

Farewell

This report is my last as President of the Technion. For the past eight years I had the privilege of serving as the President of the Technion and leading this very fine university. These eight years have been marked by a great deal of turmoil and change in a country that is constantly evolving. The Technion is certainly not what it was eight years ago and it has been transformed in many ways. In this report I shall attempt to cover all the major changes and accomplishments which the past eight years have witnessed, as well as to highlight some of the challenges that we are to face in the future.

What has always been constant for the Technion, and for this we are all grateful and gratified, is the large and very close-knit support the Technion enjoys. Our extended family, both in Israel and abroad, has been a stable pillar on which the Technion stands. Your support and friendship have accompanied me throughout my two four-year terms in office and have always been a constant source of encouragement. The confidence you have all shown in me has been heartwarming and a source of strength. This support has allowed me to pursue the very ambitious goals we have set for the Technion.

Over the past eight years I have been fortunate to have with me a dedicated management team who, with me, carried the responsibilities of leadership. This team has always worked with mutual respect, full cooperation and unity for the good of the Technion. I wish to thank each and every one of them and extend my sincere gratitude for their partnership, shared vision and dedication.

I list below all the excellent people who have been working with me at the inner-circle of Technion Management throughout my two terms of Presidency:

Senior Executive Vice President:

Prof. Aviv Rosen, between 10/2001 and 10/2007, replaced by Professor Paul Feigin who is currently in office.

Vice President for Administration and Finance:

Professor Michael Rubinovitch, between 10/2001 and 10/2005, replaced by Dr. Israel German who became the *Executive Vice President and Director General* until 09/2007 and was replaced by Professor Zvi Kohavi who is currently in office. Professor Kohavi also served as the Managing Director of TRDF from 04/2002 until 09/2007.

Executive Vice President for Research:

Professor Avraham Shitzer, who was in office when I began my first term and who served until 10/2002 and was replaced by Professor Moshe Eizenberg who served in this position between 10/2002 and 10/2008, when he was replaced by Professor Oded Shmueli who is currently in office.

Executive Vice President for Academic Affairs:

Professor Uriel Rothblum, who was already in office when I began my first term and who served until 10/2002 and was replaced by Professor Moshe Moshe who served in this position between 10/2002 and 10/2006 and was replaced by Professor Moshe Sidi who is currently holding this position.

Vice President for Resource Development and External Relations:

Professor Peretz Lavie, between 10/2001 and 10/2008 who was replaced by Professor Raphael Rom who is currently holding this position.

These fine men have all been very instrumental and helpful in their leading administration roles and each one of them has truly made a mark on the Technion and its future.

There are many others who have been invaluable in their roles: the various division heads of the central administration and their personnel, the various Technion and Faculty Deans, and Heads of Research Centers who served in office throughout these eight years, and all the women and men working, teaching and studying at the Technion.

I would like to take this opportunity to convey my profound gratitude to the staff working in the President's Office under the very capable leadership of

my head of office Mrs. Leah Milo. Without their support, patience and dedication my work would have been extremely difficult and I am thankful to all of them for the wonderful advice and commitment they have shown me. I wish to also convey my appreciation to the staffs of the other management offices that have also been instrumental in the routine functioning of our management team.

I would like to thank the members of my research group for their patience, cooperation and support which allowed me to continue enjoying my scientific activity throughout these eight years, and actually to continue being among the leading groups in our field in chemistry. Without their devotion and talent this would not have been possible.

And finally, I would like to thank my family and especially my wife Tzipi for her love, patience, support and valuable advice that lightened my road throughout these turbulent eight years.

My friends, it was a privilege for me to serve as President of Technion. I was honored and humbled when I was selected to the task and I leave with a great feeling of accomplishment. There is still much work to be done and there will always be. I am confident that my successor, Professor Peretz Lavie, with whom I have worked closely and in harmony for seven exciting years, will lead the Technion to continued excellence and leadership and to new achievements. It was a privilege and pleasure to know all of you, to become your friend and to strive together to advance the Technion.

Thank you,

Yitzhak Apeloig

Professor Yitzhak Apeloig
President

The National Scene

Overview of Political Events of the Past 8 Years

On the eve of my first term in office one of the events to shape the next decades took place: the September 11th, 2001 unparalleled terrorist attacks on the USA. This event was so profound and so traumatic that even now its ramifications affect many aspects of our life. The ensuing wars in Iraq and Afghanistan which once again managed to "drown" the US military in a foreign bog, the shutting down of the American borders, the impact on the way we travel, and the realization that things are never going to be the same again are just some of them. Ever since, the world is still holding its breath and waiting in worry to what many believe will be an inevitable additional attack.

Another major event to take place prior to the beginning of my first term in office was the beginning of the second intifada, what came to be known as the Al-Aqsa Intifada. It began with Ariel Sharon's visit to the Temple Mount in the end of September 2000. This visit sparked many riots and violent clashes between Israeli forces and Palestinians. The tension spilled to Israel and riots broke out, especially in the Galilee, leaving 13 Arab-Israeli citizens killed at the hands of the Israeli police. These events and the Second Intifada have also made an impact on the following years, including the eight years of my terms as President of the Technion.

My term in office began with a series of devastating terrorism attacks in major Israeli cities, such as the "*Matza*" restaurant suicide bombing in Haifa in the end of March 2002, where many Israelis lost their lives, as well as many bus suicide bombings in the cities of Israel. This wave of terrorism was unprecedented in its extent and cruelty. The Israeli response was operation "Defense Shield" on March 29, 2002 in an attempt to uncover and uproot the nests of terror which existed within the Palestinian - ruled villages and towns of the West Bank. As you may recall, this military operation affected the lives of hundreds of our students as many of them were called for reserve duty and many participated in actual combat.

In January 2003, a new *Likud* government, headed by Ariel Sharon, was elected into office. This new government had a volatile security situation to contend with as well as a severe economic crisis. The implications of this economic crisis on the universities in Israel and the Technion among them were very severe and this will be described later. One of the major actions this government decided to pursue has been the decision to withdraw from the Gaza Strip and a few West bank settlements. The pullout (*HaHitnatkut*) took place in August 2005 and went off without major incidents, although it was very traumatic to many sectors of Israeli society. It was not violent as many feared it would be, however, its effects are still being felt today. The Palestinian Authority has since lost control of the Gaza Strip and it is now governed by Hamas. As a result, Jewish settlements and towns within Israel who are in proximity to the Gaza Strip are constantly being bombarded by Qassam rockets, a point I shall elaborate on further on.

In November 2005, Prime Minister Ariel Sharon decided to leave the Likud Party and form a new party which was named "Kadima". The reason for this was to eliminate the opposition he had within the *Likud* party to the disengagement plan he formulated. This political "big-bang" threw the Israeli political system into frenzy, as many members from other parties joined *Kadima*, totally changing the Israeli "political map".

On January 5th, 2006, Israelis woke up to a new reality when Prime Minister Sharon suffered a massive stroke and slipped into a coma, one he has yet to awake from. Due to this sad event, Israelis went to the polls on March 2006 and *Kadima* received 29 mandates, making it possible for Ehud Olmert to build a government.

This new government was challenged almost from the beginning. In June 2006, the soldier Gilad Shalit was kidnapped in the Gaza Strip by Hamas and has yet to be released. On July 12th, Hezbollah attacked an IDF patrol within Israel and kidnapped two Israeli soldiers, killing three others. The fate of the two kidnapped soldiers: Eldad Regev and Ehud Goldwasser (a Technion graduate student serving in the reserve forces), was unknown at the time and

this incident sparked what came to be known as the Second Lebanon War. During the course of this war, which lasted for a month, Hezbollah fired more than 4,000 rockets on Northern Israel, including about 100 on Haifa, making the lives of one million Israelis impossible. The War ended with a cease fire on August 14th 2006. The costs of war were high with 119 soldiers killed, 43 civilians killed, and a financial cost estimated at \$5 billion. The newly formed Olmert government suffered a great deal of criticism following the war and the public cry for a public investigation led to the establishment of the Winograd Commission. The final report of the Winograd Commission which was submitted in January 2008 refrained from placing personal responsibilities for the war and declared that the war was a missed opportunity for the State of Israel as there was no clear victory at the end and this clearly damaged Israel's deterrence. Prior to the final report, the Minister of Defense Amir Peretz stepped down and the IDF Chief of Staff Dan Halutz resigned. On July 15th 2008, coffins containing the remains of Ehud Goldwasser and Eldad Regev were returned to Israel as part of a prisoner exchange. It was determined that the two were probably killed during the initial attack on their vehicle.

Due to several ongoing investigations against him, Prime Minister Ehud Olmert decided to resign in July 2008. He has stepped down from heading the *Kadima* Party to be replaced by Tzipi Livni who won the *Kadima* Party Leadership Elections. He remained Prime Minister under the dictates of the law until a new government was formed or an election. Tzipi Livni was unsuccessful in forming a new coalition government and therefore new parliamentary elections were set for February 10th, 2009.

Prior to the elections, the government, led by Ehud Olmert, Tzipi Livni and Ehud Barak decided on a military operation in Gaza to try and stop the constant rocket and mortar attacks on our Southern cities. On December 27, 2008 Operation "Cast Lead" was launched. The Operation began with intense bombardments on Hamas targets in the Gaza Strip. All this time, Hamas rocket attacks intensified and reached previously untargeted cities like Beer Sheva, Ashkelon and Ashdod. On January 3rd, 2009 the Israeli ground invasion of the

Gaza Strip began. As the humanitarian situation in Gaza began to deteriorate, the international calls for a ceasefire increased. The immediate conflict ended with a unilateral ceasefire on Israel's part. Unfortunately, the Hamas continues to launch sporadic rocket attacks and despite the Egyptian guarantee that no weapons will be permitted to pass into Gaza through Egypt, the armament smuggling continues.

On February 10th, 2009 Israelis went to the polls as scheduled. The *Kadima* Party under the leadership of Tzipi Livni received the most mandates with 28 mandates, however, the overall results showed a significant strengthening of right wing parties such as *Yisrael Beytenu* led by Avigdor Lieberman who received 15 mandates, and a weakening of left wing parties such as the *Labor* Party led by Ehud Barak which received only 13 mandates. The President therefore gave the *Likud* Leader, Benjamin Netanyahu, who won 27 mandates, the task of forming the new government. On March 31st, 2009 the 32nd Israeli government was approved by the Knesset and sworn in. This is one of the largest governments in Israel's history with 30 different ministers. The government is made up of a coalition of five different parties which have all come together under various coalition agreements. The government includes Prof. Daniel Hershkowitz, a professor at our Faculty of Mathematics (now on leave) who was nominated as the Minister of Science. Hopefully, this government will have the strength and longevity to make the desperately needed changes for the benefit of our economy and security.

Another burning issue this past year has been the kidnapped soldier Gilad Shalit who has yet to be released. Unfortunately this young soldier is still being held captive despite great efforts to release him. We hope and pray that his release will be secured soon.

One of the major players of the past year has been the global economy crisis. I would like to review this in the following section. However, I would like to point out that the past eight years have been full of ups and downs economically speaking. We have seen a major economic crisis between 2001 and 2004 which has left our economy reeling. This was followed by an

economic awakening and strong growth between 2005 and 2008, which was halted in the second half of 2008 by this global financial crisis.

The Israeli Economy in 2008

In last year's report the emphasis was on Israel's fourth straight year of strong economic growth, after the 2001-2003 slowdown. However, I ended the report by noting that "for 2008 there are numerous storm clouds on the horizon". And indeed, in the second half of 2008, the storm arrived. The global financial and economic crisis which began in the United States and spread abroad affected all aspects of Israel's economy: foreign investment, capital markets, philanthropy, tourism, exports, employment and consumer spending.

The year 2008 saw Israel's economy perform an almost unprecedented mid year U-turn. Gross Domestic Product (GDP) continued to grow at a 5% per year pace in the first half of the year, but slowed to only 1.1% in the second half and in the first quarter of 2009 Israel's GDP shrank by 3.6%. Business-sector GDP slowed even more, from 5.7% to 0.8%. With GDP declining in the fourth quarter of 2008 and more so in the first quarter of 2009, Israel's economy is now officially in a recession (defined as two consecutive quarters of GDP decline).

The abrupt shift by Israel's consumers was remarkable. Spurred by a strong shekel (at one point, NIS 3.25 per dollar) and hence cheaper import prices, consumers increased their purchases of durables (cars, appliances, computers, etc.) by 25% during January.-June 2008, and bought 71% more vehicles than a year earlier (at annual rates). These numbers continued, in general, but with minus signs (!) during July-December, 2008. This negative trend continued in the first quarter of 2009.

Exports were hard hit by the global downturn. After rising 12% in the first six months of 2008, they declined by 7% in the second half. Imports too declined, but by less than the fall in exports, leading to a rise in Israel's trade deficit. As business profits fell, investment in fixed assets (machinery and buildings) also fell sharply.

The construction industry continued its decline in 2008, with housing starts, completions and employment all at low levels. However, since real estate prices never reached unrealistic 'bubble' levels, like they did in the USA and many other countries, their decline was relatively modest.

During 2008, inflation amounted to 3.8%. However, inflation was negative in the last quarter of 2008, and during 2009 prices in Israel are expected to fall; another abrupt U-turn from inflation to deflation.

A rise in unemployment was inevitable in the face of the slowdown. Unemployment touched a low of 5.9% of the labor force in October 2008, and then began to rise. Some 17,000 persons lost their jobs in December 2008 alone, and in the end of March 2009 the number of unemployed reached a new record of 20,072. Some experts fear unemployment will top 10% by the end of 2009.

Facing the sharp downturn, the Bank of Israel acted decisively. From September 2008 interest rates were lowered from 4.5%, to only 0.75% in February 2009, the lowest level by far in Israel's 60-year history. The money supply grew by 15% in 2008, as the Bank sought to improve credit and liquidity.

The Bank of Israel's policies included large purchases of dollars to combat the falling dollar-shekel exchange rate, which was hurting export. The Bank bought \$6.85 billion worth of dollars in the last quarter of 2008, with total foreign exchange reserves rising to \$42.3 billion at the end of the year, compared with about \$26 billion in 2007. The dollar strengthened at year end, relative to the shekel, and in February 2009 the dollar-shekel exchange rate touched NIS 4.20 per dollar, 30% higher than the 3.25 rate at one point in 2008!

Israel's capital markets are tightly linked with global markets and reflected the global decline. The Tel Aviv Stock Exchange TASE-100 index fell by half in 2008, equal to the average decline in the world's 50 leading stock exchanges, compared with a 23% rise in 2007. The overall value of the public's

financial assets fell by 12% in 2008. Israel's two largest banks, *Poalim* and *Leumi*, both reported large losses in the last quarter of 2008.

In 2008, the government budget deficit was 2% of GDP. However, as the recession began, tax revenues dropped by some 10%, leading to projections of deficits to increase from 5% to 7% of GDP.

The year 2009 will be amongst the most difficult for Israel's economy since 1948. The Bank of Israel predicts GDP will fall by 1%, but some other bodies project a larger decline of about 2%. Much will depend on the United States and world economies. It is estimated that each 1% decline in world trade causes a 1.4% fall in Israel's exports. And with Israel's economy strongly linked to America's in at least three ways: foreign investment, exports and philanthropy, Israel's economic recovery will begin only after America's downturn ends. Israel therefore focuses its attention not only on its own fiscal and monetary stimulus plans, but also on those of the United States.

Despite this difficult financial situation, the Israeli economy proves to be stable in an encouraging way compared with the economies of other countries. Israeli banks are more stable than those of the USA, and neither of them have collapsed or needed the help of the State; the increase of the unemployment rate in Israel is lower compared to the USA. All these facts show that Israeli knowledge-based economy is strong and stable.

The Status of Higher Education

At the beginning of my first term in office towards the end of 2001, the higher education system in Israel was already in a state of major change. The demand for higher education has risen considerably over the last two decades resulting in an increase in the number of colleges and the share of undergraduate students which they train; in fact nearly 50% of all undergraduate students are now being trained in institutions other than the six research universities. On the one hand, this creates some competition for students but on the other hand, it allows the Technion to concentrate on teaching and research in cutting-edge areas of engineering and science, leaving

the more traditional well-established fields to the colleges. The Technion now views some of the engineering colleges (or good engineering departments within certain colleges) as a potential source for students for graduate studies at the Technion, thus maintaining the Technion supremacy as a research university, and is looking into promoting some kind of collaboration with select colleges and departments.

A major issue facing the Israeli higher education system over the last eight years was the fact that the overall government budget for higher education decreased considerably, plunging the Technion and other institutions of higher learning into a budgetary crisis. Due to these severe budgetary cuts – about 20% over the last 8 years, the Technion had to implement severe cutbacks in almost all areas of academic life, even extremely painful areas such as recruitment of new academic staff. Unfortunately, the budgets allocated for higher education are still lacking and despite constant work on our behalf and warnings regarding the future of higher education, the Israeli government has yet to take steps which will remedy the situation. In last year's report I reported at length the recommendations of the Shochat Committee nominated by the government to examine the status of higher education. The Committee recommended several steps to be taken immediately in order to secure the future of higher learning in Israel. Since 2001, budget cutbacks to the universities have amounted to NIS 1.4 billion. The Committee recommended an increase in the allocation to the budget for higher education by at least this amount, as well as other important recommendations regarding research and recruitment of new academic staff which is vital for the survival of the universities. Unfortunately, even today, the Shochat suggested reform has yet to be discussed by the government, let alone implemented! We are still hopeful that this issue will be fully and responsibly addressed by the new government and that it will be given the high priority it deserves.

Another issue that has created turmoil in the higher education system was the ramifications of the Maltz Report. In 1997, a public commission headed by Retired Chief Justice Jacob Maltz was appointed to examine the

organizational structure of the institutions of higher education in Israel. The final proposals suggested by the Maltz Report which suggested major changes were adopted by the Israeli government in September 2003. The Council for Higher Education approved recommendations based on the report and forwarded them to the universities for immediate implementation. For the Technion, the ramifications of the report were not as major as for other universities because the Technion had already modified its governance structure so that the President is clearly the head of the university responsible for both the administrative and academic issues. The two main points in the report relevant to the Technion were to create a stronger and more effective Technion Council and to limit the size of the Senate. In general, the Technion followed the recommendation with some changes suitable for Technion. However, these imposed changes created bad feelings with Israel's academia and many feel that it is contrary to the Law of Higher Education that secures the independence of universities and an attempt of the government to have more control over the universities. At the Technion, this led to many unproductive confrontations within the Senate: between the Senate and management and between the Senate and the Council. I hope that this issue has finally been brought to rest and that the next President will not have to deal with it again.

In last year's report I detailed the very lengthy national faculty strike, a strike which lasted 89 days (!) and affected the whole academic year. The agreement reached between the government and the faculty union promises a 24% wage increase for faculty. This amount is made up of a 14% addition due to wage erosion up to the end of 2007, a 5% increase which is true for all public sector employees, and a 5% increase for half of the seniority component for academic faculty. Unfortunately, the agreement is valid for a very short period of time and has to be revisited by December 2009.

Another major problem I reported about was the worrying "brain-drain" which Israel is dealing with. Many young and very talented researchers chose to continue their careers and life abroad. The most precious resource which the

State of Israel boasts is the human one, i.e. brain power. If this resource will be constantly exported we shall find ourselves in dire straits. The Technion and I have always been and continue to be committed to attracting as many brilliant faculty members as we can. We have gone above and beyond to offer them attractive packages and make the Technion their home. Our efforts have indeed paid off and we have been able to absorb truly gifted individuals into our fold, but still, because of the budget situation, we cannot offer positions to many other outstanding candidates. I shall elaborate on this point later on in the report.

The Technion

The Technion's Vision Statement:

“A science and technology research university, among the world's top ten, dedicated to the creation of knowledge and the development of human capital and leadership, for the advancement of the State of Israel and all humanity.”

Since the beginning of my first term in office I have always been consistent in declaring what my goals and objectives are for the Technion. These have always stood in front of me when making decisions and they have always guided me in my leadership of the Technion. In essence, all the efforts of my administration were directed towards achieving Technion's vision given above, which was formulated during my term following a whole day of discussion of Technion leadership. Translated into scientific actions this meant the following:

- Fostering academic excellence in research and teaching.
- Recruiting the best faculty and students to the Technion.
- Developing new fields at the frontiers of science and technology, particularly where the Technion enjoys an advantage.
- Expanding the scope of multidisciplinary and interdisciplinary cutting-edge research, especially in fields that are vital for the State of Israel.
- Constantly striving to improve our international standing amongst the leading technological and scientific universities in the world.

My management team and I have been working tirelessly to achieve these goals, goals that are truly vital for the continued supremacy of the Technion not only in Israel but worldwide. *I am proud and extremely thrilled to report that for the past 8 years we have made remarkable progress in each and*

every one of these above mentioned goals, despite the difficult political and economic background.

To begin with I would like to shortly review the main multidisciplinary and interdisciplinary academic programs which we have initiated over the past few years, as well as the seeds we have planted for future programs the Technion will be developing.

Overall we will be investing at least \$270 million in these programs; most of the funds will originate from donations from our friends around the world.

Major Academic Goals & Programs

Multidisciplinary and Interdisciplinary Centers

Nanotechnology and Nanoscience

The Nanotechnology program, carried within The Russell Berrie Nanotechnology Institute (RBNI) under the leadership of Professor Uri Sivan, is the largest academic project in the entire Technion history. This program has truly transformed the Technion in many aspects.

The RBNI was established in January 2005 as a joint venture between the Russell Berrie Foundation, the Israeli government and the Technion. This unique institute truly touches upon every facet of campus life and is the essence of interdisciplinarity. The RBNI spans 14 faculties, 110 faculty members, and some 300 graduate students and postdoctoral fellows, and overall, the investment in its activities is nearly \$100 million. These vast resources were invested mostly in the recruitment of new faculty members and in purchasing new equipment and building new laboratories.

The research conducted at RBNI is cutting-edge and revolutionary, such as the "electronic nose" which has great hope for early diagnosis of cancer through breath samples and the "electronic peptides" with potential applications ranging from full color organic LED displays to the detection of bio-molecules such as poisonous compounds and disease initiators. There are

dozens of exciting research avenues already being explored, avenues that will certainly lead to discoveries spanning into industry and to a better quality of life for all of us. Under the auspices of the RBNI we have recruited some of the most talented young faculty members available in this field. They have joined us with new ideas and energy and have already made their positive impact on the Technion.

I have no doubt that many great discoveries are still to come from the RBNI – at this point we are only seeing the tip of the iceberg! The face of science is constantly changing and advancing and this field is no different. Many predict that nanotechnology will change the face of science and will lead to a new industrial revolution. In fact, a new initiative being explored at the Technion at this point in time is the *NanoMed Initiative*, and our vision in this field is to merge nanoscience and nanotechnology with biomedicine and medicine for the benefit of medical diagnostics, prognostics and therapeutics. I shall describe this new exciting initiative in more detail shortly.

The Life Sciences

As we entered the 21st century, it became clear that this will be the “Life Sciences Century” and that many engineering disciplines will integrate into their research and teaching programs problems from the life sciences and medicine. Traditionally, the Technion was not as strong as it should have been when it came to the life sciences, as the focus was on engineering. When I became President, I strongly believed that this should be changed and that we must develop and invest substantially in the life sciences field as it is crucial for the Technion's future. We have therefore made the development of the life sciences a priority for the Technion. This was not a simple task because it required complex strategic decisions to be made and fund-raising of large financial resources in a time of a budgetary crisis.

The establishment of *The Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering* (LS&E), initiated in 2007 and headed by Distinguished Professor and Nobel Prize Laureate Aaron Ciechanover, was a

key step in strengthening the life sciences on campus and in two years only moved the life sciences into the center of attention on campus.

A primary strength of the Technion is its ability to merge sophisticated research in the exact sciences and engineering with the life sciences and medicine. The LS&E Center brings a new concept to the campus. It is a unique research center which spans the entire campus through five distinct areas of research. The Center, although young, is well on its way to becoming a major force in life sciences research. The Center's activities are spread over several facilities, first and foremost, the Emerson Life Sciences Building which is under construction and in the future will house state-of-the-art laboratories, a central instrumentation center and interdisciplinary activity of common areas for students and researchers to interact, offices etc. The building will serve as the physical hub for the Center and the life sciences activities on campus.

Other interdisciplinary laboratories of the LS&E Center are:

- The Lorry I Lokey Laboratory for Network Biology Research is a good example of what we wish to accomplish in terms of interdisciplinary research. It is made up of researchers from four Technion faculties: Medicine, Physics, Electrical Engineering and Chemical Engineering. This unique research laboratory, physically located at the Fischbach building at the heart of the campus adjacent to the Electrical Engineering, aims at developing an experimental and theoretical framework for the study of biological networks, with particular emphasis on general mechanisms that allow for robust, yet adaptive functionality in complex environments.
- Research laboratories in the Biomedical Engineering Faculty are home to the Lorry I. Lokey Tissue Regeneration Group which tries to find solutions and innovations in tissue repair and is already making important headway in this area.
- The National Proteomics Center is a hub of knowledge and technology in both analytical and functional proteomics and can perform large-scale comparative analysis of proteins and their post-translational modifications. It offers researchers from the Technion, Israel's other universities and

research institutes, hospitals and biotechnology companies direct access to the Center's technology and expertise, including protein and peptide mass-spectrometry, micro- and two-dimensional chromatography, and electrophoresis, as well as in analyzing minute amounts of proteins. The Unit's responsibilities are to provide consulting services to individual laboratories, teach courses to technical staff, arrange workshops and seminars and provide state-of-the-art computing tools and platforms.

- The Biomedical Optics Laboratory is working on developing new imaging tools such as minute endoscopes and microscopes to allow access to all areas of the human body.
- The Developmental Gene Networks Laboratory aims to decipher the gene networks that transform a single cell into a complex, differentiated, free-living animal.
- The LS&E Infrastructure Unit forms the focus for interdisciplinary collaboration between researchers from many disciplines, especially between biologists, chemists, biotechnologists, and engineers. In order to enable this vital inter-disciplinary work, it is imperative to provide the researchers with the state-of-the-art equipment and instruments.

I have no doubt that the LS&E Center will continue to excel in all the areas which I described above and it will make the Technion proud. In the first phase we will invest some \$35 million in the LS&E program.

In addition to the establishment of the LS&E program we moved aggressively to develop and strengthen the Faculty of Biology. At a time when budget cuts are necessary we had to reduce the number of faculty members in almost all faculties, however, we intentionally increased the number of faculty members at the Faculty of Biology. The Faculty was successful in recruiting several outstanding new faculty members and they are already entirely changing the department, introducing new cutting-edge areas of research, mainly in molecular biology, genetic engineering and more. In addition, a

modern experimental life sciences facility which will serve all researches in this field was built on campus.

The synergism between the LS&E program and the Faculty of Biology will lead the life sciences at the Technion to new heights.

The NanoMed (Nano Medicine) Initiative

This initiative is a natural evolution of merging our powers in nanotechnology and the life sciences and a direct outcome of our programs within the *Russell Berrie Nanotechnology Institute* and the *Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering (LS&E) Program*. Our vision in this field is to merge nanoscience and nanotechnology with medicine for the benefit of medical diagnostics, prognostics and therapeutics. This research will result in the creation of functional interfaces between man-made engineering and living matter at the single cellular and molecular level. Research will focus on biomedical imaging, novel disease biomarkers, targeted drug delivery, regenerative medicine and nano tools for medicine and therapeutics.

At this point in time we have already raised \$5 million for the program, and in addition, our wonderful friend, Lorry I. Lokey made a major future commitment to support the Program. Within the framework of this program, we hope to accomplish the following: recruit 12 brilliant new faculty members in the coming five years, establish cutting-edge laboratories for the faculty members recruited and upgrade existing laboratories, establish a NanoMed infrastructure center, generate a vibrant multidisciplinary community through joint seminars, programs, courses etc., expand the successful *Norman Seiden Multidisciplinary Graduate Program in Nanoscience and Nanotechnology* into NanoMed and nurture other multidisciplinary educational programs on campus, create a world-leading community in nanomedicine on campus and spawn numerous commercial applications. The NanoMed Initiative is a joint initiative between the RBNI and the LS&E and its plan was devised jointly by Professors Ciechanover and Sivan.

We have already started our efforts to recruit the first two faculty members within the program. Activities will certainly gain momentum next year.

The Energy Program

Last year I reported that the Technion seeks to establish itself as a global leader in energy research and related new technologies. Pressure to innovate has never been greater, especially as mounting environmental concerns drive demand for versatile, clean, efficient and renewable means of powering our lives. Scientists believe that new energy sources could have a transformational effect as great as that of the Industrial Revolution. With demand for power growing exponentially, especially with the fast development of giant countries like China and India, an energy shortage or supply cutoff would prove catastrophic. Israel is particularly vulnerable in this respect: its security situation makes energy independence a matter of survival. Innovative technology is needed to promote the country's economic growth and ensure its security, while reducing pollution. As one of the few non-oil-producing countries in the Middle East, Israel has a fundamental national interest in developing alternative energy resources.

The solution to the energy crisis is threefold: conservation, the development of renewable energy sources, and improving the efficiency of combustion technologies. Technion researchers are already performing vital work in both energy conservation and production, developing ingenious solutions. The establishment of a strong and innovative energy program will enable the Technion to attract the best new faculty members in this field and become a leader in this vital field of research.

The Technion Energy Program, headed by Professor Gideon Grader from the Wolfson Faculty of Chemical Engineering, focuses on 4 key research areas:

- Alternative Fuels;
- Renewable Energy Sources;
- Energy Storage;
- Energy Conservation.

This year some headway was made in getting the program started and running. To begin with, in December 2008 the Technion hosted the Technion – Aachen – Jülich 23rd Umbrella Symposium on Future Energy. This event was a great success and furthered cooperation between these three leading institutions that already cooperate under the *Umbrella* cooperation. Another international activity has been the submission of a joint research proposal to the US National Science Foundation (NSF) on International Energy Education. This proposal includes three U.S. universities, the University of Thailand, the University of Iceland and the Technion. If approved, this program will facilitate student exchange and the development of special courses on Alternative Energy. In addition, we have established an interdisciplinary committee to draft the curriculum of a Technion Energy Graduate program. We also began work on establishing *The Satell Family Nitrogen/Hydrogen Alternative Fuels (NHAF) Reaction Laboratory*. The laboratory will focus on research dealing with developing non-carbon based energy sources. The Technion is now in the final stages of constructing this unique laboratory.

I am confident that by next year more progress will be made in fully initiating this very important program that aims to be a \$50 million program.

The Autonomous Systems Program

Autonomous systems represent the next great step forward in the fusion of machines with sensors, computers, and communication capabilities. The objective is to develop intelligent systems that can interact dynamically and autonomously with the complexities of the real world. These systems make their own independent decisions about how to act, even in groups, especially in unplanned, changing, or unexpected conditions. Autonomous systems applications include: performance-enhanced unmanned aerial vehicles (UAVs); unmanned vehicles for under-water, land-based, and space exploration; environmental disaster cleanup operations; rescue operations; detection, identification, and neutralization of chemical or biological weapons and explosives; transportation and traffic control systems; communication

networks; swimming medical micro-robots that can travel through the human body and a wealth of other implementations that will drive progress in defense, industry and medicine. The Technion is engaged in cutting edge research in all of these areas. Again, this Program is a multidisciplinary and an interdisciplinary one which spans a total of eight different faculties. The program consists of five major centers.

- *The Arlene & Arnold Goldstein Unmanned Aerial Vehicles (UAV) and Satellites Center.*
- Unmanned Ground and Marine Systems,
- Autonomous Medical Systems,
- Autonomous Agent Networks,
- Household and Industrial Robotics.

Seven research projects are already underway at the *Arlene & Arnold Goldstein Unmanned Aerial Vehicles (UAV) and Satellites Center.*

In the coming year we hope to begin activities in the other centers under the umbrella of the program. For this we will need to raise more funds. The total funds required for the program amount to \$25 million.

The program is headed by Distinguished Professor Daniel Weihs.

Other Interdisciplinary Institutes & Programs

Grand Water Research Institute (GWRI)

In water research we are among the leading centers in the world and the Grand Water Research Institute (GWRI) is doing valuable work on one of the region's most scarce resources. The mission of the Grand Water Research Institute (GWRI) is to advance, through research and development, the science, technology, engineering, and management of water, through inter-disciplinary research and development and dissemination of information, with emphasis on the issues and problems facing Israel's water sector. The GWRI operates with a broad national perspective and remains Israel's leading institute of water

research. It fosters interdisciplinary work, and encourages collaboration of Israeli researchers from all universities and agencies. It also seeks to establish collaborative projects with other countries, particularly with Israel's neighbors in the Middle East. The GWRI was established in 1993 and currently has 66 members: 37 professors in 7 academic departments of the Technion and 6 professors from other Israeli universities. The Institute is headed by Professor Raphael Semiat from the Wolfson Faculty of Chemical Engineering.

The Center for Security Science and Technology (CSST)

The *Center for Security Science and Technology* was established at the Technion following the 9/11 attack and the realization that terrorism is a global problem that will plague us for a long time. The main goal of the CSST is to serve as an active point of contact between Technion's know-how and the needs of the security world. To achieve this goal the CSST updates the Technion research community with the current and developing security needs, as presented by representatives of the Israeli security leaders. The updates are done either during brain-storming sessions of Technion researchers with these representatives or through the head of CSST, who is a member of national and international security committees. The CSST initiates and promotes new ideas and collaborations, with special emphasis on interdisciplinary research projects in collaboration with other universities, research institutions, and industries worldwide. Most of the research programs deal with generic technologies that can be applied to a variety of needs.

The CSST is funded by donors from Israel and North America, and the projects are selected by a professional committee, based on relevance, creativity, and scientific excellence. About 30 projects are funded every year, including projects proposed by and performed in other research institutions. Prominent examples of interdisciplinary projects include understanding and design of high-impact materials, robotics, decontamination of chemical warfare, and the evolving micro-satellites project. In addition, the CSST organizes an annual workshop on "Security and the Fight against Terrorism –

the Scientific Challenge" that has become a regular meeting point for technologists from all security-related institutions in Israel. Also, an undergraduate student competition on "Security Developments" has been recently launched, leading to the development of some very creative ideas by students.

There is no doubt in my mind that the seeds we have planted in all these innovative interdisciplinary programs as well as in other programs will grow and flourish. These new research frontiers the Technion has embarked on will undoubtedly enhance the Technion's already existing arsenal of excellence.

We have made great strides in other areas of research which are important to the Technion and to the State of Israel. For example, stem cell research at the Technion is one of the most advanced in the world and we have top-notch laboratories doing important and valuable work every day.

All these programs and exciting activities would not have been possible if not for the faithful support of our friends. All of the institutes and the programs discussed above were created and funded with the generous help of our friends and donors from all over the globe. We have been truly blessed by extraordinary supporters who have seen and recognized the brilliance of our people.

International Academic Review Committees

The Technion conducts a detailed and in-depth evaluation of its Faculties on a regular basis. On the average, each academic unit is reviewed and evaluated every 6-8 years. The Technion has been a pioneer in Israel in this process, starting it nearly 40 years ago! The committees are composed of 3-4 world renowned experts from leading universities abroad and one representative of the Israeli academia. The committee members spend about a week at the Technion, meeting the Dean, the relevant faculty members, students and Technion's central management. The Committee submits a detailed evaluation report to the President. This report is discussed by Technion

management, the faculty council and the Senate, and serves as a guiding work-plan for implementation.

During the last year we have had an extremely successful and complimentary review of the Faculty of Electrical Engineering – the largest on campus in terms of the number of students. The external review committee was chaired by Professor Rafael Reif, Provost of MIT, and included world renowned scientists and engineers from other universities in the US, France and Israel. Highlights included a glowing report on the undergraduate education as being *second to none*, as well as world-class ranking of the Faculty for its research. In contrast, they have expressed their concern for the Faculty as to being able to preserve its status in view of the high students to faculty ratio (threefold to fourfold higher than in the leading universities abroad). The committee is also worried about the low support on the part of the government in funding research and in providing resources for universities in general. The second departmental review for this year will be of the Physics Department in June.

As a result of the recommendations of last year's Technion review of Architecture and Town Planning, an unusual step has been taken by appointing a committee to search for a new Dean from outside the Technion. The search committee will consider suitable candidates amongst leading architects locally and overseas.

The Council of Higher Education (CHE) has recently started a similar evaluation process of all universities and colleges in Israel. However, the CHE evaluation is less comprehensive and so far has concentrated mostly on the undergraduate programs.

Major New Academic Initiatives

The International School of Engineering

We have come to realize that the Technion, being such a high quality engineering powerhouse, can provide quality education to international students, thus carrying the message of Technion and Israel all over the world.

This thought led to the strategic decision to create an International School of Engineering which will offer students from around the world the opportunity to pursue their undergraduate and graduate studies in English at the Technion. In August 2009, we will initiate the school with the first class leading to a B.Sc. degree in: Water Resources and Environmental Engineering, Transportation Engineering and Civil Engineering, and Graduate programs (Master of Engineering) in Environmental Engineering and Construction Management. We strongly believe that this school will enhance Technion's position globally as well as considerably strengthen the Faculty of Civil and Environmental Engineering. Based on the experience gained from this program we plan, in the future, to expand the activities of the International School to other fields.

Galilee Medical School

The Council for Higher Education has asked for proposals from research universities to establish a fifth medical school in Israel to be located in the Galilee. The Technion, together with Haifa University, have decided to submit a joint proposal based on a 4-year medical degree program with students to be admitted after finishing a 3-year biological or science B.Sc. degree. The plan is to expand the school to cover all the health-related studies including programs such as nursing, which is currently a joint Technion – Haifa University program. The Technion will be responsible for the pre-clinical and clinical medical studies, while Haifa University will provide support for the public health education, psychological, ethical, managerial and legal aspects of the studies.

The proposed program was presented and approved by the Technion's Academic Development Committee, the Senate and the Council. From all these bodies it received wide support as it was recognized as both a natural way to build on the Technion's current cooperation with the accredited hospitals in the Galilee, as well as participating in a very important national project to which the Technion can make the most effective contribution. As was always the case in the past, the Technion has taken upon itself to engage in national tasks, for

example, the establishment of the School of Engineering at the Ben Gurion University in Beer Sheva.

The proposal will be submitted in June. The main competitor is expected to be Bar-Ilan University. The proposals will be evaluated by a special committee of the Council of Higher Education. The successful proposer will then have a year to provide a detailed plan. It is clear that the project will require government financing in order to provide the required upgrading of the medical facilities and infrastructure in the Galilean hospitals and health community services.

The Technion "Dream Team"

One of my main goals from the beginning was to bring to the Technion the best new and talented faculty members who will help us take the Technion to the new frontiers we aspire to. **The faculty is the core and the spirit of a university and their excellence is the key to its success.** My management team and I have worked tirelessly to make this goal a reality. This was no easy task and still isn't. Budgetary constraints have made it difficult for us to be as competitive and attractive as other leading universities abroad, especially leading American universities, who offer great personal and scientific packages to promising researchers. However, I can say with confidence and authority that during my term of presidency, we have managed to truly attract to Technion a "dream team" of brilliant faculty members who will form the core of future developments at the Technion.

In the beginning of my first term in office we anticipated about 30 faculty members to retire or leave for other reasons each year and this was the number we needed to recruit just to keep the number of total faculty members as it was. In practice, because of the severe budget cuts by the government, we were forced to recruit only about 60-70% of this number each year, resulting in a painful decline in the total number of faculty members at the Technion. This natural "changing of the guard" provided us with a wonderful window of

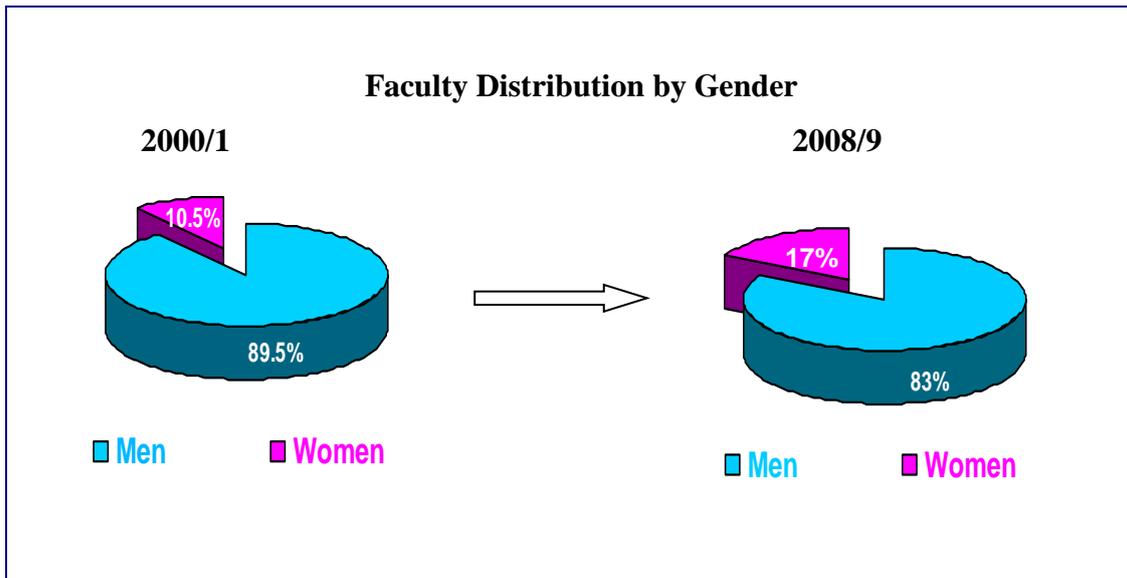
opportunity to seek the most brilliant people in disciplines we aspire to develop at the Technion.

As a result of the severe budget cuts by the government, we were forced to drop the total number of full-time faculty members from 615 in 2000/1 to 574 in 2004/5 and to 542 this year (2008/9). This number of faculty members is similar to what it was in the middle of the 1970's when the number of students at the Technion was only 60% of what it is today! Needless to say, this increase in the number of students versus the number of faculty is damaging to Technion's academic goals. It is clear that the Technion reached the "red-line" in terms of the number of faculty members, and this number should increase significantly over the next few years. This is one of the main missions and challenges of the administration in the next years.

Below you will find a Table that shows the recruitment of new faculty members to the Technion in the years 2000/1-2008/9. From the year 2000 we recruited 188 senior academic staff, mostly at the Senior Lecturer level and 149 clinicians whose major appointment is in hospitals, a total of 337 new faculty members. The total number of senior academic staff in March 2009 is 542 (without clinicians), 817 (including clinicians). The Table reveals that about 30% of the current Technion faculty joined us during my term as president – indeed a substantial "changing of the guard"!

Year	Senior Academic Staff	Clinicians	Total
2000/1	24	17	41
2001/2	27	6	33
2002/3	15	18	33
2003/4	24	14	38
2004/5	24	20	44
2005/6	21	20	41
2006/7	10	9	19
2007/8	22	14	36
2008/9	19	32	53
Total	188	149	337

The recruitment of new academic staff also provided us with the opportunity to increase the number of female faculty members. In 2000/1 the percentage of female faculty members stood at 10.7%, this number has since increased to 17%, as can be see in the chart below. I have always been committed to increasing the number of female faculty members and this trend will certainly continue into the future.



With the help of special programs such as the *Leaders in Science and Technology*, nanotechnology, the life sciences and engineering and the autonomous systems programs, the number of faculty members that are recruited can be slightly increased. However, we need the long term commitment of the government to significantly increase the number of faculty members. For example, we hope that the government will adopt the recommendations of the Shochat committee which implies significant additional resources to the universities that will allow the Technion to increase the number of excellent young faculty members that we can recruit. In addition, we continue to develop new fund raising programs such as Career Advancement Chairs, which will allow us to recruit more faculty members and reverse the trend of recent years, increasing back the number of faculty to around 600 over the next five to seven years. This implies that we will have to recruit about 30-35 new faculty members each year.

To help us with the recruitment of new faculty members we initiated several programs based on generous donations which helped us offer attractive start-up packages to these new faculty members.

"The Leaders in Science and Technology Program", generously supported by the Taub and Shalom Foundations, which started in 2002, has helped us recruit 4-5 excellent faculty members each year by providing them with the required infrastructure and equipment they need for research and supporting their salaries for the first few years. The total number of faculty members recruited by this program stands at 32 faculty members. Another important program is the *First Steps* program which helped bring to the campus many new faculty members. Other faculty members were recruited with the help of RBNI and the LE&E Program.

The talent and success of our young faculty members is apparent by the fact that each year many of them are awarded various prizes and distinctions, including the prestigious *Allon Fellowship* – the most competitive program in Israel for new faculty. Two years in a row, four of our new faculty members won the *Allon Fellowship*. Last year the four that won the *Allon Fellowship* were Dr. Kinneret Keren from the Faculty of Physics, Dr. Tamar Ziegler from the Faculty of Mathematics, Dr. Itay Yanai from the Faculty of Biology and Dr. Yuval Shaked from the Faculty of Medicine. All four were recruited with resources of the *Leaders in Science and Technology Program*. This year Technion also has four recipients of the *Allon Fellowships*: Dr. Gil Alexandrowicz from the Faculty of Chemistry, Dr. Oren Cohen from the Faculty of Physics, Dr. Koby Crammer from the Faculty of Electrical Engineering and Dr. Sigal Savaldi-Goldstein from the Faculty of Biology. A short description of their vitas and research interests will give you a glimpse at their potential.

- Dr. Alexandrowicz completed his Ph.D. studies at the Cavendish Laboratory at the University of Cambridge in 2005 and spent his post-doctoral period also at the University of Cambridge. His research interests

are in surface dynamics, adsorbate interactions, nano-scale friction and helium atom scattering.

- Dr. Cohen completed his Ph.D. studies at the Technion, spent his post-doctoral period at the JILA Institute at the University of Colorado and his research interests are in ultra-short laser pulses, attosecond science, strong field physics, ultra-fast imaging, non-linear dynamics and solitons.
- Dr. Koby Crammer completed his Ph.D. studies at the Hebrew University in Jerusalem and is now completing his post-doctoral period at the University of Pennsylvania (he will join the Technion on October 2009). His research interests are machine learning, artificial intelligence, algorithmic game theory and computational finance.
- Dr. Savaldy-Goldstein completed her Ph.D. studies at the Weizmann Institute, spent her post-doctoral period at Salk Institute and her research interests are hormone signaling regulations of plant growth and development.
- Another important distinction for young faculty is the Maof Fellowship that is aimed to encourage the recruitment of faculty members from minority groups such as Arabs and Druze, within Israel. Dr. Mahmoud Jabareen from the Faculty of Civil and Environmental Engineering was this year's recipient of the Maof Fellowship.
- The new Faculty members recruited this year under the *Leaders in Science and Technology Program* are: Dr. Tamar Ziegler from the Faculty of Mathematics, Dr. Itai Yanai from the Faculty of Biology, Dr. Yuval Shaked from the Faculty of Medicine, Dr. Oren Cohen from the Faculty of Physics and Associate Professor Shie Manor from the Faculty of Electrical Engineering. As mentioned above, some of the above also received the Allon Fellowship.
- Dr. Ziegler completed her Ph.D. studies at the Hebrew University of Jerusalem and spent her post-doctoral period at Ohio State University, at the Institute of Advanced Study in Princeton and at the University of Michigan.

Her research interests are in the combination of ergodic theory with combinatorial number theory.

- Dr. Itai Yanai completed his Ph.D. studies at Boston University and spent his post-doctoral period at the Weizmann Institute, at Heidelberg EMBL and at Harvard University. His research interests are in developmental biology and complex biological systems and mechanisms. He was recruited within the framework of the Lorry Lokey Life Sciences and Engineering Interdisciplinary Center.
- Dr. Yuval Shaked completed his studies at the Hebrew University of Jerusalem and spent his post-doctoral period at Toronto University. His research interests lie in studying novel drugs for the treatment of cancer.
- Associate Professor Shie Manor completed his Ph.D. studies at the Technion and spent his post-doctoral studies at MIT. He then became a faculty member at McGill University, Canada. His research interests are in machine learning, adaptive control and multi-agent systems.

Dr. Asaf Levine from the Faculty of Industrial Engineering and Management received the Chaya Career Advancement Chair. He had a position at the Hebrew University of Jerusalem and we attracted him to the Technion. His research interests are in deterministic operation research, combinatorial optimization, mathematical programming, approximate algorithms, network flows and network design.

Another important national prize for young faculty members is the Wolf Fund's Krill Prize for Excellence in Scientific Research and this year it was awarded to *Dr. Debbie Lindell* from the Faculty of Biology who joined the Technion a couple of years ago. Her research interests are interactions between marine viruses and their globally important phytoplankton hosts.

Most importantly, the quality of our faculty recruits is truly outstanding. An important indicator of this is the fact that in 2007 when the European Union launched within its 7th Framework Program for R&D, a competition between young faculty members. Out of 10,000 young European

researchers who applied for grants only 300 received the grants (3%). *Out of these 300 young researchers 7 Technion researchers won the grants and were awarded a total sum of €8 million for their research. This is the highest number of wins in Israel and has placed the Technion second among all the European universities, (second only to Cambridge University)! Well ahead of other leading universities in leading technological countries like Germany, France, Italy and others.*

I am confident that the brilliant faculty members who have joined us over the last decade and have decided that the Technion will be their scientific home will maintain Technion's excellence and serve as the future leadership that will lead our university into even greater heights, securing the leading position of the Technion.

Administration Appointments in the 2007/8 Academic Year

Technion Central Management

Executive Vice Presidents

- Professor Paul Feigin – Executive Senior Vice President
- Professor Moshe Sidi – Executive Vice President for Academic Affairs
- Professor Oded Shmueli – Executive Vice President for Research
& Managing Director of TRDF
- Professor Zvi Kohavi – Executive Vice President & Director General
- Professor Raphael Rom – Vice President for Resource Development
& External Relations

Deputy Vice Presidents

- Professor Moshe Sheintuch – Deputy Senior Vice President
- Professor Anat Rafaeli – Deputy Senior Vice President for International
Academic Relations
- Professor Zalman Palmor – Deputy Vice President for Academic Affairs

Technion Deans

- Professor Yaacov Mamane – Dean of the Undergraduate School
- Professor Moshe Shpitalni – Dean of the Graduate School
- Professor Michal Green – Dean of Students
- Professor Shammai Speiser – Head, Continuing Education and External Studies

Faculty Deans:

- Professor Moris Eisen – Faculty of Chemistry
- Professor Ben-Zion Levi – Faculty of Biotechnology and Food Engineering
- Professor Arnon Bentur – Faculty of Civil and Environmental Engineering
- Professor Israel Cidon – Faculty of Electrical Engineering
- Prof. Yachin Cohen – Faculty of Chemical Engineering
- Professor Boaz Golany – Faculty of Industrial Engineering & Management
- Professor Dan Adam – Faculty of Biomedical Engineering
- Professor Ido Perlman – Faculty of Medicine
- Professor Omri Rand – Faculty of Aerospace Engineering
- Professor Charlotte Schapira – Department of Humanities and Arts
- Professor Eli Biham – Faculty of Computer Science
- Professor Gadi Schuster – Faculty of Biology
- Professor Emil Zolotoyabko – Department of Materials Engineering
- Professor Josef Avron – Faculty of Physics
- Professor Abraham Berman – Department of Education in Technology & Science
- Professor Yerach Doytsher – Faculty of Architecture and Town Planning
- Professor Pinhas Bar-Yoseph – Faculty of Mechanical Engineering
- Professor Jacob Rubinstein – Faculty of Mathematics

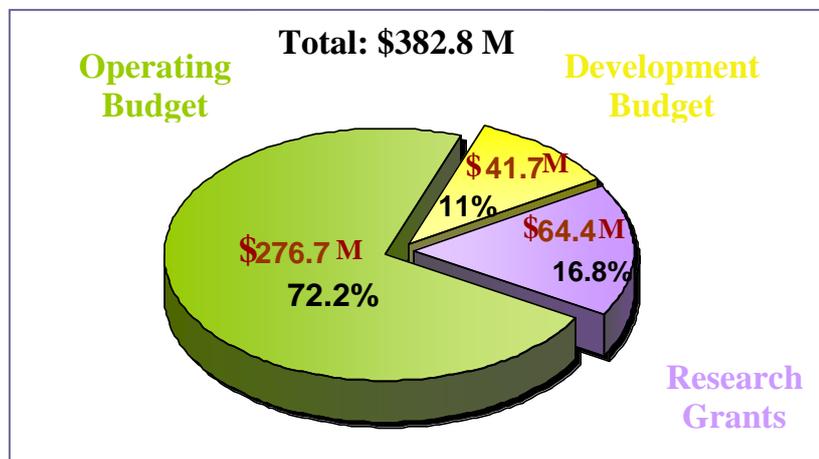
Budget & Finances

Overview of the Last Eight years

The Technion budget is composed of three types of budgets:

- (1) *Operating Budget* – covers all the regular activities of the Technion.
- (2) *Development Budget* – includes the budget for construction of new buildings and infrastructure, the development of new interdisciplinary centers, etc. This budget is based almost entirely on gifts from our supporters around the world.
- (3) *Extramural research grants* – raised by individual researchers from competitive grant agencies, industry, and government agencies. These grants are used to support the research activity on campus and are discussed under the research section on pages 66-73.

The 2007/8 budget, divided between the three categories discussed above, is given below in millions of US dollars.



The total budget in 2007/8 was \$382.8 million, of which \$276.7 million (72.2%) were used for the operating budget, \$41.7 million (11%) for development and capital projects and \$64.4 million (16.8%) were raised by the faculty as research grants.

Operating Budget

It is important to understand the basic “boundary conditions” under which the Technion and the other universities in Israel operate. Most of the operating budget is provided by the government through the Planning and Budgetary Committee (VATAT). VATAT budgets the universities using two major indicators: the number (and flux) of students and the level of research activity. The tuition charged from the students and the salaries of all employees, including the faculty, are determined by the government and are the same for all Israeli universities and public colleges. The operating budget of the university must be balanced on a yearly basis and universities are not allowed to take loans.

When I began my first term in office, the Technion's budget stood at a deficit of NIS 17 million. As soon as I came into office, my administration had to begin work on the 2001/2 budget. We anticipated cutbacks from VATAT and therefore we began to implement a series of cut-backs ourselves. These were made in all areas of Technion life, but despite our efforts, and due to expenses we could not control, such as increase in pension payments due to new agreements with the employees' unions and higher than anticipated cutbacks from VATAT we were left with a deficit of over NIS 30 million. This deficit was covered by a special Technion reserve fund controlled by VATAT. In 2002/3, VATAT implemented unprecedented budgetary cutbacks on all universities and as a result, an even larger deficit accumulated: NIS 79 million. As the Technion is not allowed to operate with a deficit, my administration had to make very painful cutbacks in personnel, both academic and non-academic, and in operation expenditures, but this was not enough to offset the very large unprecedented cuts imposed on us by the government. As a result, we began a massive campaign involving our friends and supporters from the industry to lobby VATAT. This resulted in a recovery of some of the budget cuts. Unfortunately, the difficult economic situation prevailing in Israel at the time made the situation even more difficult and the deficit for the 2003/4 budget stood at NIS 97 million, after another series of cutbacks on behalf of VATAT.

In the budget year 2004/5 the deficit stood at NIS 114 million. Again, for the third year running the Technion implemented severe and painful cutbacks on all fronts in an attempt to curb the deficit and try to stabilize the budgetary crisis we were facing. Facing this unprecedented difficult situation, both, the faculty and the technical and administrative employees, voluntarily agreed to cut-backs in their salaries.

All the above mentioned deficits were covered by the special Technion reserve fund controlled by VATAT.

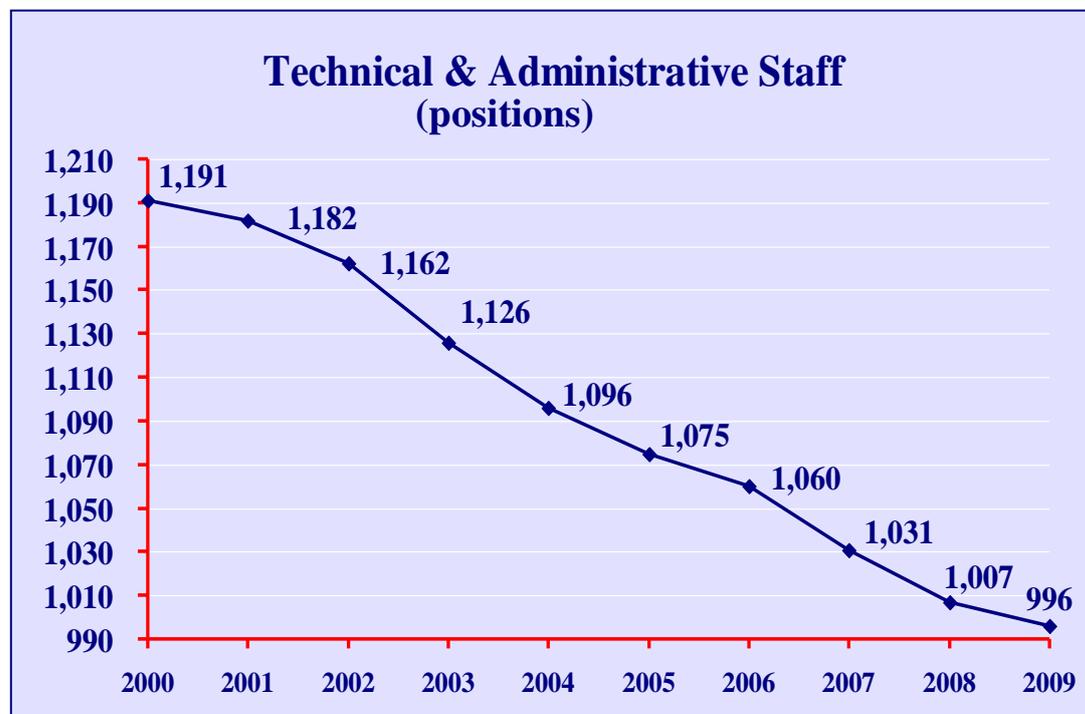
In November 2003, at the request of VATAT, the Technion submitted a five-year plan which was meant to provide some kind of long-term budgetary framework to try and emerge at the end of the period with a balanced budget. The five year plan required the Technion to devise a set of further cutbacks in all aspects but also included significant additional allocations from VATAT. The Technion has indeed lived up to its side of the agreement and managed to remain within the framework of the projected budget. However, only in May of 2007 did VATAT finally give the Technion its approval for the five-year plan already implemented by the Technion and with this approval the Technion actually began to get some of the funds owed. Due to the five-year plan and the diligence in which the Technion adhered to it, *we emerged with a balanced budget in the budget year 2006/7. In the budget year 2007/8 the Technion continued to implement the five year plan and the budgetary framework resulted in a balanced budget.* The balanced budget was made possible by a special additional allocation from VATAT as part of the 5-year plan. Another reason why we were able to balance the budget for 2007/8 was a significant increase in the income supported by gifts from our friend societies, mainly from the American Technion Society, directed to the operating budget.

So, in 2007/8 the Technion budget was finally balanced and the financial situation has become stabilized, after 6 years of turbulence. However, we were not allowed to rest and enjoy this achievement! The world-wide economic crisis and new budget cuts by the government will drive the

actual 2007/8 budget performance into a small deficit of NIS 7 million. The situation is more serious for 2008/9, as discussed below.

It must be stressed that the severe budget cuts imposed on the Technion by VATAT during the years of my presidency caused a great deal of damage to the Technion, in particular in terms of recruitment of new faculty members and a higher student/faculty ratio. When discussing the recruitment of new faculty members, I have already mentioned that between the year 2001 and 2009 we lost 84 faculty positions, which brings the student/faculty ratio to 23. In addition, we had to drastically reduce the number of technical and administrative staff by 195 positions! The decline in the number of technical and administrative staff positions since the year 2000 is shown in the Figure below. Although some of this reduction resulted in increasing efficiency, it also created many hardships and almost a complete freeze in new hires, especially the hiring of high-quality technical staff that could not be continued.

The implications of all these steps forced on us by the severe budget cuts by the government are discussed elsewhere in the report.



Development Budget

This budget is the driving force behind Technion's development and, because of its nature, it is managed as a multi-year budget. Investment in development projects is usually divided into four categories: New Buildings and Renovations, Infrastructure and Landscaping; Multidisciplinary Research Centers; and Laboratories and Equipment.

The development budget for the Technion originates almost entirely from donations from our friends societies around the world.

The Table below shows our investments in various projects and programs since 2001/2. As can be seen, on average around NIS 150 millions every year, ***a total of NIS 1 billion over the last 7 years, were invested in the development of the Technion!*** In addition, hundreds of millions of NIS went into various Technion funds that strengthen the Technion designated endowment and secure its future. These huge investments would not have been made possible without the devotion and generosity of hundreds of supporters around the world. The development of the Technion in the last decade is primarily due to their vision and support.

<i>Year</i>	<i>Investment in Projects (in million NIS)</i>
<i>2001/2</i>	164
<i>2002/3</i>	132
<i>2003/4</i>	76
<i>2004/5</i>	161
<i>2005/6</i>	146
<i>2006/7</i>	204
<i>2007/8</i>	151
Total	1034

An example of the way the investment (in millions of NIS) was divided among the various categories in the year 2008/9 is given in the Table below. On the average, the investments in multidisciplinary research centers and in buildings, renovations and infrastructure were comparable.

Project	Received	Invested in Projects
Buildings, Renovations & Infrastructure	110.3	82.7
Multidisciplinary Research Centers	69.6	54.5
Laboratories & Equipment	15.1	13.7
Total (NIS)	195.0	150.9

Some of the major development projects in which we invested this year are: the Shalom Stanley Zielony Student Union Building, Shalom Stanley Zielony Graduate Students Village, Asher Space Research Institute, Emerson Life Science Building, the Louis & Bessie Stein Biotechnology Complex, extensive Laboratory renovations in the Schulich Faculty of Chemistry and the Experimental Life Science Facility. Among the multidisciplinary research centers, the major investments were in Nanotechnology (RBNI), and the LS&E Program and the Autonomous Systems program.

These large investments had a dramatic impact on the campus and they are the driving force behind Technion's achievements. New modern buildings and laboratories were built, new multidisciplinary research centers were established, modern instruments and equipment for tens of millions of dollars were purchased and more. *Today, Technion is a very different campus from what it was a decade ago! It is much more modern and up-to-date,*

enabling our researchers to carry out cutting-edge research and compete globally.

Pension Payments

Pension payments to all Technion employees are made from the operating budget. In 2007/8 pension payments amounted to NIS 155 million, 15.7% of the operating budget, and this year they are expected to rise to NIS 168 million, or 16.4% (!) of the operating budget. The significant rise this year is a result of the new wage agreement with the faculty following last year's long faculty strike which affects the pension payments as well. Pension payments are expected to increase for the next 10 years and then they will level out. This is a major burden on Technion's operating budget and we, along with other universities, are seeking long-term solutions to this problem together with VATAT and the Ministry of Finance.

As was pointed out in previous reports, starting from January 1, 2004 all new Technion employees, both faculty and administrative staff, have a regular external pension fund. This will have a very positive, future, long-term effect on Technion's financial stability.

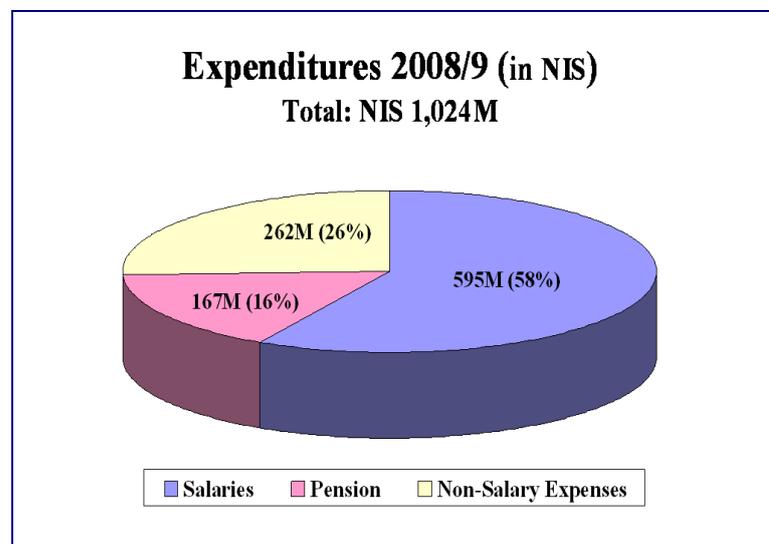
Bosmat

At the beginning of my term in office it was clear that the issue of *Bosmat* – the professional high school which historically was affiliated to the Technion – would have to be addressed. The school was in financial difficulty and the number of pupils in it was steadily decreasing since the 1990's. We already began negotiations with the Haifa Municipality in 2001, so that they could take over the governance of the school and integrate it into the city-wide education grid. Unfortunately, negotiations with two different Mayors of Haifa and the Ministry of Education were unsuccessful. Following these negotiations, in view of the ever-increasing deficit in the school budget and the low prospects to change the situation without the help of Haifa Municipality or the Ministry of Education, we decided to close down the school by July 2007 after reaching agreements with all the Technion Employee Unions regarding the Technion employees working in *Bosmat*.

The 2008/9 Budget Year

Operating Budget

The 2008/9 budget framework of NIS 1,024 million includes a NIS 28 million deficit. This budget is basically the same as the 2007/8 budget, with no substantial changes in the expenditures: 74% are devoted to staff emoluments and pension payments, 9% to operating expenses, 8% to students' fellowships, scholarships and aid, and 9% for operations and maintenance. This is presented graphically below.



The main causes of the deficit, after we have already reached a balanced budget in 2007/8, are an increase in pension payments (see the next page), an increase in energy costs and a decrease in VATAT allocations. This budget proposal includes an estimated amount of \$21 million (about NIS 80 million) that were expected to be received for the operating budget from all Technion's societies and it does not include any reference to the possible effects of the world financial situation, specifically the ATS financial difficulties that developed after the budget was constructed. In reality we expect that the deficit will be higher, but at this time it is difficult to estimate its magnitude.

Investments & Endowment

Technion's investment portfolio includes Technion pension funds that are invested within the framework of the investment pool. The investment policy is set by a public professional committee which meets several times a year. The value of the portfolio on September 30, 2008 was NIS 3,812 million (\$1,114 million). By April 30, 2009 it rose to NIS 4,058 million. About 70% of the portfolio was in Israeli index-linked investments, 8% in foreign exchange linked investments, 14% in shares and 8% in liquid assets. Our conservative investment policy proved itself in the current financial crisis and in the calendar year 2008 we suffered only very modest loses of -2.1% (nominal return), which were already regained in the first quarter of 2009. *It is gratifying to note that the annual return over the last 5 years was impressive: 6.3% nominal, 4.1% CPI and 12.0% dollar return.*

During my presidency term, the total portfolio of the Technion rose from NIS 2.5 billion in 2002 to NIS 4.0 billion in April 2009, an increase of NIS 1.5 billion (60%). Part of this impressive increase came from our successful investment policy and another part – from additional endowed funds that were raised for Technion activities during the last eight years. **I therefore leave behind, despite the difficult years in terms of the operating budget, an endowment which will help Technion to cope with the current economic crisis and the difficult period that we are to face in the immediate future.**

Undergraduate Studies & Graduate Studies and Other Academic Programs

Undergraduate Studies

Student Numbers and Distribution according to Faculties

Over the last several years the number of students has more or less remained the same, although, due to constraints imposed by VATAT the number is by about 700 students lower than it was in 2003 – 13,516, when the number of students was the highest in Technion's history.

The total number of undergraduate students in 2008/9 is 9,278 of which 7,191 (77%) students study engineering (4-year program) and 2,087 (23%) study non-engineering disciplines (3-year programs). The distribution of students among the various faculties is given in the Table on the next page. As in previous years, the three largest faculties are Electrical Engineering, Computer Science and Industrial Engineering and Management.

Early figures for this year indicate a national-wide decrease in applications for university entrance by 15-20% for the next academic year to start in October 2009. The figures for the Technion show a somewhat smaller decrease of 10%. This is probably a reflection of the economic situation making it more difficult for candidates to pursue academic studies. The Technion is continuing its marketing efforts to attract the best candidates to the campus – including personal tours to the campus, discussions of potential candidates with faculty members, media exposure, and active encouragement of those candidates who have been offered a place to actually enroll. We hope that with these efforts the final number of new enrolments will be similar to the number last year.

Undergraduate Students by Faculty in 2008/9

Engineering Faculties:

•	Aerospace Engineering	362
•	Architecture & Town Planning	524
•	Biomedical Engineering	233
•	Biotechnology & Food Engineering	304
•	Chemical Engineering	347
•	Civil & Environmental Engineering (incl. Mapping and Geo-Informatics & Agricultural Eng.)	843
•	Computer Sciences – Engineering, 4-year program	1094
•	Electrical Engineering	1597
•	Industrial Engineering and Management	855
•	Materials Engineering (jointly with Physics or Chemistry)	261
•	Mechanical Engineering	771

Total Engineering: 7,191

Non-Engineering Faculties:

•	Biology	317
•	Chemistry	139
•	Computer Sciences (3-year program)	123
•	Economics and Management	110
•	Education in Technology and Science	162
•	Mathematics	188
•	Medicine	783 ^a
•	Physics	227
•	General Undergraduate Track	38

Total Non-Engineering: 2,087

Grand Total:	9,278
---------------------	--------------

^a Including 462 MD 4th-6th year students

Recruiting New Students

The Technion is situated in the Northern part of Israel and as such we learned that it is not always the first choice for students who live in the Center and the South of Israel. The Technion has confronted this challenge on several levels. There are many reasons for this, all of them are non-academic. Even those who tell us they will study in Tel-Aviv clearly say that academically Technion is definitely their first choice. The reasons for not joining Technion are coming from different areas. One important aspect is economical. To be more attractive in this respect there are two main issues to advance: housing and scholarships. Regarding housing, the Technion has made great efforts to increase the dormitory space available for students, thus making the Technion more attractive for students from the Center and South of Israel. In fact, we have already initiated a total refurbishment process of existing dormitories and have begun planning two additional dormitory buildings with hundreds of additional beds. With regard to scholarships, lately we received an important boost from the public American charity Israel Endowment Funds (PEF). PEF has recently decided to allocate very significant scholarships to Technion undergraduate students realizing their importance to Israel's future. Forty scholarships, each at the amount of \$7,000, were granted this year to needy students and to excellent students. The number of fellowships is expected to grow to 80 next year and afterwards, each year, there will be 120 scholarships. These scholarships are known as *The Alfred and Anna Grey Scholarships* and they are extremely important as they help us recruit to Technion the best students in Israel.

In addition, in the public relations arena, we have been holding open days in the Tel-Aviv area for this purpose and the Technion also initiated yearly advertising campaigns.

Improving the Quality of Teaching

The Technion has always been committed to improving the academic experience and the quality of teaching and we have been investing much effort

in our commitment to this issue. As part of our efforts to better the student academic experience at the Technion and improve the process of learning this year we initiated a revolutionary program known as the "*Good Start*" Program. This program was designed to help overcome the initial stress that many students experience during their first year of studies at the Technion and their feeling that many of the courses they are studying are "not relevant" to their future profession. A very important component of the program is the first year design course – a vehicle by which students can learn early on about the challenges of their chosen profession and understand how studying basic science subjects will help meet those challenges. This year the design course is being piloted in two departments: Chemical Engineering and Industrial Engineering and Management. Plans are also underway to carry out departmental teaching workshops to improve the didactic skills of faculty. The impact of these first steps has already been felt, and we have received positive responses from many students and student leaders.

Another aspect of the program is on significantly reducing the size of exercise classes in the Mathematics courses, together with providing the students with more feedback during the course of the semester. The latter is achieved both by training the tutors and teaching assistants to encourage active learning in their sessions, and by providing individual grading of homework assignments. "Drop-in" workshops were instituted and are available every afternoon for students with specific questions. These extra efforts are needed as we have come to realize that the mathematics preparation in high schools has deteriorated significantly over the last decade. This program obviously requires significant resources and despite the difficult budgetary situation, we decided to support it, realizing how important it is for the core of what we do at the Technion. Funding is being sought to maintain the momentum of this program during a time when budgets are otherwise being cut. There is no doubt that this program concerns the essence of the Technion's responsibility to the future of Israel's engineering and scientific human resource.

Another important activity to improve the quality of teaching is carried by the Center for the Promotion of Teaching. The Center provides workshops for new faculty members as well as refresher courses for veteran faculty members who feel they would like to update their skills. The Center conducts the yearly survey of the quality of teaching which helps in the learning process of faculty members. At the Streaming Media Service students can watch videos of their courses. This is particularly helpful for students who have been called for reserve military service or have been absent for other reasons.

The Unit for Personal Assistance has always been a fixture of student life at the Technion, however, in an attempt to make life easier for our students we have placed great emphasis on the services which the unit offers. Over the last few years Israel has had its share of military operations and we are proud that many of our students are active reservists who are called for frontline duties on a regular basis, especially in times of a general call-up. At times, students can miss many days of studies and the unit has to become creative in order to help them catch-up. For example, the unit will provide tutoring for these students, photocopying services, counseling, summer courses, and at times even provide them with loans or special scholarships. The Unit also assists students with financial difficulty by extending loans and offering special scholarships. The Unit is a valuable tool in facilitating life for our students and I believe that it has helped hundreds of them navigate through their degree safely.

The Irwin and Joan Jacobs Graduate School

As a leading research university, the Technion's Graduate School is one of the finest. The backbone of any good research university is the quality of its graduate school, and I am proud that we have one of the best. My commitment to strengthen the graduate school has motivated me through the past eight years and I have always made it known that one of my goals was to increase the number of graduate students, in particular those studying towards a Ph.D.

degree, thus making us a more research oriented institution. I believe that we are well on our way to achieving this goal.

A crucial step that allowed us to develop our graduate school, despite the budget difficulties, was the marvelous commitment of Irwin and Joan Jacobs to endow the graduate school and thus secure steady support for fellowships. This generous gift covers only a fraction of our needs and I have directed much of our fund-raising efforts towards fellowships either current or endowed. On the overall, in order to support the current number of graduate students, we need an endowment of some \$400 million. *We are only at the beginning of the efforts to raise this sum and our campaign for fellowships will have to continue insistently in the future – it is essential.*

Only two months ago we broke ground on the very unique graduate village dormitory complex bearing the name of the very generous benefactor, Mr. Shalom Zielony. This is the largest single building project ever carried out at the Technion. The 215-unit complex will be primarily used for married graduate students including those with children and will be a wonderful incentive for top-notch graduate students to come study and research at the Technion. *The Stanley Shalom Zielony Graduate Student Village* is being built on the southwestern heights of the campus, overlooking an expansive panorama of the Haifa Bay. This 22,000 square-meter Village will be a “green building” project with top grade thermal insulation and careful consideration towards integration into the natural forest landscape. All the buildings will be connected and every unit will have parking. A perimeter road will provide vehicle access and the intention for the Village is to be will be “car-free”. The new Village will have four fully-equipped playgrounds with equipment and a community center with an activity hall for leisure time activities. The Village will also enhance and encourage the "mingling" of students from different disciplines. In an era of interdisciplinarity it is vital that these graduate students from all disciplines meet, socialize and in the process brainstorm about their research as well.

The new *Stanley Shalom Zielony Graduate Student Village* will naturally be a drawing factor for top graduate students and postdoctoral fellows from both

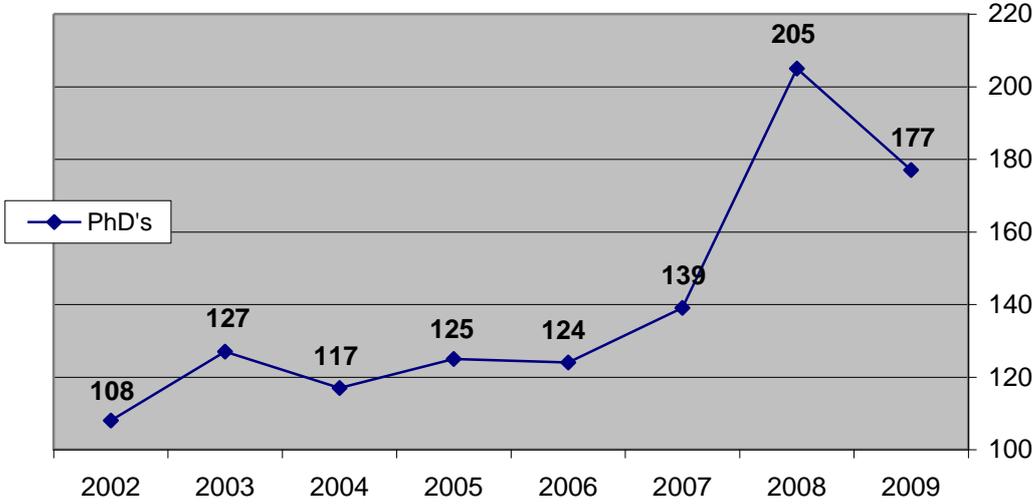
Israel and abroad, especially those with families. The Village will be inhabited in three years and I am confident it will significantly increase the number of our graduate students and postdoctoral fellows.

Another way in which we can attract graduate students is through graduate fellowships. I have been constantly pushing towards the raising of funds to create a long-term source for graduate fellowships to ensure the continued success of our graduate school. Our longtime friends and supporters, Irwin and Joan Jacobs, have seen the significance of such an investment in our graduate students, both to the Technion and the State of Israel, and have generously committed \$30 million towards the graduate school, mostly to support fellowships. I strongly believe that if we are to truly build a lasting framework of graduate fellowships we need to raise an endowment fund of ***\$400 million***. Our efforts in this direction are continuing.

As part of our efforts to improve our Ph.D. program, we approved providing each internal doctoral student with at least one travel scholarship for the purpose of presenting their research in international conferences, especially those held abroad. We believe that this is very important for their overall education and promotion of their career as well as promoting Technion's name world wide. This program has been supported by gifts, but we are looking forward to creating an endowment fund that will support it in perpetuity.

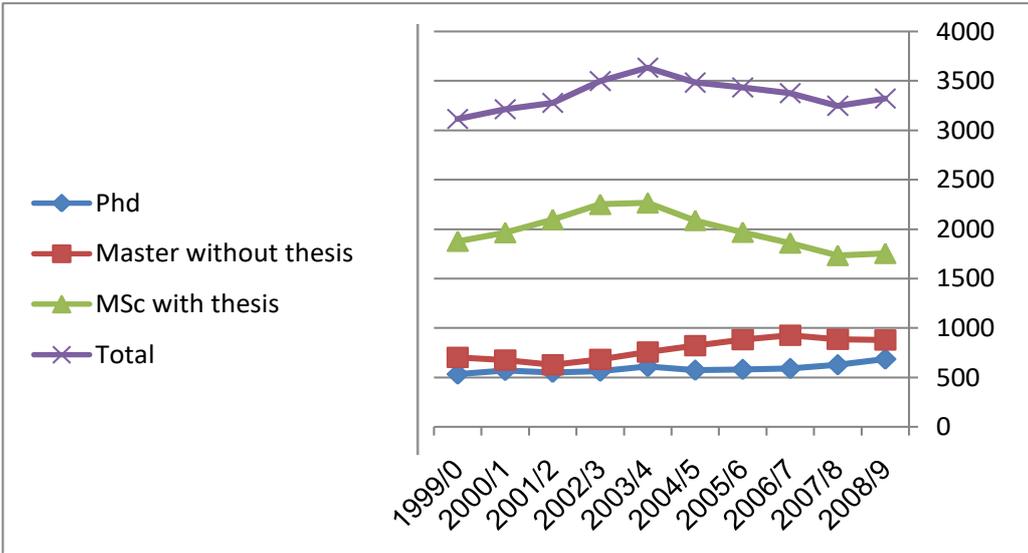
The Graph on the next page shows some of the fruits of our efforts. The graph demonstrates the progression in the number of Ph.Ds graduating from the Technion since 2002. The picture is clear and very encouraging – there is a steady increase since 2006, and in the last 2 years the average number of Ph.D.s graduating from Technion is 70% higher than what it was 10 years ago. From the total number of Ph.D. students now studying, we estimate that a similar number will graduate in the next 3 years. This is an important achievement, but we have not yet reached our goal and our efforts to increase the number of Ph.D. students by another 50% must continue.

Technion Ph.D. Graduate Students
(2001/2 – 2008/9)



The Graph below shows the progression in the total number of M.Sc. and Ph.D. students for the last 10 years. As can be seen, the total number has increased slightly compared to the year 2000. Within the Master students, there is a continuous trend which shows a decrease in the number of students that study towards a Masters' degree with thesis (allowing them to continue to a Ph.D.) and an increase in the number of M.Sc. without thesis students.

Technion Graduate Students
(1999/0 – 2008/9)



In mid March 2009, the number of graduate students stood at 3,350 students, 880 of which are doctorate students (26%) and 2,442 are Masters students (74%) – 1,757 (72%) of them studying towards an M.Sc. degree with thesis. This number marks a slight increase from last year's (April 2008) numbers which stood at 3,249 students in total.

In the upcoming Masters graduation ceremony the Technion will be awarding 751 Masters Degrees: 357 Masters with thesis, 218 Masters without thesis, 115 are MBA graduates and 61 who are on the “direct” track to doctorate. These numbers are similar to those of last year (2007) - 743 Masters Degrees in total.

This year the Senate approved a *bi-institutional double doctorate degree*. This is a significant decision which allows the Technion to attract excellent graduate students from abroad and cooperate with colleagues from other leading universities in their tutorship. This program has the potential to improve research, increase the number of graduates on campus, allow for a more cosmopolitan campus and expose our graduates to the global scene.

The following new programs were approved and initiated this year:

- A Masters program (without thesis) in Real Estate.
- A Masters program (without thesis) in "Industrial Design (MID).
- Ph.D. and M.Sc. (with thesis) programs in Polymer Engineering.
- A Masters program (without thesis) in "Mapping and Geo-information Engineering".
- A Masters program (without thesis) in "Genetic Consultation".

The Technion has also decided that starting next year our MBA program will be taught in English, thus making it more accessible to international students.

To conclude this section, it is with great pleasure that I report to you that three Technion female Ph.D. students have received the Google Anita Borg Memorial Scholarship and three additional students have become finalists for the

scholarship. This particular scholarship is aimed at encouraging women to excel in computing and technology. The six Technion students will travel to the Google annual retreat in Switzerland and the three scholarship recipients will receive a sum award of € 5,000. This is only one indication of many to the high-quality of our graduate students.

The Technion Center for International Academic Relations (IAR)

Any good research university is judged also on its international academic relations and the cooperation and collaborations it promotes with leading universities worldwide. After all, science knows no political borders and is very much a universal language. The Center for Academic Relations at the Technion, headed by Deputy Senior Vice President for International Academic Relations Professor Anat Rafaeli, serves as a gateway between Technion faculty and administration, and people, universities and governments abroad. Although the Center existed for many years, its activities received a major emphasis in the last few years.

The Center maintains academic collaboration and exchange agreements with 68 universities in 24 countries. Of these, 14 are new university-wide agreements that were signed during the past year, with universities in the United States, South America, Europe, Australia, Asia and Africa; university wide agreements enable student exchange and other forms of collaboration with any of the Technion faculties and departments. In addition, six faculty-specific agreements were signed this year. Another 18 collaborative agreements with universities in 11 countries are currently under consideration and development. Particular attention was required this year to handle the security concerns that the war in Gaza raised for foreign universities and scholars.

The Center receives queries on a daily basis from people, institutions and government agencies interested in visiting the Technion or developing some type of a relationship with the Technion. The activities entail identifying the best form and format for effective and productive collaborations. We place a particular focus on hosting foreigners from multiple countries at the Technion

and assisting Technion students and faculty who wish to visit and form collaborations with universities abroad.

The Technion hosted 286 students and academic visitors from 27 countries this year. The IAR office also promotes the social integration of visiting students into the Technion campus life, and assists students or visitors who encounter particular difficulties. This role required special attention during the war in Gaza which created severe security concerns for many students and visitors.

Several of the special international programs initiated recently are listed below:

(a) *Scholars from the Far East at the Technion* – I see great importance in developing academic relations between Technion and the emerging universities in the Far East and have therefore initiated several collaborations with leading Asian Universities. Within this initiative, 4-6 Chinese scholars either postdoctoral fellows or young faculty members from three top-league universities in mainland China are hosted on a yearly basis at the Technion. We recently initiated a similar program with several renowned research institutes in Singapore, Taiwan and Korea.

(b) *HIBUR* - this MIT-Technion program is a “bottoms-up” program developed by students and aimed at connecting Technion students with MIT students. Last year a delegation of 10 MIT students visited the Technion and 9 Technion students visited MIT.

(c) *MISTI* - The MISTI-Israel program is an MIT initiative to send MIT students for short (12 week) visits to Israel. This year 5 MIT students were hosted in different Technion faculties.

(d) The Jewish Agency programs for students – We recently successfully negotiated the inclusion of the Technion under the umbrella of *MASA*, a special program of the Israeli government and the Jewish Agency to provide funding for introducing the Technion to young Jewish students from around the world.

The Center for Pre-University Education

The Israeli society is one of the most culturally and ethnically diverse societies in the world. The Center for the Pre-University Education aims to bridge and reduce this gap.

Over the years the Center for Pre-University Education has become a very important fixture in Technion life. We have come to realize that there are many gifted and excellent pupils who have not been given the proper opportunities to excel and thrive. The Center has been instrumental in developing programs targeted at such youths whose potential is enormous but whose circumstances either personal, social or economical have been impeding them. The Center's facilities have undergone a massive upgrade during my term as president including the addition of the Carraso Wing, as is fitting the very important activities which are housed in them. The Center is headed by Professor Shimon Gepstein and managed with talent by Mr. Shmuel (Muli) Dotan.

The Unit for Pre-Academic Studies – Preparatory Programs

The programs offered by this unit are diverse and adapted to the different populations of Technion candidates. During the year, between 600-700 students participate in the preparatory programs for admission to Technion and approximately 1,000 students participate in the other programs offered.

The programs that are offered by the Center are described below.

The first three programs were initiated in the last 2 years.

1. *A Special Program for the Preparation of Arab students for Higher Education (NAAM Program)* – The purpose of this new program is to prepare Arab students from the North of Israel for higher education. The students participating in this program come from low socio-economic background but have achieved good grades in high-school. In 2008, 95 students participated in the program and 85% of the group was admitted to the Technion's various departments, including the most sought after departments. The others were admitted to the Hebrew University and the Ben-Gurion University. This is a spectacular success and it is

clear that without this program, many of these students would never have had the opportunity to study at the Technion. The program is fully supported by Mr. Eitan Wertheimer.

2. *A special Program Aimed at Students from the Jewish Ultra-Orthodox Sector.*

The purpose of this innovative and unique new program is to train students from the Jewish Ultra-Orthodox sector of the population, aiming to integrate these students in the Technion and other higher learning institutions in Israel. The challenge is huge, almost imaginary, because these students have no background what so ever in science and mathematics, and therefore cannot attend the regular preparatory classes. In 2007 and 2008 this program trained 60 students. The program includes a 5 months pre-entry program and an additional 12 months as a preparatory program that teaches Mathematics, Physics, English and Scientific Writing. In 2008, 11 program participants were admitted to the various Technion departments – a great achievement! Based on this success the program will also continue in the future. The importance of this program to Israel is huge because it will allow integrating the Ultra-Orthodox sector into the labor force. This program is also financially supported by Mr. Eitan Wertheimer.

3. *The "Ofakim – High-Tech" Program* – This program is for IDF veterans who served in combat units and completed 12 years of schooling but have neither a psychometric score nor the matriculation certificate. This program was initiated by our alumnus, Mr. Yehuda Zisapel, and is managed by the Technion Alumni Association. The program is partnered by the Israel Technion Society, the *Rashi Foundation* and the *Gross Foundation*. In 2008, the pilot for the program was initiated with 60 students. Three months of studies prepare the students for a twelve-month preparatory course. The goal is to admit 150 students to this program in 2009. Once the students complete the program their achievements and the psychometric score will stand as criteria for admittance to the Technion.

4. *A Preparatory Course for Discharged Soldiers and New Immigrants* – This is one the programs running for many years. The program lasts 10 months and it opens twice a year for admissions (October and March). The teaching staff includes 30 experienced and dedicated teachers and 40 mentors. The subjects

taught are Mathematics, Physics, English and Scientific Writing. Around 60-65% of the students in the program will later qualify to be admitted to the Technion or other universities.

5. *Pre-Entry Courses* – These courses are meant for students already admitted to the Technion and their purpose is to strengthen the knowledge of students in Mathematics and Physics, thus making it easier for them during their first year of studies. There are also special courses for certain faculties such as the Graphic Skills Prerequisite Course which helps prepare students towards their entrance exams to the Faculty of Architecture and Town Planning. Another course held in the unit is one aimed at Arab students who were admitted to the Technion. The purpose of this course is to strengthen the knowledge of Arab students in subjects such as Mathematics, Physics and English.

6. *A Pre-Preparatory Course for the Atidim Project* – The purpose of the course is to strengthen the knowledge of these students prior to the beginning of the preparatory program. This has proven to be important in view of their weak school background knowledge. This year 50 Ethiopian, Druze and periphery students participated in this course.

The Harry and Lou Stern Youth Activities Unit

The purpose of this unit is to make science and technology more attractive and accessible to children and youths by offering them a range of activities suited for their age group. The activities are mainly aimed at children in junior high school and high school. The activities are held in the morning during science and technology days and in the afternoons as part of after school programs. This is the second year in which the unit is operating out of the new *Arie and Jacqueline Carasso Youth Wing* which houses 7 modern well-equipped teaching laboratories, modern classrooms and the *Amos and Shoshana Horev Auditorium*. This year, 9,300 children participated in 140 days of activities.

Some of the Special Programs are:

Special Activities for Sderot Children – During the academic year we invited a group of rocket-bombed Sderot junior high pupils to stay on campus for two

days (full room and board) and enjoy diverse scientific and social activities, including a lecture by Nobel Prize Laureate Distinguished Prof. Aaron Ciechanover.

TeLeM - Technion Lessons in Mathematics – The TeLeM program aims to encourage mathematically talented children in grades 6 to 10 to develop these talents and complete their mathematics matriculation studies at the highest, 5 credit-points level. Special mathematics classes have been established in 10 selected high-schools throughout the North of Israel. Training workshops are given regularly to mathematics teachers who participate in the program. This is the 9th year for this program's activities. Today there are 700 pupils participating in the program from 10 schools throughout Northern Israel. Graduates of this program in the 11th and 12th grades are offered the option of academic studies at the Technion while still in high-school.

The Ort – Technion Classroom – This program is a joint venture between the Technion and Ort Schools for excellent pupils. This year 8 classrooms operated within the framework of the program with a total of 260 pupils. The goal is for these pupils to graduate high school already gaining Technion academic credits for future studies. The program is 8 years long and follows the pupils through junior and high school until they enroll as full time Technion students.

The Legacy Program – In 2008 we began preparations to launch the Legacy Program sponsored by the Legacy Heritage Fund. The purpose of the program is to encourage excellence amongst junior high pupils from peripheral regions and low socio-economic families. The activities take place on campus, in the teaching laboratories of the Carasso Youth Wing. The proposed program for 2009 will comprise of 17 two-hour-long sessions and we expect the participation of 200 pupils from 9 peripheral settlements.

SciTech 2008 – This year this important international science camp was cancelled because of the lack of facilities available over the summer due to the prolonged academic year (well into the summer) as a result of the long faculty strike earlier in the year.

There are, of course, more programs which are sponsored and executed by the Unit and all of them try to reach as many potential Technion students and help them live up to their full potential.

Continuing Education and External Studies

The Unit for Continuing Education and External Studies specializes in organizing and developing advanced study programs for university graduates in the exact sciences in general and for engineers in particular. It also caters to high-ranking professionals in different fields of engineering, architecture, medicine and administration, through specially designed courses, advanced courses and special study sessions in collaboration with various Technion Faculties. The unit's goals are to promote, update, and enrich the knowledge of engineers, scientists, doctors, academics, and other professional populations in accordance to the needs and trends of the marketplace and industry. All of the Unit's programs are under the supervision of an academic council made up of Technion professors representing many fields of study and different faculties. Over the years the unit has grown considerably and has truly provided professionals with the opportunity to further their education and careers. Demand for the services offered by the unit has certainly increased.

The Unit operates out of three centers: the Technion campus, the Tel-Aviv Center and the newly established Jerusalem Center. It offers accessibility from all of Israel in order to reach academics in other parts of the country. There is lack of space in the Tel-Aviv Center, and therefore, the Technion started a search for a bigger site in Tel-Aviv so as to provide for the growing demand.

There are currently 2,800 students studying in the unit and 325 faculty and staff are involved in its activities.

The following are some of the programs offered in this academic year:

a. *Programs leading to academic degrees:*

- *MBA* with emphasis on High-Tech companies.
- *M.E.* in: systems engineering; biomedical engineering; environmental engineering; civil engineering with emphasis on development and business

management in construction; civil engineering with emphasis on managing construction projects; biotechnology and food engineering.

- *M.Sc.* in architecture with emphasis on conservation.
- *M.E.E.* in electrical engineering – a program offered through Intel.
- M.R.E – Master of real estate.
- B.A. in geo-information.

b. *Programs leading to a certificate:*

- *Management Studies* in: human resources; project management; quality assurance engineering; logistical systems management; coaching, and more.
- *Real Estate Studies* in: land assessing and property management; planning and construction law; construction project management.
- *Interior Design Studies* in landscape design and curation of art exhibits.
- *Computer Studies* in: software development; software testing; network administration and management; data protection, and more.
- *Family medicine*- continuing education.
- *Dental medicine*- continuing education.
- *Tailor fitted programs* for various companies such as the Israel Electric Corporation, Intel, RAFAEL, Elbit, Cellcom, Bezeq, IDF, Iscar, Ministry of Defense, and more.

Student Affairs

General Overview of Activities

Since the beginning of my first term almost 8 years ago I am committed to making life for the Technion undergraduate student as pleasant as possible without compromising the excellent academic standards that we are famous for. We are actually constantly striving to improve the level of studies at the Technion. The Technion is known for its high standards and requirements, and Technion students have to work very hard to earn their degrees. We admit to Technion only the best and the brightest and we expect much from them. We are constantly trying to improve the processes as well as facilities.

For example, we are in the last phase of a thorough and extensive renovation of *The Stanley Shalom Zielony Student Union Building* which is situated in the heart of the Technion campus. The building houses the offices of the Student Union, restaurants, cafes, a cinema and music rooms. In the completely newly renovated Student Union Building there is a multipurpose events hall which will host open houses, employment fairs, graduation celebrations, performances, dance classes, dancing, and parties. On the main entry hall level, there is a multimedia area with a large-screen television, and a lobby for students to find a quiet corner to relax or read. The student services area of the student union building will also include restaurants and cafes and the offices of representatives of the tax authorities, the National Insurance Institute, telephone service providers, insurance agents and other services which will make lives for our students easier. As mentioned, the student union building is situated in the heart of the campus and this entire area has also been upgraded in recent years by the creation of the Shalom Zielony Plaza and recently added beautiful Calatrava Obelisk – a gift of the Russell Berrie Foundation. We have made it a wonderful place for students to relax between classes and enjoy their free time. The heart of the campus has become a bustling and fun place to hang out, a place to enjoy the company of fellow students. I hope that during your next visit to Technion you will find the time to

visit this new wonderful facility and the area around it. *Stanley Shalom Zielony has also created an endowment to support the Technion Orchestra and Choir in perpetuity. This is very important for the student's social life on campus and will secure this important activity to endure even in times of budgetary hardships.*

Also recently inaugurated is the Emerson Family Fitness Center which is a state-of-the-art gym with the best equipment, a great place for our students to unwind and get away from the very demanding course work. We have also completed the construction of a new outdoor swimming pool for the benefit of all Technion students, faculty and workers. The Ullman Building, which is a center for undergraduate activities, has also been upgraded in such a fashion as to be more accommodating to the students. The building was computerized, common areas upgraded, classrooms renovated and the Admissions section of the building has been completely refurbished.

The Dean of Students addresses the non-academic needs of undergraduate and graduate students. On October 1, 2009 Professor Michal Green from the Faculty of Civil and Environmental Engineering, the new Dean of Students, began her term in office.

There are six professional units in the Office of the Dean of Students that provide a variety of services to support and advance our students. On average these units serve about half of the student population.

- *The Unit for Personal Assistance* offers help and guidance to students in financial distress. The aid offered includes scholarships, loans, and special help and personal consultation for students who are called to the IDF reserve duty.
- *The Beatrice Weston Unit for Student Advancement* offers advice and counseling to students who have difficulty studying due to adjustment issues, personal difficulties and learning disabilities. It also helps with career guidance, and assists students with physical disability or family related difficulties.

- *The Professional Employment and IAESTE Unit* provides professional and career guidance to students and graduates. The unit organizes job fairs, career focus days, workshops for resume writing and job interviewing. The unit also helps to place students who wish to go for technical training abroad over the summer months.
- *The Phillip and Francis Fried Counseling Center* offers a professional team of skilled clinical counselors, therapists, social workers and a psychiatrist for the benefit of the student population. In recent years, we witnessed an increase in the demand for counseling, probably as a result of the terror wave and the Second Lebanon War. A program for expanding the center has been created and is waiting for a donor for adoption.
- *The Unit for Social and Cultural Activities* works in collaboration with the Technion Students Association to provide social and cultural activities for both undergraduate and graduate students.
- *The Student Housing Unit* offers housing solutions to about 3,600 students. We continue our long-term project to upgrade old dormitories.
- The new *Stanley Shalom Zielony Graduate Student Village* – this extremely important project will add 215 apartments for married couples and families which will dramatically improve the lives of graduate students and their families.

Special and Ongoing Projects

Operation Cast Lead – The students who served as reservists in *Operation Cast Lead* (about 300) were offered personal support and mentoring by experienced students in the same faculty in order to help them with the inevitable academic gaps which were created. The Technion management provided special relief and additional aid for those students.

Scholarships – due to a demonstrated need and the current financial situation we have awarded scholarships, all sponsored by donations, to approximately 20% of the undergraduate students population. The maximal amount of the

Technion's financial aid scholarship covers 100% of the tuition fee, which stands at 9,212 NIS.

Many students receive additional financial aid from many external non-profit private organizations and foundations, such as IMPAC, the Gruss Foundation, PEF and others. These organizations have actually increased their grants for Technion students for this academic year. We expect that due to the financial situation the economic situation of many students will worsen and the Technion will do whatever it can do assist them.

Loans – Technion student loans in the sum amount of NIS 10,000, offered at preferred interest rates, were awarded to about 300 undergraduate students. In addition, 40 Magbit Foundation loans in the amount of \$2,000 each were awarded, with student-tailored remittance conditions effective after graduation.

New students Welfare project – A new project for high potential new students has been successfully initiated this year. As part of this project we personally accompany the new students from the registration stage until the end of the first year.

The ATIDIM Project – assists high school graduates from Israel's periphery and economically distressed neighborhoods who have received permission to postpone their military service in order to attain an academic education in engineering or science. This program is in collaboration with the IDF. At The Technion, the program includes 460 students. The students receive financial aid from the IDF which covers tuition, as well as their living expenses.

New Immigrants – The majority of these students are new immigrants who came to Israel without their families and encountered difficulties in meeting academic requirements and tasks in addition to the expected adjustment difficulties. These students receive financial assistant and personal counseling related to their difficulties.

Students of Ethnic Minorities – A special project is underway to help ease the absorption and adjustment process of first-year students from ethnic minorities. The goal of the project is to reduce first-year dropout rates among these

populations and help them to excel. In the current academic year, 500 students were assisted by this project.

Haredim "Halamish" project – Eleven students from an ultra-orthodox Jewish background who have graduated from the Technion Center for Pre-University education successfully started studying at the Technion this year. The program supports the students with academic enrichments and emotional support.

Professional Employment and IAESTE – This year two job fairs were held. These job fairs are among the largest in the country, reflecting the Technion's leading position as a major human resource provider for the high-tech industry. In addition, 13 career focus days for recruiting and interviewing were held by leading companies. This upcoming summer we have 62 students going abroad on professional training as part of the IAESTE exchange students program.

Social, Cultural and Sport Activities – "Tirosh Music center" and a digital recording center has been inaugurated. "Naaley Byte" dormitory club has been renovated and includes a Patisserie. A new Organic gardening project has been launched.

Community projects – More than 250,000 hours of community work were contributed by approximately 1,800 undergraduate students, i.e., about 20% of the student population. The community-related activities were associated with various frameworks such as *PERACH*. In another program, Technion students reach out to about 300 junior high- and high-school students from lower socio-economic groups and peripheral areas. The students help them with their science and technology related studies. The *M.A.T.A* initiative, a collaborative effort shared by the Haifa Municipality, the Ministry of Education and the Technion, sends 50 students to provide assistance in mathematics to students in grades 4 and 5 from various Haifa schools.

Research

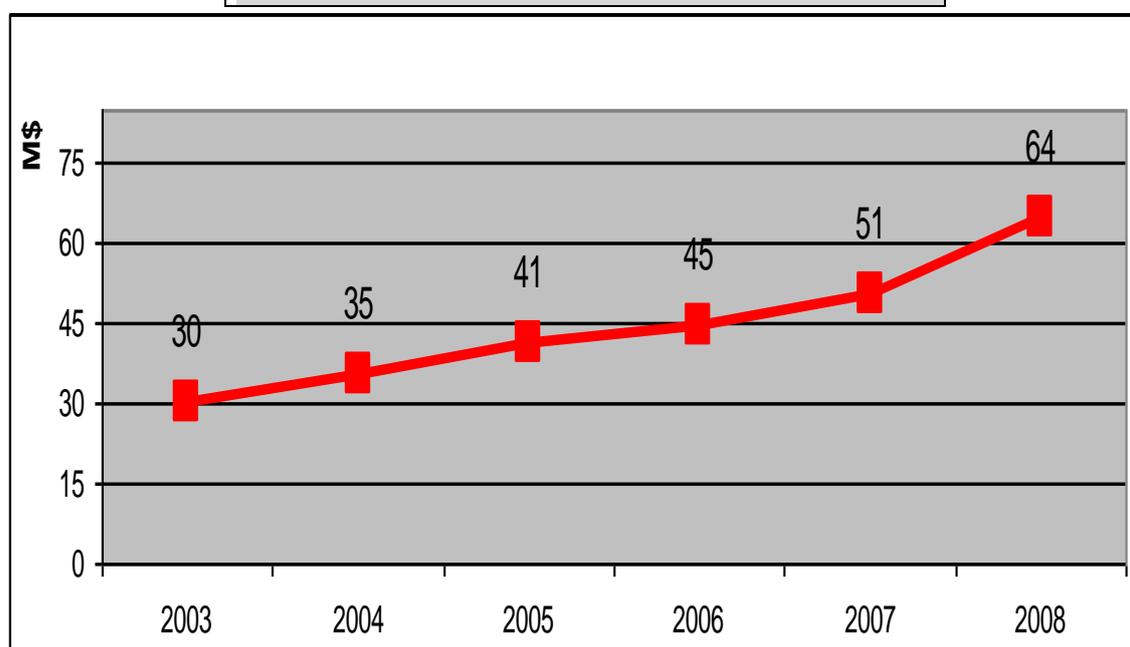
Funded Research

Research is the backbone of any excellent university and it is the engine which drives us forward as a country and as a nation. My commitment to research is unwavering and as a scientist myself, who has continued researching even throughout my presidency, I place limitless value on this issue. Throughout my eight years in office, many actions were taken by my administration aimed at promoting research within the Technion and to take the Technion to the forefront of research and technology. Improving and building new infrastructure, purchasing cutting-edge instrumentation, recruiting new faculty members, strengthening and developing the graduate school, developing interdisciplinary and multidisciplinary centers, exploring new and exciting areas of research and technology have all been leading to one goal - **making the Technion the best possible research university!**

Since I became President we have been vigorously encouraging faculty members to submit proposals to external competitive research funds. This had two main purposes: (a) to place Technion as a major competitor for research support in Israel and abroad, thus clearly positioning it as one of the world's leading universities; (b) to increase the resources available for research. I am happy to report that these efforts were successful. We have been seeing the fruits of our efforts through the increased number of proposals submitted to the main research foundations in Israel and in Europe as well as actual grants received from them.

The Graph on the next page illustrates the increase in external funding at the Technion since 2003. **In the last 5 years the Technion has more than doubled the amount of extramural funded research and this is at a time when the total number of faculty decreased.** This is a major achievement and all who contributed to this effort, primarily the hundreds of faculty members who submitted grant proposals to external agencies, the Vice Presidents for Research and his staff and everyone who helped, all should be congratulated.

***Extramural Sources of Research Funding
2003-2008***



The research contacts signed by the Research Authority for the year 2008 amounted to \$64.4 million, thus continuing the impressive increase witnessed in the last five years: \$30.2 million in 2003, \$34.8 million in 2004, \$40.6 million in 2005, \$44.5 million in 2006, \$50.6 million in 2007 and as stated above, \$64.4 million in 2008. This year, from the Israel Science Foundation alone we received \$14.3 million in research grants.

As mentioned in my previous report, the European Union launched its €50 billion 7th Framework Program for R&D in January 2007. So far the Technion received approval for projects with a total funding of €30 million. This is an important achievement. This number includes the amounts received from the European Research Council (ERC) by 7 young Technion researchers in the amount of €7.6 million. We have thus achieved our goal of doubling the research commitments from the European Framework Programs from €5 million per year to €10 million per year.

The total amount of research grants received in 2008 from the Office of the Chief Scientist at the Ministry of Industry, Trade and Labor stand at NIS

31.2 million— an increase of 30 % over 2007. Since 2002, the research grants received have tripled despite cutbacks from the Office of the Chief Scientist due to improved competitiveness of Technion researchers.

In addition to the above mentioned extramural funding, we have also received contributions from donors aimed at specific projects or individual researchers in the total amount of \$14 million. Most of these resources were associated with the Nanotechnology and Life Sciences & Engineering programs. We also raised \$8 million from donors for the purpose of equipping laboratories of new faculty members. In addition, we received \$3.8 million as part of the ongoing programs sponsored by the Ministry of Immigrant Absorption, to support about 85 researchers.

Over the past year we have also allocated, via internal funds and Academic chairs, approximately \$4 million for the purpose of encouraging research on campus. \$19 million were allocated to finance fellowships for graduate students engaged in research.

The total amount invested in research, including extramural funding, contributions from donors, internal funding and graduate fellowships stands at about \$113 million in 2008. This signifies a major increase of research funding over the last years. For example, in 2005 the total support for research was only \$70 million.

Another interesting development over the past year is that the Singapore National Research Foundation (NRF) and Ministry of Education will invest \$15 million in tissue engineering research through a joint project for the Technion and Singaporean researchers. The Singaporean authorities have approached only a few world leading universities to join this initiative, and so far agreements were reached only with the Massachusetts Institute of Technology, the Weizmann Institute and the Technion.

In yet another interesting recent development, the Technion has signed an agreement for research collaboration with Johnson & Johnson. In the framework of this agreement, totaling \$200,000, promising medical Technion projects will

be supported in the total amount of about \$50,000 per project for this year. The funds will go towards the promotion of commercialization.

The 2004 Nobel Prize in Chemistry

One of truly historic highlights of the past 8 years was the awarding of the 2004 Nobel Prize in Chemistry to Distinguished Professors Avram Hershko and Aaron Ciechanover of Technion's Rappaport Faculty of Medicine. They became the first Israeli scientists to be awarded the world's most prestigious scientific recognition. Professors Hershko and Ciechanover received the Nobel Prize for their discovery of the ubiquitin system, a critical molecular system that operates at the cellular level and controls the life-cycle of cellular proteins and many other important functions. This landmark discovery has opened new avenues of exploration in medical and chemical research holding out promise of new treatments for cancer, immunological disorders and neurodegenerative diseases. *This historic event has helped to anchor Technion's position as Israel's premier institute of technology and science, clearly positioning it as one of the world's leading universities.* Being in Stockholm for the Prize ceremony was a momentous occasion, one I will remember fondly forever. On November 17th 2004 the whole Technion family celebrated the awarding of the Prize. In a festive event the two laureates lectured on their discovery and more than 1200 people, including many students, participated. The atmosphere of great pride and joy was felt on campus for weeks.

To pay tribute to this historic event and to mark 60 years of science in Israel, last year we held a unique conference at the Technion with the participation of 10 Nobel Laureates from Israel, USA, Germany, United Kingdom, France and Switzerland. This was the highest number of Nobel Prize Laureates ever to be present at a conference in Israel.

As I have stated many times, the State of Israel is remarkable and its people have vast amounts of potential. The Higher Education system in general and research universities in particular must be placed in high priority on the national agenda because it is through research that we will survive in this

region and further develop this country. In order for us to recreate such a significant discovery as was the discovery of ubiquitin we must continue the investment of national resources in our greatest resource, the human resource.

Some Research Highlights of the Past Year

- *Professor Yeshayahu Talmon* from the Faculty of Chemical Engineering and *Dr. Yaron Kauffmann* from the Faculty of Materials Engineering, and researchers from the University of Bayreuth in Germany have succeeded, for the first time, in producing and characterizing platinum crystalline nanoparticles of 2 to 3 nanometers in diameter. Each particle is a single platinum crystal and the particles have an increased ability to speed up chemical reactions. In the future, the discovery may enable preparation of more efficient catalysts and will save energy and production costs in industry. This discovery was published in the latest edition of the prestigious scientific journal “Science”.
- *Professor Emeritus Amiram Ron*, *Dr. Moshe Shuker* and doctoral student *Ofer Firstenberg* from the Faculty of Physics, in conjunction with a researcher from the Weizmann Institute have found a way to eliminate the phenomenon of diffraction, which causes images carried by light rays to lose their sharpness. The researchers presented a special atomic medium, in which the optical diffraction is completely eliminated. The medium contains a dilute vapor of atoms at room temperature. In this medium, it is possible to cause the image to travel at a speed that is 100,000 times slower than the speed of light and to utilize the thermal movement of the atoms in order to “drag” or “push” the light moving through them. The researchers discovered that by fine tuning of the interaction between atoms and light, it is possible to cause the atoms to push the diffracted light rays back to their original path. Every image which enters this medium will move through it and emerge on the other side without distortion. There are several

applications which can come from this discovery. Their work was recently published in the important scientific journal “Physical Review Letters.”

- *Dr. Assaf Klar* and *Dr. Raphael Linker* from the Faculty of Civil and Environmental Engineering have developed a way to locate tunnels using fiber optics. Their research lays the groundwork for the initial stages in developing an underground fence based on technology which allows the distributed strain measurements along optical fiber. The findings of this research were presented in April at the Defense, Security and Sensing Conference of SPIE – an international society advancing light-based research.
- *Professor Karl Skorecki* and *Dr. Maty Tzukerman* from the Technion’s Rappaport Faculty of Medicine and the Rambam Medical Center have succeeded in developing an experimental model in which cancer cells, isolated from a patient with ovarian cancer, created a cancerous tumor in human tissue in a mouse that mimics the development of ovarian cancer in the human body. This novel approach, which is being developed into cancer treatment, stands to promote the individual adaptation of treatment to the type of cancer the patient is suffering from. In addition, the innovative experimental model, which mimics cancerous tumors in human tissue, exposed the presence of cancerous master cells in the ovarian cancer that are apparently the most important target for extermination in anticancer treatment. The research appears in the online edition of the January 2009 “Clinical Cancer Research”.
- *Professor Erez Hasman*, *Dr. Konstantin Y. Bliokh*, *Dr. Vladimir Kleiner* and *Avi Niv* from the Faculty of Mechanical Engineering and the Russell Berrie Nanotechnology Institute have become the first to observe the Magnus effect in light, potentially opening a new avenue for controlling light in nanometer-scale optical devices. The Magnus effect for light causes the light to deflect due to the interaction between the light’s spin and shape of the light’s trajectory. The researchers detailed a unified theory of this effect, and also made the first experimental observation of it. The hope is

that we will be able to control light in all-optical nanometer scale devices in ways that were impossible before. Their work was published in the December 2008 issue of Nature Photonics.

- *Professor Yoram Reiter* of the Faculty of Biology and his team, in collaboration with the Sheba Medical Center and the Weizmann Institute, has succeeded in developing an innovative method for predicting the ability of white blood cells to fight cancer cells. The research integrated a team with expertise in systems biology and bio-informatics. The new method enables to manipulate the patient's immune system reaction so that it will be more effective. Their research was published in the latest issue of the scientific journal "Molecular Systems Biology" and is included in the "editor's choice" of the prestigious scientific journal "Science". Application of the method in laboratory tests carried out on samples from 12 cancer patients resulted in improved functioning of the white blood cells in 10 of them. Medical applications for this method are now being explored.
- *Prof. Zeev Gross* and his students of the Schulich Faculty of Chemistry developed innovative materials called corroles, which were found to be a very effective treatment for various diseases. Minor synthetic changes enable one derivative to identify and destroy cancer cells and turn another derivative into a catalytic antioxidant that attenuates the development of atherosclerosis. The atherosclerosis project is the result of collaboration between the Schulich Faculty of Chemistry and the Rappaport Faculty of Medicine. The cancer project was made possible through cooperation between the Technion, the California Institute of Technology and the Ceders-Sinai Medical Center in Los Angeles.

For example, the attachment of a corrole containing gallium was used to deliver a protein that is associated with the most virulent breast cancer cells thus enabling the direction of the corrole to these tumors. In an article published in the journal "Proceedings of the National Academy of Science," the researchers describe how they used the fluorescence of the gallium-corrole for a non-invasive image of the cancerous growth in mice. In

addition, they found that the corrole shrunk the cancerous tumor at much lower concentration from those needed to get a similar result with a leading commercial drug used against this type of cancer and it was also free of the most common side effect of that drug, heart damage. Work in progress on the effect of these and similar corroles on other diseases is yielding highly promising results.

- *Professor Ze'ev Hochberg* of the Rappaport Faculty of Medicine and his colleagues from Goteborg University in Sweden have identified a mechanism that explains about half of the cases of short stature, for which, until now, there was no known reason. Using evolutionary life history theory the researchers have shown that adult body size is determined, to a large extent, during the transition from infancy to childhood, generally between the ages of 6 to 12 months. Every month of delay causes the child to be 0.9 cm shorter in adulthood. A delayed transition from infancy to childhood has a lifelong impact on a person's stature and is responsible for 44 to 50% of the cases of short stature in children and adults in developed countries, and for many more in developing countries. In a recently published article in the scientific journal "Pediatric Research", the researchers present data and the theory of an evolutionary adaptive strategy of plasticity in the timing of the transition from infancy to childhood. This strategy adapts our height to the prevailing energy supply in the environment in which we live.

The Technion Research & Development Foundation (TRDF)

General Overview of the Past Eight Years

When I began my first term in office the TRDF was in severe financial difficulties having a substantial deficit over the last several years. An aggressive and innovative approach to stabilizing it financially was warranted. I appointed Professor Zvi Kohavi as the Director of the TRDF and he brought with him a great deal of administrative experience to the job as well determination and courage to solve the problems.

To begin with, the TRDF's various units were reviewed and a process of improving efficiency began. One of the painful acts that had to be taken was the reduction of the number of employees. Between 2002 and 2003 the number of employees in the TRDF was reduced from 362 to 255. However, these initial steps were not sufficient to financially stabilize the TRDF. The largest unit of the TRDF in terms of employees was the Building and Infrastructure Testing Laboratory, which was operating at a substantial loss for more than a decade. The TRDF Board of Directors, chaired by the Technion President, instructed the TRDF management to shut down the Laboratory: either privatizing it or selling it. Following a long negotiation with the employee unions at the Technion (that also represent TRDF employees) it was decided to sell the unit to an external company. In March 2006, the Building and Infrastructure Testing Laboratory was sold and it was no longer a part of the TRDF as of May 2006. There was considerable effort made on the part of the TRDF and Technion to place as many employees with the purchasing company so that the damage to the employees will be minimal. Some employees were also integrated into the Technion. It is important to emphasize that all this very difficult unprecedented process was done in agreement with the employees' unions and without pulling the campus into strike, which is common in Israel under such circumstances. Much credit for this is due to Professor Kohavi and the leaders of the Unions.

The new Managing Director of the TRDF since October 1, 2008 is Professor Oded Shmueli who is also the Executive Vice President for Research.

When I began my first term in office the TRDF had suffered from a large operational loss as well as the burden of the pension payments. At this point in time, there is an operational gain (not including pension payments). The forecasted TRDF operational **profit** (without allocations due to actuarial maintenance of pension payments) for 2008 will stand at NIS 12 million. The situation is dramatically improved from two years ago in 2006, when the net loss was NIS 94 million!

The improved financial results are mainly due to an increase in the research activity on the one hand and, a significant increase in the TRDF's share of income from intellectual property on the other, mainly from royalties on the anti-Parkinson drug *Azilect* developed jointly by Technion researchers – Professors Mousa Youdim and John Finberg from the Rappaport Faculty of Medicine, and Teva Pharmaceuticals.

Pension payments are a major burden on the TRDF budget, as is the case for the Technion. In 2008, the retirement pension payments were NIS 23 million, bringing the overall net loss of TRDF to NIS 13 million.

The TRDF has truly come a long way in the past 8 years and I believe that the steps taken to streamline the TRDF, as well as placing great emphasis on the commercialization of Intellectual Property at the Technion will certainly make for a healthier balance in the years to come.

TRDF Units

There are five types of activities which come under the umbrella of the TRDF:

1. *The Research Authority* which handles the Technion sponsored research (last year around \$65 million). Today, after the closing down of the Building and Infrastructure Testing Laboratory, this is the major center of activity of TRDF. Here, the emphasis is on improving the administrative service to the researchers.
2. *The Liaison Office* which handles the research ties with the European Union, industry, universities abroad and the Ministry of Industry. With the increase of the importance of funding from the EU this unit has become very important.
3. *The Technion Technology Transfer Office* which deals with the commercialization of Intellectual Property and patents which are developed at the Technion.
4. Two service units: *the Israel Institute of Metals* and *the Land Systems Unit* which cater to various branches of the economy.

The Israel Institute of Metals – The Institute has several activities such as the corrosion laboratories, metallurgy, foundry technology, vehicle testing laboratory, and steel testing. About 40% of the Institute's income is derived from funded research from industry, the government and the European Union. The remainder 60% of the income comes from testing for industry. In 2008, the Institute's turnover stood at NIS 16 million and the operational profit stood at NIS 2.4 million.

The Land Systems Unit – In 2007 the Ministry of Defense increased the budgets allocated to this unit, however, in 2008 this allocated budget decreased and as a result the unit experienced an operational loss of NIS 1.8 million.

5. *The Unit for External Studies and Continuing Education* – This unit, which is discussed on pages 59-60, is administratively under the TRDF. In 2008, operational profit of the Unit stood at NIS 2.8 million.

Business Development and Commercialization

In 2008 we continued to give special attention to the issue of business development and the commercialization of intellectual property. During the past year the effort to define clear and effective models to commercialize the intellectual property developed at the Technion continued. The purpose of this activity is to formulate convenient models which are acceptable to our faculty, partners in industry, venture capital funds and technological incubators, and will facilitate the efficient, speedy and successful transfer of projects developed at the Technion and realizing their full commercial potential.

The global financial crisis did not skip the TRDF in general and this unit in particular. The crisis manifested itself in various ways, including the shutting down of companies based upon Technion developed technology or freezing their activities. The following companies are some of the companies which were caught in the crisis:

Guide-X which operated out of the Meytav Technological Incubator and is based on technology developed by Professor Moshe Shoham from the Faculty of Mechanical Engineering. The technology is known as the *Guideliner* which is an image guided system for precise needle positioning and navigation in soft tissues for percutaneous therapies and biopsies. This will enable precise lesion biopsy and cancer detection at early stage which will significantly improve survival rate.

Genegrfts continues to operate but all its employees were let go and it has halted its activities almost entirely; the licensing agreement with *Bioline* for the commercialization of Professor Amram Mor's (from the Faculty of Biotechnology and Food Engineering) technology to develop a peptide-based drug which will allow for the development of a new cheap and efficient antibiotic was cancelled.

Despite the crisis *Regentis Biomaterials Ltd.*, a company which was established in September 2004 which is a medical material development company focused on commercializing its patent-applied Gelrin™ Platform Technology for the cartilage repair niche market, has succeeded in raising \$7.5

million from two Israeli venture capital firms for continued trials. Regentis' initial proprietary technology platform is based on a biomedical innovation of the laboratory of Prof. Dror Seliktar from the Faculty of Biomedical Engineering.

Despite the difficulties which characterized 2008 and the beginning of 2009 the unit has increased its activities and this has manifested itself on several levels:

- *Income from Commercialization.* – In the past year the TRDF income from commercialization stood at NIS 26.6 million (including the researchers share). In 2002 this income only stood at NIS 2.4 million (\$0.5 million). As was the case last year, almost all the income this year came from the sales of *Azilect (Rasagaline)* – NIS 25.5 million.

In the final quarter of 2008 *TEVA* concluded its trials to test the effectiveness of *Azilect* as a preventative drug which significantly slows down the progression of the disease. The publication and FDA approval of these drug trials may lead to a significant increase in the drug sales and in royalty revenues to the TRDF.

- *The Number of Patent Applications* – In the past year the unit handled approximately 100 invention disclosure forms submitted by Technion researchers. This number demonstrates stability in relation to the years 2006 and 2007 and it is double the forms submitted in the years 2004 and 2005. The increased number of patent applications points to an increased openness on behalf of faculty members to the issue of commercialization.
- *Establishing Companies* – In 2008 the TRDF was directly involved in initiating six new companies in various areas including medical equipment, environment, alternative energy, embryonic stem cells, imaging systems, aesthetic medicine etc.
- *Licensing Agreements* – In 2008, four licensing agreements were signed for the commercialization of developments by Technion Faculty. In addition, six Magnetron agreements with leading companies, such as Elbit, Tower and GE were signed.

- *Investment in Projects.* – Despite the global financial crisis, the TRDF continued to vigorously improve the intellectual property developed at the Technion through direct financial investment in promising projects. The investment is done through several designated donor funds such as the Mitchell Fund and the Gurwin Fund. Regrettably, following the Madoff fraud, the Yeshaya Horowitz Association which supported this activity was completely wiped out. This is significant because over \$1 million was annually received from the fund for the purpose of investing in promising projects. The loss of this source of funds has significantly damaged the unit's ability to support and promote projects for the purpose of commercializing them. In 2008, the unit invested a total of \$300,000 in promising Technion projects.

The Alfred E. Mann Institute for Biomedical Development at the Technion (AMIT)

The Alfred E. Mann institute at the Technion (AMIT) created in 2006 is a non-profit organization supporting the development and commercialization of innovative biomedical technologies and devices developed at the Technion. AMIT was established in December 2006, as part of the vision of the philanthropist and biomedical entrepreneur Alfred E. Mann, who plans to establish several such institutes in the USA, along with AMIT, the only center outside the USA. Mr. Mann has seen the vast potential which exists at the Technion and decided to show his confidence by endowing \$100 million for the establishment of the Institute. This endowment creates a yearly income of around \$5 million dollars for AMIT's operation. The ultimate goal of AMIT is the successful commercialization of its developed products. This in turn will create more funds for AMIT itself as well as for Technion for academic and research activities.

AMIT is physically located at the Industrial Research Center on Technion campus and occupies two floors which were completely renovated.

The two most important activities of AMIT are screening of new potential projects and operating and managing the four projects that were approved for funding. There is a close collaboration with TRDF in screening new potential projects.

Currently the following four projects are developed within AMIT:

- A biomimetic surgical tissue adhesive under development for two years. The main R&D focus is on pre-clinical large-animal studies, and standardization of manufacturing and quality systems.
- An experimental cardio protective drug, under development for two years. Most of the drug development efforts are invested in pre-clinical studies on rodents and large animals, with promising results. In parallel, AMIT is running business development activities.
- A revolutionary cancer detection system based on analyzing breath samples with an "electronic nose". Development activities focus on clinical studies and system optimization.
- A promising anti-cancer compound, currently at early stage in-vitro studies.

I am proud of the fact that we were able to make commercialization a reality at the Technion. The steps we have taken over the past few years, especially the establishment of AMIT, have been very significant and I have every confidence that we shall collect the fruits of our labor for many years to come.

Prizes, Honors & Professional Distinctions

- *Professor Daniel Hershkowitz* former Dean of the faculty of Mathematics was appointed the Minister of Science in the newly elected government. This achievement makes us very proud of this outstanding faculty member.
- *Distinguished Professor Emeritus Jacob Ziv* is the first recipient of the prestigious BBVA Foundation's "Frontiers of Knowledge Award in Information and Communications Technologies". Professor Ziv received the €400,000 award for his ground-breaking innovations in data compression that have had a fundamental and lasting impact on both the theory and practice of communications and information technology. In addition, this year Professor Ziv received an Honorary Doctorate from Tel Aviv University.
- *Technion Nano-Bible in the Vatican* – On the recent visit of *Pope Benedict XVI* in Israel, *President Shimon Peres* presented him with a Nano-Bible the size of a grain of sand, which was created at the Russell Berrie Nanotechnology Institute. The Nano-Bible was written as part of an educational program that was developed at the RBNI, the goal of which is to increase the involvement of youth in the nanotechnological sciences.
- *Dr. Shulamit Levenberg* of the Faculty of Biomedical Engineering has been awarded the Excellence for Israel Prize in Rome. The prize, under the aegis of the Italian Minister of Culture, has been awarded in the framework of events being held in Italy for Israel's 60th anniversary.
- *Dr. Hossam Haick* of the Wolfson Faculty of Chemical Engineering and Russell Berrie Nanotechnology Institute has been named one of the top 35 innovators under the age of 35 by MIT's Technology Review. He was selected from more than 300 nominees to receive this prestigious title for his development of an "electronic nose" to diagnose cancer via breath samples. This list honors young innovators that are "poised to have a dramatic impact on the world as we know it".

- *Dr. Debbie Lindell*, a senior lecturer at the Faculty of Biology, received the Wolf Foundation's 2009 Krill Prize. The Krill Prize is awarded annually to six excelling faculty members at Israel's universities who hold positions of lecturer or senior lecturer and have not yet been granted tenure.
- *Distinguished Professor Aaron Ciechanover*, 2004 Nobel Prize Laureate in Chemistry, was conferred membership in the Pontifical Academy of Sciences by Pope Benedict XVI in a ceremony that took place on October 31, 2008 at Vatican City in Rome. In addition, he was awarded several Honorary Doctorates by universities around the world.
- *Professor Avram Hershko* of the Rappaport Faculty of Medicine received an Honorary Doctorate from the Hebrew University in Jerusalem.
- *Professor Mordechai (Moti) Segev* of the Faculty of Physics has been awarded the Optical Society of America's Max Born Award. The Max Born Award is presented to a person who has made outstanding contributions to theoretical or experimental physical optics.

Three Technion researchers received the *Landau Prize* this year:

- *Professor Rachelle Alterman* of the Faculty of Architecture and Town Planning received the Landau Prize in the field of urban studies.
- *Professor Jacob Rubinstein* of the Faculty of Mathematics received the Landau Prize in the field of applied mathematics.
- *Professor Emeritus Giora Shaviv* of the Faculty of Physics received the Landau Prize in the field of astrophysics.
- *Associate Professor Shimon Marom* of the Faculty of Medicine received the Ohad Shaked Prize (conferred by Bar-Ilan University) for brain research for his pioneering contributions to the study of biophysics of ion channels and the study of the development and activity of artificial neural networks.
- *Associate Professor Alfred Shalom Hakkert* of the Faculty of Civil and Environmental Engineering has been awarded an honorary doctorate from Hasselt University in Belgium for his contributions and research into road safety.

Physical Development

Summary of Eight Years of Presidency

A university is very much like a living entity and it requires constant regeneration and upkeep. In the past eight years we have set many projects in motion, although my main emphasis was in developing Technion human potential and launching new interdisciplinary centers, which were mostly virtual in nature. Such grand plans require an adjustment and investment in the physical facilities the Technion enjoys. I am extremely proud that we have transformed the campus over the last few years and truly improved research conditions and the quality of life, for those who are doing research, studying and working at the Technion.

We have accomplished much in the past eight years in terms of physical development and ***there are very few places on Campus that were not built, renovated or touched in some way over this period.*** In this report you will find only a small taste of what we have achieved.

Essentially, all the resources required for this vast physical development on the campus came from donations. It would be impossible to name each and every building, office, laboratory, garden, park, sculpture etc. However, I can clearly state that we would not have been able to achieve this without the support and generosity of our extended Technion family.

Following is a list of major construction projects which were completed during my presidency, divided into 3 categories: research and teaching facilities; projects to improve the quality of life on our campus; projects in the planning stage.

Research and Teaching Facilities –

- In the beginning of my term in office the Rabin Civil Engineering Building was completed – a magnificent state-of-the-art building in the heart of our campus
- The Lidow Physics Complex with its 7,000 m²
- The Chais Family Teaching Laboratory Wing at the Faculty of Chemistry
- The Stephen and Nancy Grand Water Research Institute
- The David and Janet Polak Center for Cancer Research and Vascular Biology
- The Sohnis and Forman Families Center for Stem Cell and Tissue Engineering Research
- The Andrew and Erna Finci Viterbi Computech Center for Advanced Studies
- The Dalia Maydan Materials Engineering Building
- The Sara and Moshe Zisapel Nano-Electronics Center
- The Schulich Faculty of Chemistry – a complete refurbishment of the research laboratories
- The Asher Space Research Institute
- The Louis and Bessie Stein Biotechnology and Food Engineering Complex.

Projects to Improve the Quality of Life on Our Campus –

- The Eastern Village with ten dormitory buildings
- The Reginald Colman-Cohen outdoor swimming pool
- The Emerson Family Fitness Center
- The Technion Kinetic Obelisk – a unique sculpture created by the world famous architect Professor Santiago Calatrava and many more
- Lorry I. Lokey Park
- Several round-about on campus

Projects in Advanced Planning Stage –

- Undergraduate Dormitories Village – with 650 beds
- The D. Dan Kahn Building of the Faculty of the Mechanical Engineering
- The Schulich Faculty of Chemistry – renovation of the teaching wing
- Sohnis Garden – at the entrance to the Emerson Family Life Sciences Building
- Faculty of Civil and Environmental Engineering – renovation of the microbiology laboratory in the Sherman Environmental Engineering Center
- Rifkin Dormitories Village for Undergraduate Students – renovation of 2 buildings.

Measures have been taken in all new construction projects to ensure that buildings be as “green” as possible to ensure maximal energy efficiency and savings in water consumption. All new buildings are planned to ensure easy maintenance and follow the motto that "Safety Comes First". In addition, they are fitted with computerized monitoring systems that will save on maintenance costs and efficiently control all systems.

In the past few years, we have also continued, as we did over the last 8 years, to upgrade existing buildings. A great deal of emphasis has been placed on building safety. A campus-wide effort has been made to promote energy conservation. Due to the success of the pilot program in this area in the Faculty of Electrical Engineering (16% average saving), the project was expanded to include the Faculties of Physics and Computer Sciences (20% average saving), and they will be joined this year by the Faculties of Civil and Environmental Engineering, Biology and Medicine and the Department of Education in Technology and Science. This project will continue until it covers the entire campus.

We are also continuing to make the campus as accessible as possible for individuals with disabilities and by now after a multi-year effort, most of the campus is indeed accessible. This effort will certainly continue.

The “Green Campus” project is continuing, with emphasis on preserving the beautiful Carmel flora found on campus, conserving water and energy, and enhancing campus cleanliness.

Below is an overview of the main development projects recently completed, which were not mentioned above, and those under construction.

Projects Completed in 2008

- Ullmann Teaching Center – renovation of offices and new area for registration and student recruitment offices
- Faculty of Biomedical Engineering – three new research laboratories in the framework of the Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering and renovation of an additional research laboratory
- Rappaport Faculty of Medicine – new research laboratories and renovation of existing laboratories on the fourth floor
- Samuel Neaman Institute – completion of roof floor
- Faculty of Biology – renovation of two research laboratories
- Faculty of Architecture and Town Planning – renovation of the library
- Faculty of Mechanical Engineering – renovation of research laboratory and offices
- Sherman Forum – renovation and expansion
- Coler-California Visitor Center – Nobel Prize Laureate’s Exhibition Room
- Rifkin Dormitories Village for Undergraduate Students – full refurbishment of the common areas in one building
- Alfred Mann Institute – renovation of laboratories and offices on the second floor of the Industrial Research Building
- Faculty of Biotechnology and Food Engineering – experimental animal facility and renovation of a laboratory
- Adapting campus buildings for the disabled – teaching floors at the Rappaport Faculty of Medicine

Projects under Construction

- Shalom Stanley Zielony Graduate Student Village – the largest construction project in Technion’s history with 216 apartments involving an estimated investment of \$40 million
- Shalom Stanley Zielony Student Union Building – addition of three new wings and complete renovation, covering a total of 8,000 m²
- Louis & Bessie Stein Biotechnology Complex – new wings of laboratories and offices, covering a total area of 2,900 m²
- Emerson Family Life Sciences Building – covering a total of 10,500 m² including parking space (8,800 m² without parking)
- Life Sciences Experimental Research Facility – covering an area of 1,500 m²
- Schulich Faculty of Chemistry – major renovation of all research laboratories, many offices and public areas.
- Wolfson Faculty for Chemical Engineering – renovation of Nanotechnology laboratories
- Ullmann Student Center – renovation of Dean of Undergraduate Studies offices, tuition offices and information center
- Adapting campus buildings for the disabled – teaching floors at the Rappaport Faculty of Medicine
- Faculty of Mechanical Engineering – new D. Dan and Betty Kahn Mechanical Engineering Building (5,000 m²) to meet the new needs of the Faculty
- Goldberg Family Garden – Schulich Faculty of Chemistry
- Jacobs Plaza – sculpture is in the construction stage

Fund Raising

Summary of Eight Years of Presidency

The years 2000-2008

This report is an opportunity to summarize the fund-raising effort in which we were engaged over the last eight years. As can be seen from the Chart on the next page, **over the last 8 years \$ 510 million were transferred to Technion from our friend societies around the world.** These funds were used for a variety of research and teaching projects for the multidisciplinary centers and programs, fellowships, scholarships, for the operating budget and for many other important needs of the Technion. **In addition, hundreds of millions of dollars were donated or committed for future transfer to the Technion–ATS endowment.**

This is a staggering sum that emphasizes once again the devotion and the generosity of our friends around the world.

Most of the support to the Technion came from the American Technion Society – an outstanding devoted professional organization led by impressively devoted lay leadership. *This outstanding organization will be soon completing its unprecedented campaign, the largest that any Israeli University has conducted in the USA, to raise 1 billion dollars for the Technion, most of it raised in the last decade.*

The Israel Technion Society led by Gen. (res.) Amos Horev, has also done miracles reaching an average fund raising of \$10 million a year.

Other friend societies have also done their part by helping us reach the impressive sum of a half a billion US dollars in 8 years which drove Technion toward new heights in research and teaching.

Total Income from Societies 2000-2008 (in millions of US dollars)



During the past year, the worldwide economic crisis posed unprecedented challenges for fundraising for every public institution in Israel including the Technion. Notwithstanding these new realities, the Technion's Societies doubled their efforts and transferred a total of \$89.3 million in philanthropic support to the Technion in 2007/8. This represents an increase of \$15 million over transfers from the Societies in the previous year. It is a record year and presents the **highest sum ever** transferred to the Technion!

The Activities of the Public Affairs & Research Development

Division (PARD) in 2007/8

The economic situation did not deter PARD from pursuing new avenues of support. The Netherlands Technion Society held its first inaugural event in Rotterdam with the participation of Technion President and several professors in the presence of corporate, private and academic supporters. The Australian Technion Society conveyed energy and confidence in opening a representative office in Sydney and initiating new activity. The Australian, British, Canadian,

French, Italian, Netherlands, and Swiss Technion Societies made new efforts to actively identify and enlist younger supporters to their respective ranks.

In particular I would like to mention the wonderful work being done on our behalf by Muriel Touaty, the Executive Director of the French Technion Society, who has made considerable headway with activities and fundraising on our behalf and has raised awareness for the Technion in France. It was recently announced that Muriel will be receiving a special recognition from the President of the French Republic and the Minister of Research – the *Chevalier de l'Ordre National du Mérite* for her contributions to strengthen the French-Israeli cooperation.

Despite the economic climate, interest in support for the Technion did not decline. PARD's Projects Unit prepared over 110 new projects for support this year. A total of 120 projects were adopted during the course of 2008. Examples of major projects supported this year include the Stanley Shalom Zielony Graduate Student Village; the Stanley Shalom Zielony Student Union Building; initiation of the D. Dan and Betty Kahn Mechanical Engineering Building; the Autonomous Systems Program; the Energy Program; new state-of-the-art facilities within the Louis and Bessie Stein Foundation Biotechnology Complex; and new research laboratories, scholarships, and fellowships. *Mr. Shalom Zielony, a man who cares deeply about the whole student experience at the Technion, has generously decided to endorse and support the Technion orchestra and choir by creating a fund to support them in perpetuity.*

Over the course of the year, PARD's Alumni Liaison Office organized ten reunions for different faculties bringing nearly one thousand alumni "back home" to the campus. These reunions were held in coordination with both the Israeli Alumni Association and Israel Technion Society. PARD also actively assisted the Alumni Association to renew its activities and reach out and involve more graduates in support of the Technion.

PARD sent out nearly 500 individual reports to donors in Israel and abroad as well as over 2,000 hand-written personal letters written by undergraduate and graduate student scholarship recipients.

The Technion continues to lead as the most cited university in the Israeli media. Over 100 news releases describing Technion research and innovations were circulated to the press. Technion breakthroughs are also widely covered on Israel's most read internet site – *www.ynet.co.il*. We continue to produce three annual issues of the Hebrew magazine “Ha-Technion”. This journal reaches no fewer than 60,000 homes in Israel and highlights Technion achievements and breakthroughs in teaching and research. As in past years, we also published three annual issues of the Technion's English-language “Focus” magazine which is distributed to the university's worldwide circle of friends, supporters and academic partners. Both “Ha-Technion” and “Focus” are now also available on the Technion's website.

This year, PARD produced a new image film entitled “Technion-Back to the Future” for viewing on campus and before supporters overseas. We also completed and inaugurated a new interactive film theater within the Coler-California Visitors Center celebrating the Nobel-prize winning research of Distinguished Professors Ciechanover and Hershko. The department also produced nearly 50 videos on projects and ceremonies for individual donors, and is currently completing an attractive book on Technion's history and achievements to mark the university's 85th anniversary.

Like other institutions in Israel, the Technion was impacted by a decline in overseas visitors due to both the worldwide economic situation as well as Israel's defensive military operation against Hamas terrorism in the Gaza strip last summer. On the other hand, the war to protect the south inspired many supporters of Israel to visit the country and express solidarity, and several groups requested to visit the Technion. These groups included the Allentown, Pennsylvania Jewish Federation, South Palm Beach Jewish Federation, Jewish Federation of Metropolitan Chicago, and Los Angeles Jewish Federation. The Coler-California Center also continued to organize high-level visits by

academic, corporate, government and non-profit groups from Israel and around the world during the course of the year. Between January 1st and December 31st 2008 the Center hosted 9,000 visitors – a very impressive number.

Professor Raphael Rom of the Technion's Faculty of Electrical Engineering entered his position on October 1, 2008 as Vice-President for Resource Development and External Relations. Professor Rom has already visited Societies in the USA, UK, and Europe to meet with the Societies' leadership and donors and discuss means and ways that PARD could assist in their respective public relations and fundraising activities.

I would like to take this opportunity and extend once again my heartfelt gratitude to all our friends and supporters both in Israel and abroad. Your generous and unwavering support of the Technion is our source of strength and without you we would not be able to soar or even approach the heights we have.

A Final Word

My dear friends,

I wish to end this report with a few words of gratitude to all of you for the journey we have made together. The past eight years have been an experience of a lifetime and I shall cherish this time as a wonderful period. I have come into office with little administrative experience in running a large and complex organization like the Technion but with a vision of taking the Technion into the 21st century as a strong and leading institution.

I believed and continue to believe that a strong, world-leading Technion is vital to the survival of the State of Israel and the fulfillment of the Zionist dream in which I strongly believe. Despite the many challenges we faced, we achieved a great deal and laid foundations for even greater things to come.

I have enjoyed and was privileged by the support and love given to me by the extended Technion family and I take with me many friendships and a feeling that this big family is as strong as ever. Of course, all this could have not been achieved without the hard work and devotion of many and the vital support of my family, especially my wife Tzipi.

I continue my professional journey as a scientist, a chemist, who loves his work and the thrill of discovery, but I also take with me a sense of great accomplishment of leading one of the world's best universities.

When I leave office I see a much stronger Technion than the Technion of eight years ago – a Technion which is well prepared and positioned for the challenges of the 21st century.

My successor, Professor Peretz Lavie, with whom I have worked closely for 7 years, is a man who has already proven himself worthy of becoming the President of the Technion. I leave the Technion in very talented and capable hands and I know he will lead this university to new heights.

I am sure we shall meet again as I know my work for the Technion will continue in a different capacity.

Once again, thank you for your support, generosity and friendship.

Sincerely yours,

J. Apeloig