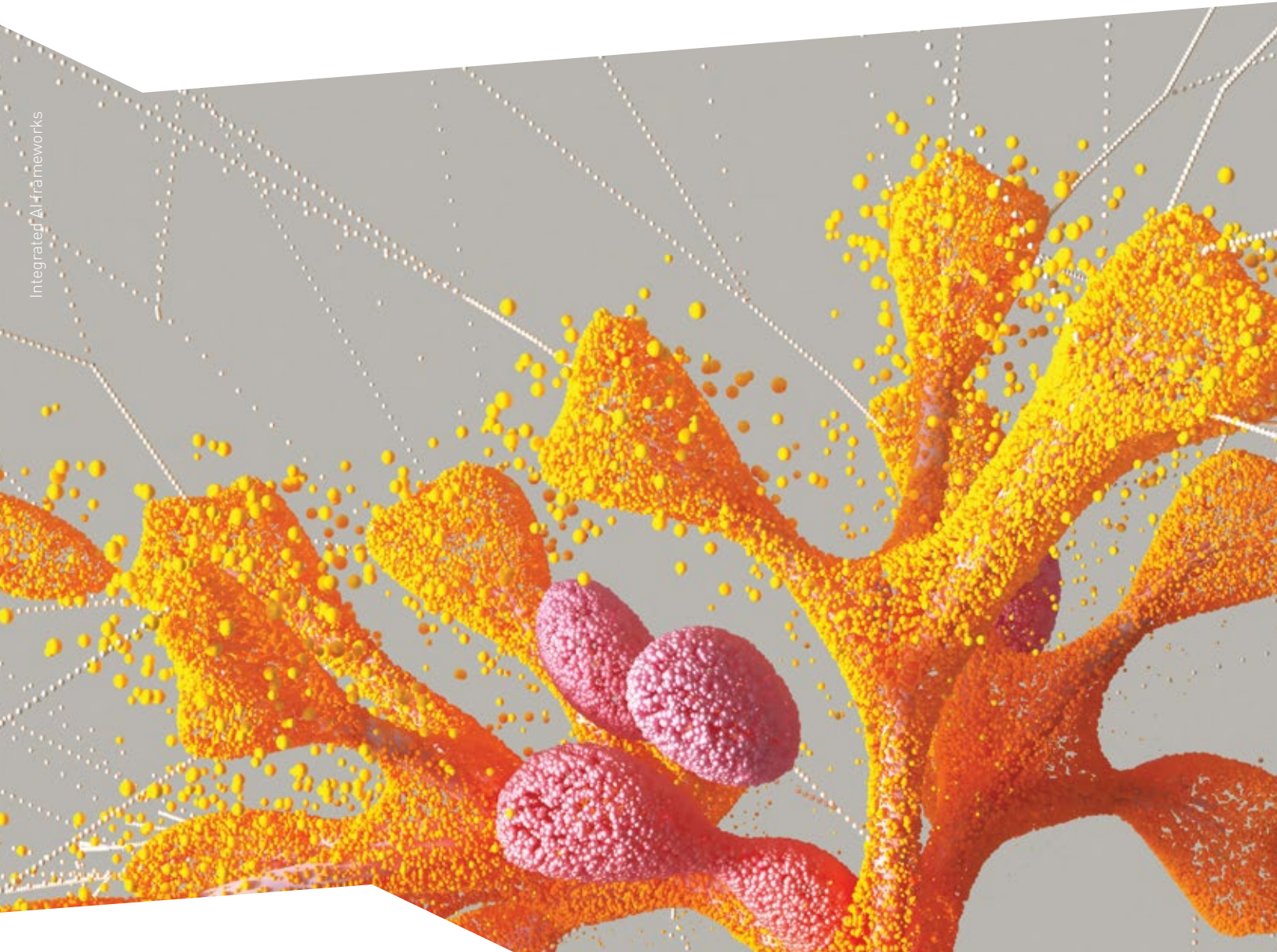


PROPOSAL

Laboratories *in the* Andrea and Lawrence Wolfe Center for Translational Medicine and Engineering

A TECHNION-RAMBAM ALLIANCE

Integrated AI frameworks



TODAY'S SCIENCE,
TOMORROW'S CURE.



The Andrea and Lawrence
**Wolfe Center for Translational
Medicine and Engineering**

A TECHNION-RAMBAM ALLIANCE

Technion - Israel Institute of Technology has played a crucial role in the establishment and vitality of Israel, and in improving the lives of people worldwide, since opening its doors in 1924. Over the past century, Israel's oldest public university has not only gained a reputation for excellence as one of the world's top academic centers — the Technion is credited with launching the careers of generations of engineers and scientists whose ingenuity has gifted the world a stunning array of innovations. Celebrating its Centennial in 2024, the University is a premier force for technological advancement in Israel and worldwide.

Rambam Health Care Campus is a 1,100-bed, world-class academic medical center serving a diverse local population of 2.5 million as well as international visitors seeking Rambam's specialized consultation, programs, and services. As the largest hospital and referral center in Northern Israel, it provides the full spectrum of patient care, ranging from the most advanced treatments to cutting-edge therapies. Alongside superb clinical care, Rambam is widely recognized as an academic hospital that fosters an environment of innovation and entrepreneurship reflected by numerous discoveries that have impacted human health on a global scale, many of which are the result of Rambam-Technion collaborations.

Rambam Health Care Campus and the Technion have forged a powerful alliance, which aims to transcend traditional disciplines and to merge clinical practice with science, computing, engineering and healthcare management. Building on their long history of close collaboration, Rambam and the Technion seek to address some of healthcare's greatest challenges.

ABOUT THE CENTER

Improving human health is one of the grand challenges of the 21st century — an urgent need that calls for a multidisciplinary approach. Healthcare transcends disciplines and seeks to merge clinical practice with science, data analysis, engineering, healthcare management, and design — with the overall aim of ensuring significantly improved treatment options for billions of people around the globe. These classic scientific disciplines, which have traditionally been pursued separately, must be combined to take the next leap in medical research — accelerating the pace of therapeutic application for the benefit of us all.



Prof. Uri Sivan
President
Technion Israel Institute of Technology



Prof. Michael Halberthal
Director General
Rambam Health Care Campus



**ANDREA AND LAWRENCE WOLFE CENTER
FOR TRANSLATIONAL MEDICINE AND
ENGINEERING**

AI &
MEDICINE
LAB

BIOELECTRONICS
(BIOCHIPS)
LAB

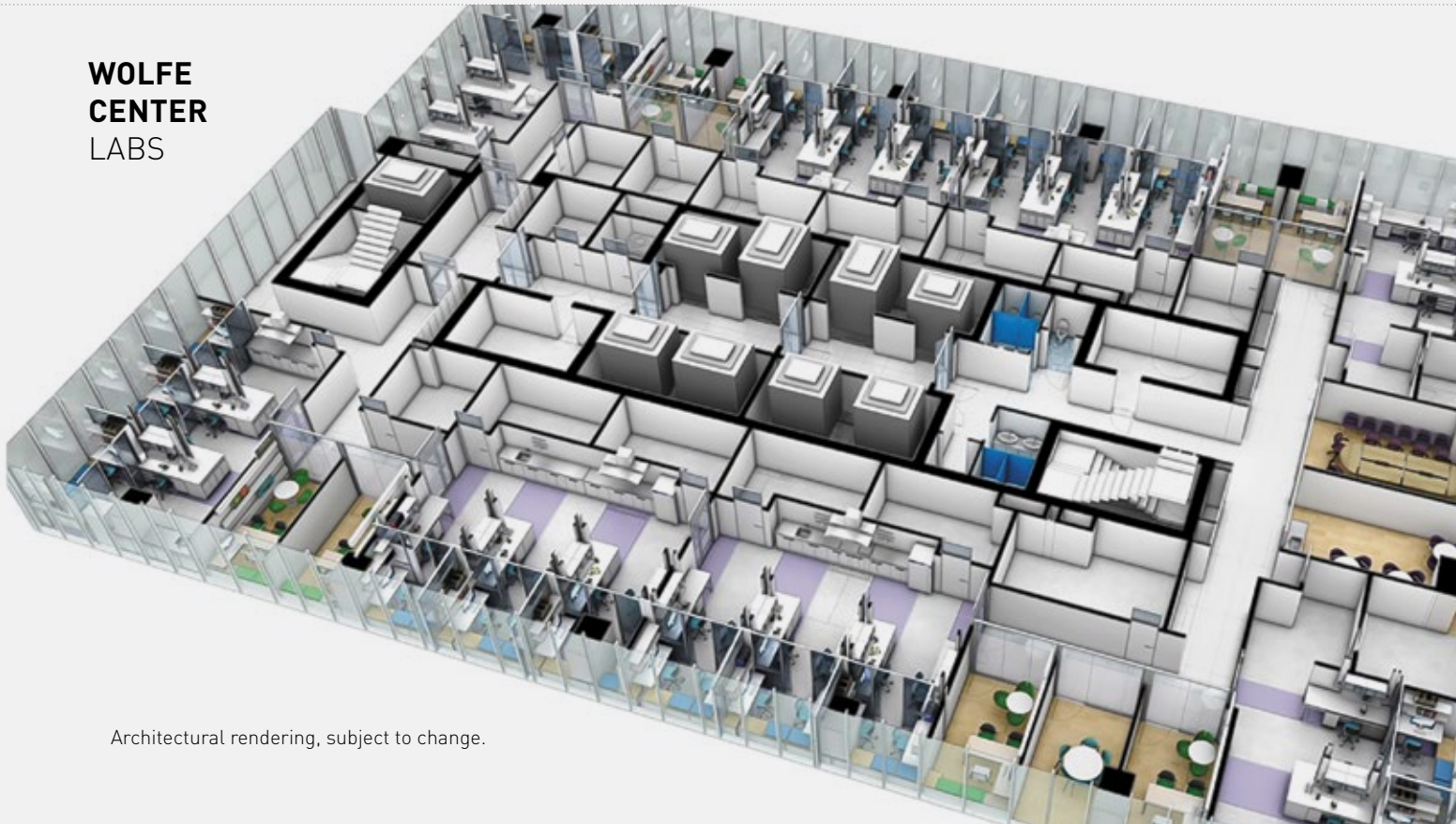
DRUG DELIVERY
& MOLECULAR
THERAPY LAB

MEDICAL DEVICE
INNOVATION LAB

TISSUE
ENGINEERING &
REGENERATIVE
MEDICINE LAB

HEALTHCARE
OPERATIONS LAB

**WOLFE
CENTER
LABS**





THE TECHNION-RAMBAM ECOSYSTEM

The Technion and Rambam Health Care Campus envision the Andrea and Lawrence Wolfe Center for Translational Medicine and Engineering as a unique research alliance and ecosystem — one that will bridge clinical and academic initiatives within a shared space. The Center will contain a series of integrated laboratories within which the Technion-Rambam community of physician-scientists, engineers, and researchers, including those within the Ruth and Bruce Rappaport Faculty of Medicine, can work together to address acute challenges in human health.

FROM VISION TO REALITY

Integrating three vital pillars — clinical practice, scientific research, and engineering — has long been a joint mission of the Technion and Rambam. The Andrea and Lawrence Wolfe Center for Translational Medicine and Engineering will ensure that physician-scientists, scientists, and engineers are able to collaborate more closely and more efficiently than ever before, and bring to bear the core components of transformative innovation: Need identification, ideation, development, testing and deployment, all this while educating a new generation of researchers and physicians with a joint background in engineering and medicine.

A NEW HOTBED OF INNOVATION FOR MEDICINE

Located at Rambam Health Care Campus, neighboring the Technion's Bruce and Ruth Rappaport Faculty of Medicine, the Wolfe Center will serve as a nexus for translating science from the lab to the bedside. The new Center will include all the essential components for successful translation — physician-scientists acutely aware of real-world challenges, shared spaces for ideation, development and prototyping, clinical data and data experts, access to cutting-edge fabrication services and core facilities, expertise in regulation, ethics, clinical trials, clinical and biological samples and business development, and — importantly, clinical expertise to test devices, algorithms and treatments in the field. The Wolfe Center aims to attract scientists and engineers from the Technion's main campus and from local high-tech hubs, and act as a magnet for a wide range of entrepreneurial-minded physician-scientists, scientists and engineers who aim to combine clinical practice with cutting-edge research and development.

**THE WOLFE
CENTER OCCUPIES
TWO FLOORS IN
THE HELMSLEY
HEALTH
DISCOVERY
TOWER**



The Wolfe Center will be housed on two floors in the Rambam Health Care Campus's Helmsley Health Discovery Tower, with a total floor space of over 2,750 square meters (29,600 sq. ft.). The Center will host six tightly integrated yet specialized laboratories as described below. These state-of-the-art facilities will offer Technion-Rambam researchers, physician-scientists, and engineers the physical structure and tools that they require to advance medical discoveries to the next level: new working spaces in which to expand the boundaries of medicine and improve the standard of care, all within a richly collaborative atmosphere. In addition to the six laboratories described below, the two floors will house offices for experts (clinical trials, ethics and regulation, clinical samples, business development), meeting rooms, workspaces for guest scientists, as well as an office for the director and administrative staff.



AI AND MEDICINE LABORATORY

Focus: Developing novel AI-based therapies and integrating them into clinical studies to assess their effectiveness in improving patient outcomes.

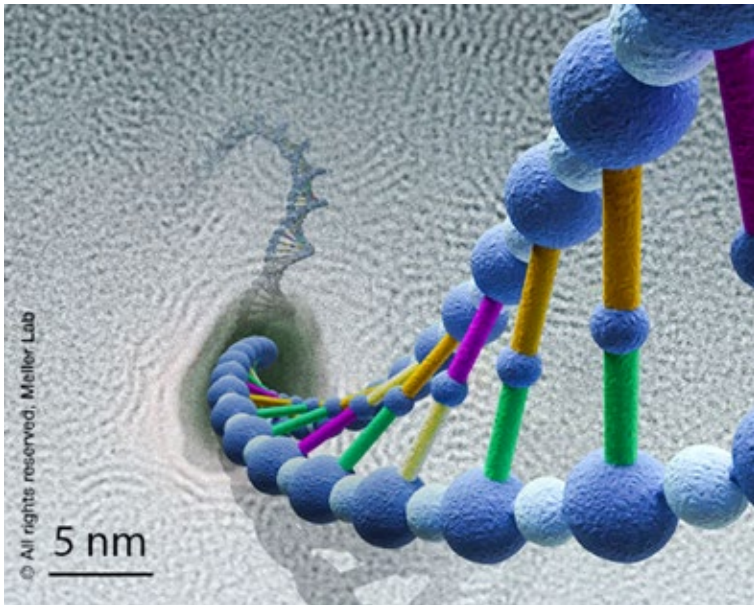
Medical data science aims to derive insights from healthcare data that can improve clinical decision making and potentially save lives. With the low cost of technical advances such as mobile medical sensors and medical imaging, new medical data is easier to gather than ever before. Moreover, the explosion of artificial intelligence (AI) based tools gives the impression that gaining useful insights from these data should be easy and straightforward. Surprisingly, however, this wealth of information has had only limited success in improving patient care due to two major challenges:

1 Establishing effective pipelines to collate and share streams of data in myriad formats (images, tests, physiological recordings, free text) generated in a hospital's medical units and doing so in compliance with strict regulatory and ethical constraints.

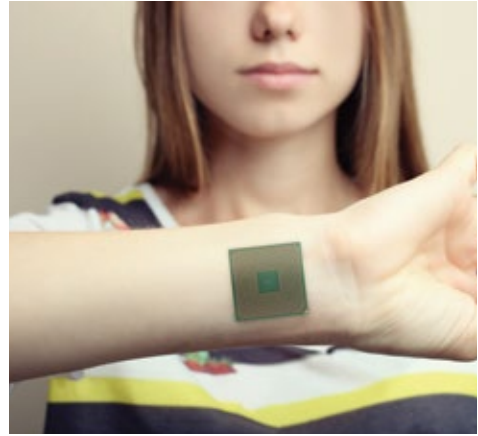
2 Difficulties in deploying and testing the insights and outcomes in real-world, clinical settings, due to regulatory, technical, and cultural factors.

The Technion and the Rambam Health Care Campus have established a new collaboration, named TERA, (Technion-Rambam Initiative in Medical AI) that aims to address these two challenges head on, closing the loop from patient-derived data to improved patient care. The Center's AI and Medicine Laboratory will house TERA, creating a dedicated ecosystem and physical space which will be the meeting point between researchers, clinician scientists, and graduate and MD/PhD students. The lab will be staffed with support personnel, solve ethical challenges in medical data sharing by employing experts and providing "on site", secure infrastructure to collect, prepare, and validate the large streams of medical data generated in the dozens of medical units. Finally, TERA will support the regulatory and technical basis for deploying pilot systems within Rambam units.

TERA's long-term aim is to serve as a central hub for medical data science in Israel — increasing the number of research projects and educational activities being conducted within the country and encouraging the creation of medical start-ups.



A nanopore – identifying molecules one by one



BIOELECTRONICS (BIOCHIPS) LABORATORY

Focus: Harnessing cutting-edge biochip technology in therapies and diagnostics.

A biochip is a microchip designed to function in a biological environment. Innovative biochips are widely considered to be game changers in advanced healthcare applications, in particular when coupled to new materials, wireless data transmission and AI-supported data analysis. Such applications include fully-integrated platforms for continuous monitoring of human disease biomarkers, implantable devices, hybrids of electronics and artificial organs, and extremely sensitive, single molecule analytical devices. Many obstacles, however, are present on the road toward these desirable goals. For example, improvements are necessary for enhancing the sensitivity and accuracy of devices in order to make them capable of providing reliable and continuous measurements.

Just as information technology cannot advance without innovation in microelectronic chips, the biomedical device industry cannot advance without the availability of next-generation biochips. The Technion's culture of multidisciplinary collaboration across materials science, chemical and biomedical engineering, medical research, computer engineering,

and micro-nano fabrication processes has qualified its researchers to acquire significant fundamental know-how and develop prominent technologies in the biochip field.

The vision of the Wolfe Center's Bioelectronics (Biochips) Laboratory is to integrate biochip technology into current biomedical science and technology, inspired by real-world clinical needs. Various types of sensors and actuators will be combined into a single biochip, including acoustic, optic, electrical, and biochemical sensors, to extract more comprehensive data from samples (physiological and disease biomarkers), utilize hybrid artificial organs (for drug screening and testing) and patients (wearables, sophisticated implants for monitoring, drug delivery and closed-loop intervention). The Bioelectronics (Biochips) Laboratory will serve as home to a team of clinicians and experts specializing in various biochip ideation, design and testing, including sample processing, sensors, fabrication, hardware and software, clinical procedures and implantation, and will be assisted by the in-house experts in clinical trials, regulation, clinical samples and business development.

DRUG DELIVERY AND MOLECULAR THERAPY LABORATORY

Focus: Delivering drugs to specific organs in the human body and ensuring the drugs remain at those locations at effective concentrations.

Over the past decade, researchers have made remarkable advances in our understanding of the molecular biology of diseases. Discovery includes learning more about multiple signaling pathways, i.e., the processes by which chemical and physical signals travel through cells, and the identification of potential targets for gene therapies. One significant barrier to advancing these therapies is the challenge of delivering certain substances — e.g., nucleic acids, viruses, and cells — into tissue with precision and efficiency.

Traditional molecular therapy relies on manipulating small molecules. While powerful, this approach is limited by factors ranging from high cost to the risk of side effects from high toxicity. As a result, a slew of novel therapeutic approaches have emerged which are based on much more specific delivery systems. These approaches have already transformed the treatment of several diseases, including some types of cancers, and the rapid development of highly effective vaccines. However, the development of these novel approaches introduces its own challenges, including the ability to send these drugs to specific organs and ensuring the drugs remain at that location of the body. To meet such complex therapeutic requirements, teams of scientists, engineers, and clinicians must work together to find ways to target medication to exact coordinates and create a mechanism to anchor the payload to its desired location.

The Wolfe Center's Drug Delivery and Molecular Therapy Laboratory will provide a unique environment for collaboration between Technion and Rambam researchers, with teams of clinicians, molecular medicine specialists, and engineers focused on novel therapeutics and in particular, their targeting. Insights from this lab will be fueled by expertise in clinical medicine, medical imaging, experimental biology, stem cell biology, RNA therapeutics, nanotechnology, bio-engineering, and medical robotics.

The Drug Delivery and Molecular Therapy Laboratory will house two tissue-culture facilities. The first facility will be dedicated to generating and studying stem cells for drug testing, implantation and for "organ-on-a-chip" applications, with incubators, bioreactors, tissue culture hoods, and workbenches. The second facility will be dedicated to studying therapeutic viruses for use in gene therapy, and will include high-capacity incubators, and tissue-culture hoods. These multidisciplinary facilities will also contain workbenches and space for microscopes, sterilization equipment, and bioprinters, as well as workstations for graduate students. In common with all other Wolfe Center labs, the Drug Delivery and Molecular Therapy Laboratory will have access to the Center's experts in clinical trials, regulation and ethics, meeting rooms, and offices to host investigators from the Technion Neve Sha'anani campus.



MEDICAL DEVICE INNOVATION LABORATORY

Focus: Taking new medical devices/technologies from concept to prototype and potentially to the start-up stage.

The Medical Device Innovation Laboratory will provide space for projects conducted by teams of Technion–Rambam scientists, engineers, and physicians who specialize in a vast range of routine medical procedures. These experts will identify unmet clinical needs and develop innovations to be tested in clinical settings, including Rambam Health Care Campus, with the help of the Center’s resident experts in designing and running clinical trials, regulation and ethics. The laboratory research team will include experts in mechanical and electrical engineering, who will assist with translating ideas to tangible devices, developing these and creating prototypes, assisted by Technion fabrication facilities; technicians with experience in performing laboratory preclinical experiments; and M.Sc./Ph.D. students, who will carry out studies in fields including medicine, biomedical engineering, and mechanical engineering.

The Medical Device Innovation Laboratory will issue annual calls for projects to be conducted by physicians and scientists aiming at developing new devices and advances in human health, as well

as calls to provide seed funding for the projects selected for further development. The laboratory will host a monthly seminar series spotlighting its activities and ongoing projects. In addition, an annual meeting will provide hands-on experience for M.D. and graduate students, in which future clinicians and engineers will be tasked with solving a clinical problem. Scientists and engineers will learn about unmet clinical needs, and engineers will obtain insights into clinical decision making.

Innovation is key to improving medical care, with medical start-up companies widely recognized for producing new lifesaving technologies, attracting investors, and providing jobs for highly skilled personnel. The Wolfe Center’s Medical Device Innovation Laboratory will aim to leverage entrepreneurial collaborations between Rambam and the Technion, move novel medical devices and technologies from concept to working prototypes, and spin off successful innovations as newly formed start-up companies.

TISSUE ENGINEERING AND REGENERATIVE MEDICINE LABORATORY

Focus: Creating a hub for the development of biological tissue substitutes that can restore, maintain, or enhance tissue function in the human body.

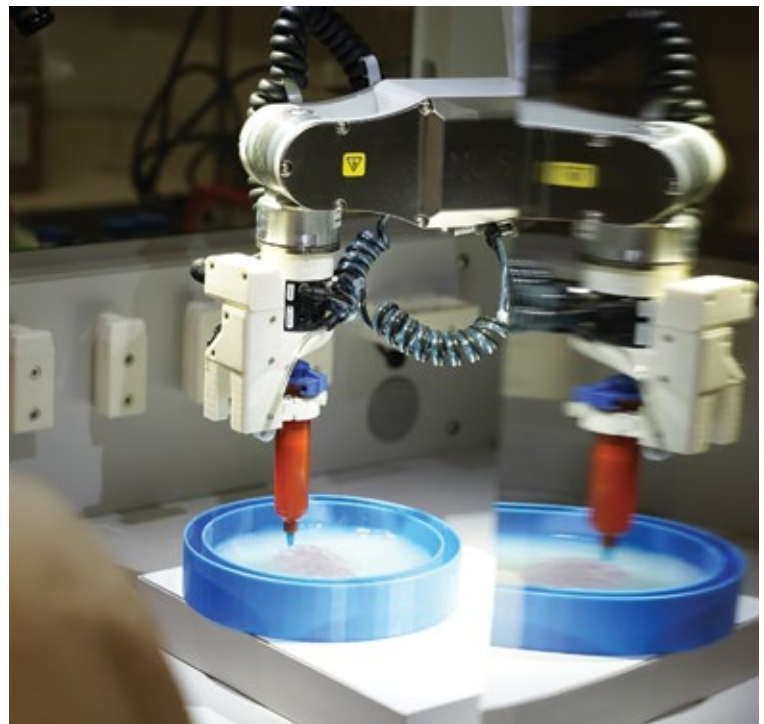
In recent years, Technion and Rambam researchers have made significant contributions to the field of tissue engineering, particularly in sub-fields such as biomaterial development, stem cell research, 3D bioprinting, and engineered tissue implantation. However, further advances are needed to tackle the complex challenges — e.g., creating new tissue and blood vessels, ensuring patient compatibility, scaling-up production, and navigating the regulatory landscape associated with this field.

The Wolfe Center's Tissue Engineering and Regenerative Medicine Laboratory will aim to create a hub for tissue engineering research, bridging the gap between fundamental research and clinical applications.

The laboratory will enable specialists to develop innovative biomaterials for various tissue engineering applications. The laboratory will also advance techniques such as bioprinting-based fabrications of complex tissues, including essential blood vessels, at clinically relevant scales; explore the potential of patient-specific stem cells; develop methods for monitoring the survival and functionality of bioengineered implants; and promote collaboration among clinicians, industrial partners, and other Wolfe Center labs. Finally, taking advantage of in-house expertise in clinical trial design, regulation and ethics, application-ready technologies developed in the laboratory will be tested in early clinical trials conducted directly at Rambam Health Care Campus.



// Heart modeling



A bioprinter printing tissue

HEALTHCARE OPERATIONS LABORATORY

Focus: Improving access and quality of care by improving space design, work methods, and resource management within hospitals.

The ever-growing complexity of healthcare facilities, coupled with the constantly increasing demand for health services and the dramatic rate of medical innovation, are placing enormous pressures on hospital design and operations. The Wolfe Center's Healthcare Operations Laboratory will seek ways to improve access and quality of care, specifically by improving space design, work methods, and resource management within hospitals. Research within the Healthcare Operations Laboratory will be mainly based on data collected at Rambam Health Care Campus— its wards, ER rooms and operating theaters.

By collaborating with Rambam physicians and nurses, Technion researchers will identify operational challenges and obtain data that help identify the source of roadblocks that ultimately impair objective and subjective measures of care. In effect, the Healthcare Operations Laboratory will use Rambam as a field study hospital, in which innovative operational methods will be implemented and tested. Monthly group sessions will focus on problem solving in collaboration with Rambam's operations division, physicians, nurses (and even selected patients), with Rambam staff being offered space and facilities for successful joint research. In addition, the laboratory will hold annual open meetings, inviting physicians, health care professionals, industrial engineers, IT

experts, and others to identify problems worth studying in the laboratory.

Given the ethical and legal constraints associated with the use and sharing of medical data, a Rambam IT specialist will be appointed to help researchers at the Healthcare Operations Laboratory to protect the identity and privacy of patients while creating secure access to patient data generated in Rambam's medical units.

Examples of projects that the Healthcare Operations Laboratory aims to promote include:

- > analyzing surgical video data to facilitate the development of new tools to improve the safety and efficiency of surgical procedures
- > providing new methods for automatically monitoring and scheduling operating rooms, thus improving efficiency
- > improving patient flow within ER and other hospital wards to reduce waiting time
- > delivering performance feedback to medical practitioners
- > evaluating outcomes from hospitalization versus home care



The Andrea and Lawrence Wolfe Center for Translational Medicine and Engineering will provide a unique opportunity for discovery and practical application among first-rate minds — bringing together the Technion and Rambam’s top-ranking academics and medical professionals in a tight-knit academic community. The collaborations within the center will involve researchers from multiple faculties and disciplines at the Technion, comprising scientists, clinicians, and engineers alike. The center will also allow graduate and MD/PhD students capable of conducting high-level research to contribute and obtain first-rate training. In these state-of-the-art laboratories, top scientists, clinicians, and engineers will work together — utilizing the facilities and tools they require to collaborate, developing new medical applications and therapies, and ultimately benefiting a wide range of patients worldwide.

We invite you to partner with the Technion and Rambam to support high-impact innovation and discovery in the future Larry and Andi Wolfe Center for Translational Medicine and Engineering.

FUNDING OPPORTUNITIES

The Wolfe Center Capital Fund will allow the Technion and Rambam to provide direct support to the general capital or maintenance needs of the new Wolfe Center. Gifts of \$25,000 and above are welcomed to support this fund.

In addition, the following individual facilities within the Center are available for naming:

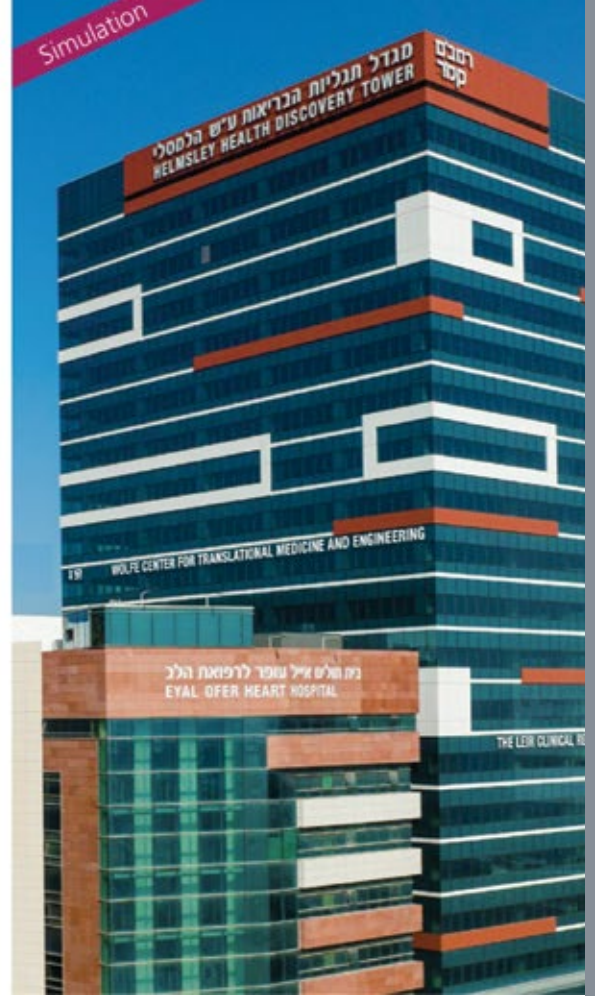
OPPORTUNITY	AVAILABLE	CA\$
Laboratories*	6	\$3.1M each
Meeting Room and Eating Area	2	\$235K each
Director’s Office and Administration Space	1	\$235K
Expert’s Offices	4	\$47K each
Guest Principle Investigator’s Offices	3	\$47K each

*A gift of CA\$3.1M will enable the Technion and Rambam to complete construction and infrastructure for each laboratory in the Wolfe Center.

LABORATORIES

AVAILABLE FOR NAMING

- ① AI and Medicine Laboratory
- ① Bioelectronics (Biochips) Laboratory
- ① Drug Delivery and Molecular Therapy Laboratory
- ① Medical Device Innovation Laboratory
- ① Tissue Engineering and Regenerative Medicine Laboratory
- ① Healthcare Operations Laboratory



DONOR RECOGNITION

The highest form of donor recognition bestowed by the Technion is the title of Technion Guardian. This extraordinary honor is awarded by the university to its most devoted friends upon reaching the milestone of \$1 million in support.

Gifts starting at \$100K will be listed in the President's Report, the official annual report of the Technion. Gifts are listed in one printed version of the Report and then in perpetuity in the online version; listings appear when gifts reach 50% completion.

Donors to the Wolfe Center Capital Fund will receive an annual report containing updates on construction plans, research, faculty, and students. Additionally, donors to this fund will have their name included on a physical master plaque to be mounted at an appropriate location in the Wolfe Center. Gifts starting at \$500K will entitle the donor to a plaque in the Helmsley Circle in the main lobby on the ground floor of the Helmsley Health Discovery Tower

Donors who bestow specific capital naming gifts will receive an annual report containing updates on construction plans, research, faculty, and students. Their names will also be included on a physical plaque located in the specific facility they are supporting.

Thank You



The Andrea and Lawrence
**Wolfe Center for Translational
Medicine and Engineering**

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TODAY'S SCIENCE,
TOMORROW'S CURE.