

DRIVING INNOVATION

KAUST INNOVATION & ECONOMIC DEVELOPMENT

ANNUAL REPORT
2019



جامعة الملك عبد الله
للعلوم والتقنية
King Abdullah University of
Science and Technology

INNOVATION
AND ECONOMIC
DEVELOPMENT

In September 2019, KAUST celebrated its 10-year anniversary. At the heart of this journey: the university's commitment and contribution to technological research and education. Now we are building on that foundation, designing innovative ways to create and commercialize the technology that will change the future.

What's next for KAUST Innovation & Economic Development? A strategic shift to the forefront of deep tech innovation and lasting value for the Kingdom of Saudi Arabia — and the world.

KAUST I&ED: DRIVING INNOVATION AND IMPACT

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WELCOME TO THE HEART OF DEEP TECH

2019 MARKED A NEW CHAPTER FOR KAUST AND A MILESTONE TRANSFORMATION FOR THE DEPARTMENT OF INNOVATION & ECONOMIC DEVELOPMENT.

As it has for the past 10 years, KAUST continues to be a beacon of opportunity and home to some of the brightest minds in the world.

The department of Innovation & Economic Development (I&ED) plays an important role in the KAUST ecosystem: enabling the transformation of research into real impact. By the end of our first decade, we had the necessary insight and resources to serve as a research and development (R&D) bridge between innovators, industry, the Kingdom of Saudi Arabia and the world. But our impressive intellectual property (IP) portfolio remained largely untapped.

Our new strategic I&ED plan prioritizes our mission to become the “deep tech” heart of the Saudi economy.

2019 saw I&ED shift toward an impact-centric model that facilitates problem-solving, enabling a flow of knowledge that begins with university research and leads to real global change. This new model focuses on:

- **Increasing the value of KAUST technology**
- **Growing our startup portfolio**
- **Increasing entrepreneurship training beyond KAUST's walls**

The past year has been a period of transformation as I&ED began implementing the necessary programs and structures to accelerate research commercialization and to scale innovation capacity. In this report, you'll read about some of the most exciting events and industry engagements that occurred in 2019, as well as how we're evolving our innovation ecosystem to promote entrepreneurship.

We've set ambitious goals for the future of I&ED. Join us as we achieve them.



Kevin Cullen, Vice President,
Innovation & Economic Development

Why deep tech?
Deep tech ecosystems create products and services based on scientific discovery and engineering innovation — and that's what we do here at KAUST.

10

YEARS OF INNOVATION
AND COUNTING...



KAUST spinout FalconViz is a next-generation 3D surveying provider



EDUCATION

WITH AN

IMPACT

253

STARTUPS SUPPORTED
SINCE 2009

At KAUST, we're enabling the next generation of deep tech founders through the study and practice of entrepreneurship and startup acceleration.

ENTREPRENEURIAL LEADERSHIP

OUR GOAL:

50,000

INNOVATORS TRAINED
BY 2025



Global startups on campus for the Entrepreneurship World Cup bootcamp

KAUST's ecosystem — open to all entrepreneurs in Saudi Arabia — begins with ideation training and includes product and prototyping development, mentorship and grant funding. KAUST's commitment to fostering and growing this entrepreneurial ecosystem extends beyond the University walls.

Modeled on deep tech teaching hubs such as MIT, Cornell, Berkeley and Stanford, KAUST's entrepreneurship education embeds innovation at the heart of the learning experience:

- The New Ventures and Product Innovation course, now in its third year, boasted 57 graduates.
- Entrepreneurship for All, a new on-campus course created by the Stanford Center for Professional Development, teaches design thinking, commercialization and leadership core skills to help students put their learning to work.

Our inclusive, growth-centered community extends beyond our students to active partnerships with 18 other in-Kingdom universities and a broad network of partners and investors.

KAUST ENTREPRENEURSHIP CENTER

The KAUST Entrepreneurship Center fosters a Kingdom-wide community of innovators, providing hands-on training and funding support for emerging ideas. We help scientists and students turn research into real-world impact and inspire innovators to create world-changing companies.

“KAUST Entrepreneurship Center's main goal is to create new high-quality, high-impact ventures from across Saudi Arabia by providing professional training, network access and mentorship to help founders take their ideas to the market.”

Hattan Ahmed, Head of KAUST Entrepreneurship Center



Junction X KAUST Hackathon, September 2019

AWARD-WINNING STARTUPS



FalconViz and Ajeer: Top 100 Mena Startups, World Economic Forum



Red Sea Farms: 3rd place win, Entrepreneurship World Cup – Global Finals

Cura, Red Sea Farms, Dhad, Sadeem, UnitX, Faheem: National winners, Entrepreneurship World Cup – Saudi Finals



RoboCrop: Best Date Palm Innovation award, Global Innovations in Agriculture



Babar Khan (Qualsens): Mena recipient, MIT Under 35



Wayakit: 3rd place, Startup Turkey



OrbitCrops: 2nd place, Startup Istanbul



Sanoor: 3rd place, Seedstars Riyadh



Sadeem: 1st place and selected to pitch at Bitz & Pretzels, Startup Germany



Global founders at the Entrepreneurship World Cup KAUST Bootcamp

NEW STRATEGIC PARTNERSHIP:

ENTREPRENEURSHIP WORLD CUP

KAUST and Misk Global Forum partnered to attract cutting-edge, impactful startups and top entrepreneurial talent to Saudi Arabia for the inaugural Entrepreneurship World Cup. As the Innovation Partner, KAUST hosted all Entrepreneurship World Cup finalists on campus to prepare them for the global finals in Riyadh.



مؤسسة محمد بن سلمان الخيرية
Mohammed bin Salman Foundation
مسك الخيرية misk foundation



MISK
GLOBAL FORUM
منتدى مسك العالمي

TAQADAM STARTUP ACCELERATOR

Now in its third year, KAUST's TAQADAM Startup Accelerator, in partnership with Saudi British Bank (SABB), has graduated 28 startups, equipping them with the tools to launch technology-based startups. The program develops startups in industries ranging from e-commerce and engineering to health care and science to technology and gaming.

The Accelerator provides mentorship and business training in topics such as ideation, product development, pitching and fundraising.



GenosTech pitching at TAQADAM Showcase

>12M

SAR GRANTED

2019 TAQADAM ACCELERATOR SHOWCASE WINNERS

Six 2019 Showcase winners received 375,000 SAR (100,000 USD) in follow-on funding.



Firmas Aero: Drones-as-a-service for airport infrastructure inspection



Faseeh: Learning app teaching Arabic language skills to help raise Qiyas scores



Genos Tech: Transforming microalgae into high-value products such as vitamin A and dietary supplements



Peregrine Genomics: Accurate genetic diagnoses in half the time and cost



GlucoJet: Noninvasive, pain-free glucose testing for diabetes patients



Talon Dust Control: Low-cost, liquid spray-on solution for environmental dust control

GROWING KAUST'S ENTREPRENEURSHIP ECOSYSTEM



2010

**KAUST
Entrepreneurship
Center founded**



2011

**Venture Lab
accelerator
program
established in
partnership with
Babson College**



2013

**HIKMA Startup
Accelerator opens;
notable graduates:
Sadeem, FalconViz
and NOMADD**



2016

**First for-credit
course launched:
New Ventures &
Product Innovation
(IED 210)**

**9/10ths
Accelerator
launched; notable
graduates: Dhad
and Cura**



2017

**TAQADAM Startup
Accelerator
launched in
partnership with
SABB; notable
graduates: UnitX,
iyris and Edama
Organics**



2018

**KAUST
Entrepreneurship
Center wins Top
Challenger award
from UBI Global**



2019

39 innovation bootcamps in 2019

- Official startup training partner of GITEX Superstars, Misk Global Forum, MITEF Saudi Arabia, MITEF Pan Arab, Rise Up and ArabNet
- Biggest ever STEAM Innovation Challenge: 305 students from 21 Saudi universities
- 200 hackers at JUNCTIONxKAUST in partnership with NEOM and Microsoft
- Official knowledge partner for Ministry of Communications and IT (MCIT) Tech Champions programs in Jeddah, Riyadh and Dammam
- 70 innovators trained in partnership with Makkah Government Emirate

A DECADE OF COLLABORATIVE IMPACT

10th KAUST Industry
Advisory Board

A DECADE OF INNOVATION

150+

RESEARCH PROJECTS FUNDED
BY INDUSTRY PARTNERS

70+

INDUSTRY PARTNERS

FINDING SOLUTIONS THROUGH INDUSTRY ENGAGEMENT

“KAUST was founded to help solve global challenges — in food, water, energy and the environment. We do so by striving for research excellence and through deep and lasting relationships with industry leaders.”

Farhan AlShahrani, Head of Strategic Innovation Partnerships

KICP MEMBER CONTRIBUTIONS

25%
OF GRADUATES HIRED

160
KAUST GRADS
EMPLOYED IN KRTP

In September 2019, KAUST celebrated its first decade as a university. This period saw significant academic achievements, providing a solid foundation for future innovation. Now, KAUST is designing new ways to create and commercialize technology that will change the future of Saudi Arabia — and the world.

THE KAUST INDUSTRY COLLABORATION PROGRAM (KICP)

KAUST’s flagship industry engagement program helps partners leverage the University’s human and technological resources, enabling us to transform business needs into innovative products, processes and technologies. KICP members have funded more than 150 research projects with University faculty members, hired more than 25% of the University’s graduates and employed 160 highly skilled workers in the KAUST Research and Technology Park.

MILESTONE MOMENTS: CELEBRATING INDUSTRY IMPACT

The 10th annual meeting of the KAUST Industry Advisory Board (KIAB) in November 2019 highlighted the University’s decade of milestone achievements in research, education and economic development. The meeting, chaired by KAUST President Dr. Tony Chan, included the participation of 26 executive-level KICP members.

This year’s KIAB meeting looked beyond 2030 to focus on future technologies that will deliver impact in Saudi Arabia. KAUST faculty presented their vision for the future in bioscience, food, water and energy security and their intersection with digital technologies such as artificial intelligence and supercomputing.



KICP HIGHLIGHTS THE FIRST 10 YEARS

<div>2009</div> <div>KAUST opens and 11 founding members join KICP, connecting research talent with R&D-intensive corporate leadership.</div>	<div>2011</div> <div>SABIC begins annual support of KAUST postdoctoral fellowships (55+ to date).</div>	<div>2013</div> <div>SABIC awards endowments to five assistant professors at KAUST.</div>	<div>2014</div> <div>Air Products sponsors research at the KAUST Clean Combustion Research Center.</div>	<div>2015</div> <div>KICP reaches 40 members.</div> <div>Saudi Aramco funds the Ali I. Al-Naimi Petroleum Engineering Research Center.</div>	<div>2016</div> <div>Halliburton grants 15 software licenses to KAUST.</div> <div>Saudi Aramco and KAUST Core Labs complete the world’s first trillion-cell reservoir simulation using KAUST supercomputer Shaheen.</div>	<div>2019</div> <div>Asel Tech becomes the 42nd tenant of the KAUST Research and Technology Park.</div>
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NEW RESEARCH, NEW PARTNERSHIPS



KAUST signed an agreement with Virgin Hyperloop One, the world's leading hyperloop company

“We are creating new research initiatives — we already have energy, water, environment, and food, and we are now launching new initiatives in AI, smart health, and impact-focused translational research.”

Dr. Tony Chan, KAUST President

KAUST is looking to the future, actively growing an ecosystem that bridges science and research with industry and economic development. Our corporate and government partners are essential to bringing KAUST research to life through real-world applications.

KAUST is home to some of Saudi Arabia's leading industry and academic partnerships. Since 2009, 40 companies have been part of the KICP. Eleven of these founding members have been with us for the past decade: Abdul Latif Jameel, Boeing, Dow, Halliburton, IBM, Nalco, Sabic, Saudi Aramco, Schlumberger, Siemens and Sumitomo Chemical.

NEW KAUST PARTNERSHIPS IN 2019



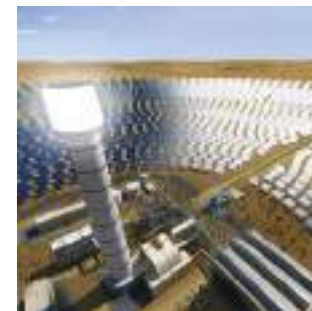
Elm: Educating Future Talent

February 2019

Partner: Elm, Saudi Arabia's leading digital solutions company

Purpose: Entrepreneurship training programs

This partnership seeks to support and educate Saudi youth, helping to advance a knowledge-based, digital-focused economy. Past collaborative projects include KAUST-based hackathons focused on energy and smart-city solutions and Elm-sponsored attendance for KAUST students at Junction, Europe's largest hackathon.



ACWA Power: Establishing Sustainable Excellence in Desalination and Solar Power

September 2019

Partner: ACWA Power, a leading independent developer, investor and operator of power-generation and desalinated-water plants

Purpose: Desalination and solar power

The KAUST-ACWA Power Center of Excellence for Desalination and Solar Power, which pursues research aimed at cost efficiencies in the production of desalinated water and the generation of solar power, was inaugurated. Biofouling, sensor development and evaluation, and reducing the carbon footprint are also on the agenda.



Virgin Hyperloop One: Driving Technology and Transport

November 2019

Partner: Virgin Hyperloop One (VHO), the world's leading hyperloop company, based in California

Purpose: Technology and transportation

Following a feasibility study by VHO and King Abdullah Economic City (KAEC), KAUST and VHO are seeking approval for a VHO Center of Excellence. If approved, the Center could create more than 124,000 local high-tech jobs, incorporating advances in robotics and AI and driving an estimated \$4 billion increase in Saudi Arabia's GDP over the next 10 years.



MODON: Creating Smart Campuses

December 2019

Partner: Saudi Authority for Industrial Cities and Technology Zones (MODON), a government agency established to develop, operate, and maintain industrial cities and technology zones in partnership with the private sector

Purpose: Power grids, air quality, water reuse and integrated “smart” campuses

This partnership aims to find new ways to improve performance, productivity and efficiency. MODON will provide access to its data, sites and tenant factories. KAUST will provide research support and access to courses, incubators, and business accelerators to MODON and its tenants.

NEW PARTNERSHIPS

This year KAUST welcomed 10 new industry and government partners:



INNOVATION DESTINATION

KAUST is unique: home to some of the world's brightest minds, a world-leading industry park and a vibrant community.





KAUST RESEARCH & TECHNOLOGY PARK

“Supporting SMEs at the Park is a major step moving forward, and with advances and increased interest in deep tech, the pipeline for those companies has expanded.”

Amr AlThagafi, Research Park & Tenant Affairs Manager

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T E N A N T S

KAUST is more than a university — it is a research-focused smart city, equipped with housing, schools and shops as well as world-class R&D and educational facilities. When companies come to the KAUST campus, they get more than an R&D lab — they get access to KAUST’s full innovation ecosystem.

KAUST-based company products and services are integrated wherever possible into the campus, from transparent solar windows to desert composting facilities. Park corporates and startups are embedded in the fabric of the university.

In 2019, Research Park & Tenant Affairs Manager Amr AlThagafi launched a new strategic plan for the Park, focusing on startups and on small and

medium-sized enterprises (SMEs) as well as on maintaining an existing portfolio of large corporate partners.

“Five years ago, the Park’s value proposition was perfect for R&D bases, but startups saw our distance from major cities as a challenge,” AlThagafi explained. “Now, the KAUST Entrepreneurship Center is graduating more students than ever, our Innovation Fund is investing in more companies, and we’ve removed restrictions that limited our ability to support startups’ R&D efforts.”

The Research Park has launched a new startup subsidy program aimed at enabling the growth of SMEs. Through this and other programs, KAUST is enticing and retaining more startups, developing more R&D partnerships, and increasing both the growth of the Park and the likelihood of success for the companies in it.

2019 PARK MILESTONES



Saudi Vaccine and Biomanufacturing Center (SVBC) Construction

Partners: RPDC, SaudiVax, KACST

Purpose: This research and industrial center will develop and produce solutions in the fight against epidemic risks in the Kingdom, including the Middle East respiratory syndrome coronavirus (MERS-CoV).



Dow Innovation Center

Partner: Dow

Purpose: This state-of-the-art R&D facility is Leadership in Energy and Environmental Design (LEED) Gold certified and houses labs, offices and the Dow Digital Marketplace Center.

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NEW TENANT COMPANIES

“KAUST is a living laboratory for digital transformation. The self-driving vehicle project underscores our strong AI research base and the flexibility of our campus community.”

Dr. Tony Chan, KAUST President

ANOTHER FIRST: KAUST LAUNCHES SELF-DRIVING VEHICLES

In a first-of-its-kind pilot project, KAUST introduced the Kingdom’s first fully electric, self-driving shuttles to its campus. The project incorporates vehicle technology from Local Motors (by LM Industries) and EasyMile, global leaders in autonomous mobility and advanced manufacturing.

The launch of this project establishes the University as a frontrunner in eco-friendly transportation and mobility research and makes KAUST a notable smart city in the region. Innovation and sustainability are two of the University’s highest priorities, and the two pilot vehicles represent an important advance in transportation solutions that can help to—

- reduce emissions,
- increase mobility and
- diversify the Kingdom’s economy.

To navigate safely, the shuttles use mapping, cognitive response technology, light detection and ranging (Lidar) and obstacle avoidance systems. KAUST strategic partner Saudi Public Transport Co. (SAPTCO) operates the two autonomous shuttles, which are scheduled to enter rotation in January 2020.





THE FUTURE OF DEEPTECH

Collaborating with KAUST researchers to drive research towards commercialization and increasing the number of licenses are essential steps to creating vital new technology products for the Kingdom.

We're pioneering the next generation of deep tech startups through strategic seed and early-stage venture capital investment.

NEXT-GEN TECHNOLOGY TRANSFER AT KAUST

“We’re asking the question: ‘How best can we do deals that turn research into impact?’”

Sean Flanagan, Director of Technology Transfer

KAUST’s Technology Transfer Office (TTO) spent its first decade developing procedures and skill sets to manage the University’s intellectual property (IP) assets and patents. In 2019, the team shifted its focus to a “3D” model of KAUST’s mandate: integrating technological discovery with economic development and practical deployment to create lasting impact in the Kingdom.

DEPLOYMENT

The Deployment team gathers competitive intelligence and market trends to identify key partners for KAUST technologies and expertise. Once identified, the team strives to effectively transfer the technology through licensing with the goal of creating impact as fast as possible.

DISCOVERY

The invention process begins with a thorough understanding of the research conducted at KAUST and the filing and development of related patents. The team then decides which projects should be developed, based on licensing potential, interest to venture capital investors and impact potential.

DEVELOPMENT

Innovations that show the greatest potential move on to development. A development manager works with the research team to prepare the idea for industry engagement; for example, later stage tech could be turned into a startup. The TTO team works with researchers to develop and pitch their ideas so that the real-world impact is as clear.

GREATER IMPACT

This new approach is already reaping results. In 2019, the TTO closed 16 deals, more than in its previous 10 years combined. A focus on creating impact, reducing hurdles and simplifying deals is helping the department foster research and startups with world-changing potential and get them to market — fast. New licensing models such as the KAUST Easy Access Program (KEAP) and pragmatic deal construction give deployment managers enhanced tools to close deals that meet industry and researcher needs.

The office continues to evaluate how it can improve its communications and processes to better meet those needs. With a goal of 50% growth through 2022, the focus for the coming year is on new training, new ideas, new funding and greater impact.

KAUST TECHNICAL CONSULTANCY

2019 marked the launch of KAUST’s Technical Consultancy program, designed to engage University faculty with companies and government organizations. This new program provides an industry pipeline to KAUST’s expertise, technologies and resources, encouraging innovative, economic development and a new generation of knowledge.

Current Technical Consultancy projects involve providing training to high-profile organizations and assisting with research and testing for projects that have the potential for economic benefit for the Kingdom.

SELECT 2019 LICENSING DEALS



McLaren Automotive: Software



UnitX: Novel algorithms



Quantum Solutions: Quantum dot technologies



Dalian Eurofilm Industrial: Exclusive option



HBR Electronics: Conductive ink technologies

TECHNOLOGY TRANSFER 2019 RESEARCH GRANTS



Impact Acceleration grant: \$100,000 over six months

Challenges researchers to think about their research in a different way, as the means to lay ground for new ideas.



Research Translation grant: \$1 million over two years

Sets the stage for startups that are ready to go to market, generating high-value products and companies.



Near-Term Grand Challenges

Demonstrates significant impact in the Kingdom within two years.

INVESTING IN DEEP TECH

“At KAUST, we are actively investing in startups and technologies that are shaping industry 4.0, and UnitX is a deep tech startup at the forefront of this revolution.”

Tamer Osman, Head of the KAUST Innovation Fund

The KAUST Innovation Fund act as a strategic and financial partner for commercially viable deep tech startups, applying both a business and an engineering mindset. The 2019 startups selected to receive seed and early-stage funding seek to solve the world's most pressing scientific and technological challenges.

The Fund actively leads co-investments with Aramco's Wa'ed Fund, Research Products and Development Company (RPDC) and Saudi Venture Capital Company (SVCC) to leverage its limited annual funding allocation. With exponential growth in its investment

activities during the fiscal year 2019–2020, the Fund saw a 304% year-over-year growth in funding commitment.

These phenomenal results clearly demonstrate that the Innovation Fund has become the primary source of deep tech pipeline deals in the Kingdom and throughout the Greater Middle East.

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STARTUPS FUNDED

\$40M
INVESTED

\$100M
RAISED

120+
JOBS CREATED



UnitX business model uses KAUST's unused supercomputing power to power their cloud-based offering

2019 STARTUP INVESTMENTS

KAUST INNOVATION & ECONOMIC DEVELOPMENT



UNITX: SUPERCOMPUTING ON DEMAND

\$2 million series A including \$1 million co-investment from Saudi Aramco's Wa'ed Ventures fund

Founders: KAUST Ph.D. graduate Kiran Narayanan, KAUST professor and acting dean of Physical Science and Engineering Ravi Samtaney and Ankita Shree

Impact: UnitX aims to help enterprises of all sizes make data-driven decisions, reduce IT spending, innovate and become globally competitive. The company creates partnerships with institutions that have spare supercomputing capacity and then makes that capacity available, via an easy-to-use cloud model, to traditionally underserved industry verticals.



SADEEM: SMART-CITY MONITORING SOLUTIONS

\$2.67 million series A including \$1 million co-investment from Saudi Aramco's Wa'ed Ventures fund

Founders: KAUST Ph.D. graduates Mustafa Mousa, Ahmad Dehwah and Esteban Canepa and former KAUST professor Christian Claudel

Impact: Sadeem's unique monitoring solutions for flood, traffic, weather and air quality are noninvasive, scalable and easy to deploy. The sensors are already being used in Madinah and across the globe. This award-winning company is also a member of the U.N. Disaster Management Community.



RED SEA FARMS: GROWING MORE WITH LESS

\$1.9 million seed including \$900,000 co-investment from RPDC

Founders: KAUST Professor Mark Tester and KAUST Research Scientist Ryan Lefers

Impact: Irrigation water scarcity and hot, arid lands threaten agricultural self-sufficiency. Red Sea Farms' unique solutions for growing saltwater-tolerant crops in saltwater-cooled greenhouses reduce both fresh water and energy requirements up to tenfold and offer a return on investment in less than two years.

SEED
\$700,000
IYRIS
\$650,000
SENSOTECH

PRE-SEED
\$100,000
TRYSL
\$50,000
AQAL



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INNOVATION AND ECONOMIC DEVELOPMENT

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