

Interdisciplinary Research Platform (IDRP): Smart Healthcare

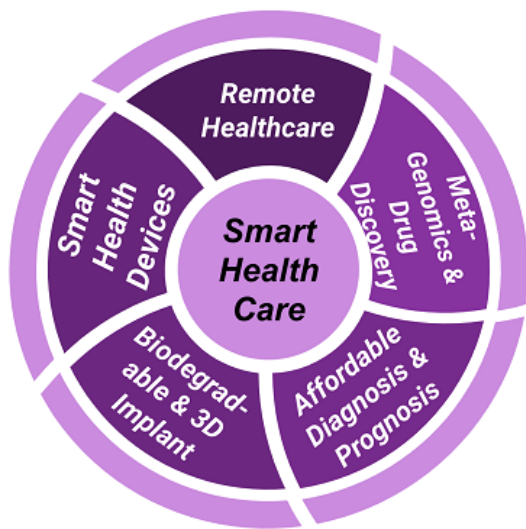
Sushmita Jha and Sumit Kalra

News and Views

The Smart Healthcare IDRP aspires to create significant scientific and technological advancements in the area of healthcare by bringing together a multidisciplinary team of scientists working in the interface of Biology, Chemistry, Healthcare & Engineering. The research is intended to focus on designing and developing sustainable solutions for point-of-care health devices, drug discovery, affordable diagnostics, biocompatible implants, and remote health care, including personalized telemedicine. The IDRP platform is expected to support the development of various eHealth- and mHealth-based solutions for improving the quality of healthcare and making it available to large segments of the society.

The focus of IDRP is on:

- Augmenting existing methods for medical research using machine learning and artificial intelligence based approaches
- Designing new and optimizing existing point-of-care health devices
- Identifying novel methods for early diagnosis and personalized treatments
- Creating a platform to use various electronic, mechanical, and bio-sensors for improving the remote health care facilities
- Capability of Creative Thinking;
- Development of new biodegradable metallic implants



Thrust areas of Smart Healthcare IDRP @ IIT Jodhpur.

At IIT Jodhpur, multiple labs are working in various related domains in collaboration with several external organizations such as AIIMS Jodhpur, Defense Lab Jodhpur, ACTREC/TMH Mumbai, and IIT Bombay. These labs are appropriate candidates to grow as interdisciplinary labs and contribute in the following areas as follows:

01	Smart Health Devices	<ul style="list-style-type: none"> • Early Detection & Diagnosis • Treatment & Prognosis
02	Metagenomics & Drug Discovery	<ul style="list-style-type: none"> • Novel drugs & genetic sources • Sustainable synthetic methods
03	Affordable Diagnosis & Prognosis	<ul style="list-style-type: none"> • Sensors & Biomaterials • NMR Metabolomics
04	Biodegradable & 3D Implant	<ul style="list-style-type: none"> • Advanced Manufacturing • Controllable Degradation
05	Remote Healthcare	<ul style="list-style-type: none"> • AI driven mass Healthcare • Enabling PHCs with Experts

Key Contributions of various labs under Smart Healthcare IDRP @ IIT Jodhpur.

The short-term deliverables from this IDRP group will be:

1. Creating a research platform to bring experts from different domains related to Smart Health Care to IIT Jodhpur
2. Generate financial support and provide mentorship to PhD scholars for conducting the research and development activities
3. Bring consultancy projects and external agencies on-board

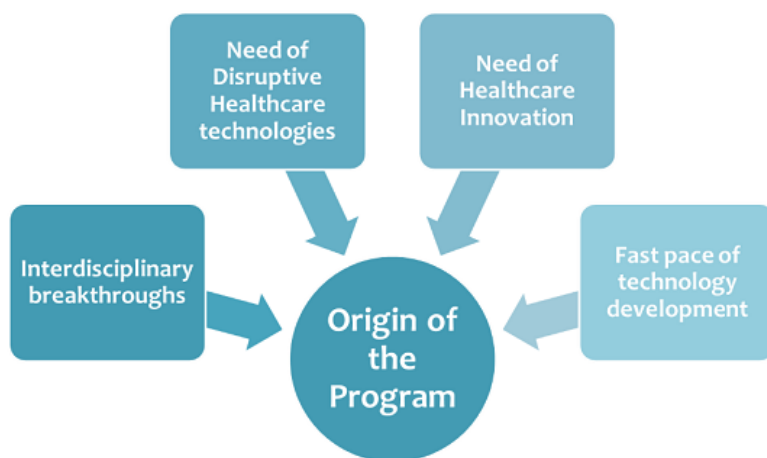
Master's, PhD and Master's-PhD dual degree Programs in Medical Technologies

The Post Graduate Programs in Medical Technologies, jointly offered by IIT Jodhpur and AIIMS Jodhpur, aim to foster innovation and produce a pool of Medical Technologists in the country who shall develop globally competitive Medical and Healthcare Technologies to address the current as well as emerging challenges of the future. These programs have been conceived and designed in a way to not only knit together the relevant key elements of Medical Science and Engineering Technology but also have desired emphasis on translational R&D, innovation, technology management and entrepreneurship aspects to realize deployable techniques, technologies, devices and systems in medical & healthcare domains.

Origin of the program

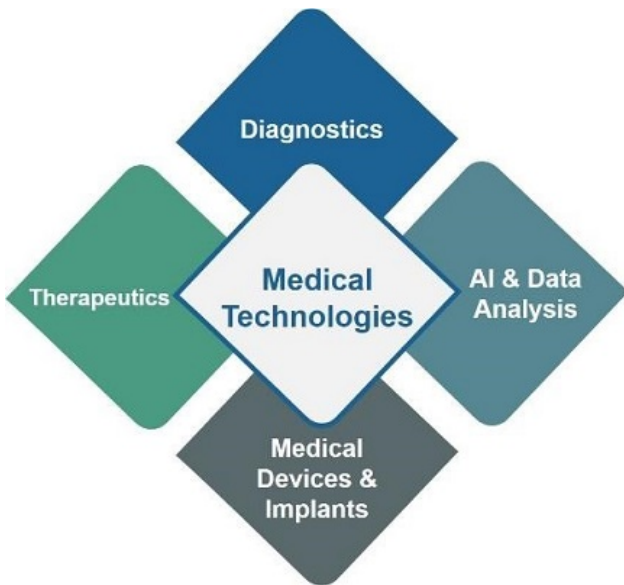
The healthcare industry has observed an unprecedented surge of innovations in diagnostics and therapeutics enabling significant improvement in the quality of life and its expectancy. However, healthcare challenges have risen with an equal rate demanding innovations that can improve quality, improve access, increase efficiency, eliminate waste, and lower costs (Haughom, J (2014) Innovation in Healthcare: Why It's Needed and Where It's Going. Health Catalyst). Biology and Medical Sciences have begun experiencing Moore's law due to accelerated growth in multi-omics including genomics, bio imaging, biosensors and bio-inspired robotics. These inherently interdisciplinary developments have enhanced the scope of improving health care facilities for:

- Technology interventions for disease prevention
- Personalized or precision medicine that enable tailored healthcare regime designed specifically with respect to a patient's genetic profile and needs
- Creative, efficient, and dynamic technology-enabled models for healthcare and health encounters between patient to caregiver, caregiver to caregiver, and patient to patient)



Origin of the programme.

The **Medical Technologies Programs (Masters, Masters-PhD and PhD)** proposed jointly by IITJ and AIIMS Jodhpur aim to provide a common platform for doctors and engineers fostering knowledge sharing and innovation, leading to development of indigenous healthcare devices and systems through the process of incubation and entrepreneurship. This inherently structured program has been designed to be open and to evolve to create a synergy between skill sets of technologists and medical practitioners. This will also create a unique collaborative platform that integrates technology and medicine to solve problems in human health and encourage entrepreneurship in healthcare technology. The program offers an equal number of seats to medical and engineering graduates and coursework offered jointly by IITJ and AIIMS Jodhpur. The course work is followed by hands-on immersive project work enabling extensive coherence and complementation amongst the team members to build futuristic devices, processes, products and/or protocols.

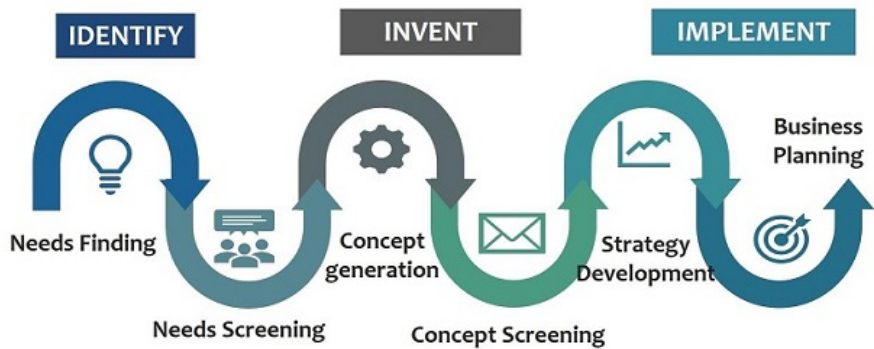


MMT Programme: Key Focus areas.

Why a Multi-Disciplinary Program on Innovation in Healthcare?

The nonlinear pace of progress technology today will almost certainly create a substantial market disruption in healthcare, spawning wave after wave of opportunities for traditional healthcare organizations, and new start-up companies alike. There is a need for professionals with multi-disciplinary background with training in entrepreneurship and business dynamics for meeting the challenges of future transformations of the healthcare technology. This cannot be done by only medical practitioners or engineers or management professionals. The program targets to generate manpower with multi-dimensional capability of creative thinking, deep knowledge and strong sense of business.

Learning Process for the Medical Technologies Programs



MMT Programme: Learning Process.



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