The Rina & Avner Schneur Type 2 Diabetes center brings together top researchers from the faculty of Biomedical engineering, Prof. Shulamit Levenberg, and the faculty of Medicine, Prof. Eddy Karnieli, at the Technion-Israel Institute of Technology to seek for a cure to type II diabetes.

Over the past few decades, the number of people with diabetes mellitus has more than doubled globally, making it one of the most important public health challenges to all nations. Type 2 diabetes mellitus (DM2) and pre-diabetes are increasingly observed among children, adolescents and younger adults.
The Biomaterials Research Center is involved in activities of both academic and applied nature. Current research projects are briefly outlined below:

- Blood and Blood Plasma
- Metabolic Assist with BloodSelf-Controlled Drug Delivery
- Large-Scale Separation of Biomaterials
- Molecular Bio-Electronics

Prof. Noah Lotan

Research Laboratory
Stimulation of nerve cells using short pulses of ultrasound at low intensity. You can see on the screen nerve cells that blink when calcium ion influx is induced by the ultrasound. We, in the lab for cell biomechanics and therapeutic ultrasound, claim that the bilayer membrane is responsible for most of the bioeffects induced by ultrasound in the living cell.
In the biomedical optics laboratory, new methods for medical imaging and therapy are being studied using lasers and advanced optical technologies.
We develop and apply cell mechanobiology approaches for cancer diagnosis and prognosis and for wound prevention and healing. Our main focus is on cancer research, understanding metastasis and developing patient-specific mechanobiology approaches to predict the likelihood for metastasis formation. We are currently working with cell lines and tumors from patients with breast and pancreatic cancers and also adolescent’s Ewing’s Sarcomas. In parallel, in the context of wounds, we are developing mechanobiology based tools and approaches to prevent wound formation and accelerate wound healing.
Engineering vascularized tissues constitutes a significant challenge in tissue regeneration. For the engineering of such vascularized complex tissues for heart, skeletal muscle, pancreas and spinal cord regeneration we use 3D biodegradable polymers, stem cells and bioreactors allowing cell organization and differentiation. In addition, we develop microfluidics devices to provide a controllable microenvironment for stem cell differentiation.
Functional Ultrasound Imaging – one of the Lab’s R&D projects is developing methods of measuring Cardiac Function, based on image processing of Echocardiographic cines. Comprehensive understanding of cardiac function guides the R&D engineering efforts.
One of the main research topics in our lab is the development of new ultrasonic methods for breast lesion detection and treatment. Shown in this picture is a breast phantom immersed in a water tank which is being irradiated by ultrasonic waves.
Gel Electrophoresis (GE) is one of the most broadly used methods for nucleic acid and protein characterization in life sciences. In GE an electrical field is used to mobilize biological molecules through a porous media in which molecules are separated by their size and/or charge. Nanopores are the single-molecule analogs of GE, permitting the analysis of individual biopolymers.
The laboratory engages in the research of the actin-myosin motility assay studies and the isolated muscle motor unit dynamic, using state of the art technique of laser trap, advance image analysis technique and fast real time control system. The studies aim to provide insight into the mechanisms underlying the biochemical to mechanical energy conversion by the biological linear motor units, and for the analysis of the mechanisms underlying heart failure, at the molecular level of the isolated motor units (Established at 1999)
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<th>Research Laboratory</th>
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<td>Neural Interface Engineering Laboratory</td>
<td>Prof. Shy Shoham</td>
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A new bionic eye concept being developed and tested by associate prof. Shy Shoham and his students uses a holographic display and light-gated proteins. Such devices could potentially bypass degenerated photo-receptors in certain kinds of blindness.
The Technion Biofluids Laboratory, directed by Dr. Josué Sznitman, examines a broad range of fluid flows relevant to biology and physiology.
In Prof. Seliktar’s tissue engineering laboratory, chemical fume hoods are used to synthesize new polymeric building blocks that will eventually be used to create biocompatible materials that support cell growth and tissue regeneration.
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<td><strong>Bioenergetics and Bioelectric Systems</strong></td>
<td><strong>Prof. Yael Yaniv</strong></td>
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The Technion Bioenergetics and Bioelectric Systems Laboratory examines the mechanisms that connect the electrical and energetic signals in the body. Specifically, we focus how the degree of synchronization between internal mechanisms that are related to the electrical energetics signals creates spontaneous activity and generation of arrhythmias.
Our research interest is in engineering aspects of vascular biology with a focus on the interplay between hemodynamics, vascular physiology, and transport phenomena in vascular diseases. The long-term objective of this research is to allow better understanding of the biophysical determinants of vascular disease and to leverage this knowledge to develop innovative therapeutic approaches.
Applying engineering to biology: Principles of genetic circuit design and synthetic biology. We use principles inspired by electrical and computer engineering to design and construct new biological systems for biotechnology and biomedical applications. Cytomorphic electronics; analog circuit design for modeling biochemical reactions and biological networks. Bioelectronics- Whole cell biosensors for biomedical applications. Bio-electrochemical systems for energy applications.
Optimal PSF for 3D localization microscopy

How, and to what precision, can one determine the 3D position of a sub-wavelength particle by observing it through a microscope? This is the problem at the heart of methods such as single-particle-tracking and localization based super-resolution microscopy (e.g. PALM, STORM).