

A Great Year for Israeli Science!

2011 was the year that Israeli scientist, Danny Shechtman, won the Nobel Prize in Chemistry – the fourth Israeli to win the chemistry prize, and the 10th to win a Nobel.

It was also the year when Israeli scientists developed countless imaginative ways to try to reduce our carbon footprint while making giant strides in environmental innovations from solar energy, to desalination, alternative fuels, and even the world's first tugboat for airplanes.

With so much happening during 2011, it's hard to keep track of all of these advances. To refresh your memories, here's a list of the 10 most popular Israel science stories of the year.

1. [A vaccine that can kill cancer](#)

Vaxil BioTherapeutics' ImMucin, a therapeutic vaccine in advanced clinical trials at Hadassah University Medical Center in Jerusalem, can be tailored to treat not only 90 percent of cancers, but also mega-diseases such as tuberculosis. ImMucin is not a preventative; it activates and enhances the body's natural immune system to seek and destroy cancer cells already present, such as those lingering after cancer surgery. The treatment causes no side effects, and can be taken indefinitely, like vitamins. CEO Julian Levy tells ISRAEL21c that ImMucin could be ready and marketable within six years.



Vaxil CEO Julian Levy.

2. [The latest in high-tech security -- a mouse](#)

Israeli startup Bioexplorers has a non-invasive and easy method to detect contraband in purses, luggage and cargo: trained rodents. "Mice have an excellent sense of smell, and they're relatively easy to train," explains CEO Eran Lumbroso. When a person goes through a Bioexplorers system passageway, a fan blows air into a sensor receptor and delivers it into a chamber containing several trained mice. If they sniff drugs or bombs, they move into another chamber and set off an alarm. "The mice rarely make an error,

and the entire procedure is far less invasive or intimidating than the alternatives, like using dogs or X-ray machines," says Lumbroso.



Trained mice can sniff out drugs and explosives.

[3. Breakthrough device helps Alzheimer's patients regain cognitive skills](#)



NeuroAD, a new electromagnetic stimulation system developed by Yokneam-based Neuronix, appears to change the course of the degenerative Alzheimer's disease and allow patients to regain faded cognitive skills. It is the first medical device in the world to receive approval for treating mild to moderate Alzheimer's. Clinical trials, which are continuing in 2012 in Europe and the United States, show that a few weeks of this non-invasive treatment measurable results in cognitive improvement superior to improvements achieved with Alzheimer's medications.

[4. A game-changer in breast-cancer detection](#)

After Israeli electro-optical engineer Boaz Arnon lost his mother, Ruth, to breast cancer in 2004, he set his sights on inventing a more accurate, cost-effective and hands-off

screening alternative to mammography. RUTH, the device he innovated and named after his mom, uses a new trademarked platform based on quantitative computer analysis of 3D and infrared signals emitted from cancerous and benign breast tissue. The brief screening procedure involves no physical contact or radiation, and could be available in doctors' offices -- initially as an adjunct to mammography -- in 2012.



RUTH: Better than mammography.

5. [An Alzheimer's vaccine in a nasal spray?](#)

Could Alzheimer's disease be prevented, not just treated? That's the thinking behind a Tel Aviv University-developed nasal two-in-one vaccine that could protect against both Alzheimer's and stroke. The spray appears to repair vascular damage in the brain by rounding up "troops" from the body's own immune system. This breakthrough is of extraordinary interest to American pharmaceutical makers, given that one in eight Americans will develop Alzheimer's at some point, and because Alzheimer's is often associated with increased risk of a potentially fatal stroke due to vascular damage in the brain.



Photo by Tsafir Abayov/Flash90.

Alzheimer's could be preventable with a nasal spray.

6. [A solar window that generates power](#)

Pythagoras Solar unveiled the world's first transparent photovoltaic glass unit (PVGU) designed to be easily integrated into conventional buildings. CEO Gonen Fink tells ISRAEL21c: "There are many companies today doing energy-efficient windows or energy generators using photovoltaics such as skylights, but this ... is the first time somebody has actually combined the advantages in one product." In June, the Pythagoras Solar window won the prestigious [GE Ecomagination Challenge](#), which recognizes the most promising innovations for capturing, managing and using energy in buildings.



The Pythagoras window lets in the light and uses it for electricity.

7. [Coming soon: a vaccine against cancer](#)

Israeli biomed startup Vacciguard is introducing a technology for developing vaccines against cancer and a wide range of diseases that currently have no effective treatments, such as meningitis type B, three types of West Nile virus and cytomegalovirus (CMV), which infects between 50 percent and 80% of adults in the United States, and 40% worldwide. CEO Dr. Anat Eitan points out that more than 15 million people die each year from infectious diseases -- and not only in developing countries. Vacciguard is based on the research of world-renowned Weizmann Institute of Science immunologist Prof. Irun Cohen.



Vacciguard CEO Anat Eitan.

8. [A bionic retina for the visually impaired](#)

Inserted into the eye in a 30-minute procedure, the Bio-Retina implant, about the size of a grain of rice, turns into an artificial retina that melds to the neurons in the eye. It is activated by special eyeglasses that transform incoming light into an electrical impulse that stimulates the neurons to send images to the brain. The results are almost immediate. While Israeli startup Nano Retina is not the first in the field to develop such a technology, its implant offers a tenfold improvement in vision compared to the two solutions on the market today. It's now at the end of the R&D stage, which is good news for the thousands of people who go blind every year.



Bio-Retina is a man-made electronic retina activated by glasses fitted with a laser energy source.

9. [Mind-controlled computing for the disabled](#)

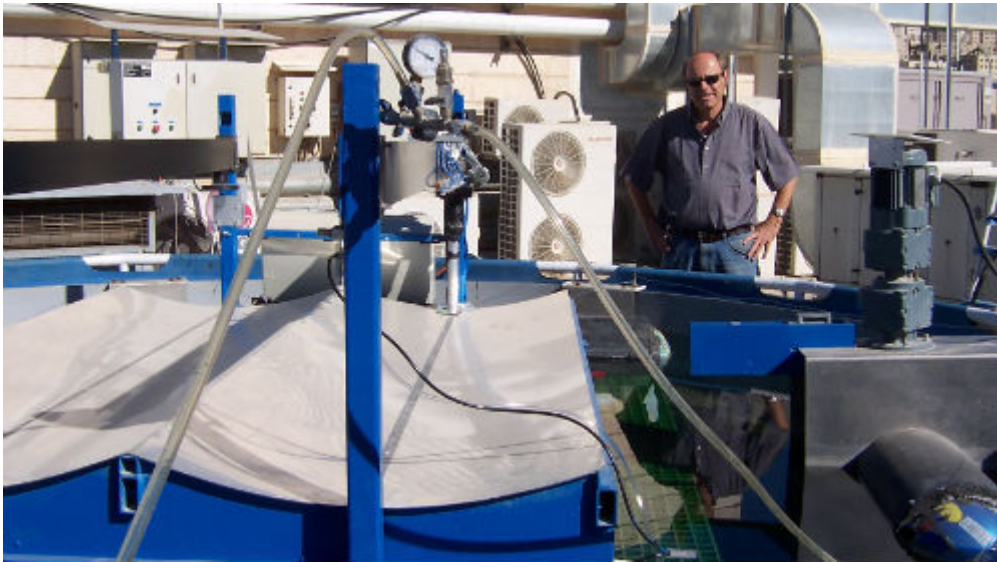
Hoping to give more dignity and communications possibilities to the disabled, a trio of students from Ben-Gurion University of the Negev developed MinDesktop, a graphical user interface (GUI) program that connects brain waves to a computer via Emotiv, a headset that can record and analyze brainwave EEGs. Though years away from commercialization, this advance would enable the physically challenged to use their thoughts to send emails, surf the Web, turn on media players and communicate with their computer and the outside world. It also has potential for noisy environments or situations where two hands are just not enough.



Ben-Gurion University of the Negev students Uri Usami, Ariel Rosen and Ofir Tam developed a way for people to control computer actions with their thoughts.

10. Solar energy that floats on water

Generating energy from the sun would be more practical if not for two huge drawbacks: The expense of the silicon material that converts light to electricity, and the large tracts of land needed for solar farms. By solving both problems with solar energy grids that can float on water, Solaris Synergy captured first place in the Israel National Cleantech Open IDEAS Competition in November 2010. Constructed of lightweight plastic and fiberglass, a grid of connected modules can float on any fresh-, salt- or wastewater surface. This solar-on-water platform doubles as a breathable reservoir cover that reduces evaporation and eliminates algae.



A prototype of the floating solar energy system on the roof of the Jerusalem headquarters of Solaris Synergy.

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