantum Science at World Quantum Day 2025 Event

Thursday 05/10/1446

وكالة الأنباء السعودية SAUDI PRESS AGENCY

وكالة الأنباء السعودية SAUDI PRESS AGENCY



QUANTUM INSIDER powered by RESONANCE

Saudi Arabia Lays Out Its Strategic Vision For The Quantum Era

National, Quantum Computing Business, Research Matt Swayne • January 6, 2025

QUANTUM INSIDER powered by RESONANCE

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C4IR Saudi Arabia To Host Global Experts In Celebration Of 100 Years Of Quantum Science At World Quantum Day 2025 Event

Quantum Computing Business Matt Swayne • March 24, 2025

Saudi Arabia Centre for the Fourth Industrial

الإخبارية

الإخبارية

الشرق الأوسط
Asharq Al-Awsat

Saudi Arabia awards global start-ups for quantum innovation

C4IR Saudi Arabia & WEF's UpLink award Quantum for Society Challenge winners

CARRINGTON MALIN
APR 14, 2025

MEA TECH WATCH

Leaders

Saudi Arabia Launches Quantum Valley, Honors Innovators at UpLink

Sanaa Hasan · April 15, 2025 · 2 minutes read

Leaders

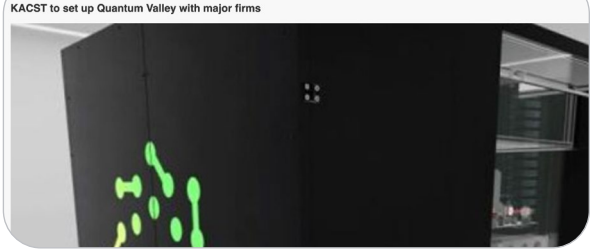
C4IR Saudi Arabia to Host Global Experts for World Quantum Day 2025

Sanaa Hasan · April 4, 2025 · 2 minutes read

TradeArabia
BUSINESS NEWS INFORMATION

& Telecommunications

KACST to set up Quantum Valley with major firms



GCC Business NEWS

Home › Events › C4IR Saudi Arabia to host event for World Quantum Day

C4IR Saudi Arabia to host event for World Quantum Day

Fri, 4 Apr, 2025 | By Arya M Nair, Official Reporter | Follow author on

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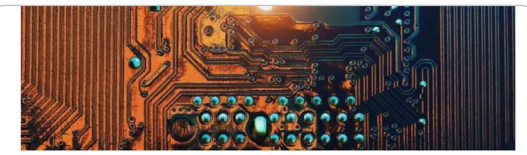
BY REFINITIV



Quantum computer concept photo. Image used for illustrative purpose. Image courtesy: Getty Images/ Wong Yu Liang
Getty Images

TECHNOLOGY

Saudi: KACST to set up Quantum Valley with major firms

OneArabia

News | Local

Saudi Arabia Establishes Quantum Valley To Launch First Quantum Computer And Recognise Top Innovators

By OneArabia
Published: Tuesday, April 15, 2025, 20:20 [GST]

The Centre for the Fourth Industrial Revolution Saudi Arabia recently wrapped up the "World Quantum Day 2025" activities. This event was organised in collaboration with King Abdulaziz City

Saudi Gazette

Saudi Arabia Launches Quantum Valley to Operate First Quantum Computer, Honors Top 10 'UpLink' Challenge Innovators

Riyadh: The Centre for the Fourth Industrial Revolution Saudi Arabia concluded the 'World Quantum Day 2025' events, which it organized in partnership with King Abdulaziz City for Science and Technology (KACST), in the presence of President of KACST and Chairman of the Centre's Board of Directors Dr. Munir bin Mahmoud El-Desouki, along with a distinguished group of experts and enthusiasts in future technologies from within and outside the Kingdom.

According to Saudi Press Agency, Senior Vice President of KACST for Research and Development Dr. Talal bin Ahmad Al-Sudairy stated that KACST is working with Aramco and the Saudi Data and Artificial Intelligence Authority (SDAIA) to establish a Quantum Valley by leveraging strategic partnerships with major quantum companies such as IBM and Pasqal to operate the first quantum computer in the Kingdom. He added, In the Kingdom, the future is not a distant dream—it is being translated in the quantum labs at KACST, discussed in the innovation centers in NEOM, and tested in the startup garage. We are working on building an ecosystem that brings together academia,

Recent Post

Custodian of the Two Holy Mosques Extends Condolences to Vietnam's President on Passing of Former Leader
May 26, 2025

Multilingual Translation and Guidance Services in Madinah Ensure Pilgrim Comfort
May 26, 2025

22 Projects Open for Feedback through 'Istitlaa' Platform
May 26, 2025

Saudi Arabia Tribune

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Social Media Impact

C4IR Saudi Arabia's WQD 2025 event generated meaningful engagement across digital platforms, amplifying the conversation around quantum innovation and its potential across society. Through curated content, live coverage, and audience interaction, the Centre elevated visibility among local and global stakeholders, reinforcing its role as a key enabler within the quantum ecosystem.

Key Highlights

6.12M
Total Impressions

The campaign achieved broad visibility, placing C4IR's message in front of millions of users across C4IR digital platforms, aided by paid media activity.

83.5K
Total Engagements

The content received high levels of interaction in terms of clicks, likes, comments, and shares, demonstrating strong audience interest and relevance.

128.5K
Livestream Views

The live event successfully captured audience attention, with thousands tuning in to follow discussions.

3.36M
Video Views

Aided by paid media, the high number of video views reflects strong content appeal with targeted audiences actively engaging with the Centre's messaging.

46h
Total Watch Time (Wrap-up Video)

Extended watch time shows viewers were engaged with the wrap-up video and found it valuable and informative.

100%
Positive Sentiment

Audience reactions and comments on C4IR posts were overwhelmingly positive, reinforcing C4IR's credibility and positioning as a trusted thought leader.

Campaign Summary

The World Quantum Day campaign marked a significant leap forward for C4IR Saudi Arabia, dramatically increasing awareness and engagement compared to the previous year. In 2024, the campaign generated just over 63,000 impressions and 10,000 engagements. In contrast, this year's effort, bolstered by a targeted paid media strategy, achieved over 6 million impressions and more than 83,000 engagements.

With high livestream viewership, strong video performance, and 100% positive sentiment, the campaign not only expanded its reach but also deepened audience connection, firmly establishing C4IR as a leading voice in the global conversation on quantum innovation.

C4IR Channels

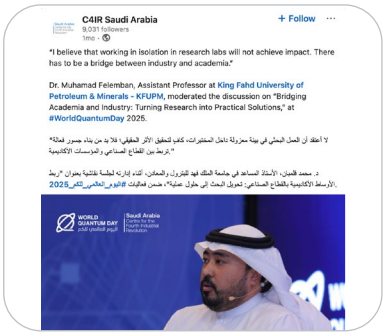
YouTube

World Quantum Day C4IR Saudi Arabia 2025

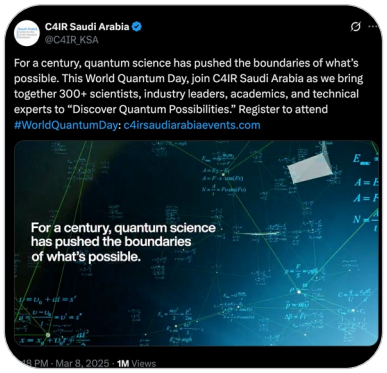
Meet the Quantum for Society Top Innovators

LinkedIn

Top Performing Posts



Top Performing Posts



Social Echo

اليوم

ARAB NEWS

KACST مدينة الملك عبدالعزيز للعلوم والتقنية

KACST مدينة الملك عبدالعزيز للعلوم والتقنية

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وزارة الاتصالات وتقنية المعلومات
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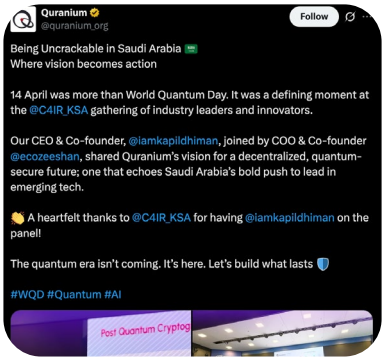

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Stay up to date on the latest projects and developments shaping the Kingdom's 4IR ecosystem

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