AMERICAN TECHNION SOCIETY

Technion INNOVATIONS

POWERING **ISRAEL**
CHANGING **THE WORLD**

Since 1924, the Technion - Israel Institute of Technology has been home to dreamers, inventors, and innovators who think about the world's problems differently. Within classrooms and laboratories, Technion students and faculty are encouraged to explore their passions, to reach beyond the confines of their disciplines, and to pursue the unconventional. Alumni carry that pioneering spirit to some of the highest positions within the Israeli government and multinational corporations around the world.

The inventions highlighted here are just a sample of how Technion ingenuity is helping the State of Israel flourish while solving some of humankind's most intractable problems. From safer, environmentally friendly rocket fuel, to an innovative "glue" that can safely fuse torn human tissue, to microfluidic chips that can detect heart disease and cancer, Technion faculty, students, and alumni are making the seemingly impossible possible, every day.

Pictured on Cover / Avigail Landman (left) and Rawan Halabi (right) with the breakthrough prototype of the H2Pro system for efficient and safe production of hydrogen using only solar energy

*Credit company/innovator's websites.

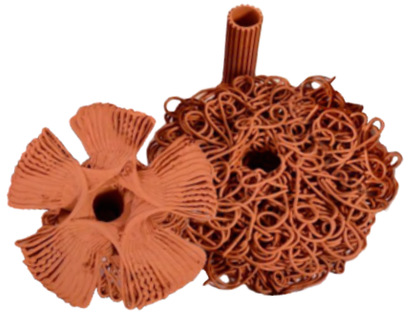
SUSTAINABILITY

INNOVATIONS FOR A
GREENER WORLD

3D-Printed Coral Reefs

Developed by Prof. Ezri Tarazi

Some 40 species of fish are now sleeping, hiding, and laying eggs in the world's first 3D-printed bioplastics and ceramic reef in the Red Sea. These reefs could be the key to rebuilding our oceans' dying coral reefs.



Water for Everyone

Developed by Assoc. Profs. Eran Friedler and David Broday

A new system produces water from the air, even in dry desert regions. The innovative system can provide water to smaller, poorer, and isolated communities more quickly.

Electric Plane*

Developed by Dekel Tzidon '95

The world's first electric planes could take to the skies as early as 2022. **Eviation** has unveiled an emissions-free plane that will be environmentally friendly and inexpensive to operate.

Hydrogen on Demand

Developed by Profs. Gideon Grader and Avner Rothschild and Drs. Hen Dotan and Avigail Landman

H2Pro is developing a far more efficient way to produce hydrogen and has attracted the interest of key players in the investment community including Hyundai Motor Company and the Bill and Melinda Gates Foundation.

Wireless, Electric Roads

Developed by Oren Ezer M.S. '06, co-founder of ElectReon

ElectReon develops smart road technology that wirelessly charges electric cars, buses, and trucks. The technology, key to a driverless future, is being piloted in Israel and Sweden.

Algalafel

Developed by Prof. Yoav D. Livney and a team of Technion graduate students

An award-winning falafel enriched with the easy-to-grow, protein- and iron-rich microalgae spirulina could help stave off a global food shortage.

New Generation Rocket Fuel

Developed by Prof. Benny Natan, scientific advisor, NewRocket

Startup **NewRocket** is developing gel fuel for rocket engines that is safer and performs better than conventional liquid and solid fuels. **PowerGel** is also environmentally friendly.

COMBATTING THE PANDEMIC

WITH INGENUITY

Rapid COVID-19 Test

Developed by Prof. Naama Geva-Zatorsky

The **NaorCov19 test** diagnoses SARS-CoV-2 from saliva in 40 minutes and processes dozens of samples simultaneously. The test has been approved by the EU.

Sniff Test for COVID-19*

Developed by Prof. Hossam Haick

A device that uses nanomaterial sensors and machine learning can detect COVID-19's distinctive signature biomarkers in exhaled breath. It is less intrusive than nasal swab tests and provides results immediately.

Protective Sticker for Masks

Developed by Prof. Eyal Zussman

The 3D-printed "**Maya**" sticker covers surgical masks to dramatically boost protection for frontline medical workers. In mass production in Israel, the adhesive contains biocides and nanofibers to filter out even the tiniest infected particles.

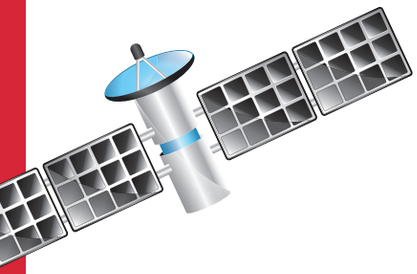
Portable PCR*

Developed by Adam de la Zerda '05, CEO, Visby Medical

This revolutionary PCR testing platform for infections such as COVID-19 is the first to receive FDA authorization for point-of-care usage. The product has been lauded for its accuracy and speed.

SECURITY

KEEPING ISRAEL AND THE
WORLD SAFE



Mini-Labs in Space

Developed by Ido Priel M.S. '11, co-founder and chief product officer, SpacePharma

Autonomous mini-labs will study the ability of enzymes to break up disease-causing bacterial residues. Space is the ideal place to study bacteria, which grow faster in zero gravity.

Beresheet Spacecraft*

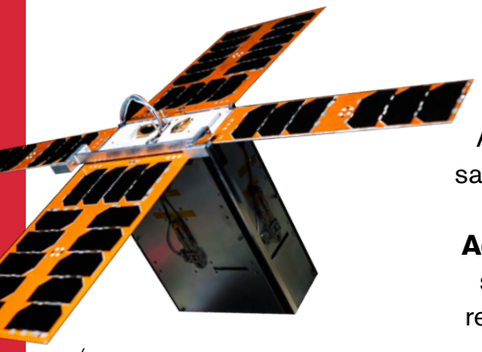
Technion alumnus Shimon Sarid '75 is CEO of SpaceIL

Capturing the imagination of people around the world, this robotic Israeli spacecraft was the first privately funded mission to the moon.

Lifesaving Aerospace Tech

Developed by Prof. Pini Gurfil and a team of students, researchers, and industry experts

Advanced satellite technology could save lives by precisely locating distress signals. Part of Israel's historic **Adelis-SAMSON** space mission, the system can be used for search and rescue and environmental monitoring.



HIGH-TECH FUTURE

TECHNOLOGICAL ADVANCES TO
TRANSFORM OUR FUTURE

Flying Cars*

Developed by Rafi Yoeli M.S. '84, Ph.D. '87, founder of Urban Aeronautics

The five-passenger **CityHawk** is the first flying car to take off and land on city streets, rooftops, and evacuation zones. Service as a rescue vehicle could begin in 2026.

Voiceitt*

Developed by Danny Weissberg '95, CEO, and Stas Tiomkin M.Sc. '09, CTO

Using machine learning, this speech recognition app helps people with speech impairments caused by stroke, traumatic brain injury, and other conditions to communicate with smart devices and in everyday life.

Cortica

Co-founded by Prof. Josh Zeevi, chief scientist, and alumni Igal Raichelgauz, CEO, and Karina Odinaev, COO

This leader in autonomous artificial intelligence has teamed up with Toyota to create a self-driving Lexus for specific routes under specific conditions.

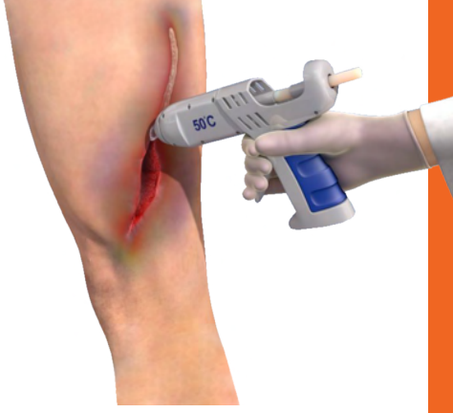
HUMAN HEALTH

MEDICAL ADVANCES
THAT SAVE LIVES

Medical Hot-Glue Gun*

Developed by Assoc. Prof. Boaz Mizrahi and doctoral student Alona Shagan

A new device delivers an innovative flexible glue that can safely adhere torn human tissue together. The glue is safely absorbed into the body once tissues have healed.



ADHD Cap*

Developed by Yousef Badran '12, co-founder of Innosphere

A new cap can safely treat attention deficit hyperactivity disorder (ADHD) without medication, through safe electrical charges to regions of the brain involved in ADHD behavior.

Hands-Free Surgery*

Based on research conducted in the lab of Prof. Moshe Shoham

A surgical robotic system performs biopsies, ablations, and other procedures by inserting and steering instruments to specific locations in the body. **Xact Robotics** received FDA clearance for its unique image-based planning and navigation.

Healthymize

Co-founded by Technion alumnus Dr. Shady Hassan M.D. '06, CEO

An artificial intelligence-based voice monitor for smartphones can detect early signs of flare-ups in patients suffering from asthma and chronic obstructive pulmonary disease.

Medical Holography

Developed by Assoc. Prof. Carmel Rotschild, co-founder, RealView Imaging

HOLOSCOPE-i™ allows physicians to manipulate real-time, interactive, touchable 3D holographs of a patient's body during minimally invasive cardiac procedures.

Cranial Surgery Patch*

Developed by Nora Nseir B.S. '09, M.S. '11, co-founder and CTO, Nurami Medical Ltd.

A post-cranial neurosurgery patch made of synthetic, biodegradable nanofibers protects the brain and spinal cord from infection, accelerates healing, and prevents cerebral spinal fluid from leaking.

Bionic Hands for Children

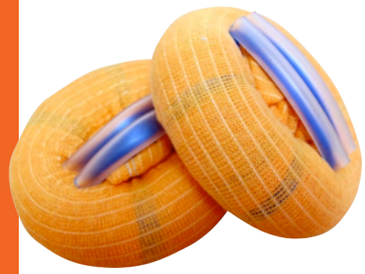
Developed by Prof. Alon Wolf and Haifa 3D

Children in need of an artificial hand receive colorful, 3D-printed hands, customized with their favorite superhero or cartoon character. More functional than existing prosthetics, they even allow children to catch a ball.

Calming Panic Attacks*

Developed by Adi Wallach '09,
co-founder and CEO, Dendro Technologies

A handheld device resembling an asthma inhaler uses lights, relaxing scents, and vibration feedback instead of drugs to regulate breathing and calm panic attacks. **CalmiGo** is sold commercially.



Hemashock*

Developed by
Dr. Noam Gavriely M.D. '79, D.Sc. '81

This pressure stocking redirects blood from the legs to essential organs to save patients in hemorrhagic shock or cardiac arrest.

Super-Smart Medical Wearables

Developed by Prof. Hossam Haick and postdoctoral researcher Dr. Weiwei Wu

Wearable technology powered by body movement is able to detect health changes by continuous monitoring of physiological markers such as heartbeats per minute.

Check-Cap*

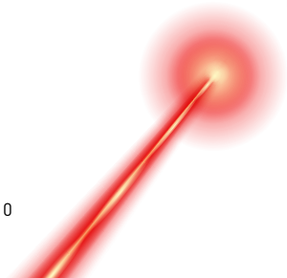
Developed by
Yoav Kimchy Ph.D. '00, CTO and Co-founder

An ingestible capsule for colorectal cancer screening does away with the onerous prep by using X-ray technology.

Light-Triggered Cancer Treatment*

Developed by Asst. Prof. Boaz Mizrahi and doctoral student Alona Shagan

The highly targeted and non-invasive drug-release method combines a nanoscale gold particle-containing polymer coating and near-infrared light.



Microfluidic Chip

Developed by Asst. Prof. Moran Bercovici and doctoral student Federico Paratore with IBM researchers

A new microfluidic chip with improved sensitivity could lead to early detection of conditions including heart disease, cancer, and malaria, as well as better treatment outcomes.

Surgical Theater

Co-founded by Technion alumni Moty Avisar M.S.E. '05, Alon Zuckerman '96, and Gidi Navrotsky '97, MBA '02

Combining flight simulation tech with virtual reality and advanced medical imaging, **Surgical Theater** allows brain surgeons to look inside a patient's head before entering the operating room — effectively simulating upcoming surgeries.

Bonus BioGroup

Dr. Shai Meretzki, CEO, Technion alumnus

In this startup's groundbreaking technology, a 3D high-density bone graft is grown in the lab from a patient's own fat tissue and transplanted by injection back into the patient.

Sealantis*

Developed by
Prof. Havazelet Bianco-Peled

Inspired by the way algae clings to rocks, **Sealantis**, makes medical sealants that prevent excess blood loss during surgery.

Novocure*

Developed by Prof. Emeritus Yoram Palti

An FDA-approved, innovative treatment for deadly brain cancer, Novocure produces low-intensity electric fields to help slow or stop glioblastoma cells from dividing.

AMERICAN TECHNION SOCIETY

SUPPORT THE TECHNION

Join our nationwide community of changemakers. Over the past 80 years, partners of the American Technion Society (ATS) have contributed nearly $3 billion to realize the impact of the Technion on Israel and the world. Launched in 1940 by a group of visionary entrepreneurs and scientists that included Albert Einstein, ATS is served by regional offices around the country.

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