

ISRAEL HIGH-TECH & INVESTMENT REPORT

A MONTHLY REPORT COVERING NEWS AND INVESTMENT OPPORTUNITIES
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The Economy is on a Roll!

In the aftermath of the war in Lebanon in 2006, Israel has experienced one of its best economic years.

Venture capital investments flowed in and could reach \$1.7 billion. Foreign investments were strong. The Tel-Aviv Stock Exchange gained nearly 30%. The Israeli currency is now at its best value, not seen for more than 10 years. Merger and acquisition activity was at an all-time high as Internet companies were in vogue again and attracted American companies.

Predictions are that the Gross Nation Product will rise in 2008 by 4.2%.

However, there are some dark clouds on the horizon. Israel is still not a member of the European Union and its acceptance is not around the corner. The various trading tariffs available to EU members are not available to Israel.

The other concern is the prospective fallout from the sub-prime mortgage morass in the United States. So far, the international banking sector has been hurt. Last month UBS wrote off \$10b. in mortgage related losses and was forced to accept an emergency injection of capital from a Far Eastern lender.

Israeli banks maintain that they are not affected, but it is too early to say whether they have been able to avoid any losses.

On the brighter side of things there are many startups that are beginning to bloom. They have been positively cited at the Davos Economic Forum, Red Herring and other handicappers.

Software and Internet companies should thrive but biotechnology companies, at best, are being sold for their science. Studies have indicated that scientists who are lacking managerial skills manage many of these companies. As a result most of them continue

to be undercapitalized, as investors are loath to wait for the many years that it takes to do clinical tests and finally to obtain regulatory approval.

Impressed by the achievements of development units of Intel, IBM, Hewlett Packard and others international companies are looking to set up such units.

2007 marked the year that Israel became the world's fourth largest defense supplier. In 1967 after the Six

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Day War Charles DeGaulle stopped supplying arms to Israel. This resulted in the building of a defense industry that required a large percentage of exports.

JamAs we went to press Rafael Israel Arms Development carried out a successful trial of its Patriot anti-missile system.

Our Israel High-Tech and Investment Report continues to thrive. We have attended more conferences than ever and continue to be quoted by publications including the prestigious Israel Journal for medical sciences.

As we welcome 2008, our twenty-third year of publication, we continue to view the future with tempered optimism.

Best wishes to our readers and a Happy New Year.

Oracle and Chief Scientist in joint venture with Aternity



Aternity Inc., a specialist in frontline performance intelligence for Global 1000 enterprises, announced that Oracle and Israel's Chief Scientist, Dr. Eli Opper, are investing in a joint project with Aternity. The new venture is part of an agreement signed by Oracle and the Israeli government to increase support

for start-up companies and independent software vendors.

Aternity provides software that arms business managers and IT departments with precise information on how frontline users' experiences impact business results, and gives them a path to constant business improvement. By monitoring users' experiences with critical business applications in real-time, Aternity makes it possible for IT departments to proactively detect and isolate performance and other frontline related service-level problems, before they impact business. The joint venture provides Oracle E-Business suite users with easy access to the innovative frontline performance intelligence of the Aternity platform.

Patent-infringement award to Weizmann

Two companies involved in the making and selling of the anticancer drug Erbitux will each pay \$60-million to the technology-transfer organization of Israel's Weizmann Institute of Science, resolving claims from a patent dispute. The settlement announced by ImClone

Systems Inc. and Sanofi-Aventis SA acknowledges that the Weizmann organization, called the Yeda Research and Development Company is the sole owner of the patent.

In September 2006 a federal judge in New York ruled that three scientists at Weizmann deserved the patent for inventing the process used for inventing the process used in making Erbitux, a drug for treating colon cancer that ImClone Systems makes.

ImClone has resolved another patent infringement lawsuit over Erbitux involving a university. It agreed to pay \$65 million to the Massachusetts Institute of Technology and the Repligen C to settle a 2004 suit that was due to go to trial.

HP buys NUR Macroprinters



Wide format printer maker NUR Macroprinters has been acquired by Hewlett Packard (NYSE:HPQ) for \$117.5m.

Fortissimo Capital acquired 55% of NUR Macroprinters for \$12m. in December 2005 when the company fell into financial difficulties and could not meet its liabilities to the banks. Fortissimo Capital's managing partner Yuval Cohen was appointed chairman of NUR. He said, "Two years ago, when Fortissimo Capital acquired control of NUR, the company was

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losing money and was in a precarious position. However, Fortissimo Capital recognized that Nur had the potential to build on its strong market presence, installed base and technology leadership, and infused the requisite capital to fund its growth. Together with the banks, we restructured the debt, recruited stellar management, and implemented a new strategy that resulted in an impressive improvement and growth. We believe that NUR is at a point where it requires the HP resources in order to bring its line of business to a new level.”

In October, NUR signed a contract with PT Samafitro, a distributor of desktop multifunction peripherals, high-end digital color presses and wide-format production printers in Indonesia.

Stem cell discovery helps cure anemic mice



A team of scientists including an Israeli doctor have successfully used skin cells altered to look and act like stem cells to cure anemia in mice, the U.S. magazine Science reported.

The team’s findings proves that the breakthrough in cell metamorphosis announced last month is applicable to medical research and could be used to bypass controversy surrounding the use of stem cells from human embryos, a debate that has inhibited research.

“When the breakthrough that we had created stem cells from skin cells was announced, it was still not certain whether these cells would be useful for medical research,” Dr. Yakoub Hana, a prominent member of the team and a graduate of the Hebrew University, said. “Our goal was to carry out an experiment that would prove that such a goal can be ascertained. It’s the first time such stem cells have cured such a disease.”

To create the stem cell clones, the team removed and altered mature skin cells from mice. The artificial stem cells were used to make blood cells that then replaced deformed blood cells in mice with anemia. Tests showed the mice that received the blood transfusions had been cured of their ailment. Researchers are hopeful such research could lead to the development of technology that would allow the production of healthy cell blood cells and cure humans

suffering from anemia as well those ill with other diseases.

The new technology, however, is still hazardous to humans. An agent called Retrovirus, essential to the method of producing the artificial stem cells, is highly cancer-inducing.

“Current methods may cause cancers and need to be replaced with less dangerous methods,” Hana said. “I believe these can be achieved within two years.

Hana, a native of the Galilee village of Rama, is a graduate of the Hebrew University in Jerusalem and is currently at the Whitehead Institute for Biomedical Research in Cambridge, Massachusetts.

“I hope that when I finish my post-doctorate in a few years, things will be better in Israel for everybody, and I’ll be better motivated to return,” Hana said.

Israelis among leaders in Internet usage

Israelis rank second worldwide in the number hours spent surfing the Internet, with an average of 37.4 hours a month, according to a survey by Dun & Bradstreet Israel. The rate of use was higher among people using broadband Internet, with an average of 38.8 hours, compared with 10.9 hours on average among people using slow connections.

The survey also revealed that the rate of penetration of broadband Internet services to the Israeli market is one of the highest in the world. Israel was ranked sixth at the end of 2006, with a rate of 68.79% to Jewish households alone. Ahead of Israel in the world rankings were South Korea, Monaco, Hong Kong, Iceland, Singapore, the Netherlands, and Denmark. Israel’s high ranking is especially interesting, given that the UK was ranked in 20th place and the US 25th.

Amarin to buy Israeli R&D company

Amarin Corp Plc (AMRN.L) said it agreed to acquire Israel-based privately held research and development company Ester Neurosciences Ltd for an initial consideration of \$15 million, in

addition to \$17 million in contingent payments.

The British drugmaker said in a statement the deal will close shortly and the transaction will allow Amarin to gain access to a unique mRNA platform technology.

Messenger, or mRNA, is a copy of the information carried by a gene on the DNA. The role of mRNA is to transfer the information contained in DNA to the translation machinery.

Ybrant acquires Israeli ad firm Oridian



Hyderabad, India-based Ybrant Technologies said it agreed to acquire online advertising company Oridian for \$13 million.

The move comes as digital marketing dollars are forecast to quadruple in India in the next three years as companies step up their online advertising efforts to reach customers.

“We understand the various elements that go into creating, developing, and maintaining customer relationships online,” Ybrant Chairman M Suresh Reddy told reporters in Hyderabad.

Oridian is a Israeli, privately held company owned by CEO Jacob Nizri as well as venture capital firms Challenge, Infinity Fund, and Invitech, which injected \$6.3 million in 2001.

Ybrant, a digital marketing company, works with such customers as Yahoo, Terra-Lycos, Capitals One’s PeopleFirst, and MediaRing, among others.

The eight-year-old startup clocked revenue of \$20 million last year. In a similar Internet advertising network business as Ybrant, Oridian provides advertising services to more than 1,000 global web sites with more than 10 billion ad impressions per month and works with more than 500 global advertisers.

“This synergy will bring 60 employees of Oridian into the Ybrant fold, taking its total to 320. Besides, it enables Ybrant to enter new markets including Germany, the U.K., France, Argentina, Australia, Scandinavia, Italy, Belgium, and the Netherlands,” Mr. Reddy said.

\$1 million has been paid to a trust account of Oridian for the definitive agreement, \$2.5 million is due at the deal’s close in a week.

Globally, the digital marketing space is pegged at \$35

billion, while it is at \$40 million in India and is expected to touch \$160 million in the next three years.

That’s good news for Ybrant, which is planning further acquisitions. The company has lined up three more companies in the lead generation, co-generation, and search engine operations in the United States and the European Union. It plans to tap capital markets to fund the deals.

In November of last year, Ybrant acquired Colorado-based MediosOne, an Internet advertising network. That deal was followed by the acquisition of U.S.-based online advertising company AdDynamix for \$10 million in February of this year. In April, it acquired Serbia-based Seenetix and its product VoLoMP (an email marketing platform) for an undisclosed sum.

InSightec a 2008 World Economic Forum technology pioneer



InSightec Ltd. has been cited by the World Economic Forum as one of its Technology Pioneers for 2008. Technology Pioneers

are companies developing and applying technologies deemed highly transformational and innovative in the areas of energy, biotechnology and health and information technology.

The World Economic Forum appointed a panel of leading technology experts to select the finalists from a pool of 273 nominees.

InSightec’s vision is to develop the next-generation, non-invasive, outpatient operating room that minimizes trauma, morbidity and recovery time.

The company’s ExAblate® 2000 is the world’s first and only non-invasive surgery system to combine focused ultrasound and magnetic resonance imaging.

“We believe this non-invasive technology has the potential to become one of the major forms of surgery within the next 20 years, helping improve millions of lives without the long hospitalizations, extended recovery times, side effects, complication risks and extensive costs associated with invasivesurgery,” said Dr. Kobi Vortman, InSightec’s President and CEO. “We’re pleased that the World Economic Forum has recognized ExAblate’s potential with this prestigious designation.”

ExAblate received its European CE Marking in 2002 and U.S. Food and Drug Administration approval in 2004 for treating uterine fibroids, a pervasive condition that impacts up to 70% of women of childbearing age and leads to serious symptoms.

The ExAblate procedure takes about three to four hours and allows the patient to go home the same day and return to normal activities within a day or two. Hysterectomy, the most common treatment for this condition, is major surgery, requiring two to five days of hospitalization, six to eight weeks of recovery and generates significant complications. Many women have chosen to suffer from the severe symptoms that fibroids cause rather than undergo hysterectomies or other invasive procedures.

Uterine fibroids carry a significant economic burden in terms of the cost of treatment, hospitalization and work absenteeism. Since the ExAblate procedure is performed on an outpatient basis without any hospitalization and allows the patient to return to normal activity within one to two days, it offers cost and comfort advantages to patients, healthcare providers and employers as compared with other treatment modalities. InSightec has launched an extensive research program to conduct clinical trials using this technology in various cancerous applications including breast, bone metastases, liver, brain and prostate, while continuing clinical trials in uterine fibroids.

Earnings jump at Israel Aircraft Industries



In the latest of a series of robust earnings announcements from Israeli defense and security companies, Israel Aircraft Industries has reported a 56 percent increase in year-over-year quarterly earnings.

This amounted to \$36 million in net profit for the third quarter of 2006, according to an IAI statement. For the same period in 2006, net profit was \$23 million; in 2005, \$11 million.

The company's vice president of corporate communications, Doron Suslik, told United Press International in a telephone interview that on the military side of the company's operations, "significant activity" in the field of unmanned aerial vehicles drove much of the sales growth. The company's Hunter UAV is in use by the U.S. military in Iraq.

"There were a few ... big contracts," Suslik said of the UAV sales for the quarter.

Dun & Bradstreet, in its annual report on Israel's 100 largest companies, said this about IAI's activity in the UAV market: "IAI is a world leader in totally integrated UAV solutions, with more than 330,000 operational hours of intelligence and targeting missions. The company offers systems from tactical close range to Medium Altitude Long-Endurance (MALE) UAVs systems."

"UAVs have a big advantage: they can be sent into war zones, into battle zones, without using manpower. (The vehicles) hover and immediately transmit pictures and intelligence on a situation, or on an enemy's position," Suslik said.

When asked to interpret the big jump in sales, Suslik said: "There is a big demand for technology projects, because this is a unique technology that offers a unique solution." He added that it is the company's policy to cooperate with local industries and governments to create tailor-made projects. This includes local employment, he said -- and in some cases, even cooperation on research and development.

Sixty percent of IAI's sales were to the military, according to the company. However, civilian sales are growing; Suslik told UPI the primary product behind that market growth is the "executive aircraft" market -- luxury private planes that sell exceptionally well in the United States.

A potential point of crossover between the company's success with UAVs and its desire to increase civilian sales could be the civilian UAV, an idea that was introduced at an Aeronautical Convention in Israel in February of this year.

"Based on (existing UAV) technologies, the company plans to develop a small unmanned plane that will be able to carry up to four passengers," Ynet, the Internet division of the Israeli daily Yedioth Aharonoth, reported at the time.

"Zvi Arazi, head of the IAI's Engineering Division, stated (at) the convention that the technology for developing such a plane already exists, and that the main obstacle that would have to be overcome is the passengers' hesitation to board an unmanned craft," according to the report.

"The backlog ... reached \$7.3 billion, an all-time high. This figure was reached internally without any outside mergers or acquisition which makes the achievement even more significant," the company's new president and chief executive officer, Itzhak Nissan, said via the

company statement. Of that figure, 83 percent is slated for export, the company emphasized.

"In this period the company continued its technological achievements, which include the successful testing of the Arrow Weapon System and the launch of the Ofek 7 Imaging Satellite, sales of over 60 G150 and G200 business jets and conversion of passenger aircraft to freighter configuration," Nissan continued.

Suslik was reluctant to make predictions for the future, as regulations governing the company's upcoming IPO on the Tel Aviv Stock Exchange strictly govern financial forecasts.

Jerusalem Global starts \$200m. tech fund



Jerusalem Global Ventures said it has launched a \$200 million equity fund that will invest in private Israeli-related technology companies.

JGV said in a statement the new fund's closing will be in April of 2008. It will invest in technology companies that "are on a trajectory to an initial public offering within three years and have a proven business model."

It said investments will be \$5 million to \$20 million in companies with late-stage financing needs of \$10-\$50 million.

"There are some interesting things going on in Israeli technology," Shlomo Kalish, JGV's founder said. "The number of private companies with revenue of more than \$10 million has exploded and we see more in the pipeline.

"There is still pressure for such firms to exit too early. This fund will help successful companies bridge that gap and get to a point where they can realise their full value," he added.

Kalish pointed to Mellanox (MLNX.O) as an example of a firm the fund will invest in. Mellanox, a JGV portfolio company, earlier this year raised \$102 million in a Nasdaq IPO.

Venture capital funds have said that in contrast to quick exits of just a couple of years for Israeli tech firms that took place prior to the bubble bursting in 2001, exits now will be taking longer and companies will need to show actual revenues.

Israel's biotechnology sector at a glance

Israel's share of sales in the global biotechnology market is about 2.5%.

Israel ranks as a top country for scientific publications per capita; almost 60% of these publications are in biology and related medical and agricultural fields.

Life sciences represent about 35% of Israel civilian research activities.

There are 160 industrial enterprises active in various biotechnology sectors.

There are 4,000 Israelis working in the biotechnology field today as compared to 400 in 1988.

75% of Israeli biotech companies are start-ups with fewer than 20 employees. A dozen of these companies represent 80% of the market value, employ 50% of the human resources, and generate two-thirds of the sales.

There are 36 companies in therapeutic pharmaceuticals in Israel and they generate 67% of the Israeli biotech product sales. Diagnostics account for 4% of biotech sales and agro-bio and veterinary products amount to 23% of sales.

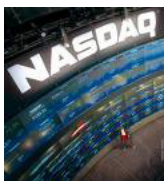
TASE and NASDAQ sign an MOU



The NASDAQ Stock Market and the Tel Aviv Stock Exchange signed a Memorandum of Understanding that will facilitate the stronger trading of company shares admitted on both markets.

"The development of the Tel Aviv Stock Exchange's international capability is a key strategic objective of the Exchange, said Ester Levanon, CEO of the TASE. "The MOU is an important event and is testament to the quality and opportunity that Israel's capital markets represent for US investors today. With the number of NASDAQ-listed Israeli companies expected to grow over the coming years, NASDAQ will play an important role in the ongoing international development of our markets. I am very much looking forward to a long and mutually beneficial relationship."

To mark the signing of the Memorandum, Levanon attended the closing bell ceremony companies with approximately 50 new companies starting up each year. Between 2001 and 2005, more companies



were established in life sciences than in any other industry in Israel. Factors contributing to the success of this burgeoning industry include cooperation between academia and business, an entrepreneurial spirit, and a highly skilled workforce.

In a presentation to investors, Yisum said that it posted \$40 million revenue in 2006, and that sales of products derived from its know-how amounted to \$1 billion. Most of this revenue comes from two drugs, Doxil and Exelon, and a proprietary tomato variety developed at Hebrew University that is suitable for greenhouses. Yisum has founded 60 companies to date. Yisum companies raised \$150 million over the past year. at NASDAQ in New York..

NASDAQ currently has 70 Israeli companies listed on the exchange. These companies have a combined global market cap of over \$60 billion.

NASDAQ is the largest US equities exchange. With approximately 3,100 companies, it lists more companies and, on average, trades more shares per day than any other US market.

Game Giveaway to support the Mideast peace process

Coinciding with the upcoming Mideast Peace Summit in Maryland, the Peres Center for Peace will be giving away 100,000 copies of PeaceMaker to Israelis and Palestinians living in the conflict zone.

In PeaceMaker, gamers play as either the Palestinian Prime Minister or Israeli President as they attempt to lead their nation and their people toward a lasting international peace. Players will encounter the same obstacles as real-life leaders, including protests, political pressures and acts of violence against soldiers and citizens alike.

“Since we first got the idea for PeaceMaker, it has been our hope to put this game in the hands of people who live with the real conflict every day, so they can play as the other side,” said Asi Burak, co-founder of PeaceMaker developer ImpactGames. “With this game, the people can succeed where politicians and leaders have failed until now - bringing peace to the Middle-East.”

Burak, a former Israeli Army Intelligence Corps captain, created the game along with American Eric Brown after the two met at Carnegie Mellon University’s Entertainment Technology program. The game was developed with a panel of Palestinian and Israeli consultants, and is the first of a series of current events-oriented games the company is developing.

“It’s significant that the PeaceMaker giveaway in the Mideast is happening around the peace summit, but also at a time of year when millions of Westerners begin their holiday shopping by purchasing games where war, violence and conflict are central points of the game,” said Brown, CEO of ImpactGames. “To win at PeaceMaker, you have to cooperate with the other side and reach an understanding; you must challenge any prior knowledge or assumptions you have about the Mideast conflict.”

75,000 copies of the game will be sent to subscribers of the Israeli newspaper Ha’aretz, while another 10,000 copies will be sent out through the Palestinian newspaper Al-Quds. 15,000 more copies will be given to Palestinian and Israeli high schools, where specially trained teachers will teach them to students over the coming months.

Taiwanese invest in Israeli image sensor startup

CIDC, a Taiwan-based venture capital fund, has invested \$6 million in Advasense Inc. (Raana, Israel), a fabless semiconductor company focusing on image sensors for mobile devices.

The deal completed the startup’s B1 round of financing, and in total, has raised over \$20 million in VC funding.

CIDC joins the existing investors, Genesis Partners, Giza Venture Capital, BlueRun Ventures (formerly known as Nokia Venture Partners) and VentureTech Alliance.

The capital raised in this round will be used to accelerate development of Advasense’s its 5Mpixel 1/4 inch CMOS image sensor.

Advasense claims, its patented technology enables the production of high image resolution imagers with small pixels at a competitive price. The image sensors include on chip image stabilization that uses the pixel array as a memory, providing sharper images in

low lighting situations. “We see a lot of added value in having CIDC with us, given its strong industry connections in Taiwan and long history of investments in the semiconductor industry,” said Naftaly Sharir, Advasense CEO.

Israel launches anti-hijack pilot identification system

Israeli authorities plan to issue a new anti-hijack identification system to incoming aircraft which they say is foolproof, but some experts are not convinced it will plug all the security holes on the horizon.

Starting next year, Israel will require pilots who fly to its airports to use the Security Code System (SCS), a local invention designed to ensure planes that have been commandeered for al Qaeda-style attacks are spotted in time.

Israel plans a trial run for the system, using a credit card-sized keypad, next month, in cooperation with five airlines from the United States, Europe and Africa. About 10,000 of the units will ultimately be issued, with Israel bearing the cost.

Pilots who fail the authentication test when they approach Israeli airspace will be denied entry. Should a plane go ahead, ignoring further warnings, Israel will consider it hostile and scramble fighter planes for an interception.

In the worst case, that could mean an aircraft is shot down.

“You can’t bluff this system,” Dani Shenar, chief of security for Transportation Ministry, said.

“It provides a higher level of confidence that the aircraft is being controlled by the right people, which is a huge asset in terms of avoiding unnecessary security alerts.”

He said the system knows how to differentiate between “a classic hostage-taking hijacking and a 9/11-style hijacking.”

Shenar and the company that developed SCS, Elbit Systems, declined on security grounds to give details of the technology and procedures involved.

Economy: 17 consecutive quarters of growth

According to statistics released by the Central Bureau of Statistics, the Israeli economy, measured by GDP, grew in the third quarter of 2007 at an annualized rate of 6.1%, and business product grew 6.6%.

Private consumption expenditure per capita increased an annualized 6.1% and private consumption expenditure as a whole rose 8%.

The improved growth statistics that the Central Bureau of Statistics released are welcome news to Finance Minister Ronnie Bar-On. According to the statistics, as of now, the strong shekel and the credit crisis in the US have not negatively affected the Israeli economy.

The third quarter growth marks Israel’s 17th consecutive quarter of economic growth, going back to 2003, during which time the economy grew 24%. This is the longest and most significant growth period in the history of the State of Israel.

The Central Bureau of Statistics also reported a sharp rise of over 24% in investments in various sectors of the economy, an important indicator for future growth, which is expected to continue into 2008. A slightly lower statistic is the investment in residential building, which grew only at annualized rate of 2.5%.

Overall, exports grew 17.8% while imports only grew by 5.9%.

Wake up and Smell the Sweat

Some people are oblivious to the odor in the locker room after a game, while others wrinkle their noses at the slightest whiff of sweat. Research by Prof. Doron Lancet and research student Idan Menashe of the Molecular Genetics Department, which appeared recently in PLoS Biology, has now shown that this difference is at least partly genetic.

Our sense of smell often takes a back seat to our other senses, but humans can perceive up to 10,000 different odors. Like mice, which boast a highly-developed sense of smell, we have about 1000 different genes for the smell-detecting receptors in our olfactory “retinas.” In humans, however, over half of these genes have, in the last few million years, become defunct – some in all people, while others in just parts of the population.

Lancet and his team had their experimental volunteers sniff varying concentrations of compounds that smelled like banana, eucalyptus, spearmint or sweat, and



noted the sensitivity with which the subject was able to detect the odor. They then compared the results with genetic patterns of receptor gene loss and found that one gene (OR11H7P) appeared to be associated with the capacity

for smelling sweat. When participants had two genes with disrupting mutations, they were likely to be impervious to the offending odor, while those that were hypersensitive to the smell had at least one intact gene.

The scientists noted, however, that while having at least one intact OR11H7P gene might determine whether you can tell by the smell that your loved one has just come from the gym, this is not the entire story. Women were generally slightly more sensitive to many smells than men, and some individuals of both sexes were better or worse in across-the-board acuity to all odorants. Finally (as is always the case), not all was in the genes – environmental factors were seen to play a role as well.

Israeli researchers aim to develop “neuromemory” chip

Researchers at Tel Aviv University in Israel are aiming to create a hybrid biological-solid state memory that could be linked to conventional computer hardware to create cyborg machines.

The possibility of growing biological memory on silicon or glass substrates and making electrical connection to wires has been demonstrated before. The Israeli team has now demonstrated that a networks of neurons cultured outside the brain can be imprinted with multiple rudimentary memories that persist for days without interfering with or wiping out others.

At present the electrical connections to the biological network are used for observation and measurement but a next stage could be to develop functioning biological networks that could interact with a conventional computer.

“The main achievement was the fact that we used the inhibition of the inhibitory neurons to stimulate the memory patterns,” said physicist Eshel Ben-Jacob, senior author of a paper on the findings published in the May issue of *Physical Review*. “We probably made [the cell culture] trigger the collective mode of activity

that...[is]...possible.”

Ben-Jacob said that previous attempts to imprint memories on brain cell cultures — neurons along with their supporting and insulating glial cells — have often involved stimulating the synapses — nerve cell connections. So-called excitatory neurons, which amplify brain activity, account for nearly 80 percent of the neurons in the brain; inhibitory neurons, which dampen activity, make up the remaining 20 percent. Stimulating excitatory cells with chemicals or electric pulses causes them to fire, or to send electrical signals of their own to neighboring neurons.

According to Ben-Jacob, previous attempts to trigger the cells to create a repeating pattern of signals sent from neuron to neuron in a population, which neuroscientists believe constitutes the formation of a memory in the context of performing a task, focused on excitatory neurons. These experiments were flawed because they resulted in randomly escalating activity that does not mimic what occurs when new information is learned.

This time, Ben-Jacob and graduate student Itay Baruchi, who led the study, targeted inhibitory neurons to try to bring some order to their neural network. They mounted the cell culture on a polymer panel studded with electrodes, which enabled Ben-Jacob and Baruchi to monitor the patterns created by firing neurons. All of the cells on the electrode array came from the cortex, the outermost layer of the brain known for its role in memory formation.

Initially, when a group of neurons is clustered in a network, merely linking them will cause a spontaneous pattern of activity. Ben-Jacob and Baruchi sought to imprint a memory by injecting a chemical suppressor into a synapse between inhibitory neurons. Their goal: to disrupt the restrictive function of those cells, essentially causing the brakes they put on the excitatory members in the network to loosen.

“This is like teaching by liberation,” Ben-Jacob says. “We liberate the excitatory neurons to do what they want to do.”

Other neurons in the culture began to fire one by one as they received an electrical signal from one of their neighbors. This continued in the same pattern, which repeated for over a day. This new sequence of

activity coexisted with the electrical pattern that was spontaneously generated when the neural culture was initially linked.

A day later, they imprinted a third pattern starting at a different inhibitory synapse. Again, it was able to coexist with the other motifs. “The surprising thing is it doesn’t affect the other patterns that the network had before,” said Ben-Jacob.

The authors wrote: “These findings hint chemical signaling mechanisms might play a crucial role in memory and learning in task performing in vivo networks.”

Active compounds found in fungus with potential to treat prostate cancer

A new development in the fight against cancer: Recent research at the University of Haifa found that molecules found in common fungus *Ganoderma lucidum* aid in suppressing some of the mechanisms involved in the progression of prostate cancer. The main action of the fungus: disrupting androgen receptor activity and impeding the proliferation of cancerous cells.

Over the past 3-4 decades much scientific research has dealt with the medicinal properties of different fungi. One of the important characteristics of fungi is the ability to fight cancer in a number of ways; however most of the research has been concentrated on how fungi affect the immune system. In this research, conducted by Dr. Ben-Zion Zaidman, he examined how fungi fight cancer from within cells.

According to Dr. Zaidman, prostate cancer, one of the most common cancers found among men in the Western World, is controlled by the androgen receptor, especially at the initial stages of development of the disease. Therefore, all of the current medications used to treat prostate cancer work to reduce the production of androgens or to interfere with their function via the androgen receptor.

At the first stage of the research, 201 organic extracts from 68 types of fungi were produced with solvents such as ether, ethyl acetate and ethanol. These solvents are used to select molecules that are small enough to act from within the cells. Of the 201 extracts, 11 were found to deter androgen receptor activity by more than 40%. In further testing, 169 extracts were tested for cancer cell growth inhibition. In this study, 14 extracts were found to be active in inhibiting prostate

cancer cells.

From among the active extracts, those from *Ganoderma lucidum* were found to be the most effective in inhibiting the function of the androgen receptor and controlling vital development of cancerous cells. “The results of this research are particularly interesting from a commercial aspect. Potential possibilities exist to establish research and development of bioactive metabolites from *Ganoderma lucidum* that could yield an anti-prostate cancer drug,” remarked Dr. Zaidman.

Israeli scientists cited by Scientific American



A discovery in the field of artificial intelligence, conducted by two Tel Aviv University academics, and Israeli research into treating Parkinson’s disease, have been selected as among the past year’s greatest advancements in science by a top U.S. periodical.

Scientific American magazine placed Professor Eshel Ben-Jacob and Dr. Itay Baruchi’s creation of a type of organic memory chip on its list of the year’s 50 most significant scientific discoveries.

In their research, the Israeli academics used nerve cells taken from rodents, and managed to create a simple method that simulates how information or memories are stored in humans and animals. Scientists hope that their work could lead to the development of computers that will be able to think creatively.

Another Tel Aviv University researcher, Professor Beka Solomon, was also listed by Scientific American for her research in treating Parkinson’s disease. “Computers that exist today are passive,” Ben-Jacob explained. “You run a program and everything goes according to what is already input. In contrast, when a person undertakes a task you know he is going to use his personal judgment in accordance to circumstances that may develop.”

Ormat signs 20-year agreement with Southern California Edison

Ormat Technologies, Inc. (NYSE: ORA) has announced that it has signed a 20-year power purchase agreement with Southern California Edison (SCE). The agreement is for the sale of energy to be produced by a new plant

that will be built in Imperial Valley, California. The plant is expected to come on line by mid 2012 and is expected to have a total output of 30 megawatts. The agreement includes an option to increase capacity to 100 megawatts.

This agreement stems from a 2007 request for proposal from SCE and it is subject to approval by the Public Utilities Commission of California (CPUC).

“The agreement for the new Imperial Valley Power Plant is the eighth such agreement between Ormat and SCE, and the second executed since the enactment of California’s aggressive renewable portfolio standard legislation,” said Ormat Technologies CEO Dita Bronicki.

In May, Ormat signed a 20-year agreement with Nevada Power Company, for the sale of energy produced from the Grass Valley Geothermal Power Plant. That contract has recently received the approval of the Public Utilities Commission of Nevada.

VC funds see 30% jump in Israeli exits

Venture capital investment in cleantech rose sharply in 2007.

2007 is shaping up to be a good year for Israel’s venture capital industry says the latest report by Ernst & Young and Dow Jones’s VentureOne.state that 168 venture capital investments totaling \$1.3b. were invested in Israeli start-ups in January-November 2007.

The value of exits by Israeli companies, either through IPOs or by sale, totaled \$3.5 billion, 30% more than the \$2.7 billion in 2006, and 58% more than the \$1.7 billion in exits in 2005. These figures refer only to venture capital-backed companies, and do not include mergers and acquisitions of public companies, such as Spansion Inc.’s (Nasdaq:SPSN) takeover of Saifun Semiconductors Ltd. (Nasdaq:SFUN) earlier this year, or the sale of Mercury to Hewlett Packard Co. (NYSE:HPQ) and m-systems to SanDisk Corporation (Nasdaq:SNDK) in 2006.

IPOs accounted for 57% of exits of Israeli start-ups in 2007, with M&As accounting for the rest. In 2006, 86% of exits were through M&As and just 14% were by IPO.

VentureOne states that IT continued to attract the most venture capital in 2007: \$992 million, 76% of all investment. \$256 million was invested in 32 life sciences start-ups, 20% less than the \$332 million invested in

36 life sciences start-ups in 2006. Investment in life sciences start-ups accounted for 20% of total venture capital investment in Israel start-ups, compared with 35% in the US, a sharp increase over last year.

Investment in Israeli cleantech start-ups increased substantially this year, with seven companies raising \$38 million, 65% more than the \$23 million raised by three companies in 2006.

Group brings children for life-daving heart surgery

The Israeli Save a Child’s Heart (SACH) organization welcomed its first group of Kenyan children with heart conditions to be operated upon in Israel Wednesday.

The organization locates children in developing countries with life-threatening heart diseases and brings them to Israel to be treated by Israeli doctors at the forefront of cardiac medical technology.

The three young Kenyans, Samuel, 7, and 1-year-olds Hastings and Winfred, were accompanied by two of their mothers. The operations will take place at the Wolfson Medical Center in Holon. The children’s treatment in Israel was arranged by a Kenyan physician who trained with SACH at Wolfson in anesthesiology.

Kenya is SACH’s 29th partner country, and plans are currently underway to expand medical and training opportunities, including the training of a pediatric cardiac surgeon in Israel.

Since 1996, Save a Child’s Heart has provided surgeries for children from Ethiopia, Nigeria, Zanzibar, Rwanda, Moldova, Vietnam and China.

Half of the group’s life-saving services have been provided to children for PA-controlled areas and Arab countries.

New camera challenges Nintendo Wii controller

3D camera promises to change the future of gaming While the Nintendo Wii’s revolutionary controller has changed the way people think about games, one Israeli company is trying to take things a step further. It’s developed a new 3D camera lens so powerful it can track every tiny movement you make.

It's called the ZCam, and has been in development at 3DV Systems' labs for two and a half years. It's similar to the PS2's EyeToy but is far more sensitive and intelligent. It will enable you to play games using very subtle movements such as the flick of a finger.

"The Wii has shown us the way, but this device can take things so much farther," 3DV chief executive Zvika Klier stated.

The ZCam will allow you to play games by physically replicating the movements of the characters on screen. So instead of playing basketball by pressing buttons on a control pad, you will actually be able to shoot hoops as though you were playing with a real ball.

Klier says he's currently negotiating with several hardware and software companies about ways the ZCam can be used. And assuming it finds partners who are willing to develop games and other software for it, the ZCam will go into mass production at some point next year.

The ZCam will eventually be available as a peripheral but it's unclear which platforms it will be offered on. It's perfectly possible that it'll be available on both the PS3, Xbox 360 and PC, with cross-platform games being designed to make use of it.

Haifa Technion scientists create world's smallest bible

Local scientists have inscribed the entire Hebrew text of the Jewish Bible onto a space less than half the size of grain of sugar.

Nanotechnology experts at the Technion - Israel Institute of Technology in Haifa say the surface of the text measures less than 0.5 square millimeters (0.01 square inches). They chose the Jewish Bible to highlight how vast quantities of information can be stored in minimum amounts of space.

It took the team about an hour to etch the 300,000 words of the Bible onto a tiny silicon surface, says Ohad Zohar, the university's scientific adviser for educational programs.

The Technion's microscopic Bible was created by blasting tiny particles called gallium ions at an object

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that then rebounded, causing an etching affect.

When a particle beam is directed toward a point on the surface, the gold atoms bounce off and expose the silicon layer underneath just like a hammer and chisel, Zohar explains. He adds that the technology will in the future be used as a way to store vast amounts of data on bio-molecules and DNA.

The tiny Bible appears to be the world's smallest. The previous smallest, known copy of the Bible measured 2.8 x 3.4 x 1 centimeters (1.1 x 1.3 x 0.4 inches), weighing 11.75 grams (0.4 ounces) and containing 1,514 pages, according to Guinness World Records. text.



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