

KAUST SDG HIGHLIGHT REPORT 2024

KING ABDULLAH UNIVERSITY OF SCIENCE AND TECHNOLOGY



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SUSTAINABLE DEVELOPMENT GOALS

1 NO POVERTY 

2 ZERO HUNGER 

3 GOOD HEALTH AND WELL-BEING 

4 QUALITY EDUCATION 

5 GENDER EQUALITY 

6 CLEAN WATER AND SANITATION 

7 AFFORDABLE AND CLEAN ENERGY 

Science on the Spine

FOREWORD FROM THE PRESIDENT

“What I have witnessed at KAUST reaffirms the critical role that universities must play in building a resilient, equitable, and sustainable future.”

Since joining KAUST as President, I have been proud to support the University's deepening commitment to sustainability — a commitment clearly reflected in this year's SDG Highlight Report.

Through every interaction with our students, faculty, and staff, I have been inspired by the depth and breadth of sustainability efforts spanning our education, research, operations, partnerships, and outreach. By training the next generation of STEM leaders and developing technologies with real-world impact, KAUST continues to demonstrate that sustainability is more than a guiding value — it is a framework for meaningful, lasting impact.

Across every part of our campus — from advanced research labs to our residential community — there is a shared determination to help solve humanity's most pressing challenges. What I have witnessed at KAUST reaffirms the critical role that universities must play in building a resilient, equitable, and sustainable future.

This report captures the momentum of our progress and the strength of our shared vision. It highlights KAUST's contribution to national transformation and global development, while also preparing the next generation to lead with knowledge and purpose.

I invite you to explore the inspiring stories within, each a testament to what we can accomplish through shared purpose and practical action.

Sir Edward Byrne AC FMedSci

KAUST President



FOREWORD FROM THE CHIEF SUSTAINABILITY OFFICER

Sustainability is not a parallel track – it is the lens through which we approach every challenge and opportunity.

This year's report reflects what can be achieved when collective purpose meets coordinated action. It illustrates how KAUST made significant strides in consolidating sustainability efforts across education, research, operations, and community engagement. These efforts reflect an increasingly unified approach to sustainability across our University, guided by shared priorities and a strong sense of responsibility toward both national transformation and global dialogues.

Building on the institutional momentum established by the launch of KAUST's Accelerating Impact Strategy, 2024 marked a year where we focused on further aligning sustainability across the institution. This alignment has laid the groundwork for our next major step: the development and implementation of comprehensive Sustainability and Climate Action Plans that will bring greater structure and direction to our collective efforts moving forward. In the meantime, this report is a reflection of the progress already made, and a preview of greater commitments lying ahead.

Those commitments, however, will extend beyond the institutional level. We envision a broader movement where universities across the Kingdom, and the world, stand together to lead on sustainability in our society. This leadership goes beyond curriculum and operations. It is about instilling a systems-thinking mindset and a deeper understanding of how scientific knowledge can serve society, preparing our students to contribute meaningfully beyond the lab, across disciplines, sectors, and spheres of impact.

Sustainability is not a parallel track or an isolated domain – it is the lens through which we approach every challenge and opportunity. And it is through that lens that I hope we continue to move forward, together.

Dr. Ana Margarida Costa

Chief Sustainability Officer
Professor of Practice of Sustainability





KAUST SUSTAINABILITY VISION

The Earth is being damaged by climate change and other human impacts at a rate unprecedented in history, threatening the well-being of present and future societies. At KAUST, sustainability is at the core of our education, research, innovation, and operation, helping us to catalyze and realize the urgent solutions and actions needed to reverse these changes, contributing to human prosperity and development in the Kingdom and the world.

We aim to be a global model for resource circularity and a technoscientific leader in the protection and restoration of the land and coastal environment on which KAUST is established.

We exist to nurture the people and the solutions that will help sustain our planet.

INTRODUCTION

KAUST continues to place sustainability at the heart of its mission, driving education, research and innovation to address some of the world's most pressing challenges. Our alignment with the United Nations 2030 Agenda for Sustainable Development and Saudi Arabia's Vision 2030 has grown deeper each year, as we embed sustainable development into every layer of the institution, from advanced research and deliberately-designed education, to operational excellence and meaningful engagement.

Our commitment remains both global and local as we participate in high-level dialogues such as the 16th Conference of the Parties (COP16) to the UN Convention to Combat Desertification (UNCCD) and the 19th Conference of the Parties (COP19) to the UN Framework Convention on Climate Change (UNFCCC), lead impactful projects shaping Saudi Arabia's transformation, such as the KAUST Coral Restoration Initiative and the Algal Biotechnology and Aquaculture Center, and work towards measurable sustainability goals across our campus operations. Guided by our Sustainability Policy, and an upcoming Climate Action Plan, we will continue to align our institutional efforts with the urgency of the global climate and development agenda. Reinforcing our academic and research excellence, KAUST was ranked the top University in the Arab region in the THE Arab University Rankings for the second consecutive year, and had 14 faculty members named in the 2024 Clarivate Highly Cited Researchers list, representing 61% of all such researchers in Saudi Arabia. These recognitions underscore KAUST's continued role as a leading higher education institution in the Kingdom and the region.

This year's SDG Highlight Report reflects KAUST's expanding efforts to transform sustainability from aspiration to action across research & education, operations, and engagement & outreach. To elevate this impact, the 2024 edition introduces a new "Accelerating Impact" section for each Sustainable Development Goal (SDG). This feature highlights flagship projects, initiatives or contributions that strongly impact the agenda of each SDG for the Kingdom and beyond, demonstrating KAUST's growing role as a solutions-driven institution working at the nexus of science, policy, and real-world application.

Also new this year, we introduce the voices of our students. In each section, we feature a quote from a student champion whose academic work, leadership, or community contribution embodies our institutional commitment to sustainable development. Their perspectives personify our collective efforts and show that future changemakers are already driving impact from within our community.

As we recognize and commemorate only a glimpse of the efforts and impact of KAUST and its people in this short report, we hope these highlights strengthen our culture of innovation, collaboration, and education. We also hope readers use this report as a starting point to reflect on their individual contributions to this shared mission in a time where everyone is requested to act in safeguarding our planet and its people.

OUR NEW CENTERS OF EXCELLENCE

As part of its Accelerating Impact strategy—advancing research and innovation in alignment with Saudi Vision 2030 and the Kingdom’s new Research, Development, and Innovation (RDI) priorities—KAUST has established four new strategic Centers of Excellence. While each center spearheads a distinct priority area in environmental sustainability and essential needs, health and wellness, renewable energy, or food security, they collectively reflect both the diversity and interconnectedness of global challenges. By leveraging interdisciplinary research, strategic partnerships, and cutting-edge innovation, the centers aim to address multiple sustainable development targets, creating powerful avenues for co-advancing the national and global sustainable development agenda.

The new Centers of Excellence embody KAUST’s mission to transition research into impactful solutions, empowering talent, and fostering innovation and collaboration to create a more sustainable future for Saudi Arabia and the world.

Discover more about these Centers of Excellence and their contributions to sustainability throughout this report.



“The KAUST Center of Excellence for Generative AI (GenAI) supports the Sustainable Development Goals by...

...addressing the scientific, technical, developmental, and upskilling challenges impeding the full unlocking of GenAI potential and adoption in KSA and the world. Through core GenAI advancements and their applications to the four national RDI pillars of the Kingdom, the center will quickly unlock unprecedented innovation, talent, and market value.”

- Professor Bernard Ghanem, Chair



“The KAUST Center of Excellence for Renewable Energy and Storage Technologies (CREST) supports the Sustainable Development Goals by...

...pioneering the development of renewable energy and storage solutions. These innovations are crucial for decarbonizing our energy systems, thereby mitigating greenhouse gas emissions and safeguarding against rising global temperatures. Our work actively contributes to the Kingdom’s and the world’s pursuit of a resilient and sustainable future.”

- Professor Husam Alshareef, Chair



“The KAUST Center of Excellence for Smart Health (KCSH) supports the Sustainable Development Goals by...

...driving innovative smart-health solutions through the integration of cutting-edge technologies and biology-focused research. Aligned with Saudi Vision 2030, and through strategic national and international partnerships, we aim to promote healthcare accessibility and equity, improve health outcomes, and contribute to sustainable and resilient communities in Saudi Arabia and beyond.”

- Professor Imed Gallouzi, Chair



“The KAUST Center of Excellence for Sustainable Food Security supports the Sustainable Development Goals by...

...addressing systemic challenges within global food systems. The food sector has, arguably, the highest environmental footprint of any sector, using 70% of all freshwater, half of habitable land, and ranking as the second largest emitter of greenhouse gases. Increasing the sustainability of this sector is therefore essential for any program aiming to increase sustainability, and this is the aim of the Center of Excellence for Sustainable Food Security.”

- Professor Mark Tester, Chair





GENERATIVE AI

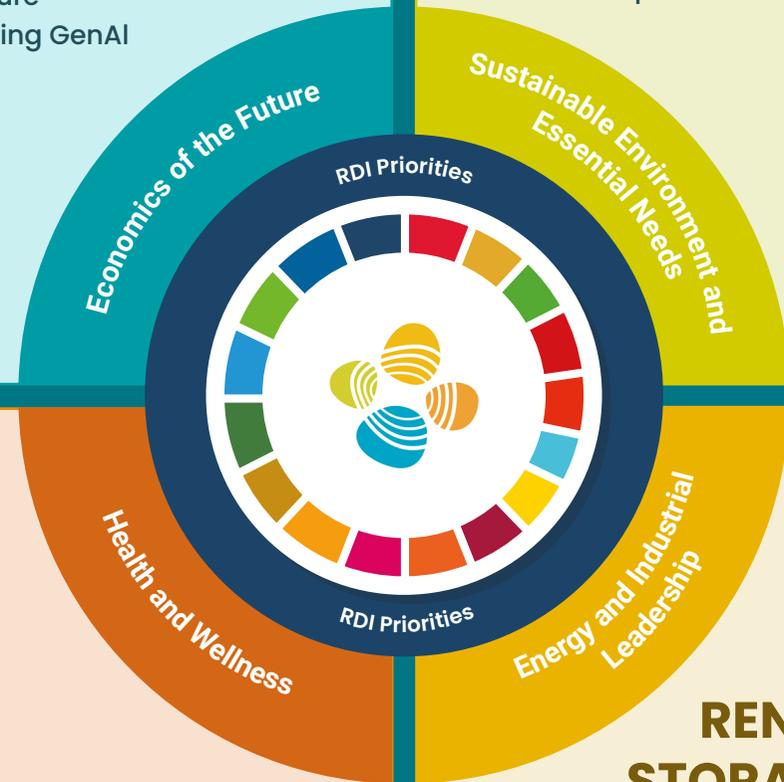
- GenAI Factory
- Applications for Health & Wellness
- Applications for Sustainability & Essential Needs
- Applications for Energy & Industrial Leadership
- Applications for Economies of the Future
- Accelerating GenAI Adoption



SUSTAINABLE FOOD SECURITY



- Increase Resource Use Efficiency
- Crops for the Future
- Sustainable Biosystems
- Capacity Development



SMART HEALTH

- One Health
- Healthy Aging & Regenerative Technologies
- Smart Diagnostic & Sensing Technologies
- Bioinformatics & Computational Biology



RENEWABLE ENERGY & STORAGE TECHNOLOGIES



- Advanced Photovoltaics
- New Battery Chemistries
- Lithium Extraction & Battery Recycling
- Advanced Cooling Technologies
- Testing, Modeling & Integration
- Energy Storage in Chemical Fuels & Electricity Generation



End poverty in all its forms everywhere

focuses on “virtual backhaul” technologies, which utilize alternative methods, such as satellite links and microwave radio relays, to connect local networks to the main internet infrastructure. This approach is particularly beneficial for rural and remote areas, low-income neighborhoods, and regions where natural disasters have damaged traditional communication lines. By implementing these virtual backhaul solutions, communities can maintain essential communication services, which are crucial for daily life, economic development, and emergency response.

the study highlights the role of family planning in reducing economic vulnerability, enabling women to better manage resources and improve household stability, contributing to long-term poverty alleviation and healthier communities.



“I hope to support KAUST’s contribution to SDG 1

by continuing to work on bridging the digital divide. Our team aims to leverage advanced wireless technologies and infrastructure – such as free-space optical communications and non-terrestrial networks – to enable solutions like remote education and smart agriculture, creating opportunities to empower underserved communities.”

– Hao Lin, Ph.D. Student in Electrical and Computer Engineering, CEMSE

RESEARCH & EDUCATION

Targeting Malaria in Low-Income Regions

A KAUST faculty member participated in a [study examining the persistence of malaria in a sub-Saharan African country](#), with a focus on eradication efforts in low-income communities. The research explored different strategies for understanding and controlling malaria, a disease that disproportionately affects impoverished populations, trapping them in cycles of poor health and economic hardship. By advancing knowledge in the disease distribution in Rwanda, the study emphasized the importance of innovative, climate adaptive, gender-, age- and district-specific malaria control strategies to improve health outcomes in underprivileged communities.

Improving Connectivity Resilience in Vulnerable Regions

KAUST researchers conducted a study on potential [alternatives for providing reliable wireless communication in regions that suffer from a lack of fiber optic-connectivity](#). The study

Understanding the Impact of Climate Disasters on Economic Inequality

Evaluating the long-term economic consequences of extreme climate events, a KAUST researcher led a study focusing on [how disasters such as Mongolia’s severe winter dzud – an extreme cold weather event – worsen financial disparities among herding communities](#). The study found that these climate-induced shocks disproportionately impact lower-income herders, making it harder for them to recover, and increasing economic inequality over time. By highlighting these vulnerabilities, the research emphasizes the urgent need for policies that enhance resilience, provide targeted financial support, and promote sustainable livelihood strategies.

Enhancing Health Equity through Family Planning

A KAUST faculty member was part of a [study on modern contraceptive use among Ethiopian women](#). The study found that only 44.2% of women in need utilized modern contraception, with significant regional disparities. Access to health facilities and socioeconomic status were key factors influencing usage. By raising awareness on these challenges,



OPERATIONS

Promoting Access to Graduate Education

KAUST continues to uphold its commitment to educational equity by offering [fully funded graduate programs](#) to most of its students based solely on academic merit. This approach ensures that students from all socio-economic backgrounds can benefit from KAUST’s academic and research opportunities. The University’s fellowship includes paid tuition, campus housing, an annual living allowance, health insurance, relocation and travel support, and free access to recreation and sports centers. Additionally, the program covers legal expenses for students and their dependents to reside in Saudi Arabia, creating an inclusive and supportive environment for our diverse and talented student body.



Sponsored Graduate Education



Sharing Blessings with Families in Need

The University's [Share the Blessings](#) campaign exemplifies its commitment to addressing local needs through meaningful partnerships. For the 2024 campaign, KAUST partnered with the Albir Thuwal Charitable Society, a recognized nonprofit institution dedicated to supporting underprivileged families in the neighboring community of Thuwal and surrounding areas. Established to promote social solidarity and alleviate hardship, Albir provides a range of essential services including material aid, monthly food baskets, educational assistance, and support for orphans and widows. The society also offers vocational training and employment services to help beneficiaries build self-reliance and economic resilience.



Celebrating the spirit of generosity during the holy month of Ramadan, the Share the Blessings campaign mobilized financial contributions and community support to advance Albir's mission. As a result, 428 registered families were supported—reinforcing KAUST's role in fostering inclusive development and promoting long-term local well-being through stronger ties with neighboring communities.

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Extending Access to Affordable Goods through Reuse

The [Second Chance Thrift Shop](#) is a prime example of a community-driven approach to fair access to household and personal items and circularity. Established in 2021,

this volunteer-led club promotes affordable access to everyday items—such as clothing, toys, books, homeware, and electronics—at symbolic prices. Many items are also distributed free of charge to those in need, ensuring that reuse remains inclusive and accessible to all. In addition to reducing landfill waste, the shop reinvests all proceeds into charitable causes, reinforcing its commitment to equity and shared prosperity. By combining environmental awareness with social solidarity, the shop has become a treasured hub for community empowerment and sustainable living.

Second Chance Thrift Shop



ENGAGEMENT & OUTREACH

Exposing Youth to the Role of Sustainable Farming in Securing Livelihoods

At the 16th Conference of the Parties (COP16) to the UN Convention to Combat Desertification (UNCCD), [a student group from The KAUST School \(TKS\) reviewed a scientific article written by KAUST researchers](#). As part of a live event dedicated to youth engagement, TKS students aged 11-14 participated on an engaging discussion on how agriculture serves as a crucial pathway out of poverty, particularly in Sub-Saharan Africa, and how research on suicidal germination of parasitic weeds can help farmers improve their livelihoods. The discussion, featuring representatives from the United Nations Development Programme and international publisher Frontiers for Young



Minds, engaged the audience by conveying the message that improving crop yields and protecting food sources strengthen rural economies and enhance financial stability for smallholder farmers. Opportunities like these nurture scientific curiosity and empower young students to understand economic inequality challenges and the role of science in alleviating them.

Harvesting Hope

For more than a decade, KAUST researchers have been studying *Striga hermonthica*, or witchweed, a parasitic weed devastating 40% of arable land in Sub-Saharan Africa, causing up to 100% crop losses and \$7 billion in annual economic damage. Supported by philanthropic and KAUST multi-phase funding from 2015 to 2030, groundbreaking work in suicidal germination technology has shown promising results in depleting Striga seed banks in multiple field trials. Currently, the technology is expected to move from validation to large-scale deployment by focusing on translating these breakthroughs into affordable, scalable products for the communities that need them. By accelerating access to sustainable solutions, KAUST hopes to empower smallholder farmers, restore harvests, and support the building of long-term economic resilience—offering a real path toward food security and poverty reduction.



ACCELERATING IMPACT



End hunger, achieve food security and improved nutrition and promote sustainable agriculture

disease resistance, and environmental adaptability. These discoveries provide breeders with essential genetic tools to develop more resilient and high-performing barley varieties. The study contributes to sustainable agriculture and global food security, ensuring that barley crops—a staple in many regions—remain resilient under diverse and changing environmental conditions.

Strengthening Food Security with Stress-Resilient Crops

Researchers from KAUST have [developed an innovative method to create more resilient tomato rootstocks](#), enhancing crop adaptability to environmental and biological stressors. The patented approach enables the production of hybrid allotetraploid tomato plants — plants with twice the usual number of chromosomes, inherited from two or more distinct species. This genetic combination enhances vigor, adaptability, and resilience, making crops more productive and stress-tolerant.



By combining desirable traits from multiple species, researchers were able to improve resistance to drought, heat, salinity, pests, and diseases. By advancing sustainable agriculture, this technique supports food security in arid regions and strengthens the resilience of global agricultural systems.



“I hope to support KAUST’s contribution to SDG 2

by advancing the integration of Direct Air Capture (DAC) technology with greenhouse crop production, providing a sustainable and cost-effective CO₂ enrichment strategy to enhance food production and support resilient agricultural systems.”

– **Zulma Reyes, Ph.D. student in Bioengineering, BESE**

OPERATIONS

Transforming Arid Land into Living Laboratories

The [Wadi Qudaid Experiment Station](#) was established by KAUST in collaboration with the National Center for Vegetation Cover Development and Combating Desertification (NCVC). Spanning 10 hectares within Wadi Qudaid National Park in Makkah Region, the station serves as a platform for translational research and capacity building to advance sustainable agriculture, water management, and ecological restoration in Saudi Arabia and other arid environments. Since Phase 1 operations began, in October, the station has launched multiple field and shadehouse trials, led by KAUST faculty, spinout companies, and local and international agri-tech collaborators. These projects feature a wide range of innovations but share the common goal of enabling sustainable agriculture and revegetation in desert regions.



NCVC Projects

6

Ongoing Field & Shadehouse Trials

3

R&D Projects In The Pipeline Involving Electric Tractors, Desalination & Agrivoltaic Systems

Driving Sustainable Aquaculture in the Red Sea

As a key partner in Saudi Arabia’s [Aquaculture Development Program \(ADP\)](#), KAUST hosted the [sixth International Saudi Aquaculture Development Workshop](#) in collaboration with the Ministry of Environment, Water, and Agriculture (MEWA). The event brought together government, industry and research leaders to discuss advances in sustainable fish farming, including new fish feed formulations, and successful production of key fish species under Red Sea



RESEARCH & EDUCATION

Advancing Wheat Breeding through Genetic Diversity

Wheat’s natural genetic diversity holds the key to breeding more resilient and productive crops. A KAUST faculty member contributed to a study [analyzing over 800 wheat genomes from diverse varieties](#) to identify key genetic traits linked to yield, disease resistance, and nutritional quality. These discoveries provide valuable insights for breeders to develop more robust wheat varieties, better suited to diverse environmental conditions. The research highlights the value of preserving and utilizing genetic diversity to meet the growing demand for sustainable and resilient agricultural systems.

Enhancing Barley Breeding through Genetic Innovation

A global team of 66 researchers from 12 different countries, including a KAUST faculty member, has [constructed a comprehensive barley pangenome](#) by sequencing 76 wild and domesticated barley varieties, revealing new insights into the crop’s genetic diversity. Their extensive analysis uncovered key structural variations that influence yield,

conditions. As Saudi Arabia expands its aquaculture sector, KAUST reaffirmed its critical role in developing science-based solutions, strengthening its infrastructure and operations to support national food security goals. With ADP aiming to produce 530,000 tons of seafood annually by 2030—reducing reliance on imports and supporting local fishing communities—the workshop served as a key convening platform, driving progress in both national and international aquaculture sectors.

ENGAGEMENT & OUTREACH

Leveraging Biotechnology for Resilient Agriculture

At the 16th Conference of the Parties (COP16) to the UN Convention to Combat Desertification (UNCCD), KAUST announced a partnership with the National Livestock and Fisheries Development Program (NLFDP) and the National Research and Development Center for Sustainable Agriculture (Estidamah) to develop algae-based biostimulants.



These biostimulants are designed to improve soil health and support agricultural productivity, particularly in arid environments. By leveraging biotechnological innovations, this collaboration seeks practical solutions to enhance sustainable farming practices, reflecting a collective effort to address agricultural challenges while contributing to improved soil management and resource efficiency in the region.

Did You Know?

KAUST is a signatory of the Food Systems Call to Action from the UNFCCC Climate Champions, which supports global efforts to make food systems more **resilient and sustainable** in response to **climate change**.



Joining Forces for Agrifood Innovation

KAUST has joined the Saudi Agrifood Tech Alliance, a partnership focused on advancing innovation and technology in the agrifood sector. Integrating over 40 leading institutions from the public and private sectors, research and academia, and nonprofit organizations, the alliance aims to address challenges related to food security, sustainability, and agricultural productivity. KAUST will bring its expertise in research and biotechnology to support the development of practical solutions for improving food systems, address challenges, create new economic opportunities, and effectively contribute to the future sustainability of agriculture and food in Saudi Arabia.



Calling for Land Restoration and Sustainable Food Systems

In collaboration with partner Aeon Collective, KAUST has issued a global call for prioritizing land restoration and sustainable food systems to address climate change and biodiversity loss. *The policy paper Bending the Curve: A Call to Action on Land Restoration and Sustainability*, co-authored by KAUST experts, was launched at the UNCCD COP16. The document proposes a comprehensive framework to halve degraded land by 2050, emphasizing the importance of reversing land degradation, which exacerbates climate change, food insecurity, and water scarcity. Key recommendations included strengthening international cooperation, leveraging technology, empowering local communities, and promoting sustainable agriculture.

Inspiring Youth Innovation for Sustainable Food Systems

In support of the KAUST School (TKS) curricula, the Office of Sustainability delivered an interactive presentation to support Grade 9 students on a class project on how to build sustainable food businesses. The session explored environmental impacts across the food value chain—highlighting the role of packaging, waste reduction,

and ingredient sourcing. Students were introduced to novel and alternative foods, including insect-based proteins, plant-based meats, and mycelium-based products, alongside local ingredient innovation and biodegradable packaging solutions. The engagement supported students in designing their own sustainable food or beverage products for a community food festival, fostering youth-led ideas rooted in sustainable production practices and responsible consumption. The activity aimed to raise awareness on national and global efforts to enhance food system sustainability and reduce the environmental footprint of foods.

Cultivating Excellence

Global food production in arid and saline regions faces critical challenges, with 45% of the Middle East's cropland affected by salinity and desertification, and 67% of freshwater resources in Saudi Arabia being used for agriculture. To tackle these threats, KAUST has launched the Center of Excellence for Sustainable Food Security, a research-driven initiative focused on developing climate-resilient crops, resource-efficient biosystems, and innovative farming practices. The center serves as a bridge between scientific research and industry, translating discoveries into practical, scalable solutions. Aligned with the Kingdom's Research, Development, and Innovation priorities, it contributes to the national goal of achieving >50% food self-sufficiency by 2040. By advancing sustainable agricultural technologies, the center will enhance food security, strengthen local farming communities, and support long-term resilience in Saudi Arabia's agricultural sector.

Research and Translation Areas



Increase Resource Use Efficiency



Crops of the Future



Sustainable Biosystems



Capacity Development



Ensure healthy lives and promote well-being for all at all ages

Forecasting Health Trends for Informed Policy Action

KAUST researchers contributed to a [comprehensive analysis projecting global health trends from 2022 to 2050](#). The study provides insights into disease burden shifts, forecasting improvements in life expectancy and a growing emphasis on managing non-communicable diseases like diabetes and heart disease. By modeling alternative scenarios, the analysis highlights the potential health benefits of eliminating key risk factors, aligning with equitable health advancements. This work also highlights the importance of continued investment, planning, and prioritization in preventative care and health systems strengthening globally, reinforcing the need for resilient healthcare frameworks that ensure access to essential services for all.



"I hope to support KAUST's contribution to SDG 3

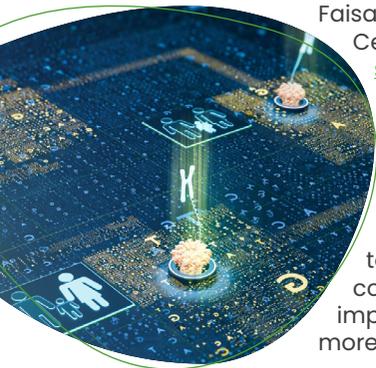
by promoting that it is possible to pursue research with passion while staying active and maintaining a healthy lifestyle—and how this actually enhances mental capabilities and overall well-being."

- Elisa Grassi, Ph.D. student in Bioengineering, BESE

RESEARCH & EDUCATION

Advancing Genetic Diagnostics through Innovative Sequencing

A new approach to gene sequencing is transforming the detection of genetic mutations in patients with rare Mendelian diseases. Developed through a collaboration between KAUST researchers and the King Faisal Specialist Hospital and Research Centre (KFSHRC), the [NanoRanger system](#) offers deeper insights into genetic abnormalities that were previously undetectable. This innovation has the potential to enhance genetic diagnostics in Saudi Arabia and beyond, offering a powerful tool for patient care and genetic counseling, contributing to improved disease prevention and more effective medical interventions.



Did You Know?



KAUST, in collaboration with Alfaisal University, is now offering Saudi Arabia's first-ever MD-Ph.D. program, shaping the next generation of physician-scientists.

Monitoring Urban Air Quality with AI-Driven Approaches

A study led by KAUST introduced a more efficient [way to identify sources of urban air pollution using AI](#) and statistical modeling. The research combines a method called Bayesian inference, which helps estimate unknown pollution sources, with a powerful AI-based technique to improve accuracy. By integrating a two-step Markov Chain Monte Carlo (MCMC) approach—used to analyze complex data patterns—with a deep learning model that simplifies calculations, this approach significantly reduces the time and computing power needed to track pollution in cities. This advancement enables a more timely identification of emission locations and intensities, facilitating targeted interventions to improve urban air quality. By enhancing air pollution monitoring and response, this research supports efforts to reduce exposure to harmful pollutants and mitigate their impact on respiratory and cardiovascular health.

OPERATIONS

Safeguarding Microbial Diversity for One Health

Hosted by the Center of Excellence for Smart Health, the [KAUST Microbial Vault](#) is a state-of-the-art biobank preserving the microbial richness of Saudi Arabia's extreme environments under the One Health framework—recognizing the interconnection between human, environmental, and animal health. With more than 2,600 microbial strains isolated from diverse ecosystems, the KAUST Vault ensures the long-term conservation of microbial biodiversity essential for human and environmental health in line with international efforts, such as the global Microbiota Vault project. As microbial ecosystems play a critical role in disease prevention, climate adaptation, and ecosystem balance, this Vault helps advance research at the intersection of human and planetary health.

Enhancing Health Research Infrastructure with Multi-Omics Integration

[KAUST's partnership with Oxford Nanopore Technologies](#) marks a transformative step in health research. Building on its existing sequencing capabilities, KAUST has expanded its genomics infrastructure by integrating



cutting-edge nanopore technology, providing researchers with next-generation tools for high-throughput genetic analysis. The integration of multi-omics technologies within KAUST's Core Labs research facilities enables more precise investigations into genetic variants and rare diseases. By investing in advanced sequencing capabilities, KAUST is strengthening its position as a leader in biomedical research, fostering operational excellence, and accelerating discoveries that drive global health advancements.

Ensuring Workplace Safety and Community Well-Being

KAUST is committed to ensuring workplace safety and community well-being through proactive operational measures. [To safeguard outdoor workers](#) from extreme summer heat, the University has implemented key protections, including adjusted work schedules, hydration stations, protective gear, and heat stress training, aligning with international occupational safety standards. Simultaneously, KAUST Health has resumed [Saturday Clinics](#), expanding access to medical services and accommodating the growing demand for weekend appointments. These initiatives reinforce a commitment to health, safety, and accessibility, fostering a resilient and well-supported community.

ENGAGEMENT & OUTREACH

Nurturing Well-Being at KAUST

In celebration of [World Mental Health Day](#), KAUST hosted a series of workshops, discussions, and wellness activities to promote mental well-being across the community.

With a focus on prioritizing mental health in the workplace, this week-long event featured sessions such as yoga, communication workshops, and panel discussions, fostering open conversations and promoting personal growth. This event highlights the importance of prioritizing mental



health and well-being for a happier, more productive, and meaningfully connected community.

Running for Breast Cancer Awareness

Each year, KAUST organizes the [Breast Cancer Awareness Month](#) as a key engagement initiative to promote health awareness. In collaboration with the International Medical Center (IMC) and the Thuwal Clinic, KAUST Health provided free screenings for women over 40 and those at high risk, ensuring access to free preventive care. These screenings aimed to detect breast cancer in its early stages, when survival rates are significantly higher. The month-long celebration also included the Run for a Cure community race, where part of the gathered proceeds were donated to the Zahra Breast Cancer Association to further their efforts in supporting breast cancer patients. Through this initiative, KAUST reinforces its commitment to the global fight against breast cancer, supporting efforts to reduce mortality through early intervention.



Breast Cancer Awareness Month



Addressing Air Quality and Health Risks from Land Degradation

Co-organized by KAUST and AEON Collective at the 16th Conference of the Parties (COP16) to the UN Convention to Combat Desertification (UNCCD), [a panel discussion examined the critical links between land degradation and declining air quality](#), highlighting the resulting public health risks in the Arabian Peninsula. Participating experts—including KAUST faculty, researchers, and government specialists—highlighted how environmental

degradation contributes to respiratory and cardiovascular diseases. The discussion underscored the urgency of integrated approaches that address both land restoration and air pollution mitigation to reduce disease burdens and protect vulnerable populations across the region.



Redefining Smart Health

Aging populations, emerging infections, and chronic diseases pose ongoing global health challenges. By 2050, the number of people aged 65 and older is projected to reach 1.6 billion. In the Middle East, infections affect 28.3% of acute-care hospital patients, while in Saudi Arabia, noncommunicable diseases account for 35% of all deaths. To help the Kingdom address these urgent health challenges, KAUST has established the [Center of Excellence for Smart Health \(KCSH\)](#), integrating AI, machine learning, and bioinformatics to drive advancements in personalized medicine and disease prevention. Collaborations with national hospitals and government agencies ensure that innovative research is translated into practical clinical solutions, enhancing diagnostics, treatment, and healthcare resilience. Through this data-driven, technology-focused approach, KAUST strengthens healthcare resilience to meet the evolving needs of Saudi Arabia and the global community.

Research and Translation Areas



ACCELERATING IMPACT



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

research impact, with 14 faculty members recognized on the [Clarivate Highly Cited Researchers](#) list of 2024. Representing 61% of all highly cited researchers in Saudi Arabia, this achievement highlights KAUST's global research impact and commitment to advancing knowledge. With 7% of KAUST's faculty featured on this prestigious list, the University stands alongside world-leading institutions, reinforcing its reputation as a hub for groundbreaking research and innovation.

Celebrating a Milestone in Saudi Graduates

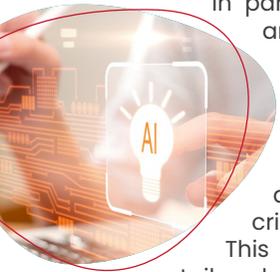
2024 marked KAUST's 15th Commencement ceremony, where a historic milestone was achieved with the [highest number of Saudi graduates in the University's history](#). Saudi students comprised 44% of the graduating class (203 out of 465), including a record-breaking 108 Saudi women, reflecting a 29% increase from the previous year. This achievement underscores KAUST's commitment to expanding educational opportunities for national talent, equipping graduates with advanced research skills that drive Saudi Arabia's transition to a knowledge-based economy.



RESEARCH & EDUCATION

Developing AI-Powered Personalized Learning

KAUST is [developing AI-driven tools for K-12 education](#) in partnership with the Ministry of Education and the Saudi Data and AI Authority (SDAIA). This initiative aims to create an interactive tutoring system that provides personalized learning experiences for school students. By engaging learners in dynamic dialogues, the AI adapts questions and responses to encourage critical thinking and deeper comprehension. This approach leverages generative AI to tailor learning pathways, making education more accessible and responsive to individual student needs. By incorporating advanced technology into early education, KAUST is supporting the development of more adaptive and student-centered learning environments.



Advancing Research Excellence in the Middle East

Continuing to set the benchmark for research excellence in the Middle East, KAUST is leading the region in

OPERATIONS

Driving Education through Multidisciplinary Graduate Programs

Graduate education at KAUST is designed to provide students with a diverse and multidisciplinary curriculum, combining advanced coursework with hands-on learning experiences. [Through specialized programs within three academic divisions](#)—Biological and Environmental Science and Engineering (BESE); Computer, Electrical Science and Engineering (CEMSE); and Physical Science and Engineering (PSE)—students engage in real-world problem solving alongside leading academics. The opportunity to be exposed to current topics across different fields, learn cutting-edge research techniques, operate state-of-the-art equipment, and collaborate across disciplines equips graduates with both theoretical expertise and practical skills, preparing them to contribute to scientific innovation and knowledge advancements in their fields.

KAUST Graduate Education



Facilitating International Exchange with Fulbright

[KAUST partners with the Fulbright Program](#) to promote academic exchange and provide STEM graduate opportunities for students from the United States. Through the Fulbright/KAUST Graduate Award, scholars gain access to world-class research at KAUST, fostering cross-cultural collaboration and engagement with international faculty and researchers. KAUST invests in its students by offering the KAUST Fellowship to Fulbright scholars, covering full tuition, on-campus housing, round-trip airfare, routine medical coverage within Saudi Arabia, and a monthly stipend. Each year, up to five Fulbright scholars are selected for Master's degree programs, contributing to research excellence.



"I hope to support KAUST's contribution to SDG 4

by fostering an engaging and inclusive learning environment as a Teaching Assistant. Through mentorship and academic guidance, I strive to inspire students to develop a deep passion for their research, encouraging curiosity and critical thinking as essential tools for their personal, academic, and professional growth."

- Otávio Bertozzi, Ph.D. student in Electrical and Computer Engineering, CEMSE

Achieving Top Rank in Arab University Ranking

For the second consecutive year, KAUST has been ranked as the [top University in the Arab region in the Times Higher Education \(THE\) Arab University Rankings](#), reflecting its excellence in education, research, and innovation. The ranking result highlights the University's dedication to advancing knowledge and fostering an inclusive, world-class academic environment. It also cements KAUST's role as a national and regional leader in higher education, driving impactful research and supporting the development of future global leaders.

2024 KAUST Academic Highlights



ENGAGEMENT & OUTREACH

Supporting Student Learning through the KEY Tutoring Program

The [KEY Tutoring Program](#), ongoing since 2021, provides school students in the KAUST community with the opportunity to receive academic support from graduate students and University staff experts. Open to all school students, including those outside The KAUST School (TKS), the program offers tutoring in different topics, including math and science, fostering deeper learning and skill development. Through a dedicated platform, KAUST staff and graduate students can train as tutors, gaining valuable teaching experience while contributing to the academic growth of younger learners. By creating an interactive, knowledge-sharing environment, the program enhances education accessibility and mentorship, strengthening the bridge between University expertise and school-level learning.

Tutoring Program



Enriching Learning through Interdisciplinary Exploration

The Winter Enrichment Program (WEP) 2024, themed "[Digital Adventure – Ride to the Future](#)," provided KAUST students and the broader community with a unique opportunity to explore the intersection of AI with health, the environment, energy, and economics. Designed as an immersive academic experience, WEP breaks away from conventional learning formats, offering a two-week journey where students engage with innovators, industry leaders, and academic experts through lectures, panel discussions, and hands-on workshops. As a required part of all graduate programs, WEP allows students to fulfill an academic milestone in a dynamic and multidisciplinary setting, driving critical thinking and cross-disciplinary collaboration. Since its launch in 2009, KAUST Enrichment Programs have hosted over 1,500 speakers and inspired more than one million attendees, reinforcing the University's commitment to innovation-driven education.



Building National Leadership Capacity

KAUST [welcomed the 10th cohort of the Saudi Leadership Institute \(KSLI\)](#), with 40 additional academic leaders from Saudi universities and the Ministry of Education for a five-day program. Organized by Strategic National Advancement (SNA), the initiative included academic seminars, one-on-one coaching, and collaborative opportunities aimed at enhancing leadership skills and

fostering professional growth. The program featured a partnership with Arizona State University's Thunderbird Executive Education to deliver insights on transformational change. Since its inception in 2010, KSLI has supported the development of over 650 alumni, contributing to leadership advancement across the Kingdom.



Empowering Future Leaders



In an era of rapid technological transformation, continuous learning and skills development are essential for economic growth and workforce adaptability. In Saudi Arabia, approximately 67% of employees recognize that upskilling will enhance their job performance in the next five years, highlighting an urgent need for targeted educational programs. [KAUST Academy](#) is redefining professional and technical education in the Kingdom by partnering with leading global institutions, offering specialized master's tracks and professional upskilling programs, ensuring alignment with Saudi Arabia's knowledge-based economy. Through tailored curricula and hands-on learning experiences, the Academy leverages KAUST talent to equip professionals, students, and industry leaders with the competencies needed to drive economic diversification and sustainable development. By cultivating a workforce that is future-ready, KAUST Academy is not only strengthening Saudi Arabia's human capital but also contributing to global education frameworks that prioritize accessibility and lifelong learning.



Achieve gender equality and empower all women and girls

security, revealing how limited water access and high water stress disproportionately impact women. The research highlights how women, particularly in rural Africa and Asia, bear the burden of water collection, affecting their education, health, and economic opportunities. With climate change and migration patterns further intensifying these inequalities, the study highlights the need for policies that integrate gender and water security solutions, emphasizing their critical role in advancing both gender equality and sustainable water access worldwide.



"I hope to support KAUST's contribution to SDG 5

by leading the WISER (Women in Science & Engineering Research) student group in fostering an inclusive and supportive environment for women in STEM. Through networking events and discussions with inspiring female leaders, we aim to empower students and promote gender equality within the scientific community."

- Damaris Alvarez, Ph.D. student in Environmental Science and Engineering, BESE

Celebrating Outstanding Women in Innovation and Impact

Female faculty members, researchers, graduate students, and alumnae from KAUST continue to receive numerous accolades for their outstanding contributions to science, innovation, and sustainability. Through international awards, regional honors, or as national champions, these women have advanced knowledge and developed solutions to pressing global challenges. These achievements are a testimony of the University's commitment to empowering women in science and fostering an inclusive environment that supports excellence in research and innovation, contributing to sustainable development worldwide.



RESEARCH & EDUCATION

Empowering Women for Leadership in Energy Transition

Recognizing the underrepresentation of women in the energy sector, KAUST's Energy Transition Specialization (WE Spark) is designed specifically for Saudi women to hone the skills needed to thrive in the energy field. The multi-step training program provides women enrolled, or recently graduated from Saudi universities, with specialized knowledge in renewable energy, energy storage, hydrogen technologies, and carbon capture solutions. Structured to instill competitiveness in a male-dominated industry, the program enables participants to advance through four stages, earning certificates based on performance. Top participants gain exclusive access to the KAUST Academy Summer Program, offering further hands-on learning and industry exposure. By closing gender gaps in rapidly evolving industries, KAUST equips women with the skills and opportunities needed to take on leadership roles in key societal sectors.

Exploring Gender Inequality in Water Security

A study led by a KAUST faculty member presented the first global assessment of gender disparities in water

2024 NOTABLE RECOGNITIONS



Leena Ibrahim
Assistant Professor, Bioscience

Recipient of the L'Oréal-UNESCO For Women in Science award for her research on neural circuits and sensory processing.



Taiba Alamoudi
Ph.D. Student, Marine Science

Recipient of the L'Oréal-UNESCO For Women in Science award for her work on the role of macroalgae in coral health and climate resilience.



Raquel Peixoto
Associate Professor, Marine Science

Named the 2024 Frontiers Planet Prize National Champion for her innovative work using microbial ecology to prevent biodiversity loss, particularly in coral reefs.



Derya Baran
Associate Professor, Material Science and Engineering

Recognized with the BCG V60 Innovation Award.



Alejandra Ortega
M.S. '16, Ph.D. '19, Bioscience

Principal Ecologist at AESG, recognized in the BCG V60 Awards.



Ameerah Bokhari
M.S. '11, Ph.D. '18, Bioscience

Senior Scientist at Aramco, recognized in the BCG V60 Awards.



Dalal Alezi
Ph.D. '17, Chemistry

Assistant Professor at King Abdulaziz University, recognized in the BCG V60 Awards.



Lila Aldakheel
M.S. '19, current Ph.D. Student, Bioscience

Recognized in the BCG V60 Awards.



Maha Aljuhani
M.S. '16, Ph.D. '19, Chemistry

Chemist at SWCC, recognized in the BCG V60 Awards.



Nathalia Delgado-Ordoñez
M.S. '20, Ph.D. '24, Marine Science

Marine Biology Manager at NEOM, recognized in the BCG V60 Awards.



Asrar Damdam
M.S. '18, Ph.D. '23, Electrical and Computer Engineering

Founder and CEO of Uvera, recognized in the Notable Innovators Under 35 list for 2024 by MIT Technology Review Arabia, and in the BCG V60 Awards.

OPERATIONS

Supporting Families and Career Growth through Childcare Services



KAUST provides comprehensive family support and childcare services, ensuring that both men and women can pursue professional growth while their children's needs are met. The [Family and Child Support Center \(FCSC\)](#) offers resources for children, including those with additional needs, fostering inclusive family well-being.

The KAUST [Daycare](#), [Preschool](#), and [Children's Center](#) provide safe, stimulating environments for children from infancy to 10 years old, integrating research-backed curricula and engaging activities. Flexible afterschool and holiday programs ease caregiving responsibilities, while parent engagement initiatives strengthen home-school connections. By investing in high-quality childcare and family support, KAUST empowers professionals and nurtures a thriving, equitable community.

Academic Year 2024/2025

	FTE Staff	Faculty	Senior Leadership		
Staff	61%	85%	79%		
	39%	15%	21%		
Students	ALL	BESE	PSE	CEMSE	
	Total	1741	473	623	616
	Female	647	295	198	146
	Percentage	37%	62%	32%	24%

Advancing Women's Well-Being

[KAUST Health's Obstetrics and Gynecology Department](#) offers lifespan healthcare for women, covering routine gynecological care, preconception counseling, prenatal and postnatal support, and family planning services.

Expectant parents benefit from personalized antenatal education, lactation support, and comprehensive newborn care guidance, ensuring a strong start for KAUST families. While labor and delivery take place off-campus, KAUST Health provides birth planning support and emergency transfer services, ensuring safe maternal care. By prioritizing comprehensive maternal and reproductive healthcare, KAUST ensures that women in the community receive the support they need at every stage of life, promoting a culture of well-being and support.

ENGAGEMENT & OUTREACH

Unlocking Women's Potential in Sustainable Development

KAUST's Office of Sustainability hosted [a workshop for 25 female Mawhiba students](#) from Madinah as part of the KAUST National Young Talent Development Program, equipping them with the knowledge and skills to understand their role in advancing sustainable development. The session introduced core sustainability principles, highlighting their intersections and reinforcing the critical role of women in shaping a sustainable future.



Students engaged with KAUST's sustainability initiatives, and received insights from the University's Students for Sustainability (S²). They also explored KAUST's cutting-edge research facilities to see firsthand how interdisciplinary science drives real-world solutions. By fostering sustainability literacy, the activity aimed for young women to recognize their value in society and their potential to contribute meaningfully to sustainable progress in Saudi Arabia and beyond.

Inspiring Inclusion

To mark International Women's Day, [KAUST hosted a community gathering and panel discussion](#) themed "[Inspire Inclusion.](#)" The event brought together KAUST faculty, staff, and leadership to reflect on advancing

gender equality through inclusive practices in the workplace and beyond. With music, community engagement, and personal stories, the celebration highlighted the importance of women's participation and leadership in all sectors – reinforcing gender equity, women empowerment, and an inclusive institutional culture.



Bridging the STEM Gap

Globally, women remain significantly underrepresented in STEM fields, comprising just 28% of researchers worldwide. In Saudi Arabia, women constitute 38% of STEM graduates, yet only 17% are employed in STEM fields. This disparity underscores the need for initiatives that not only educate but also retain women in STEM careers. KAUST has been a pioneer in gender inclusion in the Kingdom by being the first mixed-gender University in Saudi Arabia and maintaining one of the highest female-to-male ratios in STEM education in the region. The University's 15th commencement ceremony marked a historic milestone, celebrating a 29% increase in Saudi female graduates, with 108 women receiving master's and Ph.D. across diverse STEM disciplines. This diverse graduating class, representing 46 nations, highlights KAUST's role in advancing gender equality and cultivating the next generation of female scientists, engineers, and innovators—driving progress in the Kingdom and beyond.

1st Mixed Gender University in KSA

108 Saudi Women Postgraduates in 2024 (+29% vs 2023)

2000+ Women Postgraduates in STEM Since Inception

ACCELERATING IMPACT



Ensure availability and sustainable management of water and sanitation for all

researchers examined [global shifts in groundwater recharge, discharge, and storage](#), revealing increased depletion due to agricultural extraction and climate variability. These disruptions threaten water security, land stability, and resource sustainability. By advancing knowledge of groundwater dynamics, KAUST contributes to global water management strategies that ensure long-term resilience and sustainable freshwater access. The research also highlights the need for integrated policies to mitigate groundwater loss and secure this critical resource for future generations.

Advancing Sanitation through Decentralized Wastewater Treatment

Approximately half of global wastewater is discharged untreated, posing significant environmental and public health risks. KAUST researchers [evaluated both centralized and decentralized wastewater treatment systems, highlighting the socio-economic and technical benefits of decentralized approaches](#), especially in sparsely populated regions. The research emphasizes that decentralized systems, with their modular designs, offer cost-effective solutions and facilitate water reuse, making them crucial for achieving universal access to safe sanitation. This work informs strategies to meet sustainable development targets, ensuring clean water and sanitation for all.



“I hope to support KAUST’s contribution to SDG 6 through in-depth research into the chemistry and environmental implications of chemicals used in the water desalination industry.”

– Marian Tobon, Ph.D. student in Environmental Science and Engineering, BESE

Utilizing Machine Learning for Water Treatment

Desalination is crucial for providing fresh water in arid regions, but membrane fouling — a buildup of particles on a membrane’s surface —, remains a significant challenge.

The potential of using [machine learning to improve the efficiency of wastewater treatment plants](#), essential for cleaning and managing water, was highlighted in a study published by KAUST researchers. By predicting key factors like flow rates in specific sections of treatment plants, these models help optimize performance under varying weather conditions. The findings offer a simpler way to design these models, ensuring that critical features are identified and can guide more effective plant operations. This approach accelerates the development of more efficient desalination technologies, advancing global access to clean water.

OPERATIONS

Ensuring Water Security through Responsible Desalination

In an arid region where freshwater sources are limited to fossil groundwater reserves or desalination, KAUST ensures water access by operating its own state-of-the-art [Seawater Reverse Osmosis Plant](#). With a daily production capacity of 27,000 m³, the plant provides potable water to the campus and surrounding community while minimizing reliance on non-renewable groundwater. Its operations are strictly monitored for efficiency, incorporating process optimizations, advanced maintenance protocols, and careful management of antiscaling agents and brine disposal to reduce environmental impact. As KAUST and Saudi Arabia transition to a more diversified energy mix, a reduction of the process carbon footprint is expected to further minimize the environmental impacts of desalination while safeguarding water resources for the future.



Maximizing On-site Water Reuse

KAUST operates [its own Wastewater Treatment Plant](#) to efficiently manage water resources and minimize environmental impact. The plant processes collected

RESEARCH & EDUCATION

Harnessing Solar Energy for Sustainable Water Harvesting

KAUST researchers have developed a [solar-powered atmospheric water harvester](#) capable of extracting up to three liters of drinking water per day from the air. Designed for arid regions facing severe water scarcity, this innovative system operates through a self-sustaining, two-stage cycle that captures and releases atmospheric moisture using solar heat. Unlike traditional methods, the device functions continuously without manual intervention, making it a reliable, cost-effective, and low-maintenance solution for remote and water-stressed areas. Beyond drinking water production, the system can also support irrigation, offering a practical approach to sustainable agriculture in desert environments.

Assessing Groundwater Sustainability in a Changing Climate

Groundwater plays a vital role in sustaining ecosystems and human water supplies, but climate change and human activities are significantly altering its availability and dynamics. A study co-authored by KAUST



Ensure access to affordable, reliable, sustainable and modern energy for all

Unlocking the Potential of Organic Photovoltaics for Scalable Solar Energy

Researchers from KAUST have [identified optimal material combinations for organic photovoltaics \(OPV\) to enhance industrial viability](#). By evaluating seven different OPV categories, the study highlights the OD:NFA system as the most promising for commercialization, offering a balance of cost-efficiency, performance, and stability. With a lower carbon footprint, shorter energy payback period, and greater scalability compared to conventional silicon-based solar cells, OPV technology has the potential to revolutionize solar energy production. This research provides a critical pathway for advancing next-generation photovoltaics, supporting sustainable energy solutions for a cleaner future.



“I hope to support KAUST’s contribution to SDG 7

by advancing clean technologies and renewable energy solutions. My research aims to reduce green hydrogen production and deployment costs, making it a viable and competitive energy source worldwide and accelerating the transition to sustainable energy.”

– Monserrat Lopez, Ph.D. student in Environmental Science and Engineering, BESE

Making Clean Energy More Powerful and Affordable

Solar energy is key to combating climate change, yet traditional silicon solar cells are reaching their efficiency limits. KAUST researchers are at the [forefront of perovskite-silicon tandem solar cell technology](#), which can absorb a broader range of sunlight, achieving higher power conversion efficiencies than single-junction silicon cells. These advanced cells have now surpassed 33% efficiency, offering the potential for cheaper, more powerful solar panels. However, for widespread adoption, researchers must tackle stability, large-scale production, and long-term performance in real-world conditions. By

driving innovation in durability and manufacturing, KAUST is accelerating the next generation of renewable energy solutions that will make solar power more affordable, efficient, and scalable worldwide.

Unveiling a Roadmap for Saudi Arabia’s Clean Hydrogen Economy

A recent publication by KAUST, in collaboration with King Abdullah Petroleum Studies and Research Center (KAPSARC), [The Clean Hydrogen Economy and Saudi Arabia](#), outlined a roadmap for establishing Saudi Arabia as a global leader in the clean hydrogen economy. The book explores the country’s potential for hydrogen production, storage, and export, offering actionable strategies to achieve sustainable energy leadership. Released at a KAUST-hosted event on clean energy research and technologies, the publication reflects how collaborative efforts between academia and policy experts are crucial to accelerate energy transition in the Kingdom.



RESEARCH & EDUCATION

Empowering Innovation at the Summer School for Batteries 2024

KAUST, in collaboration with King Fahd University of Petroleum & Minerals (KFUPM), hosted the [Summer School for Batteries 2024](#), welcoming a cohort of top Saudi undergraduate students selected from hundreds of national applicants. This Summer School was part of the initiatives from the Center of Excellence for Renewable Energy and Storage Technologies (CREST) for human capital development and knowledge transfer. This intensive program offered expert-led lectures, hands-on workshops, collaborative projects and insights into advanced research topics, highlighting KAUST’s commitment to empowering future leaders in energy storage and advancing transformative research in sustainable technologies.



OPERATIONS

Enhancing Energy Efficiency across KAUST

KAUST is advancing campus-wide energy efficiency through innovative infrastructure upgrades and optimized building operations. The Dow Energy Optimization Program and KAUST Solar Center initiatives have significantly reduced energy and water consumption, integrating 734 Variable Air Volume units with occupancy sensors to cut unnecessary usage while maintaining air quality. Additionally, a pilot program in residential areas introduced 348 high-efficiency AC units, reducing energy consumption by 17% while using environmentally friendly refrigerants and reducing noise levels. These efforts exemplify KAUST’s commitment to sustainability, ensuring smarter energy use, lower emissions, and improved comfort across the University.

Advancing Geothermal Energy Research in Saudi Arabia

In collaboration with TAQA Geothermal, [KAUST has developed a 400-meter-deep geothermal well on campus to explore energy diversification](#) efforts in Saudi Arabia. The well provides critical data on subsurface heat flow and resource potential, which are critical to exploring future geothermal applications. This infrastructure enhances KAUST's ability to study geothermal feasibility, supporting national initiatives to explore low-carbon energy solutions. By blending research opportunity with operational testing, the project strengthens the University's role in advancing renewable energy infrastructure while providing potential insights for government and industrial stakeholders in Saudi Arabia's energy transition.



Did You Know?

KAUST's Green Printing Program upgraded campus printing by replacing outdated devices with energy-efficient, smart printers featuring QR code authentication and mobile printing via the KAUSTCentral App, optimizing energy use and reducing single-user printers.

ENGAGEMENT & OUTREACH

Driving Renewable Energy Innovation through Partnerships

KAUST is leading the change towards Saudi Arabia's sustainable energy future through a strategic partnership with ENOWA. During the [ENOWA x KAUST Energy Summit 2024](#), the Energy Cortex Program was showcased together with some of the projects led by KAUST faculty members, experts in renewable energy. This program enables partners to contribute their expertise and technologies, while ENOWA offers field experience to support their scalability. With focus areas that range from optimizing energy



generation and storage to developing AI tools for grid stability, this collaboration demonstrates the power of research in shaping practical, scalable solutions.

Revolutionizing Lithium Extraction for a Sustainable Future

KAUST's spinout [Lithium Infinity \(LiHyTech\)](#) is transforming battery-grade lithium production with its Direct Lithium Extraction (DLE) technology. Using electro dialysis and ceramic membranes, the process operates with 100% renewable energy, requires no chemicals or fresh water, and extracts lithium from low-concentration brines. With initial investments from Ma'aden (US\$4 million) and KAUST Innovation Ventures (US\$2 million), LiHyTech's pilot plant is operational, and mobile field units will optimize lithium recovery from oilfield wastewater and desalination brine. By enabling a more sustainable, local lithium supply for clean energy storage, this breakthrough advances renewable energy adoption and energy security, supporting the transition to a low-carbon future.

LiHyTech in Numbers



Advancing Scientific Cooperation for the Energy Transition

The [Saudi-Japan Conference on Future Materials for the Energy Revolution](#), hosted by KAUST in collaboration with the Japan Science and Technology Agency (JST), convened leading material scientists from both

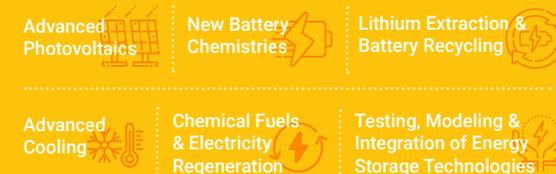
nations. The three-day event emphasized the critical role of advanced materials in driving energy innovations, fostering research collaborations, and strengthening the partnership between Saudi Arabia and Japan. By engaging early- and mid-career researchers, the conference highlighted the University's commitment to advancing scientific discovery and international cooperation in the pursuit of sustainable energy solutions.

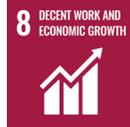


Energizing the Future

Saudi Arabia is undergoing a significant energy transformation, aiming for 50% of its electricity to come from renewable sources by 2030. The [Center of Excellence for Renewable Energy and Storage Technologies](#) is key to this transition, advancing cutting-edge energy solutions that enhance the Kingdom's industrial competitiveness and energy security. By focusing on advanced photovoltaics, next-generation batteries, lithium extraction, and energy storage integration, the center drives commercialization and workforce development. Through strategic partnerships and training programs, it ensures a skilled workforce and scalable solutions, supporting the Kingdom's sustainability-driven economic sectors. These efforts strengthen resilience against climate challenges, enabling expansion into new sustainability-focused economic sectors and contributing to a more resilient and diversified energy future.

Research and Translation Areas





Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all

in the Gulf Cooperation Council (GCC) countries as a driver of economic growth and coastal ecosystem conservation. Using a systematic literature review of 55 studies over 13 years, researchers analyzed key ecotourism sites, benefits, and challenges. The findings emphasize mangrove ecotourism's contribution to economic development, livelihood support, and ecosystem protection, while advocating for sustainable land-use planning to mitigate negative impacts on this important ecosystem. Remote sensing tools were also recommended for evidence-based conservation, ensuring a balance between economic growth, environmental sustainability, and community well-being.



generate electricity, preventing emissions. By optimizing resource productivity and reducing industrial carbon impact, it advances economic growth while minimizing environmental costs. The study highlights the economic potential of sustainable energy technologies, supporting new energy production models in the emerging sustainable energy market.

Promoting Workforce Development through AI Education

The KAUST Academy's part-time Master of Professional Studies in AI is equipping 118 Ministry of Interior employees with cutting-edge AI skills to drive innovation and technological progress in Saudi Arabia. Delivered face-to-face by KAUST faculty in Riyadh, this two-year program fosters upskilling and reskilling, ensuring a highly skilled workforce prepared for the demands of an evolving digital economy. With the first cohort graduating in Spring 2025, the program strengthens human capital, enhances productivity, and prepares professionals in the Kingdom for the dynamic digital economy, contributing to sustainable growth and long-term economic resilience.

RESEARCH & EDUCATION

Driving a Circular Economy through Sustainable Resource Use

To enhance resource efficiency and advance the circular economy, KAUST researchers examined the economic viability of extracting metals from mining waste, identifying pathways for cost-effective material recovery. The study provides scientific insights into metal extraction from industrial byproducts, reducing reliance on primary mining and optimizing waste-to-resource conversion. By integrating advanced recycling technologies, the research highlights solutions that support economic growth while reducing environmental impact. Additionally, the findings support industrial diversification and the growth of sustainable enterprises, promoting environmentally responsible industries and new economic opportunities in circular economy innovation.

Advancing Economic Growth through Mangrove Ecotourism in the GCC

A KAUST faculty member participated in a study highlighting the growing role of mangrove ecotourism



"I hope to support KAUST's contribution to SDG 8

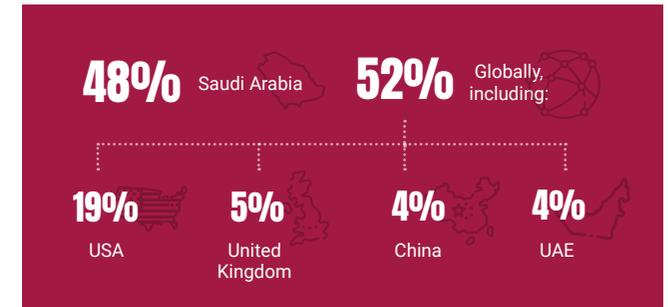
by leading the KAUST Consulting Club in equipping students with essential problem-solving skills and industry connections. By fostering collaboration with global and local firms and providing hands-on experience through case studies, we empower KAUST students to successfully transition into consulting and drive economic growth in the Kingdom."

- **Mohammad Alharthy, Ph.D. student in Applied Physics, PSE**

Expanding Economic Opportunities through Clean Energy

Researchers at KAUST conducted a techno-economic assessment of a novel geothermal energy extraction method that utilizes geologically stored CO₂ as a working fluid — called CO₂ Plume Geothermal (CPG). The system works by injecting captured CO₂ into deep sedimentary formations, where it absorbs geothermal heat before being pumped to the surface to generate electricity. This approach can use captured CO₂ from industrial processes and repurpose it in a closed-loop system to

In 2024, 210 alumni reported a new employment status



OPERATIONS

Strengthening Internal Workforce Skills

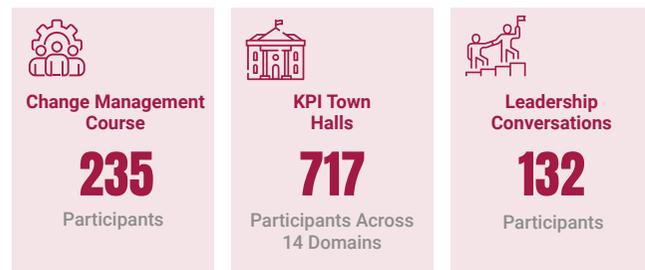
To strengthen institutional effectiveness and workforce adaptability, KAUST prioritized leadership development over 2024, equipping key staff leaders with change management skills for strategic transitions. The Learning & Development team partnered with University leadership



to select 75 professional staff from research and administrative areas for three intensive bootcamps focused on future-ready skills. Each six-month program — Managing and Leading Self, Strengthening Business Foundations, and Engaging and Partnering with Others — included expert-led workshops, internal discussions, and an online learning path through Harvard Management Mentor.

Participants also piloted an in-house designed 360 Core Skills Assessment, later expanded across KAUST's workforce. A new change management course and workshops were also designed to foster organizational resilience and employee upskilling, as well as a revamped performance measurement framework to align efforts with strategic goals and enhance productivity. By investing in leadership training, workforce development, and performance-driven management, these initiatives ensure KAUST remains competitive and efficient, while contributing to both institutional progress and national workforce development.

2024 Leadership Development Events



Recognizing Excellence through Performance Management

The KAUST's Performance Management Program (PMP) aims to achieve continuous professional growth and excellence by evaluating employees annually through structured feedback, mid-year reviews, and end-of-year assessments. High-performing employees can be referred to merit-based opportunities, career progression, and professional development, ensuring a

motivated and highly skilled workforce. Managers play a key role in setting clear objectives and career pathways, aligning individual performance with institutional goals. By coupling performance and skill enhancement with career advancement and workforce engagement, the program strengthens a dynamic, productive and competitive workforce.

ENGAGEMENT & OUTREACH

Upskilling the Industrial Workforce

KAUST has [signed a memorandum of understanding \(MoU\) with the Ministry of Industry and Mineral Resources](#) to launch three specialized academic programs aimed at enhancing workforce capabilities and fostering technological advancement in the industrial and mining sectors. The HighPo Industry and Mining undergraduate program, a master's track, and a doctoral fellowship equip professionals with industry-relevant skills while strengthening research in AI, renewable energy, and material manufacturing. Designed to align academia with labor market needs, these programs develop a skilled workforce, drive job creation, and support sustainable industrial growth, reinforcing efforts to build a resilient talent pipeline that advances the Kingdom's industrial sector and economic diversification.

Boosting AI Innovation and Job Creation in Saudi Arabia

The [AI Mission \(AIM\) national initiative](#), launched during the Global AI Summit hosted at Riyadh, aims to build a comprehensive AI innovation ecosystem in Saudi Arabia. This collaboration between KAUST, the Saudi Authority for Data and AI (SDAIA), the National Technology Development Program (NTDP), and the Ministry of Communications and Information Technology (MCIT), focuses on applied research, capacity building, and company creation. AIM positions

AI as a key driver of future economies, accelerating technological innovation, talent development, and economic diversification in the Kingdom.



Strengthening SME in the Kingdom

[Partnering with the Small and Medium Enterprises General Authority \(Monsha'at\)](#), KAUST signed an MoU to enhance innovation and expertise for Saudi Arabia's small and medium enterprises (SME) sector. Signed at the Biban 24 Forum, the collaboration focuses on leveraging scientific expertise to remove barriers hindering SME growth, and strengthening the entrepreneurial ecosystem. Joint initiatives will focus on advancing technology, driving innovation, and bridging academic and industry expertise, ensuring SMEs have the resources, skills, and support needed to drive economic productivity, create high-value jobs, and contribute to a diversified and resilient economy.

Generating Economies of the Future

The global AI market is experiencing unprecedented growth, with projections estimating an expansion from \$233.46 billion in 2024 to \$1,771.62 billion by 2032. In Saudi Arabia, the AI market is expected to reach approximately \$60.58 billion by 2030, reflecting a compound annual growth rate (CAGR) of 45.2%. KAUST's [Center of Excellence for Generative AI \(GenAI\)](#) is advancing next-generation AI models that are efficient, trustworthy, and tailored to the Kingdom's strategic priorities. As a key driver of Saudi Arabia's Economies of the Future RDIA pillar, GenAI fosters AI adoption across industries, enhances workforce capabilities, and accelerates innovation through translational research—positioning the Kingdom as a global leader in AI-driven economic transformation.

Research and Translation Areas





Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

innovation, and drive sustainable growth in the global tech sector.

Improving Transistors for Next-Generation Electronics

KAUST researchers pushed the boundaries of semiconductor innovation, a critical factor in AI advancements, by developing a breakthrough approach for two-dimensional (2D) materials-based transistors. The study published in Nature Electronics revealed that using a special insulating material (h-BN) with durable metals like platinum and tungsten can greatly improve transistor performance. This combination reduces unwanted electrical leakage by 500 times and makes the insulating layer five times stronger, leading to more efficient and reliable electronic devices. This advancement supports the evolution of faster, more efficient microchips – essential for AI – high-performance computing, and next-generation microelectronic devices and circuits.

Collaborating to Advance AI and Clean Energy Innovation

KAUST has started a partnership with the University of Connecticut to collaborate on advancing research in AI, clean energy, health technologies, and sustainability.



This agreement focuses on fostering joint innovations that address global challenges in these critical sectors. By facilitating staff and student exchanges, this partnership encourages cross-border research collaboration and knowledge

transfer, contributing to the development and commercialization of scalable technological solutions. Both universities aim to drive sustainable industrial innovation and enhance the accessibility of advanced technologies.

OPERATIONS

Offering Advanced Prototyping Facilities

The Prototyping and Product Development Core Lab (PCL) at KAUST supports technological advancement by providing state-of-the-art fabrication facilities for projects ranging from micro-scale designs to complex product development. Integrated within campus operations, PCL enables researchers, students, and industry partners to translate ideas into functional prototypes through advanced capabilities in computer-aided design, rapid prototyping, reverse engineering, and precision machining. By offering mentorship, training, and hands-on expertise, the lab fosters innovation, accelerates product development, and strengthens the technical ecosystem essential for industrial advancement and technological breakthroughs.



RESEARCH & EDUCATION

Accelerating Innovation through Global Entrepreneurship Training

The ShenTech Bootcamp in Shenzhen, China, was launched by KAUST to strengthen technological innovation and advance product commercialization. Held in January, the immersive program connected 45



Saudi entrepreneurs, startup founders, and graduate students with China's dynamic innovation ecosystem. Participants developed entrepreneurial skills and learned market-driven strategies to transform ideas into scalable solutions, fostering business capacity and industrial competitiveness. Through mentorship

from international unicorn founders and collaboration with leading startups, the bootcamp promoted cross-border knowledge exchange, empowering participants to develop scalable technologies, enhance industrial



"I hope to support KAUST's contribution to SDG 9

by continuing to work on the development of sustainable, eco-friendly and cost-efficient functional light-emitting materials for real-life applications."

- Alaa Almushaikeh, Ph.D. student in Applied Physics, PSE

Expanding Deep Tech Entrepreneurship in Saudi Arabia

The 'NextEra' startup bootcamp, an initiative of the National Technology Development Program (NTDP) in partnership with KAUST, brought 20 Saudi startups together to accelerate deep tech innovation. Designed to cultivate innovation through mentorship, guidance and learning and provide financial incentives and strategic

support, 'NextEra' helps tech companies advance and commercialize cutting-edge technologies. Hosted at KAUST, the bootcamp fostered entrepreneurial talent, industry collaboration, and the development of transformative solutions across key sectors, including AI, SpaceTech, and Green Tech, supporting Saudi Arabia's ambition of becoming a global hub for technological advancement.



Fostering Industry Partnerships for Innovation

The [KAUST Industry Collaboration Program \(KICP\)](#) strengthens ties between academia and industry, accelerating the commercialization of breakthrough technologies. As a gateway to KAUST's deep-tech ecosystem, KICP provides businesses and government entities with priority access to cutting-edge research, world-class facilities, and highly skilled talent. Members benefit from tailored research collaborations, strategic networking opportunities, and participation in key innovation events. Through KICP, industry leaders engage with KAUST's faculty and emerging startups, driving industrial transformation and technological advancement. By bridging research with real-world applications, KICP plays a major role as a hub for research-driven industrial innovation.

ENGAGEMENT & OUTREACH

Driving Innovation and Industrial Growth

[KAUST and the National Industrial Development and Logistics Program \(NIDLP\) launched the Industrial Pioneers Program](#) to equip students with STEM and leadership skills, training a new generation of innovators to drive technological advancement and industrial development. The program aims to strengthen human capital and support Saudi Arabia's transformation into a global industrial hub. As a key NIDLP partner, KAUST contributes to enhancing industrial capacity through cutting-edge research, an innovation-driven ecosystem, and strategic collaborations. Recognized as a Tier 2 technology

district under the National Technology Cluster Strategy (NTCS), KAUST is committed to advancing technology commercialization and industrial competitiveness, reinforcing Saudi Arabia's leadership in sustainable and high-tech industries.

Showcasing KAUST Inventions Internationally

The University showcased 13 of its most groundbreaking inventions at the [49th International Exhibition of Inventions in Geneva](#), Switzerland, in April. As one of the world's leading platforms for technological innovation, this prestigious event offered KAUST the opportunity to present cutting-edge solutions in various fields, demonstrating the University's commitment to advancing research and development. By participating in this global exhibition, KAUST strengthens its role as a key player in the international innovation landscape and reinforces its efforts to develop impactful, sustainable technologies.



49th International Exhibition of Inventions



Exploring New Innovation Opportunities

As part of an ongoing effort to foster international collaboration, [KAUST hosted a delegation from Business France](#), including 20 startups from the Booster Grow Global - Vision 2030 Program, to explore the University's innovation ecosystem. The visit allowed the startups to engage with local entrepreneurs and KAUST experts, giving them insights into Saudi Arabia's business

landscape and market-entry opportunities. The collaboration aimed to support the growth of impactful technologies and strengthen the ties between Saudi Arabia and France, contributing to the development of both regions' innovation and entrepreneurship sectors.



Transforming National Innovation

Saudi Arabia is investing heavily in research and development, with plans to allocate 2.5% of its GDP to R&D by 2040—a substantial increase from its current 0.8% investment. This shift is fueling the Kingdom's industrial transformation, and the National Transformation Institute (NTI) at KAUST plays a pivotal role in this transition, bridging academia, industry, and government to accelerate the development and commercialization of high-impact technologies. Through strategic partnerships, technology transfer, and venture creation, NTI fosters advancements in key development areas such as clean energy, carbon capture, marine restoration, and smart technologies. Through project scaling and implementation, consultancy, talent development, and stakeholder engagement, NTI strengthens Saudi Arabia's position as a global leader in research-driven industrial transformation.

NTI Areas of Intervention





Reduce inequality within and among countries

Enhancing Fairness in Machine Learning Models

Addressing biases in algorithmic decision-making, a study led by KAUST [explored methods to improve fairness in single-index models \(SIMs\)](#), a type of predictive model used in machine learning and statistics to simplify complex relationships between input data and outcomes. By introducing a unified fair SIM model based on the equal opportunity principle, researchers mitigated biases related to sensitive attributes such as gender, race, and ethnicity. The model was tested on 11 benchmark datasets, outperforming eight baseline methods in achieving both fairness and predictive accuracy, providing a more consistent approach to reducing discrimination in machine learning. This research contributes to equitable technology development, ensuring AI-driven systems promote fairer and more inclusive outcomes across diverse applications.

[wheelchair users](#), directly addressing disparities in mobility and health equity. Utilizing advanced machine learning techniques, the research focused on automating sitting posture recognition to help prevent pressure ulcers and enhance user well-being. By analyzing sensor data to classify postures, the study demonstrates how assistive technology can reduce barriers for individuals with disabilities. Beyond improving well-being, such research supports technological advancements in healthcare and rehabilitation, contributing to efforts that enhance independent living and equitable access to assistive innovations.



RESEARCH & EDUCATION

Expanding Speech Recognition with Arabic Dialects

As part of an internship project, a KAUST intern [developed an AI-powered model to enhance Arabic dialect identification](#), addressing a key challenge in speech recognition technologies. The project fine-tuned a large open-access speech recognition model to distinguish between 17 Arabic dialects while significantly reducing computational costs. This approach enhances language accessibility and digital inclusivity, with potential applications in education, healthcare, and AI-driven communication tools. This research also contributes to advancing AI technologies tailored for diverse linguistic communities, aligning with global efforts to foster equitable access to digital resources.



Advancing Equity in Biotechnology Education

KAUST researchers participated in a study aimed to expand global access to biotechnology education by [leveraging cloud-enabled live-cell biotechnology](#). This innovative approach allows students in underserved regions to engage in real-time experiments using low-cost, internet-connected laboratory equipment. By overcoming barriers such as limited infrastructure, high costs, and digital illiteracy, the article discusses avenues to ensure equitable access to advanced scientific learning.



Such efforts align with national and global goals to reduce inequalities, empowering diverse communities to participate in scientific discovery and innovation, fostering inclusive education and bridging the gap in STEM opportunities worldwide.

“I hope to support KAUST’s contribution to SDG 10 by enhancing natural communication for individuals with voice disorders through the integration of wearable sensors, promoting equity and accessibility in human interaction.”

- Montserrat Ramirez De Angel, Ph.D. student in Bioengineering, BESE

Improving Accessibility and Comfort for Wheelchair Users

A study led by KAUST researchers [explored innovative methods to improve accessibility and comfort for](#)

OPERATIONS

Fostering a Respectful and Inclusive Environment

As a commitment to maintaining KAUST’s workplace and campus a healthy and respectful environment, ensuring that every individual feels secure and protected, the University’s [Anti-Harassment Policy](#) outlines clear measures to prevent and address harassment in all its forms, including verbal, physical, and written. This policy emphasizes confidentiality and provides accessible reporting mechanisms, such as the anonymous

EthicsPoint system. This reflects KAUST's dedication to creating an equitable and inclusive environment, where community members can thrive both personally and professionally.

Offering Accessible Residential Infrastructure

KAUST has made significant strides towards physical inclusivity by providing several adapted residential units to meet the needs of individuals with physical disabilities, both permanent or temporary. Part of the multiple modifications include accessibility ramps, wider doorways, and lowered countertops, aimed to enhance mobility and ensure that all residents can live independently. By providing the necessary infrastructure to support the needs of all residents, KAUST fosters a living environment that includes accessibility and independence, demonstrating its commitment to inclusion.



Adapted Residences at KAUST (2024)

<p>15 Units Staff Housing</p> <p>Accessibility Adaptations:</p> <ul style="list-style-type: none"> • Accessible patios and decks • Pavement marking for handicapped parking • Reinforced ramps • Main entrance with wider doorways • Auto door closer • Stainless steel grab bars in hallways, toilet & bathrooms 	<p>14 Units Student Housing</p> <ul style="list-style-type: none"> • Hallway sliding doors • Accessible sinks • Lowered kitchen countertops • Kitchen pull-out shelves • Lowered bedroom closets • Pneumatic two-floors elevator replacing stairs
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ENGAGEMENT & OUTREACH

Raising Awareness on Dyslexia



The KAUST Family and Child Support Center (FCSC), with support from The KAUST School (TKS) students in the Peer Ambassador and Leaders (PAL) program, launched KAUST's first Dyslexia Simulation event, bringing together over 70 parents and educators from KAUST, KAEC, and Jeddah. The event featured interactive activities and games designed to simulate the attention and motor skill challenges experienced by children with dyslexia, creating greater awareness and understanding. Leading up to the event, FCSC also [released a short communication article on the Great Paradox of Dyslexia](#), reflecting the institution's commitment to supporting neurodiversity and strengthening community engagement in inclusive learning practices.

Expanding Access to STEM for Arabic-Speaking Youth

From 2021-2024, [KAUST partnered and sponsored Frontiers for Young Minds \(FYM\)](#) to translate and publish a vast collection of peer-reviewed scientific articles into Arabic. FYM is an open-access scientific journal that brings the latest research to school children aged 8-15, with articles written by scientists and reviewed by young students to ensure clarity and engagement. The initiative provides Arabic-speaking children worldwide with over 350 free-access, engaging, age-appropriate scientific articles, covering topics from astronomy to environmental science. By making complex scientific concepts accessible in their native language, the program aimed to inspire the next generation of scientists and reduce educational disparities, fostering inclusivity in scientific literacy.

Promoting Inclusion and Awareness of Autism

Over 120 people participated in [KAUST's annual Beat the Heat autism run](#), organized by the FCSC in collaboration

with Community Development, and TKS. Held as part of World Autism Acceptance Week, the event welcomed participants of all ages in a 1- or 2-loop race around TKS and FCSC. During the prize-giving ceremony, the importance of divergent thinking and the contributions of autistic individuals to innovation and discovery were highlighted. Initiatives like this one foster inclusion and accessibility, helping in creating a more equitable and supportive community.



Caring for Inclusive Innovation

Approximately 15% of the world's population, or an estimated 1 billion people, live with disabilities. In Saudi Arabia, chronic diseases and genetic conditions contribute to a rising prevalence of disabilities, necessitating advanced solutions. KAUST is partnering with the King Salman Center for Disability Research (KSCDR) to [drive research and innovation in the diagnosis, management, and treatment of disabilities prevalent across Saudi citizens and residents](#). Through the Center of Excellence for Smart Health, KAUST is developing AI-driven assistive technologies and wearable solutions aimed at enhancing communication, real-time monitoring, and personalized care. By accelerating research translation and knowledge exchange, this collaboration advances inclusive healthcare, ensuring that every individual—regardless of ability—has access to the high-quality care necessary to lead a healthy and fulfilling life.

Areas of Development

Learning Disabilities	Visual Impairments	Speech Disorders	Limited Mobility



Make cities and human settlements inclusive, safe, resilient and sustainable

RESEARCH & EDUCATION

Identifying Hotspots of Climate-Related Disasters

A KAUST faculty member contributed to a [study analyzing 4,600 climate-related disasters](#) that affected 3.3 billion people over 20 years, highlighting disparities in disaster impacts across regions. The findings revealed a sharp increase in climate vulnerability in Sub-Saharan Africa, Central America, and Southeast Asia, emphasizing the urgent need for targeted adaptation strategies. By identifying high-risk areas, the study supports efforts to strengthen urban resilience, inform disaster preparedness, and guide sustainable planning, ensuring that cities and communities, especially in vulnerable regions, can better withstand climate-related challenges and reduce future risks.



Mitigating Urban Heat with Green Infrastructure

Researchers from KAUST are [advancing knowledge on green infrastructure \(GI\) by modeling and quantifying its cooling potential to mitigate urban heat](#). The work highlights the benefits of integrating tree canopies, green roofs, and open spaces into city landscapes, demonstrating how strategic GI application can lower air temperatures, reduce energy consumption, and enhance urban resilience. This research provides valuable insights for urban planners and policymakers, particularly in arid climates, supporting efforts to adapt cities to climate change, improve livability, and promote sustainable urban development in rapidly growing regions.

Improving Traffic Flow Predictions with Deep Learning

KAUST researchers have developed a new method to improve [road traffic flow predictions](#), making urban mobility more efficient. By using an advanced data filtering technique, the authors can effectively handle complex traffic data, enhancing the accuracy of forecasting systems. Tested on two California highways, the method demonstrated superior prediction performance compared to other prediction models. This breakthrough supports efficient traffic management, helping alleviate congestion, reduce fuel consumption, and improve urban mobility, contributing to smarter, more sustainable cities.



"I hope to support KAUST's contribution to SDG 11

by developing embodied carbon benchmarks to inform emission-reduction policies in urban construction, promoting sustainable building practices and helping cities transition to a low-carbon and resilient built environment."

- Basit Mir, Ph.D. student in Environmental Science and Engineering, BESE

OPERATIONS

Promoting Shared Mobility for a Connected Campus

KAUST offers a [shared transportation system](#) to improve mobility and accessibility for its community. Scheduled shuttle buses, available free of charge, connect residents, visitors, and service providers across campus, while on-demand buses operate during non-peak hours via an easy-to-use app, with optimized routes to reduce unnecessary emissions. Off-campus routes are also available, providing access to shopping centers, railway stations, and hospitals. This transportation infrastructure reduces traffic congestion, optimizes commuting efficiency, and enhances connectivity, making daily travel more seamless and community-driven.

KAUST Bus Routes

Type of Bus	Number of buses	Total passengers per year (in 2024)	Average passenger per bus per day
Colored Shuttle Bus	20	537,963	102
TKS Shuttle Bus	30	254,997	39
On-demand Shuttle Bus	15	514,206	94
Off-campus Bus	8	77,938	27

Digitalizing Solutions for Enhanced Quality of Life

To advance digital experiences towards a better quality of life on campus and beyond, [KAUST Smart](#) has been spearheading the piloting of technologies that deliver easy, intuitive experiences. KAUST Smart serves as a living laboratory, where smart city concepts are tested and refined before scaled deployment. Piloted technologies



include autonomous delivery pilots, such as self-driving vehicles for package delivery and drones for food delivery, in collaboration with the National Digital Transformation Unit. By encouraging cooperation between the academic community and external

partners, the University is committed to improving urban environments and empowering communities to live sustainably and efficiently.

Enhancing Urban Resilience through Real-Time Air Quality Monitoring

The University has its own [Air Quality Monitoring Station](#), providing real-time Air Quality Index (AQI) data updated every 15 minutes. This service, available for the community in an online platform, enables the KAUST community to make informed decisions about outdoor activities. With air quality management under the Health, Safety & Environment (HSE) department, efforts focus on identifying pollution sources, differentiating natural and human-caused air quality factors, and enhancing capabilities for proactive monitoring. This program helps the community better understand air quality trends and take practical steps to minimize exposure to pollution, supporting overall well-being.

ENGAGEMENT & OUTREACH

Providing Environmental Transparency in Saudi Arabia

KAUST's Urban Lab hosted a workshop on [utilizing Life Cycle Assessment \(LCA\) and Environmental Product Declarations \(EPD\)](#) to drive sustainability across various sectors in Saudi Arabia. The event brought together policymakers, researchers, and industry



professionals to discuss the creation of a national LCA inventory. Participants explored how LCA and EPD can enhance product transparency, reduce environmental impacts, and support sustainable development. Fostering collaboration among key stakeholders, the event promoted strategic discussions on reducing the environmental footprint of materials and urban infrastructure, supporting efforts to minimize waste, pollution, and resource consumption in rapidly growing cities.

Collaborating for Low-Carbon Urban Infrastructure

As part of efforts to advance sustainable urban development, [KAUST is collaborating with Partanna](#), a green concrete company, to advance carbon-absorbing concrete technologies, focusing on optimizing the chemical composition and performance of sustainable building materials. Through scientific research and material testing, KAUST researchers



are enhancing Partanna's CO₂-absorbing binder formula, improving its sequestration efficiency and ensuring its suitability for large-scale construction. This innovation eliminates the need for portland cement, a major contributor to global CO₂ emissions, while utilizing locally sourced raw materials. By applying these advancements to giga-projects like Diriyah Gate and Red Sea Global, KAUST contributes to low-carbon urban development, reinforcing its role in sustainable infrastructure solutions for Saudi Arabia and beyond.

Driving Sustainable Urban Mobility

KAUST hosted the Aitonomi Company Day event, fostering collaboration [to drive fully autonomous and electric transport systems in Saudi Arabia](#). Through the In-Kingdom Career Launch Program (IKCLP), KAUST connected its global talent pool with Aitonomi, a company specialized in autonomous and electric transport solutions designed to support sustainable mobility and

logistics. As an Oxagon x McLaren Accelerator business, Aitonomi engaged with KAUST students for recruitment, supporting workforce expansion. The event reinforced KAUST's commitment to industry engagement for sustainable urban mobility, contributing to safer, more efficient, and environmentally friendly transportation systems in rapidly developing cities.



Blueprinting Impacts of Urban Development

With 82% of Saudi Arabia's population residing in urban areas—and cities consuming over 75% of global material resources—ensuring sustainable growth is vital to the Kingdom's future. To support this transition, KAUST is spearheading the development of a National Life Cycle Assessment (LCA) Framework that provides science-based tools for integrating environmental accountability into decision-making. Through workshops and engagements with key stakeholders, KAUST researchers will release the report *Building a National Framework for Life Cycle Assessment: Pathways to Sustainable Development*, outlining strategies to align LCA with Vision 2030 and KSA's net-zero goals. In addition, KAUST is leading the proposal for a Saudi National Life Cycle Inventory—a nationwide environmental database to assess product and process impacts, supporting informed, efficient urban development.

Key Components





Ensure sustainable consumption and production patterns

process with the potential to reduce environmental impacts associated with plastic pollution. This study evaluates large-scale plastic pyrolysis's technological, environmental, and regulatory challenges, comparing its effectiveness with other waste management methods. The findings highlight the need for sustainable criteria in scaling these technologies, proposing solutions to mitigate the environmental damage of plastic waste through life cycle analysis and planetary boundaries considerations. Such research supports a transition towards sustainable practices and technologies that have the potential to drive a circular economy.

Producing Industrial Chemicals from Food Waste

A novel method for converting expired dairy and beverage waste into valuable chemicals was demonstrated by a team of researchers from KAUST. It consists of a two-stage fermentation process that first generates high concentrations of lactate, which are then used to produce medium-chain carboxylic acids (MCCAs), such as caproate and butyrate, that can be used for various industrial and agricultural applications. This study showcases the potential for using food waste as a sustainable resource, contributing to a circular bioeconomy by transforming organic waste into higher-value chemical products.



"I hope to support KAUST's contribution to SDG 12

by developing nanofiltration membranes with intrinsic nanoporous architectures. These membranes enable efficient separation of high-value chemicals and pharmaceutical ingredients, enhancing sustainability in pharmaceutical manufacturing by reducing waste, solvent use, energy consumption, and carbon dioxide emissions."

- Banan Alhazmi, Ph.D. student in Environmental Science and Engineering, BESE

RESEARCH & EDUCATION

Extracting Lithium More Sustainably

An innovative electrochemical device that enables sustainable lithium extraction from low-concentration Dead Sea brine was developed by KAUST researchers. Utilizing lithium iron phosphate electrodes, the system minimizes environmental harm while achieving over 84% extraction efficiency. This breakthrough technology offers a cost-effective and scalable alternative to conventional mining, supporting the growing demand for battery-grade lithium in renewable energy systems. By advancing resource-efficient and less energy-intensive solutions, this design helps to address global energy challenges through innovative and more sustainable technologies.



Valorizing Plastic Waste through Pyrolysis

A KAUST researcher is advancing the sustainability of plastic waste management through pyrolysis, a

OPERATIONS

Reshaping Plastic Waste into Sustainable Solutions

Precious Plastic is a project that started in the Netherlands that aims to reduce plastic waste, and it has several local initiatives around the world. In Saudi Arabia, Precious Plastic KAUST is a volunteer-driven initiative that promotes sustainable consumption by tackling plastic pollution within the KAUST community. Through hands-on workshops and training at the Reuse Center, community members can learn to recycle collected plastic into reusable products, fostering creativity and collaboration. By empowering individuals with these tools and knowledge, Precious Plastic advances a culture of sustainability, aligning with national efforts to reduce waste and encourages responsible resource use.



2024 Highlights



16 Events
250 Participants



Hands-On
Workshops
& Demos



Community
Expos & Kids'
Sustainability
Clubs

Fostering Transparency around E-Waste



The Follow Your Waste initiative continues to promote collaborative efforts in sustainable waste management in KAUST, including a visit to the Holoul E-Waste Recycling Plant, exemplifying its commitment to community engagement and sustainability. The visit engaged stakeholders

from multiple University departments, fostering collaboration and understanding of sustainable Waste Electrical and Electronics Equipment (WEEE) recycling practices. Through partnerships with local recycling facilities, KAUST ensures the safe and environmentally responsible recycling of WEEE generated on the campus, and promotes environmental awareness and responsibility.

2024 Recycling Numbers



ENGAGEMENT & OUTREACH

Committing to Reducing Plastic Pollution

KAUST joined the global celebration of Earth Day with a focus on the theme Planet vs. Plastics. The annual celebration highlighted the significant threats posed by single-use plastics and the global movement needed to reduce plastic pollution. KAUST hosted various educational events and actions to engage the campus community and beyond, including panel discussions, facilities' tours, workshops and outdoor activities, promoting awareness and action to reduce plastic waste. Through this initiative, KAUST emphasized the importance of environmental responsibility and encouraged practical steps toward reducing plastic waste.

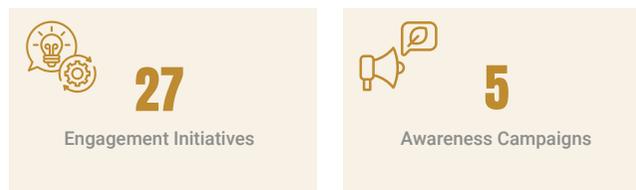


Celebrating Sustainability through Recycling Education

As a celebration for the Global Recycling Day, KAUST hosted a [Recycling Quiz and Open House at the Waste Transfer Station](#). This event engaged community members through guided tours showcasing KAUST's recycling processes and a final interactive quiz competition. Winners of the quiz received prizes, such as local biodiversity books and reusable water bottles, and were celebrated for their interest in sustainability. Initiatives like this emphasize the University's ongoing efforts to increase awareness, reduce waste, and promote responsible recycling practices, fostering a culture of sustainability that benefits our community.



Responsible Consumption Awareness



Raising Environmental Awareness in Local Communities



The [Green Schools Initiative in Thuwal](#) was launched by KAUST, in collaboration with the Ministry of Environment, the Ministry of Education's Jeddah Education Department, the Saudi Investment Recycling Company (SIRC), Averda, Saudi Dow, and Napco, as part of its social responsibility program. This initiative aims to raise

environmental awareness, with a focus on reducing and recycling plastic and paper waste in Thuwal schools. This program aligns with KAUST's broader goals for environmental sustainability, envisioned in Saudi Vision 2030, by raising awareness of the need to preserve the environment and teaching valuable skills to local communities.

Closing the Loop on Waste

Saudi Arabia generates over 110 million tons of waste annually, with limited recycling. Without intervention, landfill dependence will continue to strain resources, exacerbate pollution, and hinder sustainable growth. In partnership with the Saudi Investment Recycling Company (SIRC), a Public Investment Fund (PIF) subsidiary, KAUST is pioneering circular economy solutions through cutting-edge R&D and KAUST-incubated startups.

Examples include:

- **Edama**, which converts organic waste into high-quality compost and is now part of SIRC's subsidiary Yadoum— tasked with finding solutions for agricultural and municipal solid waste.
- **Terraxy**, which uses poultry waste and manure to enhance soil restoration at multiple national projects
- **Polymeron**, which develops biodegradable plastics from organic waste.

These innovations accelerate sustainable waste management and align with Vision 2030's waste diversion targets. KAUST-developed technology is transforming Saudi Arabia's waste sector, accelerating resource efficiency, reducing carbon footprints, and supporting a circular economy.

KAUST Waste Tech Startups





Take urgent action to combat climate change and its impacts



Leveraging Microbes for Climate Action

In a groundbreaking global effort, a KAUST faculty member led [a call to deploy microbiome-based solutions to combat climate change](#), published simultaneously in 14 academic journals and launched at COP29. Co-authored by researchers from multiple microbiological societies, the initiative highlights the potential of microbial innovations in carbon sequestration, methane reduction, bioenergy production, and pollution mitigation. The article advocates for a science-based climate task force, emphasizing the need for coordinated, large-scale implementation of microbiome solutions worldwide and promoting microbial strategies for climate resilience.

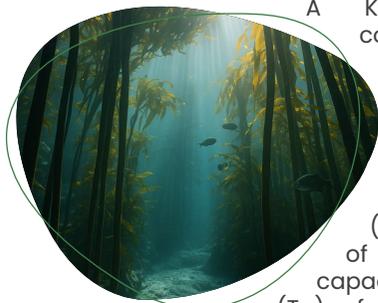


Did You Know?

KAUST researchers won the ACM Gordon Bell Prize for developing an exascale climate emulator, reducing storage and processing time for high-resolution climate models, advancing global climate research.

RESEARCH & EDUCATION

Conserving Coastal Carbon Sinks



A KAUST faculty member contributed to a [study quantifying the role of seaweed forests in global carbon sequestration](#). The research estimates that seaweed-derived particulate organic carbon (POC) accounts for 3–4% of the ocean's carbon sink capacity, with up to 56 teragrams (Tg) of carbon exported to deep ocean sinks annually. Additionally, between four and 44 Tg of this carbon remains sequestered for at least 100 years, reinforcing seaweed forests' critical role in long-term carbon storage. These findings highlight the urgent need for conservation and management strategies, as declining seaweed forests represent a lost opportunity to enhance natural carbon sinks and mitigate climate change.

Educating on Climate Change

A [new, comprehensive course on climate change](#) is offered at KAUST, equipping students with knowledge on the fundamentals of climate change, the analytical skills required to assess its impact on societies, and what solutions are being proposed to address it. The course covers historical and present-day climate impacts, societal responses, sustainability policies, and corporate and governmental solutions. The course offers students a chance to get engaged with real-world case studies, expert discussions, and policy frameworks, fostering critical thinking and preparing them for informed participation in global climate discussions.

OPERATIONS

Strengthening Global Climate Action

KAUST has joined the Network of Networks (NoN), a global coalition of leading climate institutions and University networks dedicated to advancing climate

action. Co-convened by the University of Toronto and the University of Cambridge, NoN aligns with priorities set by the United Nations Framework Convention on Climate Change's (UNFCCC) Climate Champions and Marrakech Partnership. It empowers higher education institutions as impactful non-state actors in addressing climate finance, the Breakthrough Agenda, and the Global Goal on Adaptation. KAUST's involvement exemplifies its commitment to fostering collaborations that amplify the role of universities in enhancing sustainability and building a collective voice for global climate advocacy.

Optimizing Logistics for a Reduced Footprint

To minimize its procurement impact, KAUST has been implementing measures on its supply chain operations, contributing to climate action efforts. By [consolidating shipments with its international suppliers](#), the University has been significantly reducing the frequency of deliveries to its campus warehouse. Since 2019, a collaboration with freight forwarders KWE and Biocair has enabled batching and scheduled shipping, resulting in a significant reduction on the average number of shipments. This initiative decreases transportation emissions, enhances logistical efficiency, and reflects KAUST's commitment towards more sustainable operations.



KAUST Shipments

In 2023/24, KAUST avoided 90% of unnecessary freight shipments:

4,638 Orders Placed | **468** Shipments Made

Preventing 208.5 metric tons of CO₂ emissions - an estimated equivalent of:

Taking **45+** Passenger Cars Off the Road for a Year | The electricity use of **26+** Homes for a Year



"I hope to support KAUST's contribution to SDG 13

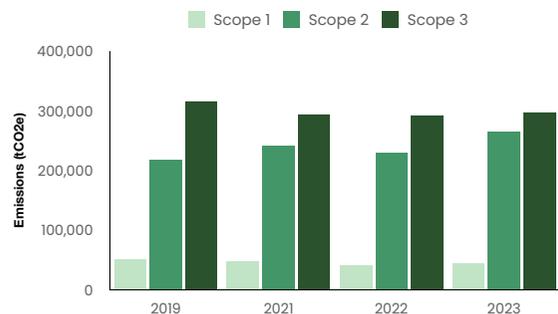
by conducting research on carbon geological storage here at KAUST. Through innovation in carbonate reservoir studies, I strive to develop sustainable solutions for mitigating CO₂ emissions, ensuring a cleaner and more resilient future for our planet."

- Dea Oemaiya, Ph.D. student in Energy Resources and Petroleum Engineering, PSE

Measuring Emissions to Set Climate Action Targets

As Saudi Arabia advances toward its net-zero goal by 2060 and global climate commitments, KAUST is strengthening its carbon accounting efforts to support data-driven climate action. Following its 2019 Greenhouse Gas (GHG) Baseline Inventory, KAUST has conducted annual emissions assessments to build a comprehensive overview of its carbon footprint and inform future climate action strategies for the University. The inventories follow the GHG Protocol standard, evaluating emissions across Scopes 1, 2, and 3, including business travel, waste management, employee commuting, and supply chain operations. These assessments provide critical insights to support the development of a Climate Action Plan and the University's transition toward a more sustainable and low-carbon future.

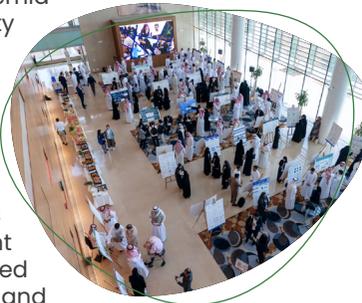
KAUST GHG Emissions



ENGAGEMENT & OUTREACH

Driving Decarbonization in Construction

The workshop [Decarbonization of the Concrete Supply Chain](#), hosted by KAUST, united experts from industry, government, and academia to promote sustainability in the cement and construction sectors. The event highlighted the need to balance infrastructure demand with global climate objectives, particularly Saudi Arabia's ambitious development plans. Participants discussed innovative technologies and strategies to reduce GHG emissions in the construction industry. This workshop provided a key platform for stakeholders and researchers to explore low-carbon cement solutions for a more sustainable future.



Advancing Zero-Carbon Fuel Cell Technologies

[KAUST has partnered with Abdul Latif Jameel Motors and Toyota Motor Corporation](#) to enhance hydrogen fuel cell research in Saudi Arabia. As part of the partnership, KAUST has established a state-of-the-art laboratory equipped with proton electrolyte membrane (PEM) fuel cell modules from Toyota, under its Clean Energy Research Platform (CERP). This facility aims to optimize fuel cells for the region's unique environmental conditions, reinforcing KAUST's commitment to pioneering sustainable energy solutions. The initiative supports the advancement of hydrogen-based technologies, aligning with the Kingdom's broader efforts to lower emissions and enhance climate resilience.

Collaborating for a Low-Carbon Future

KAUST has [signed a Memorandum of Understanding \(MoU\) with Aramco](#) to support research and development in energy transition, sustainability, materials transition, upstream technologies, and digital solutions. Aramco

is set to invest up to \$100 million in KAUST's projects over the next decade. This collaboration will focus on advancing technologies related to carbon capture and storage, the development of low-carbon aviation fuels, and the conversion of liquids to chemicals, with a focus on developing commercially viable outcomes. Building on a longstanding collaboration, KAUST continues its research efforts to drive low-carbon innovations, providing the cutting-edge research needed to support a sustainable energy transition.



Cooling Carbon Capture

The energy sector accounts for 75% of global GHG emissions, making carbon capture essential for climate mitigation. In line with the Saudi Green Initiative, the Kingdom aims to cut 278 million tons of CO₂eq annually by 2030. To accelerate this ambition, [KAUST has partnered with the Saudi Electricity Company \(SEC\) to pilot its Cryogenic Carbon Capture \(CCC\) technology at the Rabigh power plant](#). As a world-first cryogenic technology that captures multiple pollutants and GHG, the system captures over 98% of CO₂ while also removing sulfur dioxide and nitrogen oxides. By developing and scaling emission reduction technologies, KAUST supports national and global decarbonization goals and integrated pollutant management.

Cryogenic Carbon Capture





Conserve and sustainably use the oceans, seas and marine resources for sustainable development

[deployed on the International Space Station, is now being tested by KAUST researchers to analyze marine samples](#) directly in the field. The portable system enables immediate extraction, concentration, and sequencing of DNA, preserving delicate microbiome data that would otherwise degrade during transport. Initial findings from mangrove forests and the KAUST Coral Probiotics Village reveal greater microbial diversity than previously recorded. By enhancing our understanding of these complex ecosystems, this approach aims to support more effective conservation and restoration efforts for the Red Sea's coral reefs and mangrove habitats.



RESEARCH & EDUCATION

Navigating Impacts on Marine Megafauna

KAUST researchers co-authored a study examining [how climate change will shift the habitats of marine species like the whale shark](#).



The study predicted that, by 2100, climate change could cause whale sharks to lose over 50% of their current habitats, with migrations exceeding 1,000 km as ocean temperatures rise. These changes increase the species' exposure to ship traffic, with collision risks projected to rise up to 15,000 times in high-emission scenarios. The study underscores the need for climate-informed conservation strategies, ensuring that habitat shifts and human threats are integrated into global marine protection efforts.

Using Space Technology for Marine Conservation

Cutting-edge [DNA sequencing technology, originally](#)

Mapping the Ocean's Genetic Diversity

The [largest open-source database of marine microbial genes](#), comprising 308.6 million gene clusters from over 2,100 ocean samples was developed by KAUST researchers. This comprehensive resource enhances our understanding of ocean microbiomes and their roles in global biogeochemical cycles and relevance to climate change, offering potential applications in biotechnology, medicine, and environmental monitoring. The catalog also provides a baseline for assessing the impacts of climate change and pollution on marine microbial ecosystems, supporting efforts to protect and sustainably use ocean resources.



"I hope to support KAUST's contribution towards SDG 14

by highlighting the importance of mangrove habitats to our resident stingrays and showcasing the need to protect the ecosystems found in our very own KAUST backyard."

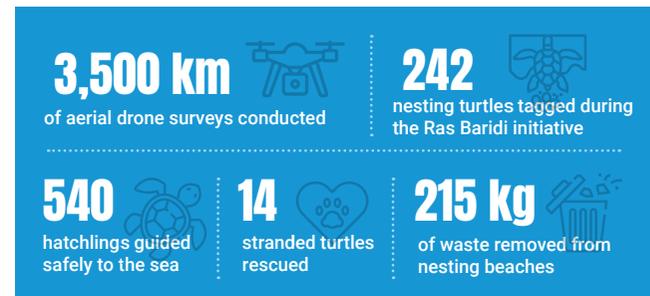
- **Lea Palm, Ph.D. student in Marine Science, BESE**

OPERATIONS

Supporting Marine Conservation Efforts in the Red Sea

Through consultancy work for NEOM, KAUST Beacon Development [provided critical expertise to support marine species conservation in the Red Sea](#). High-coverage aerial drone surveys captured thousands of images of dugongs, dolphins, turtles, sharks, and rays, with AI-powered analysis helping to inform species management strategies. Additionally, the Ras Baridi Turtle Conservation Initiative monitored and safeguarded Saudi Arabia's largest Green turtle rookery. These efforts contribute to evidence-based conservation planning, reinforcing the importance of protecting marine biodiversity in the region.

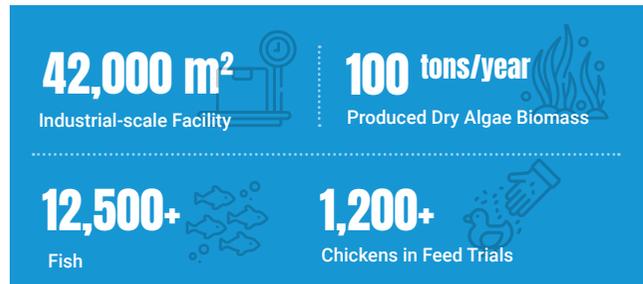
Key Achievements in NEOM and Ras Baridi



Scaling Up Algal Biotechnology

Building on the successful Phase I pilot project, which demonstrated the viability of cultivating algae strains in desert conditions, [KAUST has advanced to Phase II of its partnership with the Ministry of Environment, Water and Agriculture \(MEWA\)](#), establishing a 42,000-square-meter industrial-scale microalgae facility. As part of the KAUST-hosted Saudi Center for Algal Biotechnology Development and Aquaculture, this state-of-the-art infrastructure supports research and development in algae-based solutions for animal feed, high-value biomolecules, sustainable aquaculture, and marine resource management. With significant milestones achieved, this expansion reinforces KAUST's commitment to advancing scientific capacity and promoting the sustainable use and conservation of marine resources.

KAUST-MEWA Algae Program



Advancing Sustainable Fisheries Management

KAUST Beacon Development provided [expert consultancy to support sustainable fisheries management in the Red Sea and Gulf of Aqaba](#) as part of the NEOM Sustainable Fisheries Program.

Through advisory services, capacity building, and data-driven assessments, KAUST contributed to understanding commercial fish species, fishing practices, and the impact of recreational fishing. Additionally, the program explored alternative livelihoods to ease fishing pressure and promote long-term sustainability. These efforts informed an Ecosystem-Based Fisheries Management Plan and policy recommendations for the NEOM Nature Reserve, reinforcing KAUST's role in supporting science-based conservation and responsible resource management.



ENGAGEMENT & OUTREACH

Partnering to Advance Coral Restoration Education

The Coral Research & Development Accelerator Platform (CORDAP)—a G20 initiative hosted at KAUST—has signed a Memorandum of Understanding with the Khaled bin Sultan Living Oceans Foundation (KSLOF) to [strengthen education and capacity building for coral restoration](#).

Announced at the Champions for Coral Innovation Accelerator Gala in London, this collaboration aims to train the next generation of coral restoration practitioners by combining expertise in restoration science and education. As the host institution of CORDAP, KAUST plays an important role in driving global innovation in coral restoration, supporting the development of educational programs, training initiatives, and the dissemination of best practices to enhance reef resilience worldwide.



Amplifying Ocean Conservation at COP29

A KAUST faculty member contributed expertise to [two high-profile ocean panels at the United Nations Climate Change Conference \(COP29\) in Baku, Azerbaijan](#), advocating for science-driven marine conservation. At the "Youth Leadership and Expert Perspectives on the Future of Coral Reefs" panel, hosted at the U.S. Center Pavilion, discussions focused on the latest research in coral reef protection and the role of youth in ocean policy. Additionally, at the "Ocean Optimism in Action" session in the Ocean Pavilion, success stories in marine conservation were shared, emphasizing collaboration, scientific innovation, and community engagement as drivers of climate action and ocean resilience.

Scaling Coral Restoration on the Global Stage

KAUST has showcased its pioneering work at [Reef Futures 2024](#), the premier global symposium on coral reef restoration. The conference, organized by the Coral Restoration Consortium, convenes experts to share advancements in reef conservation. The KAUST Coral Restoration Initiative (KCRI) had significant participation across the event, with the highlight being the launch of the KAUST-developed eCoral™ platform. This revolutionary digital ecosystem created for coral restoration management includes coral husbandry life support and the world's first coral reef digital twin. This innovation aims to reinforce KAUST's leadership in driving more cost-effective and scalable restoration solutions to safeguard coral ecosystems worldwide.

KCRI Reef Futures Participation



Scaling Up Coral Reef Restoration

Coral reefs support 25% of marine life but are declining due to climate change, pollution, and habitat destruction. Without intervention, up to 90% of reefs could disappear by 2050, threatening biodiversity, fisheries, and coastal protection. **The KAUST Coral Restoration Initiative (KCRI)**, in partnership with NEOM, is pioneering the largest coral restoration project in the world. The first nursery on the Red Sea coast produces 40,000 corals annually, with a second facility set to expand production to 400,000 corals per year by 2025. This initiative aims to deploy 2 million coral fragments, providing a scalable model for reef restoration globally. By combining scientific innovation and large-scale deployment, KAUST is advancing marine conservation and setting a new global benchmark for reef restoration. This initiative enhances ocean resilience, supports biodiversity, and contributes to sustainable marine ecosystems worldwide.





Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Harnessing Mangrove Microbiomes for Land Rehabilitation

The [bacterial diversity within mangrove ecosystems](#) has been explored by KAUST researchers, revealing their potential to enhance plant resilience in saline environments. By analyzing the microbiome of Red Sea mangroves, the team was able to recover 56% of the bacterial diversity, identifying 256 bacterial strains, 11 of which significantly improved plant growth under salt stress. These findings highlight the ecological importance of mangrove-associated microbes and their role in sustainable agriculture and land restoration under saline conditions. With potential applications in biofertilizers and ecological rehabilitation, the study paves the way for innovative solutions to rehabilitate saline-degraded lands and improve overall ecosystem health and sustainability.



“I hope to support KAUST’s contribution towards SDG 15

by leading more biodiversity education and outreach events for the KAUST community in collaboration with HSE and the Students for Sustainability.”

– Alexa Foster, Ph.D. student in Marine Science, BESE

RESEARCH & EDUCATION

Unraveling the Impact of Climate and Grazing on Dryland Ecosystems

A KAUST faculty member contributed to two global studies examining how climate change and livestock grazing shape dryland ecosystems. One study involving over 100 scientists revealed that [shifts in climate and grazing pressure are altering the dominance of woody species in drylands](#), with significant consequences for biodiversity and ecosystem stability. The other study analyzed over 133,000 plant trait measurements and found that arid conditions increase plant trait diversity, particularly in highly grazed regions, [challenging the assumption that extreme environments limit biodiversity](#). These findings reinforce the need for sustainable land management to preserve dryland resilience and protect biodiversity in the face of climate change.



Enhancing Wildfire Hazard Prediction with AI

A [deep-learning-driven statistical model that predicts wildfire spread in Australia](#) was developed by KAUST researchers to improve wildfire hazard assessments. By analyzing large-scale fire data with advanced machine learning techniques, the study provides a more precise understanding of how wildfires develop across irregular landscapes. Using over 20 years of wildfire data, the model identifies high-risk regions and key environmental drivers of fire severity. These insights support better disaster preparedness, informing urban planning, land management, and conservation strategies to mitigate the impact of extreme wildfires on biodiversity and communities.

OPERATIONS

Contributing to the Discovery of New Species

Experts from KAUST have contributed to significant discoveries in Saudi Arabia’s terrestrial biodiversity, enhancing scientific understanding and conservation efforts. In collaboration with the Prince Mohammed bin Salman Royal Reserve (PMSRR), [a comprehensive bat survey from 2022 to 2024 identified 18 bat species](#), including the first recorded occurrence of *Vansonia rueppellii* in the Kingdom. Additionally, a [KAUST expert also contributed to the identification of *Rhynchocalamus hejazicus*](#), a newly described snake species found in the northwestern Hejaz region. This discovery helps bridge a biogeographic gap within its genus, expanding knowledge of reptile diversity in the Arabian Peninsula. By applying genetic analysis and field surveys, these studies provide valuable insights into species distribution, habitat resilience, and conservation priorities in the region.

New Species Description and Discovery



Vansonia rueppellii



Rhynchocalamus hejazicus

Providing Research Infrastructure for Land Restoration

The University’s [Plant Growth Core Lab](#) offers comprehensive facilities for researchers and partners focused on agriculture, reforestation, and land restoration. The Research Greenhouse features multiple plant growth rooms with independent temperature, lighting, and humidity control, supporting studies on diverse plant species. The research field site, equipped with open



plots, greenhouses, and shade houses, enables testing of plant adaptability in natural conditions. A high-throughput phenotyping system aids in identifying key plant traits for reforestation and ecological restoration. These resources support the development of innovative solutions in plant science, driving efforts in land rehabilitation and greening efforts.

Integrating Biodiversity Conservation into Campus Operations

KAUST is home to a diverse bat community, potentially representing up to one-third of Saudi Arabia's bat species, including both insectivorous species and the Egyptian Fruit Bat. These bats play a crucial role in maintaining ecological balance through pollination, insect control, and seed dispersal. As part of its commitment to biodiversity conservation within campus operations, KAUST has integrated continuous monitoring of bat populations using acoustic sensors. This program enhances ecological research while supporting the sustainable management of natural habitats within the University's environment.

ENGAGEMENT & OUTREACH

Leading on Land Conservation and Restoration at UNCCD's COP16

Hosted in Riyadh as one of the most important events in the Kingdom, the [16th Conference of the Parties \(COP16\) to the UN Convention to Combat Desertification \(UNCCD\)](#) welcomed over 30 KAUST experts, with the University demonstrating its commitment to land restoration. The event gathered global stakeholders to tackle the critical environmental challenges of land degradation and desertification, with a focus on preserving biodiversity and enhancing land productivity. KAUST presented cutting-edge technologies and research to support sustainable land management practices, emphasizing the importance of informed policy-making and integrated approaches to restore ecosystems, preserve natural resources, and enhance the resilience of drylands, aligning with national and global environmental priorities.



KAUST's Impact at UNCCD COP16



Collaborating to Protect National Biodiversity

KAUST has [signed a Memorandum of Understanding with the National Center for Wildlife \(NCW\)](#) to promote joint efforts in protecting ecosystems and enhancing biodiversity. The collaboration, announced during the UNCCD COP16, will focus on scientific research, community awareness, and volunteering programs. The agreement supports Saudi Arabia's Vision 2030 goals and the Green Saudi Initiative, aiming to strengthen the Kingdom's role in environmental sustainability. The partnership includes developing genetic diversity projects, establishing monitoring programs, and contributing to global efforts in safeguarding wildlife and ecosystems.



Influencing Art through Environmental Engagement

KAUST [contributed with its scientific expertise to the Contemporary Art Biennale in Diriyah](#), a UNESCO World Heritage Site, by supporting renowned artist Martha Atienza in integrating ecological themes into her art installation. As part of the collaboration, KAUST experts hosted the artist and her visit to the local community in Thuwal, engaging with residents and local fishermen to gather materials and explore the historical connection between the region's historic fishing culture and its natural ecosystems. To further enhance the artwork, KAUST donated 40 mangrove seedlings to the exhibition, symbolizing the role of mangroves in coastal resilience and connectedness, and their significance to local communities.



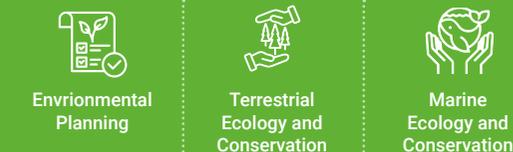
Did You Know?

KAUST participated in the International Day of the Arabian Leopard by hosting a community "Catwalk" event, raising awareness about this critically endangered species and its vital role in the region's biodiversity.

Preserving Saudi Arabia's Future

Saudi Arabia's unique ecosystems face significant challenges, with 95% of its land classified as desert. To combat land degradation, the Kingdom has committed to restoring 200 million hectares of degraded land domestically and internationally. Achieving this, while balancing development and environmental sustainability, requires science-driven conservation strategies. KAUST has been playing a key role in this effort through Beacon Development (KBD), the University consultancy arm. Collaborating with entities such as the National Center for Wildlife, NEOM, and the Royal Commission for Riyadh City, KAUST has been leading multiple environmental consultancy projects such as conducting ecological assessments, habitat mapping, and species monitoring to inform conservation strategies in national development projects. Bolstering reputable experts, faculty and researchers covering diverse topics, KAUST advances evidence-based land management and habitat restoration, supporting Vision 2030's environmental goals of ecological resilience and heritage.

Beacon Development Environmental Consultancy:



ACCELERATING IMPACT



Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

RESEARCH & EDUCATION

Enhancing Privacy in Research through Secure AI

A [privacy-preserving machine learning framework – PPML–Omics](#) – was developed by KAUST researchers to [address the growing risks of data breaches in biomedical research](#).

By integrating differential privacy and federated learning, the model protects sensitive genetic and medical data while maintaining analytical accuracy. This approach enables secure multi-institutional collaborations without exposing patient identities, reducing vulnerabilities to data reconstruction and inference attacks. By developing robust AI-driven security solutions in biomedical research, the University contributes to the ethical governance of digital health data, ensuring both scientific progress and the protection of individual privacy in an era of rapid technological advancement.



Promoting Ethical Research

Ensuring transparency and accountability in research is essential for building trust in scientific advancements. To promote ethical research practices, a [workshop on the Responsible and Ethical Use of AI in Research](#) was delivered covering legislative measures, ethical principles, and institutional policies for responsible AI adoption in academia. Additionally, [a six-hour research ethics training program](#) provided guidance on ethics approval processes, compliance policies, publication ethics, and ethical decision-making. These initiatives, along with other workshops organized by Research Compliance, enhance research governance and equip the community with the necessary tools to uphold ethical standards.

Modeling Trust in AI Systems

Trust is a fundamental pillar of effective institutions and governance, yet understanding how AI interacts with trust remains a challenge. A study involving KAUST researchers examined [whether large language model \(LLM\) agents, such as GPT-4, can simulate human trust](#) behaviors using Trust Games, a widely recognized framework in behavioral economics. The findings indicate that LLM agents exhibit strong behavioral alignment with human trust responses, offering insights into how AI can be designed to foster transparent and accountable decision-making. Such research contributes to the development of future AI systems that support fairness, trust, and responsible governance.



“I hope to support KAUST’s contribution towards SDG 16

by continuing to work on enhancing cybersecurity in software systems to safeguard critical infrastructure and prevent malicious exploits, drawing from my experience in identifying software and firmware vulnerabilities.”

– Li Zhou, Ph.D. student in Computer Science, CEMSE

OPERATIONS

Enabling Open Access Publishing

KAUST signed [Saudi Arabia’s first open access agreement with Wiley](#) – a reputable academic publisher –, providing researchers access to Wiley’s full journal portfolio and enabling publication in over 1,300 hybrid open-access journals. This three-year partnership enhances global collaboration, accelerates scientific discovery and the reach of research outputs. Promoting open-access publishing strengthens the University’s commitment to knowledge-sharing and academic accessibility, while promoting transparency and integrity by ensuring research remains public and open to peer scrutiny.



Did You Know?

In 2024, KAUST celebrated its 10th anniversary of championing Open Access, ensuring its research is freely available, promoting collaboration and advancing scientific progress.

Fostering Strong Governance and Accountability

During [Internal Audit Awareness Month](#), the launch of a dedicated website, awareness sessions, and a campus booth engaged the community in understanding the importance of transparency and effective governance. Interactive activities, such as quizzes, highlighted the role of internal audits in maintaining operational integrity. Complementing these efforts, a [new audit policy](#) was introduced to streamline the communication of findings and recommendations through clear reporting guidelines, escalation protocols, and follow-up procedures. Together, these initiatives reinforce KAUST’s commitment



to identifying areas of improvement, mitigating risks, enhancing integrity, and establishing strong institutional governance.

Elevating Cybersecurity Awareness and Integrity

To enhance cybersecurity resilience and comply with National Cybersecurity Authority (NCA) requirements, KAUST's Information Security Department launched institution-wide mandatory training programs. These include Information Security Awareness courses and a targeted "Phish Finders" module following phishing simulation exercises to strengthen detection skills against cyber threats. By equipping the community with practical knowledge to identify and respond to cyber threats, these initiatives help sustain a secure digital environment, uphold operational integrity, and strengthen KAUST's operations and infrastructure.

ENGAGEMENT & OUTREACH

Strengthening Global Partnerships and Funding Opportunities

The [EU Info Day 2024](#), hosted by KAUST, connected researchers to funding and collaboration opportunities through initiatives such as Horizon Europe, ERC, Erasmus+, and Marie Skłodowska-Curie Actions. Featuring



informative presentations, interactive discussions, and personalized consultations, the event enabled researchers to gain deeper insights into collaborative research pathways with European partners. By facilitating international engagement, knowledge exchange, and cross-border research cooperation, the event contributed to strengthening KAUST's

role as a hub for inclusive and impactful international partnerships, fostering a global network that supports transparent, accountable, and responsible research practices.

Outcomes of the EU Info Day



Promoting Open-Access Science

KAUST [Library's Open Access Week 2024](#) promoted research transparency and data accessibility through educational events highlighting open-access publishing. The week featured demonstrations of open-access tools such as NOMAD (Novel Materials Discovery), a cutting-edge platform developed by FAIRmat, a consortium committed to making materials science data openly available by following the FAIR (Findable, Accessible, Interoperable, Reusable) principles. Through discussions and practical workshops, participants explored how open-access initiatives strengthen scientific integrity and institutional accountability, empowering researchers and institutions to collaborate globally and ensuring research outcomes benefit society in a collaborative and transparent way.



Advancing Cybersecurity Resilience

During Cybersecurity Awareness Month, KAUST highlighted its [research in safeguarding digital security in critical infrastructures](#), such as energy systems and satellite communications, especially in the Kingdom. Faculty-led projects addressed real-world vulnerabilities, including side-channel attacks and malware threats that could lead to an increase in phishing attacks and consequent revelation of sensitive information or downloads of harmful software. With the potential to collaborate with industry and government, KAUST advances practical solutions to strengthen global cybersecurity resilience and reduce cyber risks.

Committing to Integrity

Globally, higher education institutions face growing calls for greater transparency, with UNESCO emphasizing accountability as crucial for building trust and effective governance. In the Middle East, enhancing institutional transparency remains essential for sustainable development. As the first Saudi University to join the UN Global Compact Saudi Arabia Network, and to submit its [Communication on Engagement Report](#), KAUST demonstrates its commitment to ethical governance by aligning institutional practices with the Compact's principles of human rights, labor standards, environmental responsibility, and anti-corruption. Through this leadership, KAUST aims to inspire other national institutions to adopt these standards, fostering transparent, inclusive, and accountable institutions across the region.

The Ten Principles mandate organizations to:

1. Support and respect human rights
2. Avoid complicity in human rights abuses
3. Uphold freedom of association and collective bargaining
4. Eliminate forced and compulsory labor
5. Abolish child labor
6. End discrimination in employment and occupation
7. Support a precautionary approach to environmental challenges
8. Promote greater environmental responsibility
9. Advance environmentally friendly technologies
10. Act against all forms of corruption, including extortion and bribery



Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development

The SDG Collection

Finalist
of International Green Growth Awards 2024 - Benefitting Society

Honorable Mention
ISCN Best Practices Report 2024

Featured Event at UN Convention for Combating Desertification (UNCCD) COP 16

RESEARCH & EDUCATION

Empowering Youth through Sustainability Literacy

In collaboration with the United Nations Development Programme (UNDP) and Frontiers for Young Minds (FYM), KAUST has launched an educational initiative to enhance scientific and sustainability literacy among youth. [The SDG Collection: How Science Can Help Us To Achieve The Sustainable Development Goals](#) is a series of articles highlighting the role of science in addressing each of the 17 SDGs. The articles, authored by KAUST researchers, are peer-reviewed by students from The KAUST School (TKS) following the FYM model, promoting engagement with young learners. The initiative will also include Arabic translations and audiovisual resources to engage children across the Arab region, fostering awareness and understanding of sustainability challenges and science-based solutions.



Offering Sustainability Education for Professionals

In a continuous collaboration with the King Abdullah Petroleum Studies and Research Center (KAPSARC), [KAUST experts joined the KAPSARC School of Policy to deliver a course on Sustainability: Climate and Energy Nexus](#) in Riyadh. Designed for professionals from diverse sectors, the program provided an interdisciplinary understanding of sustainability, integrating environmental, social, and economic perspectives aligned with global frameworks such as the UN Sustainable Development Goals. Participants strengthened their critical thinking and collaborative skills while understanding policy development on global sustainability challenges and climate strategies. Through this strategic partnership, KAUST enhanced national capacity, empowering attendees to support sustainable development initiatives within Saudi Arabia and beyond.

Bringing Connectivity to Underserved Regions

KAUST researchers are pioneering the use of [High-Altitude Platform Stations \(HAPS\) to bridge the digital divide and extend smart city benefits to underserved small towns, suburbs, and villages](#). Powered by solar energy and hydrogen, HAPS deliver cost-effective, high-speed 5G connectivity from the stratosphere. In the world's first 5G trial using HAPS, KAUST demonstrated its potential to support communities by enabling increased access to health care and education, promoting employment opportunities, and offering an inclusive digital infrastructure. This pioneering work aligns with international targets aimed at enhancing digital inclusion, fostering global cooperation in technology, and reducing inequalities by extending essential digital services to marginalized and remote populations.

OPERATIONS

Promoting Sustainability Engagement at KAUST

In June, [KAUST unveiled the Sustainability Action Lab](#), a dynamic space on campus designed to promote sustainability awareness. Projected as a meeting spot and hub to host sustainability-related activities, the room's design includes SDG branding and information, encouraging the academic community to host meetings and engage in meaningful discussions about sustainability. The Office of Sustainability also plans to activate the room by developing a program schedule for engagement around the SDGs, strengthening community involvement to advance KAUST's sustainability mission.



Did You Know?

In 2024, KAUST was ranked by the Times Higher Education Impact Rankings for its contributions on the advancement of the SDGs:

101-200th Worldwide **4th** in Saudi Arabia

Assessing Sustainability Literacy

To address the growing demand for sustainability-focused education, KAUST has pledged as a Change Leader to implement the internationally recognized [The Assessment of Sustainability Knowledge \(TASK™\) by Sulitest](#). The assessment aims to measure students' understanding of environmental, social, and economic sustainability challenges and their interconnection, scoring their knowledge of key sustainability frameworks. After the assessment, students earn a professional credential through a TASK™ certificate and can compare their knowledge against a global average. The assessment can also be carried out by academic staff

and faculty to identify knowledge gaps and increase engagement on sustainability literacy. Data acquired will be used to inform new curriculum development, close knowledge gaps, and empower the academic community through improved sustainability literacy.



“I hope to support KAUST’s contribution towards SDG 17

by leading meaningful initiatives with KAUST Students for Sustainability to enhance sustainability knowledge and practices in our community and beyond.”

- Malinalli Martínez, Ph.D. student in Environmental Science and Engineering, BESE

Aligning Research with Global Sustainability Goals

To convey the importance of connecting research activities to the United Nations Sustainable Development Goals (SDGs), the Students for Sustainability hosted a workshop titled Research for a better world: Connecting your work to the SDGs, as part of their Sustainability Workshop Series. A sustainability expert from the Office of Sustainability guided attendees on integrating and connecting global challenges with their academic and research work. The session provided practical advice on formulating research questions, thesis writing, and scientific article preparation in line with the SDG framework. The workshop equipped students and researchers with tools to enhance the impact and relevance of their research in advancing global sustainability goals.

ENGAGEMENT & OUTREACH

Modelling Future Leaders

Reflecting the importance of global partnerships in tackling worldwide challenges, The KAUST School (TKS) hosted its annual Model United Nations (MUN),



bringing together over 300 students from TKS and other schools across Saudi Arabia. Participants addressed critical issues such as inequality, climate action, poverty, and peace. By simulating international negotiations, the event

fostered interviews between students and several KAUST experts across relevant sustainable development topics. The subsequent discussions between school students aimed to promote diplomacy and cooperation—essential skills for achieving global sustainability goals. This collaborative experience deepened students’ understanding of international relations and collective action, empowering youth to advocate effectively for sustainable development within their communities and reinforcing the role of inclusive partnerships in global progress.

Sharing Sustainability Best Practices

KAUST experts participated in the [17th International Sustainable Campus Network \(ISCN\) Conference](#), held in June, at the Hospitality Business School (EHL) in Lausanne, Switzerland. Highlighting its commitment to advancing the 17 United Nations Sustainable Development Goals (SDGs), the Office of Sustainability team led two impactful talks exploring sustainability challenges in Arab universities and showcasing a collaborative initiative with Frontiers for Young Minds and the United Nations Development Programme (UNDP) to enhance scientific literacy among youth. These engagements strengthened international collaboration and the visibility of KAUST-led projects on sustainable development within higher education, contributing to shared knowledge and global partnerships.



Advancing Global Connectivity

The [fifth 6G Summit at KAUST brought together global experts from academia and industry to discuss advancements in 6G technology](#), expected to revolutionize telecommunications, healthcare,

transportation, and manufacturing. The event promoted international collaboration through interactive sessions, expert talks, and knowledge exchange, aligning with global efforts to enhance technological cooperation and innovation capacity. By hosting this summit, KAUST actively supported global partnerships in science and technology, strengthening international research cooperation and facilitating access to emerging technologies critical for achieving universal connectivity and addressing shared global challenges in the digital era.

Collaborating for Sustainability

Through its partnership with Saudi Arabia’s Ministry of Economy and Planning (MEP)—which holds the responsibility of overseeing and accelerating progress towards the achievement of the SDGs in the Kingdom—KAUST plays a pivotal role in advancing sustainable development. This collaboration is formalized through a strategic Memorandum of Understanding, enabling KAUST to engage by contributing to discussions with the Ministry of Economy and Planning, including its role in the Sustainable Development Steering Committee to support national strategies, co-developing capacity-building activities and tools to enhance sustainability expertise among stakeholders, and contributing to the Kingdom’s Voluntary National Reviews (VNRs). Furthermore, KAUST provides technical expertise in reviewing policy papers to contribute to Saudi Arabia’s SDG Roadmap. This enduring partnership highlights KAUST’s commitment to driving impactful progress toward a sustainable future at the national level.

KAUST-MEP Key Areas of Collaboration

Advance Efforts on Climate Action and Environmental Sustainability



Strengthen National SDG Ranking



Support SDG Advancement in the Kingdom





ABOUT THE KAUST SDG HIGHLIGHT REPORT

This report was elaborated by the Office of Sustainability, part of Strategic Initiatives overseen by the Office of the President. The Office of Sustainability is the connecting hub responsible for the coordination and guidance of the University's sustainability roadmap, in line with KAUST's Sustainability Vision.

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Acknowledgements

The authors would like to thank all KAUST departments, teams and students who shared data or contributed to the work highlighted in this report, including, but not limited to, National Transformation Institute, Campus and Community, Health, Safety and Environment, Human Resources, Government Affairs, Global Branding and Communications, Graduate Affairs, IT, Finance, Academic Divisions, Centers of Excellence, Research Platforms, Office of the VP for Research, Office of the Provost, Office of the President, Student Groups, and all external contractors, partners and collaborators.





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Science and Technology

