



Reimagining Healthcare in Saudi Arabia

Riyadh

Nov 29 – Dec 1

Brought to you by..





Riyadh, Saudi Arabia
Nov 29 – Dec 1

A three-day event that provides a collaborative environment for the best and brightest minds to be a part of something exciting, inspiring, and fun that will impact the way healthcare is delivered to millions of people in Saudi Arabia, and around the world.

The hackathon approach begins with **strategically chosen healthcare leaders** presenting current healthcare problems to all hackathon attendees. The attendees work together to come up with innovative solutions that tackle multi-faceted healthcare issues.



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MIT's Hacking Medicine (HM) mission is to **energize and connect** the best minds across the **health ecosystem** to solve healthcare's biggest challenges and to teach healthcare entrepreneurship and digital strategies to scale medicine.

To foster this process, MIT Hacking Medicine brings together engineers, clinicians, entrepreneurs, programmers, and designers to collaborate around shared interests, and develop health solutions over a 3-day hackathon with potential for greater impact in the healthcare industry. In these events, MIT Hacking Medicine guides participants through the healthcare design thinking process and strategies developed to constructively tackle **systemic healthcare issues** and generate tangible solutions.

In just seven years, MIT Hacking Medicine has provided immense value to the healthcare community and has facilitated nearly **150 hackathons** across over **30 countries** and multiple US states. Teams coming out of these events have had successes joining local accelerators (such as TechStars, Y Combinator, Healthbox, Rock Health, and MassChallenge), raising over \$175 million in investment funding, and partnering with healthcare institutions or companies towards piloting their solutions.

Nov 29		Opening Ceremony (Grand Auditorium)
	English	Arabic
6:00 PM	Seating in Auditorium	التسجيل والدخول إلى القاعة
7:00 PM	Opening of the Hackathon	بداية حفل افتتاح الهاكاثون
7:02 PM	National Anthem, Quran	السلام الملكي والقرآن الكريم
7:05 PM	Opening Keynote Address - KACST's VP Dr. Anas Alfaris, Vice President for Research Institutes, KACST	الكلمة الترحيبية -مدينة الملك عبدالعزيز للعلوم والتقنية د. أنس فارس الفارس - نائب الرئيس لمعاهد البحوث
7:15 PM	Hacking Medicine Overview – MIT Core Team	مقدمة عن هاكاثون الابتكار الصحي -فريق MIT
7:20 PM	Technology Incubators Nawaf Alsahhaf, CEO of Badir	دور حاضنات التقنية في دعم الابتكار أ. نواف الصحاف - الرئيس التنفيذي لحاضنة بادر للتقنية
7:25 PM	Technical Keynote: Innovation in Health MIT's Professor Kamal Yousef Toumi	الكلمة الافتتاحية لمجال التقنية بروفيسور كمال يوسف تومي -معهد أم أي تي (MIT)
7:30 PM	Joint Centers of Excellence in R&D Dr. Mansour Alsaleh, Director of KACST's Joint Centers of Excellence	البحث والتطوير في مراكز التميز المشترك دكتور منصور الصالح - المشرف على برنامج مراكز التميز بمدينة الملك عبد العزيز للعلوم والتقنية
7:35 PM	Health Keynote: Advancing Physical Therapy through Technology Dr. Einas Aleissa, Vice Rector of KSU for Female Student Affairs	تطوير تقنيات العلاج الطبيعي وكيلة جامعة الملك سعود لشؤون الطالبات - د. ايناس العيسى
7:40 PM	Hacking 101 – MIT Core Team	مقدمة عن برنامج الهاكنج - فريق MIT
8:00 PM	Closing – Wrap-up	ختام حفل الافتتاح
8:10 PM	Hacking Begins	انطلاقة الهاكاثون

Nov 30		#MITSaudiHack for Health - Lectures and Workshops	
	Conference Hall (Main)	Conference Hall #2	
Session 1: Technology and Innovation in Medicine			
9:00 AM	Vision for Digital Healthcare Ali Alqahtani, Head of Digital Solutions in STC Solutions	Assistive Technology for Patients with Physical Disabilities Dr. Hanaa AlSubayel – KSU	
9:30 AM	Dubai's Innovation in Healthcare Dr. Ayesha Al Mutawa, Chief Innovation Officer, Ministry of Health, UAE	Assistive Technology For Mobility Dr. Talal Alharbi- Arriyadh Development Authority	
10:00 AM	Experience Report: Healthcare Innovation Models Dr. Bassam Mahboub, Dubai Health Authority, UAE	Bioinformatics and Data Science Dr. Nouf Alnumair- Assistant Prof. In Molecular Bioinformatics – KFSHRC	
10:30 AM	Thinking without Doing: AI and Machine Learning in Medical Care Dr. Junaid Nabi, Harvard Medical	Telemedicine Platfoms for Connected Health Dr. Khuloud Alkhateeb, Effat University	
11:00 AM	Blockchain & AI: Pragmatic Approaches, Practical Experiences, and Open Challenges, Dr. Dr. Soleh Ayubi, OPTUM	MIT Hacking Medicine Core Team: Training for Mentors - All mentors Viqar Hussain (MIT) and Paul Cheng (Cornell)	
11:30 AM	Friday Prayers and Lunch		
Session 2: Technology Applications for Global Health Challenges			
13:00	Moving towards real time biosensing for disease tracking and therapy monitoring - Freddy T. Nguyen, MD, PhD, (MIT)	Robotics and Technology Interventions in Healthcare Dr. Mohammed AlDossary - Cleveland Clinic	
13:30	Neuroscience Meets Machine Learning Qassim Bukhari – McGovern Institute for Brain Institute (MIT)	Saleem: A Diabetes Management and Prediction Platform Dr. Saleem Alelyani, King Khalid University	
14:00	The New Model of Care – Challenges and Oppurtunities [Panel] Mahmoud AlYamany - President of 2nd Healthcare Cluster / Dr. Yasmin Altwaijry, Senior Scientists and Head of Epidemiology at KFSHRC and Visiting Faculty at Harvard Med School	What is Your Story: An Examination of Our Inner Narratives Noura AlShubaily - Mindfulness Consultant and Ghaimah Podcast Co-Host Shahad AlTukhsim, an emotional processing coach and VP of Tasamy	
15:00	Coffee Break (15:00 – 15:30)		

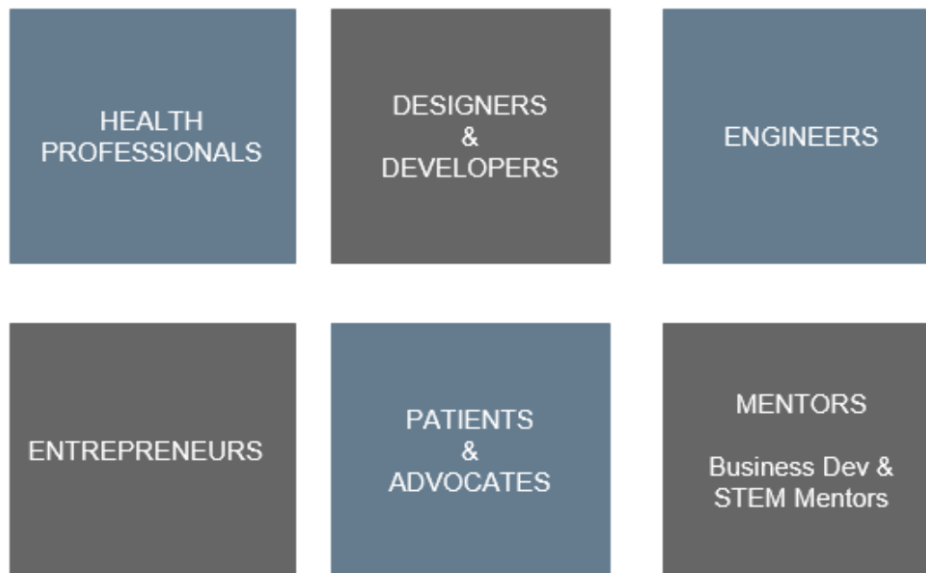
Nov 30		#MITSaudiHack for Health - Lectures and Workshops	
	Conference Hall (Main)	Conference Hall #2	
Session 3: Adoption of Advanced Technologies in Health			
15:30	Multimodal Sensor and Biosensor Platforms for Disease Diagnosis Dr. Abdel Rahman, Chemical Engineering (KFUPM)	Data Analytics for Complex Systems, Dr. Ahmad Abdulkareem, Arwa AlAnqari, Tariq AlShahrani, Sara Alnegheimesh, Maha AlMalki(KACST – MIT)	
16:00	Robotics and Automation: Challenges and Opportunities Prof Kamal Youcef Toumi, (MIT)	Cardea Platform for Smart Health Analytics Dr. Kalyan Veeramchaneni, Director of the Data to AI Group – (MIT)	
16:30		Digitization of Forensic Measurement Tools in Bitemark Analysis – Tools in Bitemark Analysis - Hidir Sayli-IT Consultant, (MSG Systems, Germany)	
17:00	Using Telemedicine to Provide Better Healthcare Across Villages, Cities, Nations and Countries Prof Amar Gupta, CSAIL (MIT)	Identify-Me App for Disaster Victim Identification Dr. Sakhr Alqahtani (Queensland University)	
17:30			
Coffee Break (17:30 – 18:00)			
Session 4: Artificial Intelligence and Therapeutic Approaches			
18:00	Innovations in Drug Delivery Prof. Ali Alhasan (KACST)	Technical Leaders Programs in R&D Dr. Mansour Alsaleh (KACST, MIT)	
18:30	Artificial Intelligence and Oncology Dr. Refaee, Oncologist, KFHU	Process-centric Discrete-event Simulation for Operational Decision Maker Dr. Essam Qattan, Wayne State University, USA	
19:00	TeleCardiology - Dr. Manawar Almajnoui, Head of Cardiology in Jubail Royal Commission Hospital	Design and Innovation in Healthcare Founding Associate Professor, Interdisciplinary Design Dubai Institute of Design and Innovation (DIDI) Dr. Carlos Montana Hoyos	
19:30	Engineering Nucleic Acid Therapeutics at The Interface of Chemistry and Biology - Dr. Jiahe Li, Paula Hammond Lab in MIT's Koch Institute (MIT)	Combination of immune checkpoint inhibitor with peptide-based synthetic vaccine Dr. Mohammad Fallatah, Assistant professor for Cancer Immunotherapy, Director of National Center for Stem cells, (KACST)	

Dec 1		Session 5: Digitization for Advanced Healthcare Services	
	Conference Hall 1 (Main)	Conference Hall 2	
09:30	Big Data Analytics for Genomics and Infectious Diseases Dr. Hosam Zowawi, Group Leader, ZOWAWI GROUP at UQCCR, (Australia) Asst. Professor of Clinical Microbiology and Infectious Diseases – (KSAU-HS)	3D Printing in Medicine Muath Abuayasha, Computational Neuroscience at Western University (Canada)	
10:00	Food and Mental Health: Relationship between Food and Perceived Stress and Depressive Symptoms Prof. Hamed Adetun, (Oxford University)	Science behind Developing anti-microbial coatings for indwelling medical devices Dr. Ahmed Fazly (MIT)	
10:30	Elastography for Pulmonary Ultrasound Prof. Beatrice Hoffmann, Associate Professor, Emergency Medicine, (Harvard Medical School)	Blockchain for Digital Health Jennifer Georgino, Technology Association of GA Digital Health	
		Open Algorithms for Saudi Urgent Care Dr. Shada Alsalamah (MIT, KSU)	
11:30- 13:00	Lunch Break and Workshops Commence		
13:00	Judging (13:00 – 17:50)		
18:00	18:00 Final Ceremony and Prizes		

Dec 1	Closing Ceremony (Grand Auditorium)	
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7:00 PM	Opening	بداية حفل اختتام الهاكاثون
7:02 PM	National Anthem	السلام الملكي
7:05 PM	Quran	القرآن الكريم
7:10 PM	Innovation in Saudi Arabia His Excellency Dr. Nabeel Koshak	منظومة الابتكار في المملكة العربية السعودية معالي الدكتور نبيل كوشك
7:15 PM	Keynote Address Joseph Rizzo, Head of Neuro Ophthalmology, Harvard Medical School	المحاضرة العلمية د. جوزيف ريزو جامعة هارفارد
7:35 PM	Saudi Genome Dr. Sultan Alsudairiy	برنامج الجينوم السعودي د. سلطان السديري
7:45 PM	Awards Ceremony Minister of Health & President of KACST	الجوائز والتكريم معالي وزير الصحة وسمو رئيس مدينة الملك عبدالعزيز للعلوم والتقنية
8:00 PM	Closing – Wrap-up	الختام

Who Attends Health Hackathons?

Students, educators, healthcare professionals, researchers, bioinformaticians, engineers, entrepreneurs, developers, designers and social science professionals are invited to take a shot at tackling the healthcare challenge .





’رؤيتنا أن تكون المملكة نموذجاً رائداً رقمياً في المجال الصحي من خلال تقديم آلية تعاون وتكامل رقمي بين قطاع تقنية المعلومات والقطاع الصحي سعياً لتقديم حلول رقمية للتحديات الصحية لتساهم في رفع جودة ونمط حياة المواطن السعودي لتسريع تحقيق رؤية ٢٠٣٠‘

- الفريق التنظيمي (MIT’s Ibn Khaldun Alumni Society)

(1) Mental Health Hackathon

In this track, we foster the leading community of mental health advocates and technologists and enable them to innovate and advance mental health care through technology.

We believe that mental health is not a problem that can be solved in isolation: it requires the collaboration of mental health practitioners and professionals, technologists, NGOs, governments, employers, and non-profits. We envision a world where mental health care and the culture of well-being is positively revolutionized alongside technology.

There are talented, inspiring mental health practitioners tackling mental health issues on the front lines. There are brilliant minds in the technology field who are eager to make a real impact in improving the health of millions of people around the globe. There are survivors and friends of loved ones who have suffered from mental health illnesses. Everyone has an important role in this conversation.

Let's come together and innovate **mental health!**

(2) Brain Health Hackathon

Machine learning is one component of Brain-Computer Interfaces (BCI) that will be used in many different fields of neuroscience, such as motor rehabilitation of stroke patients, assessment and communication of coma patients, control of devices for disabled people, cognitive training or neuromarketing. The Brain Health Hackathon has been created to show these current and future developments and unlimited possibilities of BCIs in creative or scientific fields. Furthermore, this track aims to help understanding how artificial intelligence, life science, art and technology become a unity to evolve innovative and exceptional BCI headpieces.

The brain health hackathon brings together engineers, programmers, designers, artists or enthusiasts, to collaborate intensively as an interdisciplinary team. They program or build their own diagnostic or interactive systems, or their fully functional EEG-based BCI's to control a drone, a robot or an orthosis. The participation only requires basic knowledge in neuroscience, BCIs, programming or designing.

(3) Connected Health: Virtual Care, Telehealth & Telemedicine

In this track, we aim to promote virtual care and empower it with innovative ideas around technologies and applications for physical, mental, and social well being.

Virtual care can be considered as people's first point of contact with medical care providers. It improves access to medical advice and guide users to seek appropriate care from the comfort of their homes.

Participants in this track are not required to have engineering or coding background. Every team will be provided with different open source tools, hardware, robots, and other technologies to be used to help develop their mockups, prototypes and technology solutions.

(4) Assistive Technology & Reimagining Ageing

The Assistive Technology (AT) track will bring students and makers together with people with disabilities, clinicians and technology experts to work towards designing novel, effective and accessible technological solutions that could have a transformative effect on the day-to-day lives of people with disabilities, their families and caregivers.

AT projects are interdisciplinary! We're looking for mechanical engineers, electrical engineers, software and computer engineers, designers - anyone who is interested in creating products in the realm of AT.

(5) Blockchain and AI for Healthcare

In this track, participants will use open source distributed ledger technology and health-specific standards to address Saudi Arabia's most pressing health IT problems. Concepts should be innovative.

Participants will engage in forward-thinking projects that enhance interoperability and focus on demonstrating the potential to seamlessly incorporate blockchain solutions into existing health IT systems. Participants will access open data sources for test data and leverage openly available blockchain and health IT tools and resources.

(6) Data Science for Global Health

Data Science is vast and comprised of three main fields: Computer Science, Statistics and Business Intelligence.

In this track, we are looking at innovative ways to develop predictive personalized public health models to help us identify the right therapeutic/preventive interventions, in the right dosage, for the right individual, at the right time, to get the right response and avoid the adverse outcomes in childhood and adulthood.

Domains of data science, epidemiology, public health and artificial intelligence intersect in the problems which will be tackled in this track.

(7) Wearable Devices for Healthcare

Sensors are becoming ubiquitous, measuring every aspect of today's life while generating enormous amounts of data. Internet of Things and Industry 4.0 are just two of the buzz phrases used to describe the next revolution of our data driven society and digitized industry.

As technology advances, healthcare has ever more access to data to understand patient behaviors and improve care. In particular, there has been a proliferation of wearables from consumer gadgets. In this track, we will bring together scientists, designers and coders to explore latest developments in sensor systems, networks, big data, and machine learning in healthcare.

(8) Cancer Innovation Track

The goal of this track is to brainstorm ideas that could be useful in addressing important healthcare challenges around oncology prevention, detection, diagnosis and treatment.

Our broader vision is to encourage cross-disciplinary collaboration to innovate solutions for assessing, monitoring, managing, and treating of cancer.

This event is unique because is going to bring a wide range of experts, including clinicians, engineers, designers, developers. And we believe that the more diverse the teams are, the more innovative solutions will be.

(9) Human-Centered Design for Health

In this track, we explore the application of design-thinking on a broad area of health and the promotion of physical, mental and social well-being to achieve human-centered designs. The track aligns with the objectives of the Saudi Model of Care in that it focuses on achieving activated people, healthy communities and virtual care.

We explore the shift of healthcare from hospitals to homes and communities thus empowering people to take charge of their health. Some areas to work will include preventative measures through promotion of healthy habits and behavioral changes, managing diseases and symptoms and provision of information to name a few.

(10) Digital Dentistry Hackathon: Challenging Oral Care

In this track we explore digital dentistry and bioprinting.. No drills, no injections, easier access, lower costs: How can technology transform dentistry for the better? As more high-quality digital information becomes available to researchers, the potential for more precise diagnosis and treatment only continues to grow. Data including your age, medical and dental health history, as well as your genome, will, for example, allow dental professionals to pinpoint your susceptibility to various types of oral disease. In the near future, doctors and dentists will increasingly tailor treatment to your personal genetics, making choices reflecting what has proven most effective for your genome and your particular physiology. Or they may even decide how to best treat you based on the specific bacteria that's causing your problem. Cap, crown or a bridge? Current technology uses CAD/CAM to mill a tooth from a 3-D scan. 3-D printing is the next phase.

Other dental care innovations focus on prevention. For example, manufacturers are now designing toothbrushes with all kinds of gizmos: cameras and location tracking technology that show you the parts of your mouth where you're not brushing enough; a timer that keeps track of how long you brush and syncs with apps that keep you entertained for the two minutes you're supposed to brush; and pressure sensors that warn if you're brushing too hard. Other innovators are attempting to create sensors that could detect various diseases.

10 Tracks

Ten Hackathons running in-parallel. Each track will host 100 hackers, and will be supported by 20 mentors and 5 judges.

A total of 1250 participants in a 3-day event!



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