

From the President

Concern for man himself and his fate must always form the chief interest of all technical endeavors, concern for the great unsolved problems ... in order that the creations of our minds shall be a blessing and not a curse to mankind. Never forget this in the midst of your diagrams and equations.

Albert Einstein, address at California Institute of Technology, 1931

British Prime Minister David Cameron in a message celebrating Israeli Science Day, recently said, “The work of your scientists is helping humanity in some truly profound ways.”

Albert Einstein's words to the students at the California Institute of Technology more than 80 years ago are an apt legacy, written to epitomize modern Israel and its "technological endeavors". Indeed, they are echoed in PM Cameron's recent words. From saving the lives of Syrian soldiers and civilians, to exporting life-saving and life-enhancing technologies, to actively fighting hunger and drought, Israel, with the Technion as a frontrunner, has pioneered developments that are a blessing to mankind. We are determined that we will maintain and enhance this orientation despite the increasingly difficult challenges that we face as a country and as an institution.

National and International Challenges

This is my first report to you in my second term as president and as such it will reflect on the past as well as the future. My first term was a remarkable adventure – filled with previously inconceivable challenges and accomplishments. Most dramatic of all was the Technion's entry in a major capacity into the global arena. The opening of the Technion to both New York and China within my first term of office resulted in a brand-new reality – one which we needed to create on the fly. We had no previous experience or precedents to prepare us. Yet we knew that with the talented people at our disposal, faculty members with all the skills of entrepreneurship, military life and academic research at their fingertips, we were taking a very reasonable, calculated risk. And indeed, we are progressing well on both fronts, as you will read in this report, and these new dimensions have had a dramatic impact on our home campus in Haifa.

We now need to settle down to the more mundane business of fleshing out our vision and consolidating our breakthroughs overseas. We also need to focus on the events at home, in Israel, which are impacting our institution and which need to be addressed urgently. The most significant challenge that we face is that the technological heart of the country is moving south and leaving us, the Technion, far away in the north. The Israel Defense Forces' technological units are moving to the Negev, and the city of Beer Sheva will become the new focal point of technological activity. While this is a very positive and necessary step for Israel, it increases the distance between these components of the national technological orbit, with which we have symbiotic ties, and the Technion campus in the north. The impact will be felt shortly both in student registration numbers and in the number of companies that will move away from the Technion's radius. We must prepare to face this challenge wisely with the opening of Technion branches in added locations, with flexible and dynamic outreach and with other means.

Competing in a Global Economy

Many countries have begun making a serious investment in education and research to sustain their future. There is a dawning awareness that research and development are the path to economic and ensuing political success. Huge amounts are being invested globally to turn universities into world-class institutions. University branch campuses in the Persian Gulf and in China are widespread, MOOCs – (Massive Open Online Courses) are proliferating, the percentage of the world's students studying abroad is rising dramatically, and globalization is increasingly becoming a measure of success and excellence.

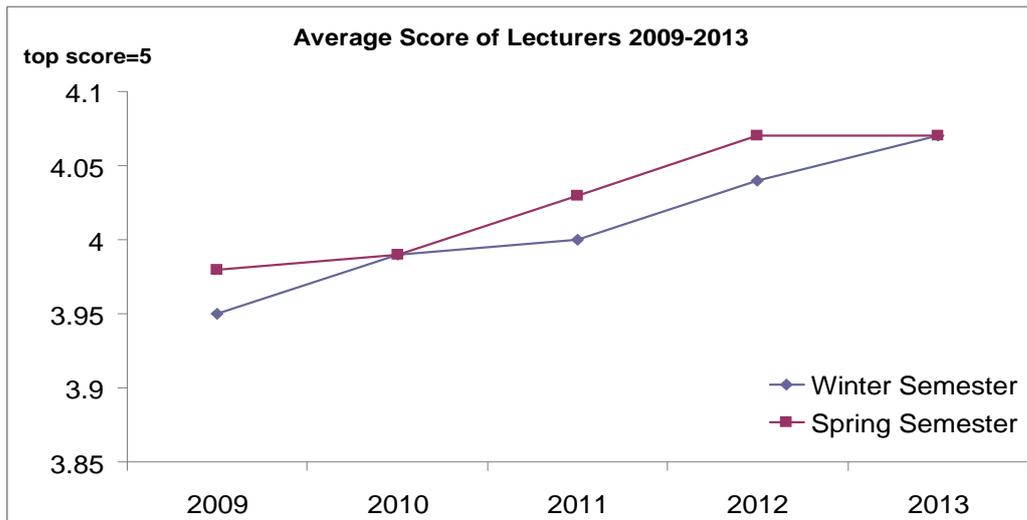
The global economy is fast-moving and open and it requires serious efforts to compete successfully within it. We in Israel are at an excellent starting point right now and we must maintain it. Much of what has been accomplished till now has been based on local and overseas philanthropy – wonderful people who are committed to Israel's growth and security. However, most of our donors are part of a generation that is disappearing and few members of the next generation have the same orientation. We will increasingly have to depend on the government to maintain our global position. Israel must take significant steps just to keep up with the reality around us; the government needs to accelerate its investments in research and science infrastructure. Global competition is getting tougher. Standing still is not an option. There is a vital necessity to invest in renewing the research

and scientific infrastructure in Israel which has been allowed to erode. Even though there has been an upswing recently, we have to be exceedingly sensitive to the fact that research is linked to progress and is therefore invaluable for Israel's future. We have got to increase our investments in science in technology now!!!

Welfare of Students

To achieve greatness as an institution we must focus on our students; they are the grass roots on which we thrive. Their welfare became an issue over the years as the Technion's rigorous striving for excellence in studies and achievements created stresses and quality-of-life issues for students. The resulting strategic decision to improve the atmosphere on campus and to address the matters which impaired the over-all welfare of Technion students has brought about a dramatic transformation in the learning environment.

The report of the Committee on Program Structure and Study Load, headed by Prof. Yachin Cohen, and on which I reported in detail in the 2013 President's Report, has created considerable improvement in teaching at the Technion. Every faculty has re-evaluated the methods and the composition of its studies and has embarked on implementing the conclusions. The net result is already palpable: a more friendly, supportive atmosphere on campus for the students. The Yanai Prize too has been a factor in this development. The prize is awarded annually to outstanding academic staff members who are selected for their excellence in teaching. As the attached graph indicates clearly, it has been most effective. It is notable as well that this year the Technion Student's Association was chosen as the best in all Israeli universities. All these features have contributed to an enhanced student experience.



Campus Enhancement

Another important component of student wellbeing is the physical dimension, and much attention has been paid to improving and developing our already remarkable campus. Within the framework of an over-all, five-year master plan to develop the campus infrastructure, headed by Prof. Shamai Assif, head of the Klutznick Center of Urban and Regional Studies and Prof Yehuda Kalay, dean of the Faculty of Architecture and Town Planning at the Technion, many improvements have been initiated. An architect was recently selected to renovate and upgrade both campus gates.



New Technion Main Gate - Rendition

Work continues on making the campus more accessible for people with disabilities. We are striving to reach the target of 5000 dormitory beds – the most of any university in Israel - but still not enough to meet the needs. The most generous contribution from the Li Ka Shing Foundation of China (established in 1980 by global entrepreneur and philanthropist Li Ka-shing) for the improvement of the campus will be used, among others, to fund 500 dormitory beds within the next six months. We have undertaken the restoration of the historic Technion building in Hadar; the project will be headed by Prof. Emeritus Arnon Bentur of the Technion's Faculty of Civil and Environmental Engineering. To the existing Science Museum on the Hadar campus we will add a studio, a "clinic" and an archive for the Faculty of Architecture and a facility for Technion activities. It is our intention that the historic building become an integral part of the Hadar neighborhood and contribute to the advancement of that vital section of Haifa's urban environment.

Outside of Haifa, the new Tel Aviv campus was dedicated last summer in Sarona, a unique restored area in the center of Tel Aviv. Built with the aid of a major gift from David Azrieli, the renowned architect and veteran friend of the Technion, it will house courses of the Technion's Division of External Studies and Continuing Education, giving engineers and other professionals a chance to continue their education in the center of the country. The first program, the Start-up International MBA program, began last fall.

Faculty Recruitment

The above steps are crucial as well to our ability to compete within the framework of the current challenges posed by the global higher-education scene. However, our most vital test is our capacity to continue to attract outstanding academics to our university. Our recruiting efforts have been massive and successful, as detailed in this report by the Vice President for Academic Affairs. The Zielony Graduate Student Village has emerged as a hugely successful tool for recruitment. It is a very attractive amenity which we can offer our young married candidates for academic staff positions.

International Outreach

The Technion is now placed among the top technological-scientific universities in the world. The New York and China projects have provided us with international visibility and exposure. In New York, we are currently recruiting faculty for the Jacobs Technion-Cornell

Innovation Institute. A few candidates have been selected to join the staff and the curriculum has been approved. In the fall of 2014, the first class will begin their studies in Connective Media – the hub of studies which was chosen to kick off the institute's operations. Prof. Craig Gotsman, of the Technion's Faculty of Computer Science, who was the first and founding director of the institute, was replaced this year by Prof. Adam Shwartz of the Technion's Faculty of Electrical Engineering. Prof. Gotsman made an invaluable contribution to the establishment of the JTCII and to setting its direction for the future. We are indebted to Prof. Gotsman for his vital role in this pioneering project.

In the interest of enhancing our global outreach we signed strategic agreements this year with the French *École Polytechnique*, with the University of Waterloo in Canada and with the Hong Kong University of Science and Technology. We have taken additional steps in the establishment of our campus in China. A cooperative agreement plan was presented to the Chinese federal government and is waiting to be authorized. A team has been formed to direct the program, headed by Brig. Gen. (res.) Moshe Marom who was Israel's first military attaché in China and speaks Mandarin Chinese. The team has been entrusted with planning the campus and the curriculum and recruiting Chinese faculty members who will come to the Technion campus in Haifa for orientation, study and training.

The MOOCS project which we described above has taken off dramatically with the opening, in January 2014, of our on-line course in English and Arabic, given by Prof. Hossam Haick, of the Wolfson Faculty of Chemical Engineering and the Russell Berrie Nanotechnology Institute. The course, presented on the Coursera network of educational partners, is entitled "Nanotechnology and Nanosensors." More than 6,000 students have registered for the on-line course which will be the world's first MOOC on the Coursera platform given in the Arabic language. Thirty thousand have registered for the English-language version.

The Technion International School will be offering an intensive 5-week English summer program for the first time this year. The Entrepreneurship and Innovation Program will give overseas students an overview of Israel's business environment and will foster an understanding of the development of modern technology companies and their management. It is notable that our Technion International School has doubled the number

of its doctoral students. In total, we currently have 850 overseas students studying at the Technion in all the different frameworks.



Technion International School Graduation

Applied Research

There is an apparent dichotomy in research between basic scientific research and applied research; the former is based on pure curiosity and a desire to discover while the latter is geared to achieving practical results – products and processes which will be used by mankind. Menahem Ussishkin, a Zionist leader and an engineer who spoke at the opening ceremony of the Technion in 1925, said then that they are two sides of the same coin, and the Technion has always been in accord. While grounding our students in basic scientific research, we promote applied research at the Technion. It is the source which leads to economic strength; it provides a public service to the country while improving the lives and standard of living of the population. We have recently renewed our undertaking to foster applied research. We have established funds to encourage faculty members with ideas for products to develop these initiatives and see them through the process of commercialization. Ten such awards were distributed this year. In addition, a fund was created to help support Technion companies, thereby providing assistance to Technion faculty members involved in these companies, and also safeguarding the Technion's share in them. Thirteen new companies were established this year within this framework, in the fields of water purification, drug development, technology for surgical procedures and

others. The Technion Technology Transfer office, headed by Benjamin Soffer, has been instrumental in fostering these developments in fields such as health care, drug discovery, engineering and physical science, computer science, food and nutrition and clean-tech.

Resource Development

Our international network of Technion Societies has always been, and continues to be, the source and support of the Technion's major development projects. Their invaluable assistance has been a determining factor in the Technion's growth and we are deeply grateful to them for their continued aid.

The major partner in this network, The American Technion Society (ATS), recently announced that Jeffrey Richard is slated to become the organization's new Executive Vice President in May of this year. Mel Bloom, who has headed the organization for the past thirty years, will become Executive Vice President Emeritus. We welcome Jeffrey Richard and look forward to continuing the outstanding cooperation and smooth working relationships which have been so critical to our success.



Mel Bloom



Jeffrey Richard

Since its beginning in 1940, ATS donors have given the Technion more than \$1.9 billion for scholarships, fellowships, faculty recruitment, academic chairs, research, buildings, laboratories, classrooms, dormitories, and more. We are blessed to have the ATS and our other international societies at our side, providing the support which we need to maintain our excellence.

Peretz Lavie, President

Technion Governance - 2014

Technion Management

Prof. Peretz Lavie - President

Prof. Moshe Sidi - Senior Executive Vice President

Prof. Gadi Schuster - Executive Vice President for Academic Affairs

Prof. Oded Shmueli - Executive Vice President for Research

Mr. Matanyahu Englman - Executive Vice President and Director General

Prof. Boaz Golany - Vice President for External Relations and Resource Development

Prof. Paul Feigin - Vice President for Strategic Projects

Technion Deans

Prof. Prof. Ben-Zion Levi - Dean of the Irwin and Joan Jacobs Graduate School

Prof. Yachin Cohen - Dean of Undergraduate Studies

Prof. Moris Eisen - Dean of Students

Prof. Yoram Halevi - Dean of the Unit for Continuing Education and External Studies

Deputies of the Executive Vice Presidents

Prof. Daniel Rittel - Deputy Senior Executive Vice President

Prof. Moshe Shpitalni - Deputy Executive Vice President for Academic Affairs

Prof. Noam Adir - Deputy Executive Vice President for Research

Prof. Reuven Cohen - Deputy Executive Vice President for Information Systems

Prof. Yaacov Mamane - Deputy Executive Vice President for Safety Affairs

Ms. Zehava Laniado - Deputy Director General, Operations

Ms. Dganit Shindelman - Deputy Director General, Finance

Mr. Ariel Hazan – Deputy Director General, Human Resources

Heads of the Academic Units

Prof. Yaakov Oshman - Faculty of Aerospace Engineering

Prof. Yehuda Kalay - Faculty of Architecture and Town Planning

Prof. Yehuda Assaraf - Faculty of Biology

Assoc. Prof. Amir Landesberg – Department of Biomedical Engineering

Prof. Yuval Shoham - Faculty of Biotechnology and Food Engineering

Prof. Raphael Semiat – Wolfson Faculty of Chemical Engineering

Prof. Alon Hoffman – Schulich Faculty of Chemistry
Prof. Oded Rabinovitch - Faculty of Civil and Environmental Engineering
Prof. Irad Yavneh - Faculty of Computer Science
Prof. Orit Hazzan - Department of Education in Science and Technology
Prof. Ariel Orda - Faculty of Electrical Engineering
Assoc. Prof. Efraim Lev - Department of Humanities and Arts
Prof. Aharon Ben-Tal – Davidson Faculty of Industrial Engineering and Management
Prof. Wayne Kaplan - Faculty of Materials Science and Engineering
Prof. Ron Holzman - Faculty of Mathematics
Prof. Pinhas Bar-Yoseph - Faculty of Mechanical Engineering
Prof. Eliezer Shalev – Rappaport Faculty of Medicine
Prof. Noam Soker - Faculty of Physics

The Technion International School (TI)

Prof. Anat Rafaeli - Head of the Technion International School (TI)

The Jacobs Technion-Cornell Innovation Institute (JTCII)

Prof. Adam Shwartz - Director, Jacobs Technion-Cornell Innovation Institute

Academic Affairs

Professor Moshe Sidi, Senior Executive Vice President, continued to focus on a number of key projects and issues which are currently on the Technion's agenda, some of which have also been mentioned in other sections of this report.

Undergraduate Program Structure and Study Load

The recommendations of the Committee on Program Structure and Study Load, aimed at enhancing the quality of learning at the Technion, are being implemented according to the planned schedule. The faculties adjusted the study program to the shortened semester (by one week) so that study and examination periods do not overlap. Mechanisms have been implemented in the faculties for coordination of course assignments and to verify the validity and appropriateness of examinations. Efforts have commenced for implementation of mechanisms to ensure quality control of teaching and evaluation. Initial steps have been undertaken by the Technion management to empower the teaching of the basic sciences and disciplinary courses, as well as to upgrade the evaluation of student achievements, with respect to validity, reliability and fairness. A major issue is the preparedness level of students entering the Technion in the basic mathematics and science subjects. Formal implementation of more strict requirements is planned for 2016, as more issues are to be considered in the meanwhile. There is progress in enhancing preparedness, in conjunction with the Technion Center for Pre-University Education. The main challenge in the coming years is enactment by the faculties of a comprehensive academic evaluation of the undergraduate studies program, regarding the breadth and depth of the basic courses, as well as their number. It is pleasing to note that this process has been jump-started by a number of faculties; in particular Electrical Engineering, Computer Science, Physics and Mathematics, and significant changes will already be implemented in 2014.

Prof. Yachin Cohen, who had led the Committee on Program Structure and Study Load, assumed the position of Dean of Undergraduate Studies, with particular aim to oversee this process. He will present a report to the Academic Committee of the Board.

B.Sc. in Materials Engineering and Biology

There are currently two different undergraduate study programs within the Faculty of Materials Science and Engineering: Materials/Physics and Materials/Chemistry. Both reflect the program's emphasis on combining an advanced engineering education with in-depth fundamental science. The students are awarded two degrees: a B.Sc. in materials engineering and a B.Sc. in either physics or chemistry. It was the Faculty of Materials Science and Engineering that first introduced the concept of a dual degree encompassing both a scientific discipline and an engineering discipline to the Technion. The incontrovertible success of this concept has led to its adoption by many Technion departments and by other Israeli universities. It is the success of the joint materials/physics and materials/chemistry programs, along with the expected increase in demand for engineers and scientists in the interdisciplinary fields connecting *materials with biology* (artificial implants, drug delivery systems, tissue engineering and tissue regeneration, bone repair, etc.), that has led the Faculty of Materials Science and Engineering to initiate a joint program with the Faculty of Biology. The materials/biology program, approved by the Technion Senate and by the Council for Higher Education, will be launched in October, 2014.

A materials/biology student is expected to earn a B.Sc. in materials engineering and biology after completing 4.5 years (9 semesters) of studies. The course curriculum operates on an annual basis. The program requires 189 credit points (CP) for graduation, 157 CP from obligatory core courses, 22 CP from departmental elective courses, as well as 10 CP from open elective courses. The obligatory core course points are approximately 25 percent materials, 23 percent biology, 10 percent mathematics, and 3 percent physics. In addition, specialized courses for the joint program have been defined by the two departments. Faculty members specializing in materials science and engineering for life-science applications have been hired to help stimulate the evolution of this pioneering direction in engineering-life-science education.

Training High School Teachers

Since 2011, in an unprecedented move designed to train a new and talented cohort of science and technology teachers, the Technion's Faculty of Education in Science and Technology is offering a tuition-free program, over two years, part-time, for former graduates of the Technion who wish to obtain an additional B.Sc. degree in science and

technology education. This training includes the requirements for obtaining a high-school teaching certificate. The response continues to be overwhelming in the second and third years – with about 250 students enrolling over the first six semesters. This influx has completely changed the atmosphere in the department which has suffered for many years from low enrollment. This is only one initiative that the Technion is promoting to solve the lack of qualified science and technology high-school teachers.

MOOCs (Massive Online Open Courses)

The use of MOOC-style courses, whether fully online for massive audiences, or for local use, and incorporating the so-called "flipped classroom" model, has many proponents and there is growing evidence that it can enhance student learning in many types of courses. There are those that say that this approach and technology will revolutionize higher education, and that it will do so sooner rather than later. The debate on the subject of MOOCs in the Academic Assembly of the Technion held in February 3, 2013, and the Workshop "Flippin' MOOCs" held at the Technion in June, 2013 with the participation of Prof. Daphne Koller, founder of Coursera, has prompted a number of programs to evaluate broader implementation of the approach in the Technion:

1. The Technion has joined **Coursera**, with the flagship course being Prof. Hossam Haick's MOOC on *Nanotechnology and Nanosensors*, whose first broadcast came online on March 2, 2014. The course is given both in English and, for the first time in the world, in Arabic. As of March 2014, approximately 30,000 students had signed up for the course in English, with close to 6,000 for the course in Arabic, including participants from the following countries: Saudi Arabia (over 700 applicants), Egypt (more than 600), and Syria (with some 400 candidates). Thomas Friedman recently published an article in the New York Times highlighting the course:

http://www.nytimes.com/2014/02/19/opinion/friedman-breakfast-before-the-mooc.html?ref=thomasfriedman&_r=0

2. Several in-house MOOCs initiatives are ongoing: (a) Prof. Haick's **Coursera** course has been approved as is for graduate-level study at the Technion; (b) The Mechina (pre-university program) has initiated a MOOCs program to provide preparation for Technion freshmen in chemistry, mathematics and physics. The chemistry MOOCs course was

piloted in summer 2013, with development of the mathematics MOOCs course currently in progress and due to come online in summer 2014; (c) The Faculty of Computer Science is currently developing a MOOCs course on "Introduction to Programming".

3. In the "Flipped Classroom" approach, students are expected to watch videos of lectures and/or read preparatory materials before coming to class, where, rather than hearing another lecture, they participate in open-ended problem solving, active tutorials and other student-centered activities. This approach was piloted, with great success, in a course on numerical methods at the Faculty of Chemical Engineering in 2013. An additional, full-course pilot in the Faculty of Physics is underway in 2014, with more full courses in flipped format planned for next year.

Department of Humanities and Arts and Enrichment Studies

Professor Efraim Lev, seconded from Haifa University, is successfully meeting the challenges as head of the department. In particular he is stewarding the introduction of new humanities courses, taught largely by Haifa University senior faculty, and which form the initial set of "enrichment courses" amongst which students must choose at least three courses (six credit points) during their degrees. Based on the first year's experience, both students and teachers have provided very positive feedback concerning this new mode of cooperation between the Technion and Haifa University. In fact, the Council of Higher Education, in its second round of calls for proposals on promoting enrichment programs, has endorsed this mode of cooperation by suggesting it as an option for other universities and colleges to adopt. The Technion and Haifa University are working to develop a further set of courses for the enrichment program beyond the 45 approved so far. An online, interactive course was successfully piloted this year as part of the enrichment program.

In addition, the department's language laboratory has been upgraded with all new computers this year, thus enabling the addition of advanced programs and teaching materials.

The department received a generous donation and as a result was able to refurbish and re-decorate the Technion orchestra and choir offices. A further substantial donation has recently been pledged to the music section of this department, for instruments and equipment.

Dr. Chaiter gave the Technion a collection of paintings of famous composers which are now hanging in the entrance of the orchestra and choir offices in the Technion's Churchill Building.

International Review Committees

Two types of international review committees evaluate faculties and programs at Technion. One is "internal" (international review committee appointed by Technion) and the other is "external" (international review committee appointed by the Council for Higher Education –CHE).

During 2013, we had one CHE evaluation of our program "**Software Engineering and Information System Engineering**", which took place May 1-2, 2013, under the leadership of Prof. David Parnas of McMaster University, Canada. At the time of writing this report, the Committee has not yet submitted its evaluation and recommendations.

Programs for Ultra-Orthodox Students

This year the Technion opened the second geodesics group in Bnei-Brak. Now there are 28 students in the Pre-Mechina (preparatory) course. On campus there are 22 students studying in the Mechina after having finished the Pre-Mechina course. In April – May, another Mechina will open for ultra-Orthodox women. By the end of this year about 130 ultra-Orthodox students are expected to be at the Technion.

Equal Opportunities for Arab Students

With funds from the Council of Higher Education and other funds, the Assistant to the Senior Vice President for Promoting Minorities at the Technion is advancing an intervention program among Arab students based on four main strategies: (1) reducing drop-out rate; (2) promoting academic excellence; (3) encouraging students to continue to master's and Ph.D. degrees at the Technion; (4) promoting employment in hi-tech sector among those who finished their studies; and (5) recruiting excellent Arab scholars to join the Technion. In addition, work is in progress with a private fund towards a strategy for advancing the achievement of excellent young Arab students in science and technology at the Technion to include: high-level convening to draw attention to the issue; focused

interventions at critical junctures, including programs targeting elite high school students; internships and job opportunities; and systemic data collection and analysis on the progress of promising students.

K-12 School Pupils – Outreach and Influencing Choices

1. World Ort – Kadima – Mada - Anier Program

The idea of this program is to expose pupils from grades 9-12 to pre-academic scientific content and together with the Ort – Kadima – Mada Program and Nahalal High School to continue the program until 2024.

2. The Kidma Program for Women

Twenty-seven women who have finished their high-school studies are in the program this year, run together with the army. They are receiving intensive training in basic technological fields, and are expected to continue in the area of technology following their studies at the Technion.

This program was initiated because of a lack of women in the reserve academic program and it is supported by outside funding.

The Irwin and Joan Jacobs Graduate School

Immediately after the Board of Governors' meeting, the Dean of the Graduate School circulated the approved 10-year plan to all academic units and graduate programs with a request for information on its implementation in their unit/program. The information was to be submitted in a table detailing the number of graduate students, separately for master's and doctoral degrees, expected in each of the next ten years, based on expected faculty recruitment and infrastructure development. In addition, a text file detailing the faculty and infrastructure needs to attain the growth was also submitted by each program. The information from the academic units and programs is now being submitted to Technion management for the preparation of a comprehensive business plan for implementation.

Due to health issues, the Dean of the Graduate School resigned from his position and a new dean, Prof. Ben-Zion Levi, has recently been appointed.



Ph.D. Graduation

Natural Gas and Petroleum Engineering

The first cohort of 20 students has finished studies for a very successful master of engineering degree with a specialization in natural gas and petroleum engineering. The second one, of 17 students, is about to start their final projects shortly. The response of both students and the guest lecturers has been very positive – so much so that three graduates have received invitations to pursue Ph.D. studies in Houston. Four of the graduates of the first class are employed by the gas companies; two are studying towards their Ph.D. degrees at Texas A&M University in Houston with scholarships from the Ministry of Energy and Water. Others are employed in the refineries, electrical company, engineering companies, private consultancies and others. It is also worth mentioning that a group from the second class has just made it to the finals of the EAGE (European Association of Geoscientists and Engineers) student competition, along with five other groups, ahead of groups from leading universities worldwide. This program places the Technion in a position to develop both technical and research capabilities in this important industry for the future of the country.

Off-Budget and Off-Campus Programs

The Technion, as part of its mission to maintain the skills of graduates through *life-long-learning*, offers several non-thesis master's programs in Tel Aviv. These programs include Master of Engineering (ME) in some areas, Master of Real Estate (MRE), Master of

Industrial Design (MID), Master of Architecture (MARC II) and Master in Business Administration (MBA). These programs were designed for professionals from industry, are taught part-time, usually for two years, and include a 5-credit final project (out of a total of 40 credits). Except for the MBA, all other programs are budgeted by the PBC (Planning and Budgeting Committee) and taught in Tel Aviv as well as in Haifa's main campus. Teaching in the Tel-Aviv area is important for making the programs accessible to the very large number of engineers, architects, and science graduates who live and work there. This outreach provides an immeasurable service to Israeli industry, as well as to Israel's Department of Defense – saving many person-years of work and travel. The Division for Continuing and External Studies moved in July 2014 to the Technion - Azrieli Sarona Campus in central Tel Aviv. This 19th century campus with its unique atmosphere has already brought about an increase in enrollment and interest by prospective students.

Apart from being taught also in Tel Aviv, these programs are managed by the Technion's Irwin and Joan Jacobs Graduate School, exactly like any other master's program, and admissions and student progress strictly follow graduate school regulations.

Two programs are not budgeted by PBC. These are the MBA program in Tel Aviv and the New StartUp MBA that is taught full time, in English, also in Tel Aviv. However, in all academic aspects these programs are run by the Azrieli Division of Continuing Education and External Studies and by the graduate school in the same manner as the budgeted programs. There is no difference in the admission standards, the required grades and average, and the degree requirement.

The Technion International School (TIS)

The Technion International School (TIS) was established in October 2012. It is located at the Mauerberger Building. TIS handles the development, management and marketing of academic programs for international students at the Technion, as well as managing academic agreements between the Technion and universities as well as multi-university umbrella organizations world-wide.

A major effort of TIS is facilitating the development of English-speaking programs, in order to form a basis for attracting international students. These programs are based on courses identical to ones taught in Hebrew and they are also open to Israeli students who may study

(in English) alongside international students and thereby experience aspects of multiculturalism and globalization. TIS' key program – the 4-year undergraduate program in civil and environmental engineering – is entering its fifth year, with the first cohort of students including 12 students having graduated in August 2013. Five of these graduates chose to continue graduate studies at Technion and four others opted to continue their studies abroad at MIT, Stanford, Johns Hopkins and Imperial College. About 1/3 of the students in this program are regularly on the President and Deans' Honors Lists.

In addition, TIS has developed special programs, including programs offering a freshman year in engineering (in English and in Russian) allowing students to transfer to study in Hebrew after completing their freshman year, and summer programs to be offered in English, including "Engineering for Developing Communities", that was previously conducted very successfully in Israel (twice) and in Nepal. This year it will be conducted in China. A new set of summer programs was started in the summer of 2013 and will run again this year: Summer School of Engineering and Science offers academic courses in four faculties (mechanical engineering, aerospace engineering, mathematics and electrical engineering). Another focus is in the development of summer programs that will start to operate in the summer of 2014, in entrepreneurship and innovation.

Efforts also focus on developing graduate level studies in English; Technion has launched a Full Time One-Year MBA – Start up MBA in 2013, and will launch a one-year Masters of Engineering in Systems Engineering, to be offered in cooperation with the Division of Continuing and External Education. Several faculties are now switching to teach all graduate studies in English (M.Sc. and Ph.D.) with the first one being the Faculty of Chemistry. TIS works with these faculties on recruitment of students and student-life issues.

Through TIS the Technion currently maintains academic collaboration agreements with 197 universities in 37 countries, including both university-wide agreements (enabling student exchange and other forms of collaboration with any of the Technion's faculties and departments), and also faculty-specific agreements. TIS also maintains agreements with umbrella organizations, such as CLUSTER (Consortium of Leading Universities of Science and Technology), GE3 (Global Engineering Educational Exchange) and CMU (Community of Mediterranean Universities). Agreements with universities in China, India, Korea,

Singapore, Taiwan and Thailand offer fellowships to encourage academic visitors from these countries.

This year a special focus was placed on programs of the Israeli Government and the European Union. TIS received funding from the Planning and Budgets Committee (PBC) of the Israel Council for Higher Education (CHE) to support hosting of students from China and India, and from the EU TEMPUS Program for the ECOMMIS collaborative effort for development of teaching curriculum. In addition TIS partnered and received approval for a new EU TEMPUS program for the SYSERMO project which will develop teaching curricula of space system engineering. TIS also partnered and received approval for Erasmus Mundus EMAIL III Program (for funding of student and researcher mobility). These programs involve collaborations with 88 universities from 46 countries.



Jacques Biot, President of École Polytechnique (left) signs an agreement for academic cooperation with Prof. Peretz Lavie

In 2012/13 (the last academic year for which complete data is available) Technion hosted a total of 725 international students and visitors – including 64 full-time undergraduate students studying in regular Hebrew programs, 105 full-time students in the English-speaking programs developed and administered by TIS (freshman year of engineering and B.Sc. in civil and environmental engineering), 92 full-time graduate students, 98 full-time medical students in the special English-speaking program of the Faculty of Medicine, 165 visiting and research students, 131 post-doctoral fellows and 70 academic visitors.

Special efforts continue to be invested in collaboration with MIT. Through the MIT MISTI program, seven MIT students spent eight weeks each on research internships in one of the

Technion labs in 2012/13. Through the TMIP Program, two Technion students spent 4-12 weeks on research internships in one of the MIT labs (two additional students postponed their visit to 2013-14 academic year and are now there, and three other applicants would like to go during summer 2013-14 hoping to get additional funding by then).

International relations developed by TIS also provide a resource for enriching the experience of Technion students, through the student-exchange program. This program is open to excellent undergraduate students in their third year of studies. In 2012/13, 51 Technion students spent a semester or a year abroad, in universities in Europe, North America, South America, Australia and Asia. In addition some 60 Technion students participated in the IAESTE summer internship program, which allows students to spend a summer working in a firm or organization in another country. Special efforts are currently being invested to develop additional programs allowing an international experience for Technion students. For example, 18 Technion students went for a special seminar held in Korea, together with fellow students from the USA, Germany, Korea and China. In addition, 17 Technion students participated in various summer programs abroad, like TIS Engineering for Developing Countries program held in Nepal, a Chinese Language Course in Shantau and Shanghai summer school for civil engineering students.

Professor Arnon Bentur, the founder and first head of TIS stepped down at the end of 2013 and was succeeded by Professor Anat Rafaeli who was appointed as head of TIS.



Students Participating in "Engineers Without Borders" Program

The Jacobs Technion-Cornell Innovation Institute (JTCII)

The Joan and Irwin Jacobs Technion-Cornell Innovation Institute is progressing very well and plays a key role within Cornell Tech. By offering interdisciplinary dual-degree programs in the applied information-based sciences, the Jacobs Institute brings a global perspective to research and education with an emphasis on technology transfer, commercialization, and entrepreneurship.

The Jacobs Institute embodies the academic partnership between the Technion and Cornell on the Cornell Tech campus. The Jacobs Institute departs from traditional academic departments and is organized in three interdisciplinary hubs selected for their relevance to the New York City economy: *Connective Media*, which focuses on extracting and using information from a variety of media data sources; *Healthier Life*, which will create better health care information systems, mobile health care applications, and medical devices; and *Built Environment*, which aims to increase the efficiency and sustainability of urban environments at all scales, including through the use of sensor-based data. In addition to the academic faculty employed by the Jacobs Institute, a dynamic industrial affiliates program provides a valuable source of local technology experts and seasoned entrepreneurial mentors.

Faculty hiring for JTCII is in high gear, both for Technion-affiliated and Cornell-affiliated faculty. A number of senior candidates have interviewed and offers have been made. The institute expects to hire 3-4 faculty members by fall 2014.

The dual MS degree in information systems, with concentration in connective media, was officially launched in a press conference with Mayor Bloomberg on Oct 1, 2013. A number of industrial collaborators among the traditional and new media companies were announced as well. With the external help of Maguire Associates Inc. – an “enrollment management” firm, a marketing plan was built and executed. This includes conducting information sessions at leading universities, having a presence at graduate student events, and distribution of electronic and printed advertising materials, email and other media advertising campaigns. About 60 students applied to the program and the goal is to successfully recruit at least 10 students for the fall 2014 class.

A workshop was held at Cornell Tech on Oct 4, 2013, bringing together the Technion and Cornell Principal Investigators (PI's) of the ten joint projects to report on their activities for the year. Based on this, a second year of research will fund three joint projects and to a lesser extent two others. A new Call for Joint Projects involving PI's at Technion/Cornell and a PI at Cornell Tech has been issued.

An Advisory Council with ten leading figures was established and the first meeting was held on January 28, 2014.

The JTCII Postdoctoral Innovation Fellows Program is a unique program designed to encourage and support entrepreneurial efforts of technologists with expertise at the Ph.D. level. In response to the call for spring 2014, six such Fellows joined JTCII in January 2014, of which three are from Israel and three from the USA.

Relationships of various sorts with industrial partners have started to be built. Of special note is a relationship with Toshiba, who desires to establish an R&D presence in the USA in conjunction with an academic partner. This may lead to a more significant relationship in the future, possibly also co-location on Roosevelt Island in the future. A high-profile R&D collaboration with NYC Citibike has been facilitated.

The founder-director of JTCII, Prof. Craig Gotsman, decided to follow his passion for research and teaching and will continue to serve as a faculty member at JTCII. Prof. Adam Shwartz, former Dean of the Faculty of Electrical Engineering at the Technion was appointed as the JTCII director.

Faculty Recruitment

The recruitment of excellent young faculty members and their retention remain the most important issues the Technion is facing. During the recent Board of Governors meetings, the Executive Vice President for Academic Affairs reported on the efforts geared to facilitate the recruitment process and to make it possible for the Technion to bring the best faculty.

The faculties are using wide-spread advertisement and proactive recruitment. The Technion has made several post-doctoral fellowships available to excellent candidates who will be

future recruits as faculty members. Along these lines, an agreement with MIT has been signed, in which six post-docs in engineering and sciences from Technion will be funded every year for the next ten years and will then be recruited as faculty members (if they excel in their post-doctorate studies). The Technion participated in very successful career fairs in the last four years in the Boston area, where several excellent candidates were identified. The Technion has established several interdisciplinary programs, some of them in the framework of ICore, that will be supported by VATAT. In several cases the Technion provided significant help in identifying employment alternatives for spouses.

With the help of special programs such as nanotechnology, life sciences, autonomous systems and energy programs, the number of faculty members that are recruited can be increased. The government started to implement the long-term policy that will yield significant additional resources to the Technion, thus providing an increase in the number of excellent young faculty members we recruit. In addition, we continue to develop new fund-raising programs, such as the *Career Advancement Chairs*, and have renewed the *Leaders in Science and Technology* program. This allows us to recruit additional excellent faculty members and reverse the trend of recent years, bringing back the number of faculty to around 600 over the next five years. In fact, during the last academic year we recruited more than 25 new faculty and, during the current academic year, we continued our success by recruiting a similar number without compromising the quality of the new recruits. We plan to continue recruiting 25-30 new faculty each year in the next five years.

A very bright angle in the recruitment of the past few years, this year included, is the excellent crop of brilliant young faculty members that joined us, despite most of them having attractive offers from other universities or industry abroad and in Israel. It took significant effort on behalf of the faculty deans and the Technion management, as well as substantial resources, to attract them to the Technion. *The Leaders in Science and Technology Program* initiated and supported by the late Mr. Henry Taub, and the *Shillman, Chaya, Andro Deloro, Leona Chanin, Shalon Career Advancement Chairs, the David and Inez Myers Career Development Chair in Life Science, Career Advancement Chair in Economy and Finance, Women's Division Career Advancement Chair and The Young Investigators Fund for Innovative Collaborative Multidisciplinary Biomedical Engineering Research* played an important role in making this a reality.

Our *Leaders in Science and Technology Program* and the *Career Advancement Chairs* assisted us in recruiting four to six new faculty members a year since 2002 and continue to serve as valuable instruments enabling the recruitment of outstanding young faculty members and providing them with the required support, infrastructure and equipment.

This year, two of our young faculty, Assistant Prof. Amir Yehudayoff from the Faculty of Mathematics and Assistant Prof. Daniel Podolsky from the Faculty of Physics, were awarded the prestigious national Krill Prize that is supported by the Wolf Foundation. This prize is for excellence in scientific research of young faculty before they are awarded tenure.

In addition to the young faculty that were recruited to the Technion at the start of their academic career as young professors, two senior scientists moved to the Technion and were recruited, in the framework of our mission to bring senior and established scientists in addition to new and young faculty members. Prof. Roy Kishony came from Harvard University and joined the Faculty of Biology and Prof. Steven Frankel came from Purdue University and joined the Faculty of Mechanical Engineering. An additional mid-career faculty member joining the Technion is Associate Prof. Tal Carmon who left the University of Michigan, joining the Faculty of Mechanical Engineering at the Technion.



Prof. Steven Frankel

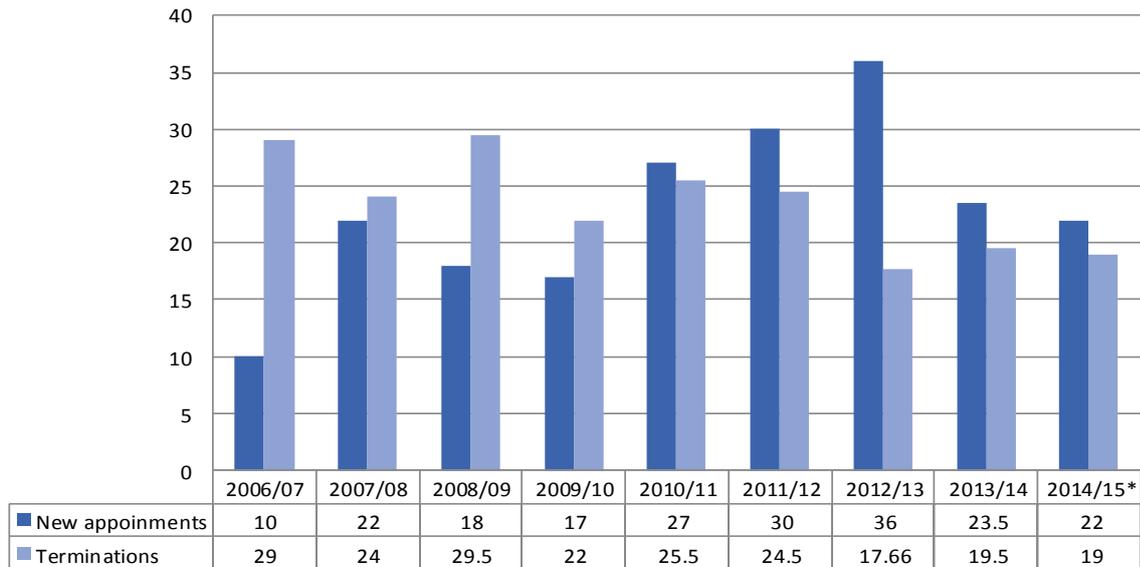


Prof. Roy Kishony



Prof. Tal Carmon

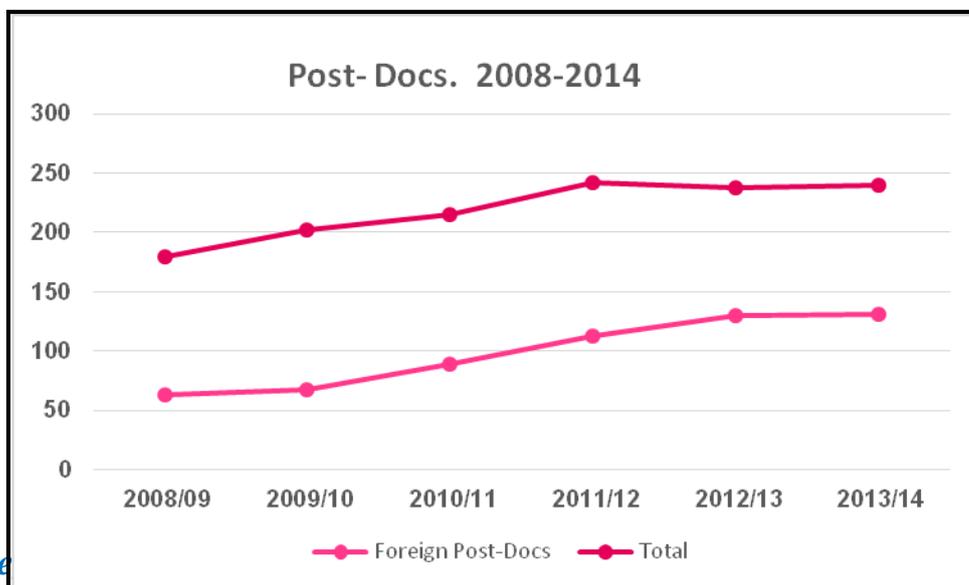
New Appointments vs. Retirements and Departures



The retirement of faculty members provides us with the opportunity to truly bring into the Technion ranks the most brilliant and innovative minds; however, we have to be in a position to be able to offer them an attractive package. The Technion is facing some tough competition both domestically and internationally in terms of faculty recruitment. In order for the most brilliant and innovative minds to join the Technion we literally have to make an offer they cannot refuse. In fact, our approach in this matter is a very hands-on one. If we find a suitable candidate for the Technion we believe that a personal approach to recruitment is warranted and are willing to travel to the candidate and persuade him or her to join the Technion. This illustrates our conviction that this should be an utmost priority of the Technion and must be pursued diligently.

Other steps we have taken to help in recruitment include making offers with higher ranks to start with, offers with built-in tenure, attractive start-up packages, establishment of laboratories prior to the arrival of new faculty members, encouraging our faculty members to be more proactive and involved in the recruiting process, allowing new recruits a reduced teaching and administrative load for the first two years, providing each new recruited faculty member with a Technion mentor, and help with the transition of new faculty members and their families – such as offering them on-campus housing (at the *Stanley Shalom Zielony Graduate Student Village*) for a certain period to facilitate and ease their transfer.

Our recruitment efforts are extremely focused and planned in terms of the disciplines for which we attempt to recruit. This priority of recruitment has to be in sync with another priority: to develop new and cutting-edge disciplines at the Technion. Our obligation is to constantly see the larger picture and steer towards our ultimate target. With this mission, we started, several years ago, an initiative to significantly increase the number and academic quality of foreign scientists that come, following their doctorate, for post-doc studies at the Technion. Indeed, the number of the post docs coming from foreign countries has almost doubled in recent years. The doubling of the number of students has corresponded with a significant increase in their scientific and academic excellence. We instituted a strategic plan to continue this trend in order to reach 500 foreign post docs by 2020.



Strate

The main task of the Strategic Projects Office, established in November 2013 and headed by Prof. Paul D. Feigin, Vice President for Strategic Projects, has been to advance the Technion's project in China: namely, the establishment of the Technion-Guangdong Institute of Technology (TGIT), in the city of Shantou, in partnership with Shantou University (STU) and the Li Ka Shing Foundation (LKSF).

The project is progressing according to a very tight time-line since we planned to submit the formal application to establish TGIT in March, that is, within six months of signing the Memorandum of Understanding with STU. The application required many documents including official certificates from Israeli authorities as well as specific plans for degree programs, student recruitment and faculty assignment and recruitment. The draft

application, for submission to the Ministry of Education (MOE) in Beijing, required coordinating the support of the Municipal Government of Shantou, of the Guangdong Provincial Government and, of course, of the LKSF which made a significant donation to the Technion.

A significant event was the November 2013 signing of a "Framework Agreement" between the Municipal Government of Shantou, STU and the Technion, in which the former guaranteed the allocation of land and capital and starting grants to establish TGIT. The signing was carried out at the opening of a festive ceremony in Shantou, in which Prof. Feigin represented the Technion and was interviewed by local press and radio.



**Signing the memorandum of understanding (MOU) for the establishment of the Technion–Guangdong Institute of Technology (TGIT) in Tel Aviv on September 29, 2013:
(l-r, sitting) Shantou University Provost Prof. Gu Peihua and Technion President Prof. Peretz Lavie;
(l-r, standing) Lu Kun, Charge d’Affaires of the Embassy of the People’s Republic of China;
Solina Chau, Director of the Li Ka Shing Foundation; Li Ka-shing, Chairman of the Li Ka Shing Foundation; Zhu Xiaodan, Governor of Guangdong; Yaakov Peri, Israel’s Minister for Science, Technology and Space; Danny Yamin, Chairman of the Technion Council**

After several months of communications and correspondence, a further meeting between Prof. Feigin, STU leaders and a representative of the LKSF was held at STU at the end of February. Following this, preliminary consultations were held with the MOE on March 3 – by the mayor and officials of Shantou, the provost and officials of STU, and a representative of the LKSF. This meeting was very encouraging, and the MOE officials made comments on our draft submission that helped us improve the formal submission. Part of the reason for the expedited submission process was the feeling by our Chinese

partners that the current MOE and Chinese political leaders are very supportive of the proposed joint venture, and we should capitalize on this support.

In order to represent the Technion in Shantou in a more continuous fashion, Dr. Moshe Marom, Israel's first Military Attaché in China, was appointed as Deputy Director of the TGIT Preparation Office in February. He will be spending most of his time in Shantou. He speaks Mandarin Chinese, and has much experience in business and government affairs in China. The office is a part of the process required for establishing TGIT according to the PRC Regulations for Chinese-Foreign Cooperatively Run Schools. These regulations govern the type of joint venture we are inaugurating. Dr. Marom will also help coordinate a whole range of Technion activities planned for STU.

Another realm of activity are the discussions within the Technion concerning the programs to be offered in TGIT during the first ten years. We are committed to opening three Technion degree programs over that period, and growing to about 1100 undergraduate students. Technion departments were approached to consider the option of offering one of their degree programs in TGIT. Executing such an option involves translating course materials into English, committing a certain number of faculty to teach TGIT cohorts in English (both while studying in Haifa and in Shantou), recruiting faculty for TGIT, and instituting a supervision scheme to make sure that Technion standards are maintained in TGIT. Various financial and research oriented incentives have been proposed, both at the departmental and the individual level. The first TGIT degree program will be environmental engineering, based on the successful English language program currently offered in Haifa in Technion's International School.

We are also promoting other dimensions of engagement between Technion and STU in order to help establish a wide basis for cooperation between Shantou and Haifa. In the area of research cooperation we have identified the area of environmental health and have identified research partners from the STU Colleges of Engineering, Science and Medicine in this field. Another opportunity is in cancer research – the STU Medical College and associated tumor hospital have some very interesting cancer research projects. In the area of innovation and entrepreneurship (of great interest to our Chinese partners), we have organized a one-week workshop to be given to STU students by Professor Emeritus Shlomo Maital. During that same week, Nobel Laureate and Distinguished Professor Dan

Shechtman visited STU, addressed both STU students as well as high school pupils in surrounding schools. The latter activity will also help promote TGIT among future cohorts of university students.

The major challenge before us is recruiting Technion quality faculty to TGIT. We have started to identify appropriate finishing doctoral students who will be encouraged to come to the Technion for a post-doctoral fellowship on their way to achieving a TGIT tenure-track appointment. Other actions include identifying Chinese academics currently in the West who wish to return to China, to a top class university bearing the Technion's name and reputation.

A second challenge is recruiting excellent students to TGIT. Given our experience so far at the Technion International School, we are confident that we will be able to attract excellent Chinese students – even if the tuition is relatively high compared to Chinese public universities – because of the opportunity for the student to obtain a fully accredited Technion degree while studying in China.

There is no doubt that this project is one of the most challenging in Technion's recent history – yet the opportunities for the Technion, including its faculty, and for the State of Israel, both politically and economically, are virtually unlimited.

PRIZES & HONORS

We are proud of our outstanding faculty members and the many prizes and honors which are bestowed upon them. Here is a selected list:

Distinguished Prof. Mordechai (Moti) Segev, Faculty of Physics, was awarded the prestigious 2014 Israel Prize for Research in Chemistry and in Physics. In addition, he received the American Physical Society 2014 Arthur L Schawlow Prize in Laser Science.

Assist. Prof. Keren Censor-Hillel, Faculty of Computer Science; **Assist. Prof. Meytal Landau**, Faculty of Biology; **Assist. Prof. Netanel Lindner**, Faculty of Physics and **Assist. Prof. Avi Schroder**, Faculty of Chemical Engineering, were recipients of the Israel Council for Higher Education Allon Fellowships for 2013.

Distinguished Prof. Dan Shechtman, Faculty of Materials Science and Engineering, was elected a member of the American Academy of Arts and Sciences for 2014.

Assistant Prof. Amir Yehudayoff, Faculty of Mathematics and **Assistant Prof. Daniel Podolsky**, Faculty of Physics, were awarded the Wolf Foundation's prestigious national Krill Prize for excellence in scientific research of young faculty before they are awarded tenure.

The **Yanai Prize** for Excellence in Academic Education was awarded to the **Faculty of Mathematics** and to ten Technion faculty members:

Associate Prof. Moshe Baruch, Faculty of Mathematics

Assistant Prof. Dafna Fisher-Gewirtzman, Faculty of Architecture and Town Planning

Prof. Moris Eisen, Faculty of Chemistry

Associate Prof. Alon Wolf, Faculty of Mechanical Engineering

Prof. Idit Keidar, Faculty of Electrical Engineering

Associate Prof. Oren Kurland, Faculty of Industrial Engineering and Management

Assistant Prof. Liron Yedidsion, Faculty of Industrial Engineering and Management

Associate Prof. Havazelet Bianco-Peled, Faculty of Chemical Engineering

Associate Prof. Amir Shpilka, Faculty of Computer Sciences

Associate Prof. Uri Shavit, Faculty of Civil and Environmental Engineering

Professor Ilan Marek, Faculty of Chemistry, received the Moore Distinguished Scholar Appointment from the California Institute of Technology.

Prof. Hossam Haick, Faculty of Chemical Engineering, received the Israel Chemical Society, 2013 Tenne Family Prize in memory of Lea Tenne for Nanoscale Sciences.

Prof. Emeritus Abraham Alexandrovitz, Faculty of Electrical Engineering, was awarded the Ministry of National Infrastructure Energy and Water, Lifetime Achievement Award.

Prof. Emeritus Jacob Bear, Faculty of Civil and Environmental Engineering, became an Israel Association of Water Resources, 2014 Honorary Member.

Prof. Freddy Bruckstein, Faculty of Computer Science, was named a 2014 Fellow of the Society for Industrial and Applied Mathematics (SIAM), and received their 2014 SIAG/Imaging Science Prize.

Distinguished Prof. Aaron Ciechanover, Faculty of Medicine, became a Foreign Member of the Chinese Academy of Science.

Prof. Michael Elad, Faculty of Computer Science, was awarded the Society for Industrial and Applied Mathematics (SIAM), 2014 SIAG/Imaging Science Prize.

Prof. Yonina Eldar, Faculty of Electrical Engineering became a Fellow of the IEEE (Institute of Electrical and Electronic Engineers) and received the IEEE Signal Processing Society Technical Achievement Award and the 2014 IEEE/AESS Fred Nathanson Memorial Radar Award.

Prof. Emeritus Alon Gany, Faculty of Aerospace Engineering, became a Foreign Associate of the U.S. National Academy of Engineering.

Prof. Zeev Gross, Schulich Faculty of Chemistry, was awarded the Israel Chemistry Society 2013 Prize of Excellence.

Prof. Orna Grumberg, Faculty of Computer Science, became a Member of the Academia Europaea.

Prof. Emeritus Josef Hagin, Faculty of Civil and Environmental Engineering, was named a 2013 Citizen of Merit by the Municipality of Haifa

Prof. Roy Kishony, Faculty of Biology, received the 2013 Sanofi – Institut Pasteur Award.

Prof. Efraim Lev, Department of Humanities and Arts, was awarded the American Institute of the History of Pharmacy, George Urdang Medal.

Distinguished Prof. Shlomo Shamai Shitz, Faculty of Electrical Engineering, was awarded the Rothschild Foundation, 2014 Rothschild Prize in Mathematics/Computer Sciences and Engineering.

Prof. Emeritus Uri Shamir, Faculty of Civil and Environmental Engineering, received the Israeli Water Association, 2013 Lifetime Achievement Award.

Distinguished Prof. Dan Shechtman, Faculty of Materials Science and Engineering, became a member of the Republic of France, Legion d'Honneur, and was named a 2014 Fellow of the American Academy of Arts and Sciences.

Prof. Moshe Shoham, Faculty of Mechanical Engineering, became a Foreign Associate of the U.S. National Academy of Engineering and received the ASME (American Society of Mechanical Engineering), 2013 Thomas A. Edison Patent Award.

Assist. Prof. Mark Silberstein, Faculty of Electrical Engineering, received the Yahoo! Labs, 2013 Yahoo ACE (Academic Career Enhancement) Award.

Assoc. Prof. Revital (Tali) Tal, Department of Education in Science and Technology was elected to the Board of Directors of the National Association for Research in Science Teaching (NARST).

Prof. David Yankelevsky, Faculty of Civil and Environmental Engineering, received the Israel Association for Construction and Infrastructure Engineers, Life Achievement Award.

Prof. Emeritus Moussa Youdim, Rappaport Faculty of Medicine, became an Israel Society for Neuroscience (ISFN) 2013 Honorary Member.

Distinguished Prof. Emeritus Daniel Weihs, Faculty of Aerospace Engineering became a member of the Israel Academy of Sciences and Humanities.



Prof. Segev Receiving Israel Prize in May 2014

Research at the Technion

Funded Research

Research contracts signed in 2013 by the Research Authority amounted to \$83.8 million. In the last two years the Technion's research contracts totaled: \$86.9 million in 2011 and \$71.4 million in 2012.

Activities to encourage the submittal of research proposals to competitive scientific funds continue. In the past few years there has been an increase in submissions, grants and budgeting from the three main funds (ISF-Israel Science Foundation, BSF-Bi-national Science Foundation and GIF- German Israeli Foundation). From the ISF we received a total sum of approximately \$18 million in grants in the past year.

The European Union's Seventh Framework Program for Research and Development, launched in January 2007, approved 232 projects as of March 2014, with funding amounting to €97.1 million. Of this amount, in 2013 there were awards to 14 researchers of approximately €4 million (together) in joint technological-scientific projects with industry; one researcher was awarded an ERC grant for mid-level researchers amounting to €1.5 million; four received ERC grants for senior researchers amounting to €8.3 million; and 14 researchers received Marie Curie Mobility Research Grants for a total of €1.75 million. Additionally, at the Technion, another €516,620 was approved for funding for projects within the supplemental and academic frameworks of the European Union.

Since 2002, when the liaison office for promoting projects in the Office of the Chief Scientist of the Ministry of Economics and Planning began functioning, the research budgets from these sources have increased four-fold. In 2013, we received research grants amounting to NIS 41 million as compared to NIS 39 million in 2012. These amounts include 26 projects in the "Kamin" program that received NIS 16 million. From October 2012 to September 2013, the total amount of contracts for research and development activities funded directly from industrial, commercial and business sources in the framework of the Research Authority reached \$6.4 million.

External Aid for Research

In addition to the external funding mentioned above, consisting of research contracts signed within the framework of the Research Authority (as described above), the Technion received contributions from donors (for specific individual researchers or for the creation of research infrastructures) for a total amount of approximately \$15.98 million, and assistance for purchasing equipment for new faculty members in the amount of \$10.6 million. In addition, we received assistance from the government for programs for new immigrant absorption (Shapiro, Giladi, KAMA – program for Olim Scientists) totaling \$4.48 million.

Internal Technion Financing

Over the past year we allocated close to \$1.13 million for the encouragement of faculty research activities (including internal grants, bonuses for researchers submitting proposals to competitive funds and the promotion of research among new faculty). This amount also includes \$260,000 in grants to researchers who submitted outstanding proposals to the ERC which were not approved. The sum of \$1 million was granted by means of academic chairs and approximately \$27 million was allocated to finance fellowships for graduate students engaged in research. The total of investments in research, including all sources: external funding, contributions from donors, external aid, internal funds and graduate fellowships amounts to \$144 million.

International and Industrial Collaboration

The Singapore Project – In 2009, a research cooperation agreement was signed with the Singapore National Research Foundation (NRF), the Singapore Ministry of Education and two Singapore universities (Nanyang Technical University and National University of Singapore) for \$20 million Singapore (\$15 million US). Research activity began in October 2009, in the field of tissue engineering. The project continues to operate to the satisfaction of both parties and a process of technology transfer has been initiated as well. In the summer of 2013 an international committee carried out an evaluation of the Singapore project. It was recommended to continue the project for five additional years.

The Umbrella Program – Aachen University, the Julich Research Institute and the Technion

The annual Umbrella Symposium was held in the Julich Research Center in February 2013 on the topic of "Nanoscale Physics and Chemistry as Drivers for Future Technological Developments". After the conference a number of beginning research grants were awarded to research teams from the three participating universities. This year the conference, held at Aachen University in March 2014, was on the subject of: "Biomaterials and Biohybrids from Basic Research to Medical Application".

Northeastern University Research Collaboration – The collaboration began in 2010; it continues this year in the field of supply chains.

The Technion Center of Excellence in Exposure Science and Environmental Health

At the end of 2010, the Technion was awarded \$1 million for five years in funding from the Foundation for Environmental Health for establishing a Center of Excellence: "From Airborne Stressors through Risk Assessment to Health Outcomes". This is a joint center for researchers from various Technion faculties run by the Faculty of Civil and Environmental Engineering and the Faculty of Medicine. The center's activities in the past three years included preparing a five-year research plan and leading research in four areas: exposure to air pollution from traffic in the urban environment, the effect of air pollution from agricultural sources on the population of neighboring communities, air pollution within structures and developing systems for remote detection of air pollutants and for analyzing data bases from monitoring systems - in order to evaluate the level of exposure of the public to air-borne pollutants.

The center directs research in a wide variety of subjects, among them wide-spread environmental detection of air pollution, the use of satellite sensory detection in health and environment, developing models for the effect of traffic on air quality in the city, developing methods for evaluating the effects of exposure to residue from pest-control substances in agricultural sprays, developing a national data base of concentrations of air pollutants and developing methods for evaluating the effects of exposure to traffic using video cameras.

The center consists of five Israeli post-doctoral researchers, approximately ten graduate students and a number of faculty members. In the three years in which the center has functioned, the researchers have published jointly about thirty papers in leading academic journals (peer-reviewed), and were active participants in approximately 50 national and international conferences.

Significant Agreements

- In the framework of the Center for Research in Electronic Commerce, with the funding and cooperation of Microsoft and the Faculty of Industrial Engineering and Management, ten additional research grants were awarded this year (in addition to ten last year).
- A wide-ranging research center in cooperation with Intel, the Hebrew University and the Technion was established. The center began its activities during the second half of 2012. The activities in the center are mainly conducted by faculty members from the Faculty of Electrical Engineering and the Faculty of Computer Science. Its topic is computational intelligence and within this framework, until now, ten research grants have been awarded.
- The Technion was awarded two Second Wave I-Core Centers of Excellence:
 - Light and Matter: non-linear optics and quantum optics spectroscopy and imaging, headed by Distinguished Professor Mordechai Segev from the Faculty of Physics and the Solid State Institute.
 - Physics and Living Systems: from the molecular level to the single cell, headed by Professor Amit Meller from the Faculty of Biomedical Engineering.
- In eight additional I-Core centers there is significant Technion researchers' participation. The centers located at the Technion began their research functioning this year.
- There is continued intensive activity in the building of three nano-satellites within the framework of the Asher Space Research Institute (Samson Project)
- The Technion conducted a wide-ranging study into the course of the development of the current and future general Technion research programs. In March 2014, the Technion Senate is slated to receive a proposal to constitute the activities of general Technion research programs into research units.

- The Minerva Fund – Prof. Yishayahu Levy and Dr. Benny Chokoral of the Faculty of Aerospace Engineering were awarded a Minerva Center for their submission on the subject of "Advanced Micro Gas Turbine Technologies towards Distributed Power". This is the first time since the Minerva Centers were reorganized in their new format, in 2010, that the Technion has merited a Minerva Center. The center was one of two centers which the Minerva Fund chose this year from amongst the 56 suggestions submitted by all the universities in Israel.
- The Focal Technology Area (FTA) Program, with a total investment of \$11 million (of which 60 percent is Technion funds), initiated its activities within the framework of the RBNI on the subject of: "Nanophotonics Research Fund for Advanced Light Detection and Sensing".
- A. focused and vigorous drive has been launched to receive accreditation from the Association for the Assessment and Accreditation of Laboratory Animal Care International (AAALAC) for the Pre-clinical Research Authority at the Technion. In the near future this will be necessary for research proposals in many of the fields of life sciences.
- The Technion Center for Computer Engineering (TCE) is functioning dynamically, including the organizing of conferences and seminars on timely subjects. A legal document has been drawn up to formalize the functioning of a number of companies and Technion researchers within the framework of TCE, particularly within the realm of intellectual property rights. Approximately 15 companies and tens of faculty members have already signed the document. This will allow full and open cooperation within the framework of the center.

Research Institutes and Centers

- In the framework of the new Center for Electronic Commerce of the Faculty of Industrial Engineering and Management with financing from, and in cooperation with the Microsoft Company, ten research grants were actuated.
- The construction of three nano-satellites (the Samson Project) by the Asher Space Research Institute is continuing at a vigorous pace.
- An inter-university center for research of the Mediterranean Sea was established with government funding at the initiative of Haifa University and the Technion.

The Technion is currently conducting a thorough review of the direction in which the existing and future general Technion programs are developing.

The Nancy and Stephen Grand Technion Energy Program - GTEP

In 2007, The Nancy and Stephen Grand Technion Energy Program (GTEP) was established to respond to a global energy challenge and position the Technion as a leader in this field. The GTEP mission is to establish the infrastructure needed to facilitate world-class research, application and education in the fields of energy science, technology and engineering.

The year 2013 has been an exciting one in which GTEP has been developing and manifesting its foundational mission. This has included a widening and deepening of research fields, and the initiation of collaborative research projects with other academic institutes. This year also witnessed an expansion of the graduate studies program with excellent new students; consolidation of the Natural Gas and Petroleum Engineering Graduate Study Program; a venture into outreach activities to raise awareness on energy issues; recruitment of top new faculty; a flow of international workshops and symposia; and an accelerated establishment of new laboratories.

The GTEP's research areas are structured into four evolving areas. These structures are responsive to new priorities based on need and research opportunity. Firstly, it is active in alternative fuels, which includes hydrogen technologies, non-carbon fuels and bio-energy generation. This area is expanding, with discoveries impacting areas of basic and applied energy science. Secondly, GTEP is engaged in the field of energy storage and conversion, including energy storage, fuel cells, and recently, also optics and light manipulation. Thirdly, GTEP scientists are at the frontiers of research into renewable energy sources - including photovoltaic energy generation, wind power and solar thermal energy. The fourth area of focus is in energy conservation, which includes energy-saving technologies and advanced combustion systems.

Pledges of over \$44 million have been secured to date. Finding new arenas of research is the core of GTEP activity and therefore GTEP is trying to leverage its funds and is seeking constant new sources of support

Central Energy Facilities

GTEP continues to prioritize the establishment and expansion of its central interdisciplinary research laboratories, thus strengthening the Technion's energy research capabilities.

A significant advantage to GTEP and Technion is found in the acquisition of unique equipment which does not exist elsewhere in Israel, both for central and individual laboratories.

The variety of laboratories and the state-of-the-art equipment serves researchers and students from the Technion. Collaboration with industry is also flourishing and developing among some of the laboratories.

The active GTEP laboratories are:

- The Ed Satell Family Nitrogen/Hydrogen Alternative Fuels Research Laboratory (NHAF)
- The Photovoltaics Central Laboratories (a joint project of GTEP and RBNI)
- The Leona M. and Harry B. Helmsley Charitable Trust Energy Storage Complex
- The Hydrogen Technologies Research Laboratory (in a temporary location)

GTEP is in the final stage of approving the new floor on the roof of the Wolfson Chemical Engineering Building that will host the hydrogen technology and fuel cells central laboratories, as well as GTEP headquarters. The new center will house offices for graduate students and visiting scientists and a seminar room.

A temperature-controlled greenhouse for growing transgenic plants is in construction, and research has just commenced.

A bio-energy central laboratory in the Faculty of Biotechnology is still in the planning stage.

Energy Research - Internal Seed Funding for Research

This is the third year that GTEP has solicited proposals for multidisciplinary research. The funding is for joint proposals that demonstrate collaboration between two or more groups at Technion.

In 2013, the program included an allocation of \$150,000 to fund three research projects in the field of energy conservation.

Two promising research projects that received funding in the framework of 2011-2012, were granted additional support of \$30,000 for a second year of activity.

A new GTEP seed funding in basic research was issued at the end of 2013 and the proposals (as for February 2014) are still under the review of an independent committee.

Another ongoing joint seed-funding program is a joint Technion – Ben-Gurion University of the Negev call for proposals for collaborative research in the field of renewable energy.

This year, three new joint research projects were selected for funding.

National Research Collaborations

Activity within the national research projects: Israel National Research for Electrochemical Propulsion (INREP) and the Solar Fuels I-CORE (Israeli Centers of Research Excellence) is progressing, bringing strong national collaborations in energy-related research between top Israeli universities. These grants are matched by other GTEP resources.

Another national collaboration project in which GTEP has expanded its scope is: "Solar Energy Conversion - New Directions", which is supported by The Leona M. and Harry B. Helmsley Charitable Trust. The project is mobilizing scientists with expertise ranging from chemical, electrical and materials engineering, as well as biology, chemistry and biotechnology, to collaborate nationally in advancing the ability to harvest solar energy. Combining strengths from the Technion and the Weizmann Institute of Science, the support for this project is affirming GTEP's impact in energy research.

External Funded Research

During the academic year 2013, GTEP researchers succeeded in leveraging their research funds and received over \$6 million in external, competitive, academic research grants and industrial support for research. This external funding has been possible thanks to GTEP's infrastructure and equipment availability on campus.

Leaders in Energy Science Program

GTEP continues its effort to attract excellent new faculty in energy research and supports the following new faculty at the Technion during the year 2013:

Assistant Professor **Oz Gazit**, Faculty of Chemical Engineering.

Assistant Professor **Maytal Caspary Toroker**, Faculty of Materials Science and Engineering.

Graduate Programs

The Energy Interdisciplinary Graduate Studies Program

GTEP's unique Graduate Program in Energy Studies continues to expand and attract students from Technion and other academic institutions. Only excellent students are accepted to the program, and the average grade point average of the entering students is 92.

During 2013, GTEP had 37 registered students in the energy graduate program. The first M.Sc. student of the graduate program graduated in May 2013. Seven M.Sc. students started their studies in October 2013. Almost a third of the students are Ph.D. students.

In the future, the plan is to have around 50 graduate students registered in the GTEP energy graduate program.

This year, seven M.Sc. students won scholarships of excellence from The Irwin and Joan Jacobs Graduate School Dean; and two Ph.D. students won scholarships from the Ministry of Science, Technology and Space. Two M.Sc. students won the Leonard and Diane Sherman Interdisciplinary Fellowships for Technion Graduate Students scholarship; one Ph.D. student won the Cyber Scholarship for the second time in a row, one M.Sc. student received a VATAT Scholarship, one M.Sc. student won the Jacobs Scholarship, one Ph.D. student received an Excellence Scholarship Faculty Funding; and finally a Ph.D. student received the award for the best lecture at the 2013 ISRAEL ELECTROCHEMISTRY

conference held at Bar-Ilan University. The above scholarships and awards are a testament to the exceptional quality of students within GTEP's unique graduate program.

The Natural Gas and Petroleum Engineering Graduate Program was launched in December 2011 with 20 elite students who are back on the employment market. The second round of the program which commenced on March 2013 admitted 22 students out of over 40 applications. In October 2014, we plan to initiate the third generation of this program.

Outreach Activity

As part of its vision, GTEP is supporting the new generation of researchers. GTEP supports energy-related activities within the Technion in order to promote awareness of energy research.

During the year 2013, GTEP supported two outreach projects:

Support of Youth Energy Activity through the Technion Center for Pre-University Education

As part of developing the next generation vision, GTEP graduate students, under the supervision of GTEP faculty, are mentoring high-school students within this program.

There is also an ongoing activity in the formal and informal mentoring of excellent high-school students within GTEP research laboratories.

The Technion Formula Team

GTEP is co-sponsoring the Technion Formula Team which designed and built a car which took part in a global competition in September 2013. The Formula students were accompanied by Prof. Gideon Grader, Director of the Grand Technion Energy Program at the competition in Italy. Two of the formula students were exposed to the GTEP graduate program and decided to join it.

Seminars and Visits

Seminars by leading international guests and workshops are a very effective way to expand and promote energy research in promising new arenas. During the year 2013, GTEP fully

supported 12 seminars and hosted 38 visits at Technion. GTEP had provided partial support to several more seminars which were energy related.

Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering

Among the many forces affecting the landscape of Israeli higher education today, the rise and future of interdisciplinary research has provoked many discussions. Interdisciplinary education requires a careful balance between the depth of knowledge needed to understand a problem from one discipline and the breadth of knowledge needed across several disciplines to understand that problem in all its complexity. The groundwork for this at the Technion, in the area of life sciences, has been laid at the Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering. The Center was founded in 2006 following a monumental gift by Lorry I. Lokey. The center was conceived by Technion Nobel Prize laureate Prof. Aaron Ciechanover and its mode of operation was outlined in a detailed agreement between the LS&E Center and Technion's President, Prof. Apeloig. In February 2013 Prof. Yoram Reiter took up his appointment as managing director of the Lokey center.

The center's vision is to establish, foster, and enhance new interdisciplinary research activities with the goal of minimizing institutional barriers to collaborative activity of faculty across the campus. The scientific focus in the center is aimed at interdisciplinary research in the areas of: tissue regeneration and stem cells, network systems biology, biomedical optics and imaging, developmental gene networks, nanotechnology, and bioinformatics. During 2013, two new research areas were introduced: metabolomics and microbial evolution.

This year there were significant advances in the development of the infrastructure facilities at the center that are essential for competing at the forefront of science – these include the microscopy and advanced imaging unit, the TGC - Technion Genome Center, the flow-cytometry unit, the BKU- bioinformatics knowledge unit and the TCSB - Technion Center for Structural Biology. The year 2013 has been very fruitful for the TCSB with significant progress made both in the final establishment of its infrastructure and in the initiation of research activity which yielded outstanding data and a few novel crystals structures of proteins studied at the Technion. The quality and number of scientific papers published during the last years have demonstrated how the new technologies can help the center to extend its mission, and enrich and strengthen its scientific abilities.

The center's management understands the need for engineers and for technological advances and promises to provide Technion students with an exciting education that will prepare them for emerging technologies and that will make them adaptable and flexible for the rapidly changing world.

This year the center moved forward with its plans to establish a graduate education program. The aim is to establish a unique program in quantitative life sciences that will bridge the exact sciences with engineers and scientists to yield a new breed of students/scientists with interdisciplinary capabilities, views and thinking in modern integrative life sciences. Currently it is in the process of implementation of ideas and directions for courses with approaches to developing both the breadth and the depth of knowledge that students will need in this emerging field of quantitative life sciences.

The center invests not only in the purchasing of highly sophisticated instruments, but also in the recruitment of a professionally trained research team. During the past year the center's team has grown to 17 people. The staff is highly trained and experienced and is dedicated to delivering necessary support and knowledge. During the past year they conducted seminars and workshops in various research areas as part of their mission.

Part of the Lokey Center's activities are coordinated with the Russell Berrie Nanotechnology Institute (RBNI), trying to provide general guidelines for maximizing the impact of large-scale equipment on campus and to provide centers of expertise. This year a new series of monthly joint lectures was launched on topics related to the interface between life science and engineering. These lectures aim to expose students to interdisciplinary research on campus.

Russell Berrie Nanotechnology Institute (RBNI)

RBNI is a joint endeavor of the Russell Berrie Foundation, the Government of Israel and the Technion.

Over 150 faculty members and 250 graduate students and postdoctoral fellows from 14 faculties conduct state-of-the-art research in nanoelectronics, nanophotonics, nanomaterials, nanomechanics and the interface between these fields and the life sciences.

RBNI is in the last year of its second phase (2010-2014). It is continuing most of the activities established in the first phase, while focusing in parallel on the development and management of two additional major research areas: the NanoMed Program, jointly established with the Lorry I. Lokey Center for Life Science and Engineering (\$5 million over seven years donated by an anonymous foundation), and the "Nano Photonics for Advanced Light Detection Imaging, Inspection, Smart Sensors and Energy Conversion" Focal Technological Area (FTA) which was selected for funding by the Government of Israel. The funding by the government will total \$4.4 million over five years, matched by \$6.6 million funding by the Technion. This project is led by Prof. Meir Orenstein, of the Faculty of Electrical Engineering.

Taking into consideration that no funds have been transferred by the government for years 2012-2014 for RBNI activities other than the FTA, a limited budget dictated a leaner plan for the last remaining year.

Towards phase III: Technion management held a full day symposium in March 2013 to consider RBNI future directions moving forward into the third phase. General directions where RBNI will emphasize activities were defined: nano devices, advanced imaging and nanomed, which will focus in turn on four main tracks: synthetic biology, imaging, sensors and controlled drug delivery.

An initial plan including a proposed five-year budget was submitted to Technion management and is in the last stages of finalization.

RBNI's Main Areas of Activities in 2013:

Vibrant multidisciplinary nano community - joint seminars, Winter Schools (The 4th Winter School was held in February 2014), Fall Symposia (the 3rd one was held in December 2012), seven monthly RBNI seminars and various research funding plans are offered annually to enhance multidisciplinary nano activity in campus.

Recruitment - In the first four years of phase II, eleven faculty members were recruited (three of them were recruited by the NanoMed project and were funded by the NanoMed budget). Due to lack of funds, RBNI did not contribute this year to the start-up package of any new faculty.

Research - Eight new Nevet research projects, with emphasis on multidisciplinary collaborations within campus and with Ben-Gurion University were selected for funding in 2013. Since RBNI's inauguration, a total of 99 "Nebet" research grants were awarded for multidisciplinary collaboration within Technion and for collaborations with Israeli and foreign universities and institutes.

Collaborations with industry – We continued to develop mechanisms for technology transfer. In 2013, there were 19 joint projects with industry and 23 patents applied for registration. 53 industrial companies used the nano related infrastructure centers on campus. Income from these companies has increased this year by 60 percent from \$440,000 in 2012 to \$735,000 this year, mainly due to the genome center in the Life Science and Engineering Infrastructure Unit (joint center established by RBNI and LS&E) which is unique in Israel and has been increasing its volume of services and income over the past few years.

Forming ties with other academic and research institutions - This year we focused on enhancing the international scope of RBNI by means of many international programs, including joint conferences and joint research projects and grants, with major nanoscience centers in Europe, North America and Asia such as Technical University of Berlin, Würzburg University, Aachen University, Aarhus University, University of California in Berkeley, University of California in San Diego, University of Calgary, Korea Advanced Institute of Science and Technology and more.

Extensive upgrade of infrastructure - Overall, RBNI invested so far in phase II (2010-2013) \$6 million for infrastructure equipment upgrades, researcher labs and start-up funds for new faculty member labs. Between 2010-2013, despite the limited budget, 25 researcher's laboratories were upgraded.

RBNI continues to support 12 infrastructure centers on campus, serving Israeli researchers in academia and industry. In 2013, subsidies from RBNI (against equal matching) for user fees at these centers were received by 112 Technion research groups. These funds go towards the maintenance costs of the various infrastructure centers on campus. The equipment serves all Israeli researchers.

The unique Norman Seiden Multidisciplinary Graduate Program in Nanoscience and Nanotechnology - The Russell Berrie Foundation approved a seven-year donation to support the Norman Seiden Multidisciplinary Graduate Program in Nanoscience and Nanotechnology and its related activities. This pledged gift of \$3.71 million, to end in December 2016, is matched by the Technion at a ratio of 2:1.

The program has grown from six students in the first year to 80 students in the October 2013 semester; 36 students are studying towards a M.Sc. degree, and 44 towards a Ph.D. degree. Thirty-nine students have graduated the M.Sc. track (out of which 19 students continued on to the Ph.D. track within the program) and 11 students have graduated the Ph.D. track. Of the program graduates, 40 percent reported that they work in Israeli industry and 60 percent continued on to higher degrees or to post-doctoral studies.



Emerson Building

Collaboration with the LS&E in the joint NanoMed Program. So far three faculty members have been fully supported, and three more have received partial support in the joint NanoMed Program. In addition, NanoMed has invested in infrastructure equipment, start-up funds for faculty members' laboratories and laboratory upgrades, has subsidized user fees in the Infrastructure Centers, funded joint Nevet Grants and a joint seminar series that began this year.

The Technion Autonomous Systems Program (TASP)

The Technion Autonomous Systems program was launched in 2007, as a result of a collaboration between the deans of the Faculties of Aerospace Engineering and Computer Science. The program was designed to comprise five centers:

Aerial Vehicles and Satellites

Marine Systems

Ground Systems

Medical Systems

Autonomous Agents and Cyber Issues.

Over 60 faculty members, from nine departments are registered members in the program.

The first center to be funded was the Goldstein Aerial and Satellite Systems Center, which started in 2008 as a 5-year program. A total of 26 faculty members performed 43 research projects within its framework. In the Land and Sea Centers, 17 faculty members are currently active in 12 projects.

In addition, a graduate program was established, with more than 40 students registered at present for advanced degrees.

While most initial funding came from donations, we have signed agreements with the Israeli Ministry of Defense and Israel Aircraft Industries for support, at the present at a level of \$400,000 annually, on a matching funds basis, and negotiations are in place for three further agreements with industrial bodies.

The Technion Computer Engineering Center (TCE)

The Technion Computer Engineering Center was inaugurated during the first annual TCE conference in June 2011. It is now open for new members and more than 50 faculty members of the Technion and other universities have joined TCE.

Significant efforts have been invested in reaching out to leading companies in Israel, and to date over 15 companies are industrial members of TCE, among them Intel, Motorola, Check Point, Rafael and more. Research and development staff from these companies may bring up new research topics and they enjoy the wealth of knowledge available at the Technion. TCE has named these researchers 'agents of knowledge' who can benefit both industry and academia and on whose collaboration the center relies.

In May 2014, TCE is slated to hold its 4th international conference. This year the conference focuses on Trends in Signal and Image Processing and will feature speakers in these areas from international and Israeli universities, as well as industry representatives. This year graduate students awards will be given by IBM and Philips to leading students with research topics relevant to the conference. The conference won a grant from the Israel Science Foundation. Last year's conference on Machine Learning and Big Data was a major success and drew over 900 participants, a record number for an academic conference at Technion.

During 2014, TCE continued its goal of knowledge dissemination with numerous workshops and talks. In December 2013, TCE featured a workshop titled "Social-Mobile-Cloud Meets Medicine @ Technion", a joint conference with the faculty of medicine and JTCII from NY. Physicians and researchers, alongside regulators and venture capitalists discussed the changing face of medicine, given the abundance of information now at one's fingertips. Young and upcoming entrepreneurs presented their work in blitz sessions. March 2014 brought a workshop titled "Big Days on Big Data", in which topics such as big data, analytics, social big data, and event processing were discussed. Companies presented Big Data in the Making in a special half-day preceding the conference. Some conferences have turned into an annual tradition and are back this year, such as Cyber Day in April and the Summer School on Computer Security in September.

The Henry Taub distinguished visitor program continues this year with eminent speakers such as Gernot Heiser from the University of New South Wales in Australia and Gustavo Alonso from ETH in Switzerland who visited TCE and met with students and faculty.

TCE supported ISCA 2013, the 40th International Conference on Computer Architecture, which was held in Israel for the first time. Following ISCA, prominent conference participants visited the Technion for a day, each gave a talk on the future of computer architecture and later they met selected graduate students for a joint brainstorming session.

The Samuel Neaman Institute (SNI)

SNI - Samuel Neaman Institute is a leading research institute in Israel that identifies, formulates, and analyzes the major policy issues that are important to Israel's national strength, in order to stimulate public debate, and to promote and assist in the decision-making process and with the adoption of these decisions.

The institute focuses primarily on formulating a national policy on matters of science and technology, industry, general and higher education, physical infrastructure, environment, energy, and other areas of national importance.

In 2013, the subjects covered and studies conducted by the institute researchers were varied and encompassed the different groups of Israeli society, from industrial excellence through energy and environment-related matters, up to the integration of the ultra-Orthodox sector in the economy.

The studies conducted at the institute are derivatives of its vision and strategy for Israel. Among these, the recently published research by the Industrial Excellence Center, aimed at deepening the understanding of the ecosystem of the Israeli high-tech industry and attempting to maintain its innovativeness by promoting national policy on industrial subjects, is worth mentioning.

Under the research group of Science, Technology, Industry, Economy and Human Capital, deserving of special attention are the studies comparing indices for science, technology and innovation in Israel with international indices, evaluating the effect of the space industry on the Israeli economy, Israel's innovation system and evaluation of the Magnetron program.

The research group of General and Higher Education dealt with unique aspects in Technion's development and academic freedom in Israeli universities. Another group examined the accomplishments and contributions made by immigrant scientists employed by the KAMEA program of the Ministry of Absorption in the Israeli academic world.

The Environmental Protection research group dealt with issues of hazardous household chemicals and hazardous waste, policy and procedures recommendations for implementation in Israel and voluntary greenhouse gas registration and reporting.

SNI has also established and maintains the Energy and Water Forums. The Energy Forum is considered a professional platform in the field of energy in Israel and includes meetings, symposiums and discussions that encourage the promotion of projects in the field of renewable energy and energy conservation. The Water Forum was established by SNI in cooperation with the Israel Water Authority and the Grand Water Research Institute at the Technion. It serves as a platform for discussing and analyzing key issues in order to contribute to the formulation of position papers on a variety of topics in the field of strategy and policy.

Outstanding Research and Scientific Achievements in the Past Year

An Airborne Virtual Periscope - Associate Professor **Yoav Y. Schechner**, of the Technion Department of Electrical Engineering, and colleagues, developed the virtual periscope called “Stella Maris” (Stellar Marine Refractive Imaging Sensor). The heart of the underwater imaging system is a camera, a pinhole array to admit light (a thin metal sheet with precise, laser-cut holes), a glass diffuser, and mirrors. Sunrays are projected through the pinholes to the diffuser, which is imaged by the camera, beside the distorted object of interest. The latter is then corrected for distortion. The unique technology gets around the inevitable distortion caused by the water-surface waves when using a submerged camera. When all of the components work together, the Stella Maris system acts as both a wave sensor to estimate the water surface, and a viewing system to see the above-surface image of interest through a computerized, “reconstructed” surface.

According to the developers, the virtual periscope may have potential uses in addition to submarines; when submerged on the sea floor, Stella Maris could be useful in marine biology research for viewing and imaging both beneath and above the waves simultaneously. Stella Maris could, for example, monitor the habits of seabirds as they fly, then as they plunge into water and capture prey. Schechner says that while the system requires sunlight, they are currently working on a way to gather enough light from moonlight or starlight to be able to use the system at night. Also contributing to this research were graduate student **Marina Alterman** and former graduate student **Dr. Yohay Swirski** (who is now working in industry). The research was conducted in Prof. Schechner’s Hybrid Imaging Lab in the Technion Department of Electrical Engineering.

Students Reveal Loophole in DNS Security - Technion students, **Roe Hay** and **Jonathan Kalechstein**, from the Faculty of Computer Science, discovered a new weakness (loophole), which had not been previously documented in the world’s most widely used DNS (Domain Name System) software – BIND. “We were very surprised to find a loophole in the protocol,” said Kalechstein. “We reported it to the authorities responsible for its implementation, they responded that they were unaware of this problem, and added that they will replace the algorithms in the next software version release.” The project was carried out at the Laboratory of Computer Communication and Networking in the Faculty of Computer Science at the Technion, and was led by **Dr. Gabi Nakibly** from Rafael

Advanced Defense Systems Ltd.. It won the faculty-wide competition, the Amdocs Best Project Contest. In August 2013, the project was publicized at an academic conference on information security ‘Usenix WOOT,’ held in the US.

“We devised an attack on DNS, a protocol that is one of the cornerstones of the Internet, and we identified a weakness in one of its implementations,” explained Roe Hay. “The DNS protocol has been around for several years and has been investigated by researchers from all over the world. We knew in advance that the chances of finding a loophole in the software would be very small, but we like challenges.” DNS is one of the most basic Internet protocols. It allows access to a decentralized database enabling computers to translate the names of websites to web addresses (IP addresses). “During the resolution of name to IP address, DNS servers look for the server storing the corresponding IP address,” explains Dr. Gabi Nakibly. “The weakness that the students found allows hackers to compel a DNS server to connect with a specific server chosen out of a set of potential servers. If that server is controlled by the attacker, that DNS server will receive a false IP address. This type of cyber attack gives hackers an advantage, by causing computers to ‘talk’ with network stations that they alone control without being able to detect the occurrence of the fraud.”

Protein Structure for Cell-Cell Fusion - Professor Benjamin Podbilewicz from the Technion’s Faculty of Biology, in collaboration **with Professor Felix Rey** from the Pasteur Institute in France, and their research team, discovered the atomic structure of a protein that is present on the cell surface and is responsible for cell-cell fusion. The discoveries were made in a model system of a tiny roundworm, and will be useful for future research designed to understand human fusion processes (during fertilization or in the formation of muscle fibers, for example). This discovery was published in the prestigious scientific journal *Cell*. The scientists also discovered the mechanism that allows this fusion to occur. “The atomic structure of this protein (but not the sequence) in the roundworm is similar to that of proteins that do the same thing – membrane fusion – in enveloped viruses”, explains Professor Podbilewicz. He describes the way in which an enveloped virus penetrates the body: “The cell ‘swallows’ it and then the membrane of the virus fuses with the membrane of the organelle that swallowed it (an organelle is a specialized lipid-enveloped structure within a living cell). As a result, the genetic material of the virus enters the cell and assumes control over it.” The discoveries by the scientists from the Technion

and the Pasteur Institute will have implications on research aimed at understanding cell-cell fusion processes in the human body. These processes play a critical role in fertilization (the fusion between sperm and ovum), and in developmental processes taking place in organs such as in muscle and bone.

Blood Vessel Transplant Success - Technion scientists succeeded for the first time in transplanting engineered tissue bearing major blood vessels to repair severe abdominal muscle injury, as published by the prestigious US science journal *Proceedings of the National Academy of Sciences (PNAS)*. In the past, researchers were successful only in transplanting engineered muscle tissue with small blood vessels. This medical breakthrough may do away with the need for complex surgeries in the future, and the Technion holds a patent on it. **Professor Shulamit Levenberg** from the Technion's Faculty of Biomedical Engineering and the Russell Berrie Nanotechnology Institute explains that in the current study, researchers fabricated an engineered muscle flap bearing its own functional vascular pedicle for repair of a large soft tissue defect. Technion scientists successfully reconstructed a full-thickness abdominal wall defect using this engineered vascular muscle flap in a mouse.

In tissue reconstruction, two approaches exist to address the clinical challenges involved in the successful restoration of tissue defects: GRAFT- where tissue is transplanted to the damaged area and nourished by the body's blood supply and FLAP – where tissue is transplanted to the damaged region with its own blood supply. Flaps are used for treating injured areas where there is an absence of blood supply. Tissue engineering constructs laboratory-grown tissue for transplantation. In this study, the tissue was grown in the lab by Technion researchers and then implanted to the region around the (femoral) artery and veins in the thigh, before being transferred as a flap. The flap is the stage where tissues can be transferred with their own blood supply and are joined to the blood vessels in the region of transplant, to repair large defects, such as in the abdominal wall region. Grafts are effective for repairing small defects, but ineffective at repairing severe injury. Consequently, this medical breakthrough is very noteworthy. The study was performed in collaboration with **Dr. Yulia Shandalov** and **Dr. Dana Egozi**, from Haifa's Rambam Medical Center, and is part of a research project led by Professor Shulamit Levenberg, funded by the European Research Council (ERC).

Cardiovascular Innovation - Technion and the Toronto-based University Health Network (UHN) have announced the establishment of the “Technion – UHN International Centre for Cardiovascular Innovation”, aimed at developing new ways to treat heart disease. **Prof. Lior Gepstein**, a pioneer in the study of stem cells and their therapeutic potential in the cardiovascular system, will lead the Technion team in the joint venture. Prof. Gepstein heads the Sohnis Family Research Laboratory for Cardiac Electrophysiology and Regenerative Medicine at the Technion’s Rappaport Faculty of Medicine. **Dr. Barry Rubin**, the Medical Director of the Peter Munk Cardiac Centre in Toronto, said, “This collaboration holds significant potential for the development of new cardiovascular devices and regenerative medicine therapies, innovations that will benefit not only residents of Canada and Israel, but all mankind.”

Technion President Prof. Peretz Lavie said that the Technion is increasingly involved in major international partnerships, and is excited at the potential of the joint venture with leading Canadian scientists. “I’m very pleased that a worldwide leader in regenerative medicine and the management of heart disease patients, UHN in Canada, chose the Technion as its partner in this venture, and did so because we are a global leader in biomechanical engineering and stem cell research.” Prof. Boaz Golany, Technion’s Vice President for External Relations and Resource Development noted that the collaboration between Technion and UHN is consistent with the Canada–Israel Strategic Partnership announced by Israeli Prime Minister Benjamin Netanyahu and Canadian Prime Minister Stephen Harper on January 21, 2014, which provides for “further scientific research cooperation, more business linkages, including in innovation; closer academic ties and development cooperation”, among other benefits.

Unlocking the Brain’s Secrets Using Sound - Work done by Technion **Professors Eitan Kimmel** and **Shy Shoham**, and Ph.D. student **Misha Plaksin**, may advance our ability to unlock the brain’s secrets noninvasively using sound, and perhaps create new treatments for illnesses. Scientists have known for a while that ultrasonic waves can affect cells in many ways. “Ultrasound is known to do all kinds of things in cells,” says Prof. Kimmel, “but how it works in many cases isn’t clear, particularly when it comes to neural stimulation.” A new model may help clarify much of this behavior. According to Kimmel’s model, when the ultrasonic waves encounter a cell, the two layers of the cellular membrane begin to vibrate (much like how a person’s vocal cords vibrate when air passes through the

larynx). Cell membranes also act as capacitors, storing electrical charge. As the layers vibrate, the membrane's electrical charge also moves, creating an alternating current that leads to a charge accumulation. The longer the vibrations continue, the more charge builds up in the membrane. Eventually, enough charge builds up that an action potential is created.

The Technion team was able to use the model to predict experimental results that were then verified using brain stimulation experiments performed in mice by a team at Stanford University. According to Prof. Shoham, this is “the first predictive theory of ultrasound stimulation”. All of these results mean that scientists might be on the verge of finally understanding how ultrasound affects nerve cells. This new understanding could lead to important new medical advances. For example, scientists could use ultrasonic waves to probe the brain's internal structure, and conceivably use ultrasound to treat epileptic seizures. And Shoham has begun studying the ways in which ultrasonic waves could stimulate cells in the retina, possibly creating images and letting people see without light. The Technion team's findings also illustrate how important it is to get a theoretical understanding of things in nature. After all, says Shoham, “there's only so much you can do with effects you don't understand”.

The Zipper Approach for Molecular Synthesis - A new approach to complex molecular frameworks brought **Professor Ilan Marek** from the Schulich Faculty of Chemistry a grant in the amount of € 2.4 million from the European Union for “thinking differently about chemical synthesis and going against mainstream wisdom”. This new method, the “zipper approach”, for selective synthesis of complex molecules was reported by the prestigious scientific journal, *Nature*. The synthesis of new molecules is central to the development of many areas of science from medicine to materials science. Professor Ilan Marek and his research team from the Schulich Faculty of Chemistry, have demonstrated for the first time, a novel approach through selective bond activation that combines the simultaneous activation and fragmentation of otherwise difficult transformations. They were able to initiate a double bond migration, similar to the zipping action of a zipper. “It's much like zipping up your jacket, joining both sides of the zipper from the bottom end and zipping it upwards,” explains Professor Marek. “Sometimes the link between the two sides disconnects when you move the zipper up. We were able to conceive this detachment and fragment it in a premeditative manner to achieve our target.”

Previously Professor Marek's team reported an innovative approach for creating molecules possessing a specific chiral center in a single-pot operation using only primary material. Up till then, only few scientists reached this point through tedious synthetic approaches. Both of these groundbreaking studies by Professor Marek have far-reaching implications for the synthesis and development of new drugs and have aroused great interest in the scientific and industrial community. He is getting ready to recruit additional researchers to assist in his promising research. Professor Ilan Marek received many prestigious prizes for this original breakthrough.

The Technion Research and Development Foundation (TRDF)

There are five bodies administering different types of activities that come under the umbrella of the TRDF: the Research Authority which handles Technion-sponsored research; the Liaison Office which handles research ties with the European Union, industry, universities abroad and the Ministry of Industry; the Unit for Continuing Education and External Studies; the Israel Institute of Metals and the Technion Technology Transfer Office which deals with the commercialization of intellectual property and patents which are developed at the Technion. More detailed information about research activities and the research authority can be found in the report on research at the Technion.

Finances

In accordance with the instructions of the Ministry of Finance and of the Budget and Planning Committee the balance sheets of the Technion and the TRDF are integrated as of September 30, 2012. The projected profit for the period October 1, 2012 to September 30, 2013 is approximately NIS 33 million, not including the estimation for the actuarial maintenance of pensions. The financial balance of this period is influenced by the nearly NIS 31 million in pension payments to 375 retired workers. The continued improvement in the financial situation is a result of the growth in income from intellectual properties and of increased research activity.

The Israel Institute of Metals

The institute has several activities within the framework of its laboratories such as corrosion, metallurgy, casting and vehicles, and additional functions in the areas of quality and authorization, and steel testing. Most of the activities at the institute are for industry, are connected to industry, and have industry's active participation. About 45 percent of the institute's income is derived from research funded by the government, industry, the European Union and overseas concerns that make direct contact with the institute. Approximately 55 percent of the income comes from testing for industry. The institute is currently in negotiations with government and industrial bodies in China requesting assistance in establishing an institute in Jiangsu Province in line with the model of the Israel

Institute of Metals. The idea surfaced as a result of successful research collaboration between the Israel Institute of Metals and a Chinese company in the province. In 2013, the institute's turnover stood at approximately NIS 17.2 million and the operational profit stood at NIS 2 million.

The Azrieli Division of Continuing Education and External Studies

The Azrieli Division of Continuing Education and External Studies specializes in organizing and developing advanced study programs for university graduates in various engineering and science domains. It also grants diplomas to high-ranking professionals in different fields of engineering, architecture, medicine, administration and teaching through specially designed courses. All advanced courses and programs for Master in Engineering (ME), Master of Business (MBA), Master of Architecture (MArc), Master of Real Estate (MRE) or Master of Industrial Design (MID) are carried out in collaboration with the relevant Technion faculties and interdisciplinary committees. In October 2013 Prof. Yoram Halevi replaced Prof. Yehudit Dori who served as the dean of the division for the last four years.



Azrieli Saron Campus (red roofs in foreground) with Azrieli Buildings in Background



Prof. Peretz Lavie presents David Azrieli with the ubiquitin molecule crystal award at the dedication of the Technion-Azrieli Saron Campus – Tel Aviv

The division's goals are to promote, update and enrich the knowledge of engineers, scientists, doctors, and other professionals in accordance with the needs of industry and trends of the marketplace. The division has an academic council that oversees the academic aspects of the division's activities, e.g. approval of all the programs and courses offered by the division and maintaining its high academic standards. The council, appointed by the Coordinating Committee of the Technion Senate, following a recommendation of the Senior Vice President, consists of professors from different faculties as well as office-holders such as the deans of undergraduate and graduate studies. Over the years the division has grown considerably, providing professionals with the opportunity to promote their education and careers.

The division operates out of three centers: the Technion campus in Haifa, the Technion-Azrieli Saron Campus in Tel Aviv, and at the Azrieli College of Engineering in Jerusalem. This geographical distribution offers accessibility to a large population of Technion graduates and other professionals in different parts of the country. The Technion-Azrieli Saron Campus in Tel Aviv was opened in July 2013 and teaching began soon after. A festive event for its naming in honor of David Azrieli was held in March 2014. The campus consists of three buildings in historic Saron, a unique German Templar colony established in 1871. The Municipality of Tel Aviv has invested in restoring and developing the site in order to create a cultural and academic environment. After close to sixty years of operating in Tel Aviv in various ad-hoc locations, the division finally has a home and a real campus.

The response of the students is largely very positive and preliminary data indicates a substantial increase in prospective students for the summer and fall of 2014.

The programs offered in the current academic year are the following.

Programs leading to academic degrees:

- MArc – Master in Architecture with emphasis on conservation.
- MBA – Master in Business Administration, with emphasis on high-tech companies.
- Azrieli StartUp MBA– Full time unique program, given in English, with strong emphasis on innovation and entrepreneurship.

- ME – Master in Engineering in:
 - Systems Engineering
 - Biomedical Engineering
 - Civil Engineering, with emphasis on development and business management in construction
- MID – Master of Industrial Design
- MRE – Master of Real Estate

All the programs are offered in Tel Aviv and the programs in MRE and in ME in System Engineering are offered at the Haifa campus as well. More than 600 students are currently studying in those eight master's degree programs that are offered by the Azrieli Division of Continuing Education and External Studies. In the last graduation ceremony in June, 2013 there were 159 students that studied at the Division of Continuing Education and External Studies and received masters degrees. They are about 25% of all master's degree graduates, excluding direct Ph.D. graduates. In the June 2014 ceremony, we expect a similar number.

The first class of the International StartUp MBA began in November 2013, with 19 students. The program is managed academically by the Faculty of Industrial Engineering with Prof. Miriam Erez serving as its head. Enrollment for the second class has started and we hope for the same academic success with a larger number of students. Another international program in systems engineering is currently offered and we are ready to open next year depending on actual enrollment.

Programs leading to a certificate:

The Azrieli Division of Continuing Education and External Studies offers a large variety of programs and single courses that are non-degree. These courses are typically intended for graduates of the Technion, or other universities, who are working in industry and wish to extend their knowledge in a certain area. The courses are divided into seven main categories.

- Computers
- Design
- Management
- Finance
- Coaching
- Photography
- Real Estate

Within those groups there exist unique courses, which were carefully designed to match the industry needs, such as Introduction to Oil and Gas Technologies, International Negotiation, Construction Project Management and Software Security.

In addition to programs that are open to the general public, the division has taught tailored programs for various companies and organizations such as the Ministry of Defense, Israel Railways, Rafael, HP and Israel Aircraft Industry.

About 2,200 students studied last year in more than 30 diploma courses in both the Haifa and the Tel Aviv campuses. On average we have about 1300 diploma students at any given time.

The Continuing Education School for Medical Doctors, in collaboration with the Faculty of Medicine, offers nine programs in areas such as gynecology, pain medicine, cardiology, and orthopedics. About 300 medical doctors study in these programs whose duration ranges from one semester to three years. In addition, the division offers a separate, long-running program in family medicine that is conducted at our center in Haifa and has 120 MD students.

The division conducts a program in Computer Security Administration for students from Russia and the former Soviet republics, holding a bachelor's degree in information management, computer science or related fields. This program is sponsored by the MASA and NATIV agencies. The third class graduated in March 2014, and about half of the students continued for an advanced stage. This unique program can potentially attract Jewish academics to make Aliya (immigrate to Israel) and quite a few of the graduates of the first two classes indeed stayed in Israel.

In February 2014 the Azrieli Division of Continuing Education and External Studies was in charge of all administrative and financial aspects of the Planning, Law and Property Rights Conference, organized by Prof. Rachelle Alterman from the Faculty of Architecture and Town Planning. The conference was held at the Technion, with close to 200 attendees, the great majority of them from abroad. This conference was a successful test-case for the division's plans to become the main provider of conference support and organization at the Technion.

The Unit for Business Development and Commercialization of Intellectual Property

The year 2013 featured deployment in preparation for the expected expiration (in the beginning of 2017) of the patents protecting the medication Azilect, whose income has comprised a large part of the unit's income. Within this framework a number of diverse avenues were pursued:

- a. giving priority to commercialization of technologies featuring life-science elements (particularly new medications)
- b. protecting the share of Technion ownership in existing companies (particularly companies in the field of life sciences)
- c. initiating the building of an accelerator to focus on the establishment of companies in the fields of communications, big data, materials, etc.
- d. exploring the establishment of a subsidiary to deal with providing commercial-development services and technology transfers to universities internationally
- e. broadening activities aimed at identifying patents that are suitable for sale on the "fast track" – i.e. via direct sales and not through commercialization
- f. broadening activities to identify sources of funding from the European Union that offer the possibility of assisting in activities aimed at initiating and establishing new companies
- g. broadening activities aimed at securing the Technion's rights in intellectual properties through alternative means (including examining the possibility of instituting legal procedures in relevant cases)

In addition to activities in the field of commercialization, comprehensive preparations were undertaken for the business unit's move to the Center for Industrial Research Building (Malat). The planning and preparation are completed and work on the site has just begun. The move is projected to take place during the summer of 2014.

The number of applications for patents - During the past year, 97 Technion researchers' discovery disclosure forms were submitted. Of these, eighty were approved for registration. This year, too, the proportion of forms returned to researchers/not presented stood at 19%; this was in line with the objective of "reducing the holes in the filter" and of screening projects at a relatively early stage. Unfortunately, this year as well there was a significant lack of applications in the fields of life sciences (particularly medical equipment and new molecules) – fields that traditionally provide a central source of commercial success for academic institutions in Israel and in the world. Undoubtedly, the split between the

business unit and the Rappaport Institute and Biorep on the one hand, and the Rambam Medical Center on the other, creates great difficulties for the unit's functioning. This fragmentation leads to serious inroads in the scope of the properties at the disposal of the unit for commercialization.

Licensing Agreements - We signed 32 agreements for commercializing technologies developed by Technion researchers. Of these, three were licensing agreements with companies established on the basis of Technion knowledge in different fields (two were new and one just now began functioning), developing materials based on aminoglycosides for the treatment of genetic mutations in rare genetic diseases, developing a simulator for analyzing projects and developing mediums and cell cultures for the stem-cell industry. Six licensing/option agreements were signed with industrial companies in varied fields: diamond cutting, reducing heat by means of CNT forests, organic semi-conductors, manufacturing and storing hydrogen, efficient sampling (sub-Nyquist) and a cement additive. Additionally, an agreement for a licensing option was signed with a sensors manufacturing company for the early detection of flaws in the food distribution chain. In addition, seven "Magnetron" agreements were signed with leading companies in Israel, among them GE and Elbit and six "Nofar" agreements were signed with companies such as RAFAEL and Biosense Webster.

Cooperation with the Alfred Mann Institute at the Technion (AMIT) - The year 2013 was marked by the intensification of the activities of the institute's companies. This was especially apparent in the Accelta Company (a stem cell company) which during 2013 signed a number of licensing agreements and concurrently established infrastructure facilities and new laboratories. It must be noted that because of the need for the institute to clear out existing projects before it can take on new ones, the amount of work of the unit with the institute has decreased to a certain extent. Concomitantly, the volume of this activity with incubators and non-Technion bodies has increased.

Income from Commercialization - In the past year the TRDF's income from commercialization and/or the actualization of the Technion's intellectual property rights amounted to approximately \$20 million (including the researchers' share). It is important to note that this income does not include income arising from the actualization of intellectual property rights following legal procedures, income from research agreements resulting from commercialization agreements, income arising from the refund of patent

expenses, and more. Income from these sources totaled several million additional dollars in 2013. The main source of income again this year came from royalties from the sale of Azilect. The annual sales of the drug amounted to over \$350 million. The Technion's royalties were approximately \$15 million.

Investment in Projects – Considerable funds were invested this year in the enhancement of the Technion's intellectual property in order to bring it to the point where it can be funded by outside sources. The funds invested for this purpose amount to \$465,750. The investment included \$324,000 from a fund earmarked for improving intellectual property (five projects); \$40,000 were invested from the Uzzi and Michal Halevi Fund (two projects); \$101,750 were invested from the Gurwin Fund (one project). Additionally, \$87,000 were invested in seven different projects from an internal fund of the business unit (Proof of Feasibility Fund). We hope that this new stream of investments in applied research projects will contribute in the coming years to a quicker and bigger maturation process for project commercialization. As in previous years, this year the importance of the "Kamin" Fund, which functions under the R&D regulations and is administered by the Chief Scientist's Office, was notable. This year, 2013, 26 Technion projects were supported by the "Kamin" Fund (new and continuing projects) for a total annual amount of NIS 16 million, a fact which underlines the importance of the fund as well as the scope of the potential of technologies developed by Technion researchers.

Technion Companies' Fund-Raising – This year, too, the considerable scope of the funds raised by Technion portfolio companies (or those commercializing Technion-based technologies) was evident. It is noteworthy that the cumulative sum of the investments during the past four years for companies established on the basis of technologies developed at Technion and incubator companies, amounted to \$200 million. These investments also accentuate the faith of industry and investors in the latent potential of Technion-produced technologies.

During the year, seventeen Technion companies, or those commercializing Technion-based technologies, raised a total sum of \$66.45 million. Among the companies which raised considerable amounts, the following were especially prominent: Argo Medical Technologies (developing a walking device), Avraham Pharma (developing drugs to combat Alzheimer's disease and mild cognitive impairment (MCI)), Corindus Vascular

Robotics (developing robotic technologies that enable cardiologists to perform remote catheterization) and Wave-Sec (dealing with data protection on web-based telephone systems).

As in previous years, this year as well, the TRDF made efforts to protect its relative share in the various companies by participating in investments in keeping with its concomitant share. The full amount invested by the TRDF within this framework in affiliated companies totaled more than \$450,000. Additionally, the Technion Investment Opportunities Fund, whose function is to invest in Technion-related companies in order to preserve the scope of Technion's holdings, invested approximately \$470,000 in two companies (Avraham Pharma and Corindus). In addition, two more investments amounting to \$1.1 million were made in Applied Immune Technologies, which deals with developing antibodies to fight cancer and in Pneumedicare, which is developing a product for monitoring breath.

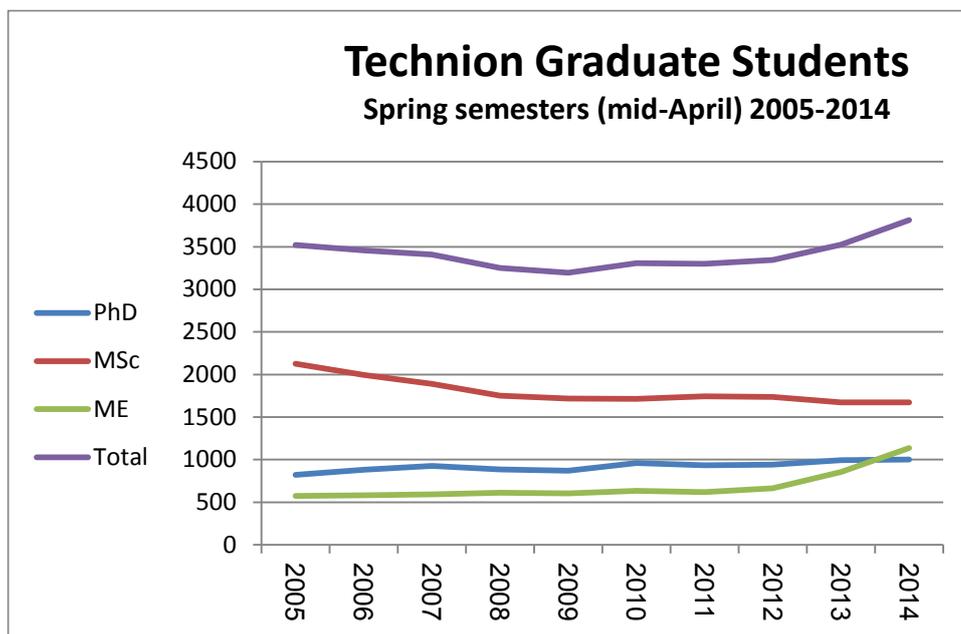
Establishing an Accelerator and an Investment Fund – The Technion Incubator Company terminated its activities in November 2011, with the unscheduled departure of a number of its partners. The departure was mainly a result of the inability of these partners (Venture Capital Funds) to raise funds for continued activity. This year, activities and contacts have been initiated for the establishment of a Technion Fund and an accelerator with focus on exact sciences, communications, Big Data and internet.

The accelerator is expected to be set up in the Center for Industrial Research Building (MALAT) where the AMIT institute is located. This building is slated to become, in the future, the "Commercialization Building" of the Technion.

The Irwin and Joan Jacobs Graduate School

On March 31, 2014 Prof. Hillel Pratt ended his two-year term as Dean of the Irwin and Joan Jacobs Graduate School. The newly appointed Dean, Prof. Ben-Zion Levi, is happy to

report on the past year's developments and statistics. As of April 7, 2014, the student body of the Technion's graduate school includes 3814 graduate students, of which 1003 are doctoral students and 2811 are master's degree students. Of the 2811 master's students, 1674 are studying towards a M.Sc. degree with thesis. These numbers are higher than those in mid-April 2013, when a total of 3,524 graduate students were enrolled at the Technion. The graph below shows the progression in the total number of active master's and doctoral degree students over the past decade.



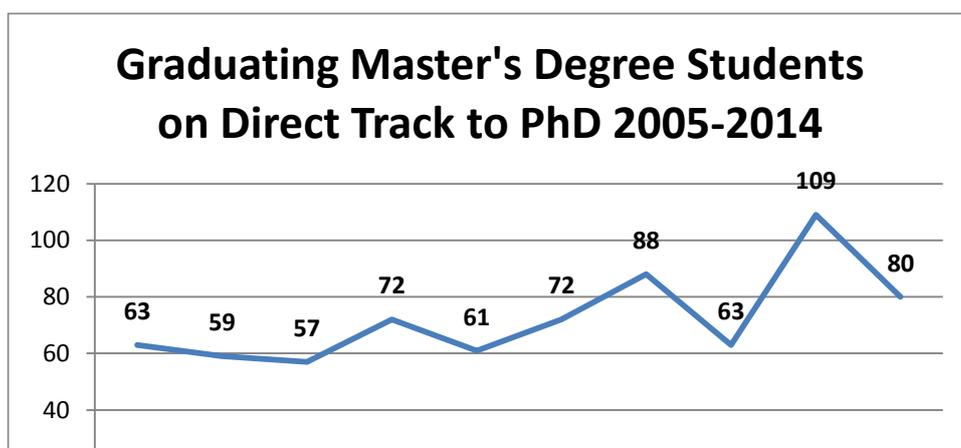
It is encouraging to note the steady increase in the number of graduate students since 2010. The persisting rise in Ph.D. students, the decline in the number of graduate students concluding their studies with a M.Sc. degree, and the increase in M.E. students is a trend that we need to foster in the context of the graduate school's 10-year vision.

The graph below shows that the number of Ph.D. graduates at the Technion has risen significantly since 2005. The slight decrease in numbers over the past three years is probably a fluctuation which is consistent with the fluctuations observed during the past five years in the numbers of master's degrees awarded to students on the direct track to a Ph.D. degree (see last graph below).



The apparently stable number of approximately 1000 Ph.D. graduate students and corresponding numbers of Ph.D. degrees awarded each year must be significantly increased over the next decade as detailed in the 10-year vision. In that respect, during the next year we will focus on marketing strategies of the Irwin and Joan Jacobs Graduate School to attract greater numbers of excellent candidates, especially outside of the Haifa area, by offering a comprehensive package. This package will include generous fellowships, on-campus housing, on-campus kindergarten facilities, and help in finding job opportunities for candidates' spouses with the help of the Dean of Students professional employment office.

At the upcoming 2014 master's degree graduation ceremony, the Technion will be awarding 691 master's degrees: 361 thesis track degrees and 330 non-thesis track degrees; of these, 80 are awarded during the direct doctorate track. Considering the fact that a major source of Ph.D. students is our own M.Sc. program, increased efforts must be made to encourage promising master's students to proceed toward a Ph.D. degree.



In addition to the ongoing activity in the various programs, the graduate school has worked on the development of new programs and courses.

The following new (accredited) programs were approved this year:

- A master's degree in Urban Engineering (accredited)
- A dual Ph.D. agreement with Leibniz Universität Hannover – LUH
- A dual Ph.D. agreement with National Tsing Hua University (NTHU) - Taiwan

By mid-April 2014, there were 71 new graduate courses approved by the Technion's Standing Committee for Academic Studies.



Dr. Nira Orny, Technion's Oldest Ph.D Graduate (78)

Undergraduate Studies

Enhancing the quality of the learning experience of undergraduate students at the Technion continued to be the focus of our attention. Activities in the past year proceeded along two main paths. First, in continuation of last years' activities, we took further steps to nurture

the quality of the learning experience at the Technion by enhancing the personal and general attention to students' needs and their relations with the academic staff. Secondly, a major effort was undertaken to implement the recommendations of the Committee on Program Structure and Study Load.

On the administrative side, a unit was established to provide a scanning service of examinations, so that students can access promptly their corrected exams and have the direct feedback needed in order to learn from mistakes, if any, and prepare for an appeal, if needed. The response received from the students and staff in the relevant faculties is very positive. In the present academic year the unit will move to a larger location with sufficient modules to serve all the faculties who require it. This unit (with two persons) also provides assistance to the undergraduate studies staff on IT issues.

The Instruction Booklet for Academic Studies was prepared and distributed to the student body and prospective students, as well as academic and administrative staff. It includes all the regulations and conditions for proper study procedures at the Technion.

We continued the pilot stage of the "Big Brother" project, in which senior undergraduate students mentor the incoming students by means of personal meetings and advice on a range of subjects from academics to personal time-management and administrative issues. The pilot, held at the Faculty of Biotechnology and Food Engineering, was expanded to twenty mentors, which elicited positive feedback on its impact by both students and mentors. Plans are underway for the coming year to expand the project to at least three more faculties.

A major effort has begun at the Undergraduate Studies unit and the Technion faculties to start implementing the recommendations of the "Study Load" committee. The current status of this implementation is reported separately. The main issues that required prompt actions were:

- the academic calendar for 2014/2015 was adjusted for shortened semesters of 13 weeks; all final exams are to be given outside the study period of the semester; and a week's vacation will be granted for Hanukah.
- adjustment of the faculties' study program to the shortened semester (13 weeks)
- mechanisms have been implemented in the faculties to ensure that examinations are pre-evaluated by additional review, so as to enhance their validity, reliability and fairness.

These efforts, initiated by the Dean of Undergraduate Studies, Professor Bshouti, will be continued by the incoming dean, Prof. Yachin Cohen, who had led the Committee on Program Structure and Study Load.

Undergraduate Students by Faculty in 2013/14

Engineering Faculties:

•	Aerospace Engineering	386
•	Architecture and Town Planning	540
•	Biomedical Engineering	189
•	Biotechnology and Food Engineering	324
•	Chemical Engineering	274
•	Civil and Environmental Engineering (incl. Mapping and Geo-Informatics and Agricultural Eng.)	1332
•	Computer Sciences – Engineering, 3 and 4-year program	403
•	Electrical Engineering	1591
•	Industrial Engineering and Management	722
•	Materials Engineering (jointly with Physics or Chemistry)	262
•	Mechanical Engineering	856

Total Engineering:	6879
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Non-Engineering Faculties:

•	Biology	217
•	Chemistry	125
•	Computer Science (3-year program)	888
•	Economics and Management	16
•	Education in Technology and Science	352
•	Mathematics	156
•	Medicine	1122
•	Physics	165

Total Non-Engineering:	3041
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Grand Total:	9920
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The Technion Program for Excellent Students

The Technion Program for Excellent Students is a home to exceptional, outstanding students in various fields of science and engineering. The goal of the program is to enable these students to fulfill their potential while providing them maximal freedom during their studies, expanding their areas of interest and broadening their exposure to topics and studies that are not included in the regular curriculum. Students are accompanied by faculty

research staff and enjoy a personal and unique curriculum. They are exempted from tuition fees, provided accommodation within the main campus and a modest monthly stipend.

The program was established almost 25 years ago (probably the first of its kind in Israel) and its original format is now implemented in excellence programs within various faculties. Over the past three years the program was revised to meet new challenges.

Program Outline

A small group of students (10-15 percent) is selected each year from a population of 100-150 candidates that are themselves ranked as highest amongst Technion applicants. During their first academic year, admitted students are not associated with any particular faculty; rather, they are students of the program, which functions as their sole academic home throughout the year. In this first year the students are required to study and successfully complete top-tier courses in mathematics and physics. In addition, during the first year the students regularly participate in bi-weekly meetings with the program staff, where they read and analyze classical scientific texts focusing on infrastructural concepts of the natural sciences. The students are expected to explore disciplines of interest by taking introductory disciplinary courses. At the end of the first year the students choose a main faculty to pursue their formal degree.

During the second year, the students are required to participate (on top of their faculty program) in a course that highlights fundamental concepts in science and engineering ("Integrative Course on Stochasticity and Time, Space and Symmetry"). The course is composed of clusters of lectures taught by leading faculty from the Technion and other research universities in Israel. At the end of the course each student is required to submit a research paper based on which the student is graded. Students are expected to maintain an average grade of 90 or higher throughout their studies. Students who fail to meet this standard leave the program. The students are routinely and personally advised by the program's staff. A system of mentoring by senior program fellows was established.

Activities in which all the students of the program participate include monthly general lectures on diverse subjects, a yearly scientific retreat and a yearly social-educational trip. The program's office and a large and nicely equipped interaction room are situated within a wing of the Fishbach Building (EE).

Admission Procedures

Admission to the program is based on proven previous academic accomplishments, creativity, intellectual curiosity and deep interest in science. The admission procedure includes two rounds of interviews with the program's staff and other faculty.

Management

At present the program is managed by a staff of four: Prof. Erez Braun and Prof. Shimon Marom (academic management), Ms. Tammy Porat (administration), and Dr. Asaf Gal (teaching assistant).

The Center for Pre-University Education

Headed by Prof. Dan Zilberstein, the Center for Pre-University Education sponsors preparatory courses, activities for science-oriented youth, courses fostering excellence and other learning programs for gifted and for challenged youngsters.

The Unit for Pre-Academic Studies sponsors many diverse programs adapted to the different populations which seek admission to the Technion and study within it. During the year, 600-700 students study within the framework of the unit's programs and an additional 1000 students participate in other programs which include:

- Preparatory Course for Discharged Soldiers and New Immigrants - a 10-month course focusing on mathematics, physics, English and scientific writing.
- Pre-Entry Courses - courses in mathematics and physics geared at students who have been admitted to the Technion but need preparation in those subjects.
- Pre-Preparatory Course for the Atidim Project - course held from August to October for Ethiopian immigrants, Druze students and those from disadvantaged backgrounds (200 participants).
- Preparatory Course for Arab Students (NAAM Program) - preparation for academic studies for students from northern Arab villages who want to study at Israeli institutions of higher learning (55 participants).
- Ultra – Orthodox - This year we opened the second geodesics group in Bnei-Brak. We now have 28 students in the Pre-Mechina (preparatory course). On campus we have 22 students studying in the Mechina after having finished the Pre-Mechina course. In April – May, we plan to open another Mechina for ultra-Orthodox women. By the end of this year we will have about 130 ultra-Orthodox students at the Technion.
- The Ofakim-Hi Tech Program - a preparatory program sponsored by Technion alumni intended for discharged soldiers from combat units who do not have a matriculation degree or a psychometric exam score (120 participants).
- Atidim Industries Program - The program offers preparation and support for discharged soldiers from disadvantaged backgrounds (35 participants) - a combined program Atidim – Rosman – Technion.
- A special program for excellent Druze high-school students (300 participants).
- The Kadima Program for Women – In cooperation with the army, there are 27 women this year participating in this program after their high-school studies. They receive intensive training in basic technological fields, and are expected to continue in the area of technology

following their studies at the Technion. This program was initiated because of a lack of women in the reserve academic program, and it is supported by outside funding.

- The second year program for outstanding immigrant students from Ethiopia encourages and strengthens the mathematics and English background of middle school and high school students. The 120 participants study weekly at the Technion.
- World Ort – Kadima – Mada - Anier Program - The idea of this program is to expose pupils from grade 9-12 to pre-academic scientific content, and together with the Ort – Kadima – Mada Program and Nahalal High School, the program will continue until 2024.

The Harry and Lou Stern Youth Activities Unit aims to make science and technology attractive to youth and to enhance learning for middle-school- and high-school-age youngsters. The activities take place in the morning in the framework of special science days and in after-school clubs and courses. This is the sixth year in which the unit is operating in the Arie and Jacqueline Carasso Youth Wing with nine well-equipped laboratories, modern classrooms and the large Amos and Shoshana Horev Auditorium, all of which enable the unit to expand and enrich its programs.

Special Projects

The Future Scientists of Israel – Twenty-five highly talented students from the northern part of Israel participate in a special program for future inventors aimed at fostering the best science-oriented students in junior-high schools. They study at the Technion one-and-a-half days every week for a six-year period.

Sci-Tech - This annual international research summer camp for 11th and 12th graders, held at the Technion, is now in its 19th year. This is an opportunity of a lifetime for gifted students to experience serious research opportunities guided by top-notch Technion researchers. The 45 participants in summer 2013 from six different countries also enjoyed the sports facilities at the Technion as well as touring Israel.

TeLeM - Technion Promotes Mathematics - The TeLeM program is a joint program of the Pre-Academic Center and the Department for Education in Technology and Sciences. It aims to persuade children in grades six and up to study mathematics at the highest level, to enhance their understanding of the subject and to encourage them to study at the Technion later on. This is the 13th year of the program's operation. Mathematics teachers who participate in the program receive special training on a regular basis. There are 400 pupils participating from six schools

in the north; the program is sponsored jointly with the Ministry of Education. The program also sponsors special competitions and a Math Olympics for all its students. Graduates of this program in the 11th and 12th grades are offered to participate in academic studies at the Technion within the special framework for gifted high school students.

The Ort - Technion Classroom - This is a joint program between the Technion and Ort Schools for outstanding pupils. In 2013, there were 11 classrooms in the framework of the program with a total of 260 pupils. The aim of the program is for the participants to accrue academic credits for future studies at the Technion when they graduate high school. The program takes the pupil from 7th to 12th grades until they enroll as full time Technion students and includes preparation courses for academic studies such as scientific research skills, logical thinking, scientific and mathematical thinking, introduction to the Technion and pre-academic courses in biology. Some of the high- school participants will be admitted to the Technion as regular students in a special early-registration process for gifted students.

Other Youth Advancement Programs

The Center for Pre-Academic Studies sponsors several other outstanding programs aimed at enhancing academic potential among a variety of groups. Some are sponsored jointly with other organizations and institutions and together they are making a difference for many talented and disadvantaged groups of middle- and high-school students in their aptitudes and attitudes towards the study of science, math and technology.

Mathematics Summer Camp - A two-week camp for 9th - 11th graders, in cooperation with the Technion's Faculty of Mathematics and the Youth Activities Unit, aimed at advancing the level of talented pupils.

The Ofanim Science Program - Inaugurated last year, this program is sponsored jointly with the Ofanim Organization and is designed to encourage scientific and technological studies for 5th and 6th graders in outlying towns. There were 90 participants this year with activities held in the Technion as well as in a bus that has been re-fitted as a robotics lab and travels to outlying towns.

Student Affairs

The Dean of Students' responsibility is the concern for the welfare of Technion students and dealing with related issues. Prof. Moris S. Eisen from the Schulich Faculty of Chemistry is the current dean.

There are six professional units within the Office of the Dean of Students which are concerned with supporting and helping the advancement of the students. These units reach approximately half of the total student population in the scope of their activities. They cover important Technion goals such as helping minority groups to ease the gap, increasing the percentage of students from peripheral areas, decreasing the dropout rate, raising grade point averages and helping students find employment. We do our best to assist as many students as possible in all possible ways, including, tutorial programs, counseling, housing and financial assistance.

The Unit for Personal Assistance offers help and guidance to students in financial distress. We have a unique project for new students with high potential, which, by personally accompanying the new students from the registration stage till the end of the first academic year, has been successful in easing the way for many first-year students. As part of the support for students, the unit offers financial aid to undergraduate students from low socio-economic backgrounds; scholarships, loans at no interest, special help and personal consultation for students who are called to IDF (Israel Defense Forces) reserve duty.

Beatrice Weston Unit for the Advancement of Students offers counseling services to students who have difficulty studying due to adjustment, lack of study skills, heavy study loads, vocational choice, personal or family problems, learning or physical disabilities. In addition, the counselors give support and advice to new immigrants and students serving in the army reserves. The counselors help the students to identify sources of distress and advise them in finding efficient ways to cope with academic requirements. The services include personal counseling, workshops, tutorial programs, special accommodation for physically challenged and learning disabilities, special meetings and lectures.

In addition to the individual counseling, the unit's staff operate a few social projects aimed at minimizing academic and social gaps among freshmen at the Technion. A unique

comprehensive model of absorption was developed to meet students' special needs. The model of absorption is based on three elements - personal tutor (mentor), academic workshops and individual counseling

Professional Employment Unit and IAESTE (A.s.b.I) (International Association for the Exchange of Students for Technical Experience) provides professional and career guidance to students and graduates. The unit organizes job fairs, career days and many other relevant activities to benefit the students.

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. Over the last few years there has been an increase in counseling requests from students and therefore we urgently need an expansion of the center. The expansion project of the counseling center has been adopted by the Southern Palm Beach Chapter of the American Technion Society.

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. Many programs are run daily including evening clubs. We are committed to continuing these important social functions to ease the pressure which students feel as a result of the difficult load of Technion studies.

The Student Housing Unit offers housing solutions to about 3,800 students. Although the Technion is a leader in providing housing to its students, there are not enough beds available to accommodate the requests. If we were able to increase the amount of housing available, we could easily increase the number of undergraduate and graduate students at the Technion. The new project, Technion Guangdong Institute of Technology TGIT, requires that we provide accommodation for the new students/faculties who will be coming to the campus for the first stage.

Ongoing Special Projects

Student Housing - A new undergraduate village housing project is underway as well as new plans for additional housing solutions for our Technion students. We continue our long-term project to upgrade the old dormitories and to finish air-conditioning all dormitories.

Scholarships – As a result of the general financial situation, we have awarded scholarships, all sponsored by donations, to approximately 30 percent of the undergraduate students. The maximum amount that can be covered by Technion's scholarships is 80 percent of tuition fees. Many students receive additional financial aid from external non-profit private organizations and foundations. These organizations have actually increased their grants for Technion students in recent academic years, due to our initiative and effort to enhance these sources. Unique scholarships are provided as a result of the collaboration with outsourced funding available to our students who are discharged soldiers and reservists. Over the past few years, students with excellent prospects from lower socio-economic backgrounds and/or from the periphery of Israel have been admitted to the Technion. Because they applied for and received financial aid (scholarship assistance), they were able to begin their studies at the Technion. Most of those students receive general assistance throughout their studies.

Parenthood Facilitation - The Technion has an assistance package for students who are expecting and becoming new parents. The students are very grateful for the help.

Loans – The Technion offers student loans of NIS 15,000, given without interest. Last year we awarded loans to 320 undergraduate students. In addition, Magbit and Geller Foundation loans in the amount of \$2,500 to \$3,000 each were awarded to 112 students.

Reservists – The Technion is appreciated by the student community as a supportive and considerate institute. We assist about 1,200 reserves students throughout the academic year. We provide support from the period before their service (V.A.L.T.A.M), during their reserve service (Net Sticks), and after their return to the Technion. We offer a wide variety of special services such as personal consulting, tutoring for the study material covered during their absence, academic credits, non-tuition summer semesters and scholarships.

On top of the already wide range of benefits given by the Technion to reservists, a new project in collaboration with the students union will allow students who are IDF reservists to get all services provided by the Technion in a “one-stop shop” internet site allowing students to be connected to the Technion while they are on reserve duty. During their reserve duty students are to be given Net Sticks – Cell Modems with a secure ID for remote access – which enables the connection to all internet services that are provided to students on campus including online lectures, videos, mail and other important services. The first steps of analyzing the needs and requested services for the interactive Technion reserve duty website have been achieved. We are now starting the second step towards the implementation of the reserve duty website.

The ATIDIM (Future) Project – This project assists high school graduates from Israel's periphery with low socio-economic backgrounds 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. This year approximately 80 students started the program at the Technion.

Students from Ethnic Minorities – A special project is underway to help ease the absorption and adjustment process of first-year students from minorities. These students face many difficulties due to language problems, cultural unfamiliarity, feelings of alienation and lack of learning skills. 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, 390 students were assisted by this project. Our model for absorption of these students was adopted as a working model for all Israeli universities by Israel's Council for Higher Education. This year we translated into Arabic our special “Study Differently” booklet and distributed it to all our students whose mother-tongue is Arabic.

The Support Center for Students with Disabilities - The Technion, in cooperation with the National Insurance office, will establish a support center for students with physical, mental and cognitive disabilities. The center will include professional staff members who specialize in helping individuals with disabilities. The center will contain classrooms with the unique necessary equipment.

The "Ofakim" (Horizons) Project – This is a project targeted at discharged soldiers from the periphery who have completed the Technion preparatory program. The project is co-funded by the Ministry of Defense and the Zisapel families. This year 28 students were admitted to the Technion under this program. The unit's staff runs a special project to support these students which includes academic and social tutors.

Rosman Atidim for Industry - The project is aimed at facilitating the absorption of discharged soldiers from the periphery and from underprivileged backgrounds. It operates with the cooperation of various industries and companies in the Israeli private and public sectors. In the current year, forty students were assisted by this unique program.

Professional Employment Projects - This year we organized two technical Job Fairs with the participation of 99 companies. These Employment 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, 12 Career Spot Days for recruiting and interviewing potential employees were held; six workshops for C.V. writing and job interviewing were operated; one company tour and two job preparation lectures were also given.



Technion Job Fair

Technical Training Abroad - The IAESTE exchange students program unit helps to place students who wish to go for technical training abroad over the summer months. This summer 78 students will be going abroad on professional training. The same program allows student from abroad to gain experience at the Technion and in Israel.

Social and Cultural Activities – This year our activities included reuniting and freshly painting the Canada Community Center and Shvil Israel Community Center. We also instituted Kabbalat Shabbat (Welcoming the Sabbath) events and enhanced our ongoing activities such as the I-Q lectures club, the weekly sports activity and the faculty get-together parties.

Computer Labs and Lounge at the Dormitories - The Heller Computer Lab and Community Center at the dormitories was renovated and updated with the latest available technology and network to provide the best environment for the students and for the dormitory tenants. It is open and running 24/7.

“Lively Campus” – In the framework of the program, the Technion has launched several different means of digital communication to allow everyone access to information about what is happening on campus.

Community Projects – More than 400,000 hours of community service were contributed by about 30 percent of the undergraduate student population. The community-related activities were associated with various frameworks such as PERACH – the big brother program.

K.A.A.T is one of the operated programs, in which the Technion students reach out to about 400 junior high - and high-school students from lower socio-economic groups and peripheral areas. The Technions' students tutor 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 39 students to provide assistance in mathematics to students in 4th and 5th grades from various Haifa elementary schools. All our projects aim to reach the weak population and minorities in the Haifa region.

ADMINISTRATION and FINANCE

Israel's Economy in 2013 ¹

¹ This report was prepared by Prof. (Emer.) Shlomo Maital, senior research fellow at the S. Neaman Institute, Technion.

The International Monetary Fund (IMF) is the global financial agency that bails out countries that overspend and borrow excessively. Each year, in early spring, like a stern school teacher, the IMF gives countries and their governments a ‘report card’ on their economic performance. Sometimes, the grade is “F”. But in Israel’s report card for 2013, delivered on Feb. 10, there are many A’s.

According to the IMF, “Israel’s economic fundamentals remain strong. GDP growth is solid, unemployment is low, and inflation remains firmly anchored within the [Bank of Israel] 1-3 percent target range. The financial sector is in good health and the external position is strong.” Many countries in the West would love to say the same.

In 2013, Gross Domestic Product (GDP) grew by 3.4 percent, the same as in 2012, but lower than in 2011 and 2010 (4.6 and 5.7 percent, respectively). In past years, the engine of growth has been exports. But since 2010, because of weak economies in Israel’s biggest export markets, Europe and America, all the growth has been caused by domestic spending, up by 3.9 percent in 2013, while foreign demand actually reduced GDP growth by 0.5 percent. Exports declined by 2.3 percent in 2013, after growing slightly in 2012, but imports also fell by 1 percent. This left Israel with a positive current account surplus in its balance of payments.

Unemployment declined from 6.9 percent in 2012 to 6.4 percent in 2013, a fact that helped buoy consumer spending. Since 2009, despite the global crisis, unemployment has consistently fallen.

As noted, inflation remains low. The consumer price index rose by 1.8 percent in 2013, up slightly from 1.6 percent in 2012.

Many countries get low grades from the IMF because their currency depreciates. Israel has the opposite problem. With the dollar weakening globally, and with dollars flowing into Israel through foreign investment and the beginnings of natural gas sales, the shekel has risen relative to the dollar. The average exchange rate in 2013 was 3.6 shekels per dollar, compared with 3.9 in 2012, and recently the rate has been only 3.45 shekels per dollar. The

strong shekel makes exports expensive; weak foreign markets and the strong shekel explain the lagging performance of Israel's exports, despite its dynamic high-tech sector.

The Bank of Israel has fought aggressively to halt the appreciation of the shekel by buying large amounts of dollars. As a result Israel's foreign exchange reserves, mostly dollars, rose to \$82 billion at the end of 2013, up from \$76 billion at the end of 2012. By the end of February, the reserves had risen even more, totaling \$84 billion, but this policy has had only limited impact on the exchange rate, because of the massive volume of foreign exchange transactions daily.

Another tool used by the Bank of Israel to weaken the shekel has been interest rates, which fell to 1 percent in 2013 from an average of 2 percent in 2012. Israel's 10-year government bond yield was 3.85 percent, compared with 5.07 percent in 2009. The low borrowing costs have helped reduce the government deficit.

In 2013, thanks to a moderate austerity program and spending cuts, the central government budget deficit fell to an estimated 3.25 percent of GDP, down from 3.9 percent in 2012 and 6.3 percent in 2009. Government debt fell to 67.5 percent of GDP, a figure many European governments would envy. Only 8 percent of that debt is owed to foreigners. Business credit remained stable in 2013, but household credit rose, as Israelis sought mortgages for housing.

The Tel Aviv Stock Exchange 25 Index rose by 11 percent in the second half of 2013, and reached historical highs.

Poverty and inequality remain stubborn social problems. Some 20 percent of Israel's population are below the poverty line, and one child in every three lives in poverty. This is true, despite Israel's relatively high average standard of living, \$32,265 GDP per capita.

In 2013, a total of 19,200 persons made aliyah (immigrated), about the same as in 2012. The largest group of *olim* (immigrants) came from the former U.S.S.R., some 7,520. There was an 11 percent decline in North American aliyah, with a dramatic 63 percent rise in immigration from France and 35 percent rise in aliyah from Western Europe overall.

After national elections, a coalition government was formed in March 2013, comprised of 68 Knesset members, and it has proved relatively stable. A notable policy failure has been the Bank of Israel's and the government's inability to moderate house price inflation, which has put buying an apartment out of reach for many young Israeli couples. Housing prices rose by more than 8 percent in 2013, after soaring by nearly 50 percent between 2008 and 2012. The IMF warns, "rapid house price inflation, if it persists, poses risks to financial stability".

What lies in store for 2014, according to the IMF? GDP growth will likely remain at 3.4 percent, with all of the growth coming again from domestic demand. Export markets will remain weak. The government budget deficit will fall even further, to 2.8 percent of GDP. Inflation will remain low.

Overall, both politically and economically, Israel remains an island of stability in the turbulent Mideast. Preserving that stability will pose major challenges for policy-makers in the future.

Budget and Finance

The budget is made up of two categories:

1. The **operating budget**, which covers all of the Technion's operational activities, including staff emoluments and pension payments, student fellowships and scholarships, maintenance and other expenses.
2. The **development budget**, financed almost entirely from donations and gifts. It is used to develop and upgrade the Technion's infrastructure and create new research centers and programs.

The financial activities cover also Technion's investments and pensions.

The Operating Budget

About seventy percent of budgeted expenses are for staff emoluments and pension payments. In parallel, about the same percentage of this budget is covered by the government. The support of the government is transferred to the Technion, as to all others Israeli universities, via P&BC, the Planning and Budgeting Committee of the Council for Higher Education. This council was established to ensure Israeli universities' academic freedom and protect them from political involvement in higher education. It receives money from the Israel Government Ministry of Finance and distributes it to the various educational institutions.

This year, 2013/2014, is the fourth year of the P&BC revised Five-Year Budgeting Plan for academic institutes. This plan includes increased funds allocated to the universities. It also includes several changes in its previous budgeting model. The most significant change is the emphasis on decreasing the student to faculty ratio and targets to achieve this goal were set. This change is expected to have a direct effect on research and teaching quality.

The Technion managed to recruit 129 new senior academic faculty members over the past five years. In 2013/2014 the Technion continued with a moderate increase in senior academic positions which reflects new management priorities and an adjustment to the P&BC's new budgeting model.

Last year, the Technion's student body numbered around 13,300 (undergraduates and graduates), about the same number as ten years ago. However, the mix of students has changed, with an increase in the number of doctoral students. The increased senior academic positions and new faculty recruitment will reflect on the students to faculty ratio in enhanced academic quality and strength. During the last ten years, the technical and administrative staff was reduced by about 10 percent. The general approach is to reduce administrative positions and steer some of them to engineering positions.

The 2012/2013 Budget Year

The 2012/2013 budget year ended with a deficit of NIS 25 million, and it corresponds to the budgeted deficit. The deficit will be covered by withdrawals from Technion's reserves.

The 2013/2014 Budget Year

The 2013/2014 budget framework is NIS 1,374 million. It includes an increase of NIS 42 million for growth and expansion of academic and other related activities and a NIS 34 million deficit (about 2.5 percent of the budget framework). The expenditures are classified into five main categories, as shown below (in NIS millions):

53%	729	Salaries
18%	245	Pensions
7%	102	Student fellowships, scholarships, etc.
9%	123	Maintenance
13%	175	Others
100%	1,374	Total

At the same time, the main income components of the budget are (in NIS millions):

71%	952	P&BC
9%	115	Tuition
4%	60	Societies
16%	213	Self-income
100%	1,340	Total

The main changes in the 2013/2014 budget as compared to the previous year are an increase in government support and in several self-income components. As for the expenses, the changes are: increased allocations for new faculty recruitment and salary agreements, research expenses, graduate students fellowships, essential safety-related activities and pension payments. The deficit will be covered by withdrawals from Technion's reserves.

Development Projects Budget

Development projects are managed by multi-year budgets and schedules. In the year 2012/2013, the Technion invested (cash and obligations) NIS 115 million (\$31 million) in development projects. Income for development projects amounted to NIS 178 million (\$48 million). The Technion policy is to approve new construction of buildings and large renovation projects only according to the income received or guaranteed for each project. Total investment in development projects in the last ten years was NIS 1,573 million. In the same time period the total income sources amounted to NIS 1,739 million.

The table below lists our investments (in NIS millions) in development projects, divided into three major categories:

Invested in Projects 2012/2013	Category
29	Buildings, renovations, infrastructure
46	Multidisciplinary research centers
40	Equipment and laboratories (not including laboratories established for new faculty members)
115	Total (NIS millions)

Investments

Technion's investment portfolio includes the Technion Pension Reserve Fund, restricted net assets designated for scholarships, research, chairs, projects and others, unrestricted net assets designated for research, development and others. The funds are invested by the investment pool method. The investment policy is set and reviewed periodically by a public committee. The value of the portfolio on September 30, 2013 was NIS 5,529.7 million (\$1,563.4 million). About 52 percent of the portfolio was in Israeli index-linked investments, 8 percent in foreign-exchange linked investments, 21 percent in shares, and 19 percent in liquid assets.

Pension Payments and a New Pension Plan

Pension payments to most of the Technion employees are provided from the operating budget. In 2012/2013, pension payments were budgeted at NIS 236 million, representing 18 percent of the operating budget; this year, they are expected to reach a total of NIS 245 million. This percentage is expected to increase over the coming years, after which it will slowly decline and eventually level out. As was pointed out in previous reports, as of 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. The total actuarial obligation of the Technion as of September 30, 2013 is NIS 6.6 billion (NIS 7.2 billion including TRDF).

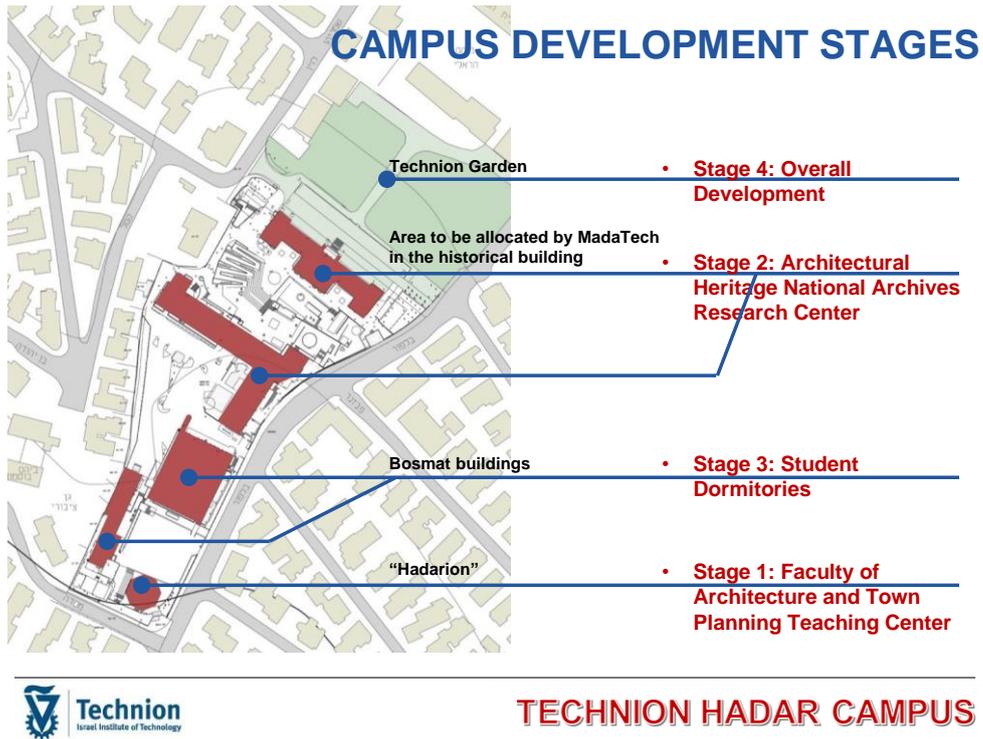
Physical Development

In the past year, we have continued to pursue new construction projects as well as maintain and upgrade existing buildings. Many laboratories are being renovated for new faculty members. Major emphasis has been placed on building safety, savings in energy and water supply as well as accessibility for individuals with disabilities. A campus wide survey is on its way to establish a five-year master plan for renewal of the existing infrastructure to upgrade it to modern requirements of functionality and safety.

Complementary to this step we are establishing a new master plan (zoning) for the campus which will enable the development of new facilities and open areas. Parallel to this master plan we are advancing a strategic plan. The strategic plan aims to determine the framework for future development of the campus both from the construction point of view and from the spatial management point of view. This plan is designed to best fit the campus to enable it to compete with the current transformation which higher education is undergoing and the new challenges this transformation poses.

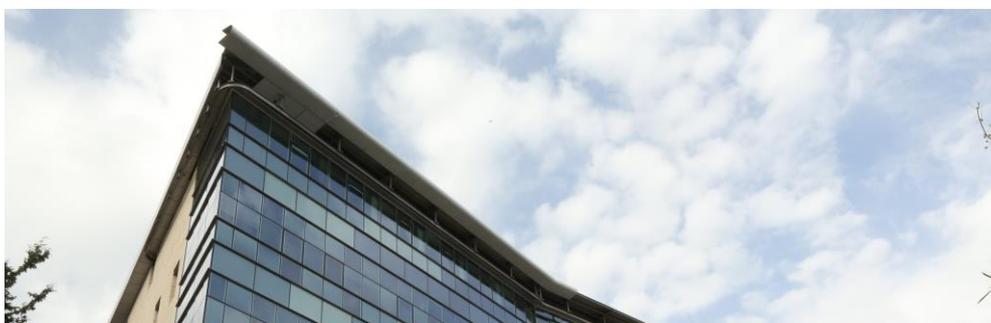
In addition, a major effort is planned for "face lifting" and upgrading the campus with emphasis on special projects which are required for increasing the accessibility of the campus and branding it as a high quality and friendly "city". These projects include upgraded gates, clear and branded signage, branded lifestyle/experience areas and a proper lighting system.

Within the framework of achieving greater integration with the urban neighborhoods in Haifa, an initial concept for a master plan for renewing the presence of the Technion in its historical campus in the Hadar neighborhood of Haifa has been set. This includes a studio, clinic and National Archive for Architectural Heritage for the Faculty of Architecture and Town Planning, construction of student housing and launching community activities in Hadar by Technion students and staff with headquarters in the newly-established campus. The first step, upgrading one of the buildings on the Hadar campus for the studio and clinic, is underway.



Ecology-friendly measures have been incorporated in all existing as well as new construction projects. All new construction of buildings is planned to be as “green” as possible to ensure maximal energy efficiency and savings in water consumption. All new buildings and renovated areas and labs are designed to enable easy maintenance and adhere to the motto, “Safety First.” In addition, they are fitted with computerized monitoring systems that will save on maintenance costs and provide efficient control of all systems.

The main development projects are outlined below, including recently completed, those under construction and those in the advanced planning stage.



D. Dan and Betty Kahn Building

Projects Completed in 2012- 2013

1. Faculty of Mechanical Engineering: new D. Dan and Betty Kahn Building
2. Schulich Faculty of Chemistry: renovation of laboratories, offices and public area
3. Emerson Family Life Sciences Building: new laboratories
4. Clinical Research Authority: renovation of temporary plant for experimental research facilities on campus
5. Rappaport Faculty of Medicine
 - Renovation and teaching auditorium (Yellow Hall)
 - MRI unit and facilities area
6. Canada Dormitory Village: renovation of entrances to building no. 943
7. Department of Education in Technology and Science: renovation of the Abraham and Sonya Slifka Auditorium
8. Technion Research and Development Foundation Ltd: renovation of three Templar buildings for the Division of Continuing Education in Sarona, Tel Aviv
9. Rifkin Dormitories: renovation of communal areas in building no. 109
10. Water saving: upgrading computerized irrigation systems and water-saving control mechanisms
11. Various faculties: renovation of various labs as part of recruitment of new faculty members
12. Campus safety upgrades: upgrading safety measures in various projects in campus buildings

13. Accessibility for physically challenged individuals on campus: upgrading accessibility for physically challenged individuals in various projects in campus buildings and in outdoor areas

14. Campus infrastructures: various projects on campus

Projects under Construction

1. Undergraduate Student Village: four dormitory buildings - 488 beds in 112 apartments for single students

2. Schulich Faculty of Chemistry: renovation of laboratories and public areas

3. Emerson Family Life Sciences Building: new labs, floors 7-8

4. Clinical Research Authority: renovation of experimental research facilities

5. Rappaport Faculty of Medicine:

- Renovation and expansion of classrooms to accommodate more students
- Renovation of experimental research labs on different floors

6. Wolfson Faculty of Chemical Engineering: renovation of teaching labs in the "Pilot area" - Stage A

7. Geographical Information System (GIS): installing Geographical Information System all over the campus – mapping infrastructure, safety, security

8. Various faculties: renovation of various labs as part of recruitment of new faculty members

9. Campus safety upgrades: upgrading safety measures in various projects in campus buildings

10. Accessibility for physically challenged individuals on campus: upgrading accessibility for physically challenged individuals in various projects in campus buildings and in outdoor areas

11. Campus infrastructures: various projects on campus

Projects in the Planning Stage

1. Zielony Graduate Student Village: community center including a kindergarten and a multipurpose hall

2. Wolfson Faculty of Chemical Engineering:
 - Renovation of labs in the "Pilot area" - Stage B (upper floor)
 - Grand Technion Energy Program - research labs on an additional floor
3. Tower Dormitory Buildings: three high-rise buildings with a total of 700 beds for single students in 2-5 bedroom apartments
4. Rifkin Dormitories: renovation of communal areas in building no. 101
5. Canada Village: renovation including air-conditioning systems in two buildings (70 beds) as part of ongoing project (entrances 941 and 942)
6. Ullmann Teaching Center: additional floor for student classrooms, two elevators and earthquake reinforcement
7. Schulich Faculty of Chemistry: renovation of laboratories and public areas
8. Various faculties: renovation of various labs as part of recruitment of new faculty members
9. Student Union Building: completion of internal construction of the existing shell building on the 4th floor
10. Faculty of Architecture: "HADARION"- renovation of existing building located in "Hadar" neighborhood
11. Teaching facilities: infrastructure renovation of teaching facilities – ongoing projects over the campus
12. Entrance to Technion: upgrading the two gates to the Technion
13. Campus "green projects": water and energy savings
14. Campus safety upgrades: upgrading safety measures in various projects in campus buildings
15. Accessibility for physically challenged individuals on campus: upgrading accessibility for physically challenged individuals in various projects in campus buildings and in outdoor areas
16. Campus infrastructures: various projects on campus
- 17.

Human Resources

Our Mission: Creating an organizational culture connected to the Technion's vision through excellence and the self-fulfillment of its workers.

Division for Personal Care and Development of Workers: During 2013 the division initiated two new work processes that foster the vision of the human resources division.

Feedback Process for Workers During their Probationary Period: The decision to grant the status of permanent worker to a Technion employee is a most significant procedure that impacts upon the functioning of the unit and the Technion for many years. To this end, a process has been devised consisting of four evaluation sessions in the course of approximately two years. The final decision is in the hands of a committee composed of members of the unit's administration as well as representatives of the Human Resources Unit.

Developing the Employee's Incentives Program: The Human Resources Unit is dedicated to developing the Technion's human capital and inspiring it to excel by varied means. The incentive program's compensation will be granted in accordance with uniform criteria; the program will be supervised and administered by the Human Resources Unit.

The Program's Goals:

- Defining the values and the norms of excellence at the Technion and converting them into an integral part of the Technion's organizational culture.
- Enhancing the level of motivation of the workers and inspiring them to achieve excellence.
- Granting recognition for their efforts and their contributions to the Technion.

Criteria for Defining Excellence: Service, professionalism, organizational commitment, team work, initiative and innovation, project management, leadership.

Recruitment Unit: This year the Recruitment Unit concentrated on internal mobility and solving personnel problems in different units of the Technion. The relatively large numbers of workers who move from one unit to another is a result of both the ability and the desire of workers to move and to advance and the desire of the administration to solve problems in the different units, with the cooperation of all those involved. This issue is a component of our vision and for the most part we succeed in our actions.

In 2013 we created 115 new positions. We recruited 84 new workers and 32 employees changed positions after going through the relevant procedures.

Most of the new workers are university graduates and engineers but we also hired microbiologists, technical staff and administrative staff.

Approximately 4 percent of the Technion's employees changed positions or their employment was terminated before reaching retirement age because of requests by the administration or the faculties. Forty-three workers left the Technion's employment and 59 administrative workers left upon reaching the age of retirement.

Orientation Day for New Workers: In order to assist the new worker in a smooth and quick absorption and to forge a connection with the Technion's values and culture, we organize orientation days for new workers. On these days we coordinate the vast amount of information needed by a new worker: the Technion's policies and other content including a description of the organizational framework and the channels of communication, both formal and informal.

These meetings take place once every three months and all employees who began work during that period are invited to participate. In a relaxed and informal atmosphere topics are presented such as: understanding the pay slip, welfare and training activities on campus and general explanations relating to the individual and his/her assimilation at the Technion. The subjects are presented by the relevant professionals responsible for the administration of most of the personnel issues at the Technion. We in the recruitment unit are convinced that these days are an important contribution to the new worker, both professionally and socially and ease somewhat the preliminary period of adjustment.

Training Unit: This year the training unit gave highest priority to the integration of the academic staff within the in-house-training frameworks which were previously aimed at the administrative staff only, in view of the understanding that these activities have added value when they serve to develop and to connect between the different staffs within each faculty and between faculties. This concept was reiterated in field activities which took place outside the campus. These activities were held in a moshav near Haifa named Kerem Maharal with the participation of units and departments including: the Finance Unit,

Mechanical Engineering, Aerospace Engineering, Civil Engineering, Chemistry and various other units.

In addition, a program for preparation for retirement was created aimed at providing tools and information for retirement and discussion of issues common to all retirees. This new framework contains much material aimed at the large number of retirees expected in the next two years. The subjects broached have been updated to include, aside from the standard practical information regarding national insurance rights, the composition of the salary slip, and the process of acquiring pension rights, subjects such as health and quality of life, leisure time activities, and the social networks. This is in addition to courses and workshops which are adapted to the needs of the different faculties and units.

Welfare Unit: "The Circle of Life" is the subject emphasized by the welfare unit. This is expressed by the distribution of gifts to mark important events in the life of an employee: birthdays, weddings, births, gifts for workers' children drafted into the IDF or national service and sending relevant equipment for use by mourners during the Shiva for a close relative. Part of our assistance to workers is the availability of mental health counseling for those who need it. In addition, we conduct festive events such as a "happening" for first-graders, bar/bat mitzvah ceremonies, a ceremony marking 25 years as a Technion employee, and an evening in recognition of the workers. The unit fosters the retired workers as well, and at Hanukah time the holiday is celebrated with a candle-lighting ceremony and a party. This year, a runners' group for both academic and administrative staffs was added to our activities.

The Volunteers in the Community project this year includes 60 volunteers from among Technion employees who have taken over four afternoon community clubs in the neighboring city of Nesher and in the Hadar neighborhood of Haifa. The activities of the volunteers include assisting the children with their homework and organizing holiday celebrations, which on Purim include activities on campus in a creative Purim spirit with the participation of the assistant director of the Human Resources Unit and on Tu B'shvat (Arbor Day) there is a tree planting ceremony on the campus with the participation of all the children, the volunteers and the president of the Technion.



Pres. Lavi planting trees with children on Tu B'Shvat

Academic Staff: In 2013 the Academic Staff Unit focused on the continued improvement of the efficiency of the administrative processes for academic staff. This year we transferred to the computerized system (by way of the Technion's portal on SAP). The updating and the reporting of data on vacation days, sick-leave and reserve duty as well as entitlement for payments for full-time work are all carried out digitally through the Technion's portal.

The absorption of new staff members is proceeding actively and the connection with them, as well as with outstanding candidates, is initiated at very early stages - sometimes while they are still overseas, a long time before beginning their official employment at the Technion. The unit is responsible for determining the needs of new staff members and their families and attempts to assist them in every way possible.

At the same time, the continuing concern for the areas for which the unit has on-going responsibility is maintained: student fees, sick days, dorm increments, full-time work allocations, work accidents, leave without pay, maternity leave, staff cards, job increments and computerization of personal data.

SAP/Computerization: In 2013 we completed the process of specification for the human resources module and the integration process began in 2014.

Adaptation of salary slips to the internet: In 2013 we completed the transition of the entire Technion to the distribution of academic and administrative staffs' salary slips via the internet and we ended their distribution through the mail.

Computing and Information Systems

The computing and information systems division that was established in 2011 with the merger of the Information Systems Department and the Taub Computer Center is operating as one unit. One major concern is the fact that the merged unit is still operating from two separate and distanced buildings. Significant efforts are being made to find the funding that is needed to move the two units into one merged building. This will surely improve the functionality and the daily operations of this unit.

The plans for the new building also include a plan to upgrade the very old Data Center that is 35 years old and needs a major renovation. Also, strategies for Disaster Recovery (DR) in conjunction with this plan are being developed.

The most significant projects are outlined below:

HR Module Implementation (SAP)

The project of Human Resources module implementation started in 2011. It covers three HR offices: HR Division of the Technion, HR Department of TRDF and the Academic Staff Office. The project went live in January 2014. This is a major project that has a significant impact on a very wide population (actually – all employees), and like many other similar projects, it is quite common that there are some issues right after going live. It will take a few months to stabilize all related processes and to solve all open issues. Then we will start the phase of adding more functionality to this module.

Payroll System

The current Payroll System is operating on the old IBM mainframe. Due to the decision to move away from the old mainframe computer, there is a need to find a solution to this major and central application. We are looking into the option of outsourcing the payroll process to the same company that provided the original payroll software to the Technion. This service will be interfaced with the new HR module that went live recently. The system analysis phase has already started, and the target date for going live with this project is January 2015.

Campus Management Module (SAP)

The Campus Management Module will remain the last major function that is still operating on the old IBM mainframe after the completion of the human resources module implementation and after outsourcing the payroll services.

We are looking for the right professional resources to implement this complicated and unique module and the preparations for the public tender have already started, using the high-level analysis document that was written.

ECM – Enterprise Content Management System

The first part of this system went live in January 2013 in the Technion Research and Development Foundation. We are proceeding with the implementation of two other steps: content management for the Technion Public Affairs and Resource Development Division, and the other for the SAP HR Module.

All employee documentation and filing will be stored and managed in this system.

Data Communications Infrastructure

The wireless network infrastructure across the campus was upgraded and the coverage of the WiFi network was spread to new locations. This was a significant investment and effort that has been completed.

The project of upgrading the data communication backbone is progressing. After completion, the network speed will be increased from 1GB/Sec to 10 GB/Sec.

New Technion Website

The new Technion website went live in November 2013. It was a shared effort of the CIS Division and the Marketing Unit.

Also a new template for faculties and academic units was formed, using a new development tool that was put in place. New websites for faculties will be developed by this tool, and, to a certain degree, they will have the look and feel of the Technion's main website.

Improving Forms and Processes for Academic Staff with SAP Portal

We completed the automation of a few forms that are in use by large numbers of academic staff, such as: Travel Request and Approval Form, Absence, Full-Time Work Dedication, and Funded Academic Research Application.

Some of these forms have work-flow processes imbedded, and they significantly improved some manual processes that were in use.

Outsourcing the Internet Services in the Dormitories

The internet services in the dorms have been outsourced to a local Internet Service Provider. This company is providing 24/7 services and support.

The Organization and Systems Unit

The Organization and Systems Unit is a staff office, with professional authority on matters of organization and operations, which provides service to managers at the Technion and its various units and is involved with core strategic projects of the Technion.

The unit is responsible for evaluating organization and operation systems (assessing work processes and their improvement), characterizing needs and defining requests of the information systems, integrating designated off-the-shelf systems, accumulating and processing data, updating and writing regulations, dealing with applicant, student and alumni data and publishing it.

The Unit's Vision - to improve the work processes in the different units with an integrative view of the functioning of the entire organization in order to foster uniformity in the functioning of all the institute's units.

During the past year we completed the following activities:

Organizational and Operational Assessments:

1. Student Accounts Department – this assessment included:

- a review of the work processes and the mode of dividing responsibility for them among the unit's workers
- a review of the flow of information within the unit
- a review of the methods of data storage in the unit and its retrieval
- identifying difficulties within the current system
- recommendations for improvements

2. Examining Difficulties within the Purchasing Process on Campus – the project included:

- interviews with academic staff and administrative management
- assessment of findings and chief problems connected with the purchasing process
- retrieval of the quantified data for 2013
- defining the principles for the statistical analysis of the data
- a statistical analysis of the length of time between the different stations in the purchasing process within the campus (based on 2013 data) – from the opening of

the purchasing request in the unit until the creation of a purchasing order in the Purchasing Unit

- recommendations for efficiency and improvement of processes

Technion Regulations

Writing, Updating and Publishing Regulations – In the course of the past year, 32 codes of regulations were written and/or updated and six codes of regulations were published.

Creating a New Website for the Organization and Systems Unit - Characterization of the new website and familiarization with its work setting to facilitate its maintenance by the unit.

Routine Administration of Candidate, Student and Alumni Data – Classification of the various tracks and academic programs for reporting to the Central Bureau of Statistics, preparation of reports for the Central Bureau of Statistics and the preparation of statistics in accordance with the needs of management, the division heads and others - thereby creating a tool for decision-making defining requirements for preparing presentations for various purposes (i.e. for the Report of the President, reports for review committees, responses to national and international ranking questionnaires, reports by seniority, type of degree and others).

Project Management for the Integration of the Telephone Supplies and Billing Systems – Integration between the requirements of the main consumers in the Technion and in TRDF and the requirements of the Tamar Company for its support of the system.

Central Technion Projects

- **Transfer of the Materials Library to the Central Library (continuing project from 2012)** – Work processes were examined which were designated for each stage of the project, improvements were suggested and the requisite hours were allocated for this project.

- **Preparations towards Establishing a Central Exam Scanning Unit in the Technion**

The organization-wide work processes and regulations were specified and defined (in the examination unit in the undergraduate office, in the undergraduate offices in the faculty and in the central exam scanning unit) from the exam preparation stage to the administration of the exams and the transferring of the exam for checking in the different units and their transfer from there to the central scanning unit.

The notebooks and labels needed for future scanning were prepared. The equipment needed to establish the unit was specified.

- **Israel Science Foundation Report**

The requirements for compiling computerized reports for the use of new faculty in reporting to the ISF regarding the purchases, which were made from equipment budgets, were specified.

Safety and Health

Safety and health has become a high priority as reflected in the resources provided to the Safety and Health Unit. The objectives are to prevent work-related accidents, to minimize safety accidents and occupational illnesses, and to comply with safety laws and regulations. The actions taken are intended to promote the safety and health of staff, students, visitors/guests and contractors on campus. An annual action plan has been developed and implemented, including 18 focused safety projects in several areas of activities, which include safety improvements and upgrading of infrastructure in existing buildings.

Work-Related Accidents and Incidents Indicators

The number of reported work-related accidents in the year 2013 was twenty with an accident rate of 2.67 accidents per 200,000 working hours. These accidents resulted in the loss of 215 working days at a rate of 28.7 lost work days per 200,000 hours. Comparison of these rates to the equivalent rates in 2012 shows a decline of 28 percent in work related accidents and lost working days.

Risk Assessments and Implementation of Standards

We continued the systematic risk surveys from last year in laboratories and work areas and in zones which have undergone major change or renovation, to identify main risks and implement risk-control measures. We administered 74 risk surveys including seven additional surveys of laboratories and areas after renovation or construction and prior to occupancy. An overall of 1329 corrective actions were recommended to the relevant faculties.

Renovation and Construction Safety Guidelines

The Safety and Health Unit participates in all the renovation and construction activities in all areas of the Technion. As part of these activities, in 2013 the Safety Unit issued 72 safety guidelines for planning new or renovated laboratories.

Most of the safety planning guidelines, 17, were for renovation of laboratories in the Faculty of Materials Science and Engineering. Guidelines were submitted for the Faculties of

Biology and Aerospace Engineering (7 each) and for the Faculties of Chemistry, Chemical Engineering, Civil and Environmental Engineering and the Faculty of Medicine (5 each).

Emergency Preparedness

In the area of emergency preparedness two main evacuation drills were carried out during the year 2013. The drills were performed in the Faculty of Medicine building and in the Materials Engineering building. The buildings evacuation staff was trained by the Safety and Health unit staff prior to commencing the drills. The drills were analyzed and conclusions and corrective actions were issued to the participants.

The Emergency Response Team (ERT) steering committee finished its work during the year 2013. Work on the ERT implementation program is scheduled for the year 2014.

Safety Awareness and Training

Safety trainings courses were carried out during 2013 that included 21 courses with 1699 participants out of 2066 invited (87% participation rate). In addition, the Safety and Health Unit administered two safety courses with the participation of 192 contractors and 1721 of their workers, as well as eight courses for fire safety practice with 124 participants.

Security

- **Security Concept and Strategy:** The security concept of the unit was updated to conform with the instructions of the Israel Police and taking into account the potential threats and scenarios for the years 2012-2013. The security directives for 2013 were upgraded and authorized by the Israel Police's Haifa Station.
- **Training:** The campus security guards completed a security guards training course which authorizes them to search, identify, seize objects dangerous to public safety revealed during a search, and detain persons in accordance with the 1998 security regulations for public bodies.
- **Assistant Director of Security:** A new Assistant Director of Security was named in accordance with the recommendation of the National Police Committee in Jerusalem. Two new emergency four-wheel-drive vehicles were donated and equipped with stretchers, resuscitation equipment, respiration devices, fire-fighting equipment and more. The generous contributions, by way of the American and Canadian Technion Societies, were from Harry and Rena Sheres, Canada and the late Marion Gordon, Gordon Foundation Fund, Washington.
- **Enhancing Security:** We secured the reservoir by technological means and connected it to the Technion's security center. The reservoir serves as the regular water source and the emergency source for the entire campus and hence the importance of its security.

The office of the head of security and the weapons room were secured by means of surveillance cameras, entry control measures and linked to the security center in accordance with the standards of the Israel Police and the Ministry of Defense.

Electronic security means were installed in the Kessel Student Dormitories as a means of saving the expense of posting a security guard. An alarm system, surveillance cameras, entry control and a link to the Technion's security center were installed. The subsequent cancellation of the security guard resulted in large savings.

Twenty mobile communication units were acquired for the routine use of the security alignment and for emergency use.

A security model was approved for the Technion medical faculty with the cooperation of the Israel Police's Haifa station. This was incorporated partially and will be completed in 2014.

A security concept was adopted for the Tel Aviv Sarona complex of the Technion with the cooperation of the Tel Aviv police. Trained guards have been posted.

The supply of pistols in the weapons room was renewed. The unit donated 35 unsuitable pistols to the Israel Police.

As a result of the expected growth of the number of overseas staff and students, we acquired additional gas mask kits: 300 for adults, 15 for children and 15 for infants.

An annual work plan was prepared for the testing and control of the security system.

The unit participated actively in the securing of mass events such as: the visit of the President of the State of Israel, visits of large donors, student day events.

We assessed the security needs and secured the student building in accordance with the business licensing law for student parties with mass attendance.

Routine drills of the security system were conducted: first aid, fire extinguishing and elevator rescue.

We created an organizational data base of events beginning with their routine operations and including briefings and feed-back, and recommendations for preserving and improving events.

Routine investigation of all unusual security events on campus were carried out, some of which led to the detaining of suspects.

Green Campus

The Green Campus project in the Technion aims to introduce and amplify environmental values to the Technion campus, addressing the campus on four levels:

- as a working place
- as an educational institution
- as a research center and
- as a residential neighborhood for students

The goal of the project is to promote a green and sustainable environment on the campus, while raising the sustainability awareness of students and staff – an awareness that will also continue its impact off-campus, in the homes and workplaces of Israel's future engineers and scientists.

Green Campus activities include: education and awareness raising, resource saving (water, energy, waste recycling etc.), pollution prevention and more. The Green Campus Program coordinates the different environmental activities on campus, and serves as a meeting place for entrepreneurship as well as a communicating tool of the different activities taking place on campus.

Main projects in 2013:

- **Energy Saving** project operated under the direction of the Energy Saving Forum of the Technion Construction and Maintenance Division.
- **"Green Campus" Website** that serves as a center for updates and information on environmental activities on campus, <http://greencampus.technion.ac.il/>.
- **"Green Campus" Facebook** page providing updates, green office tips and links to relevant articles from around the web. URL of the Facebook page "[Technion Green Campus](#)".
- The Technion Green Campus is a founding member of the **Green Campuses Forum** of universities and colleges around the country, to promote inter-university cooperation and alliance with organizations such as the Ministry of Environment and more.

- **Technion Greenhouse Gas (GHG) Emissions** reporting for the third year – the GHG emissions are calculated and reported to the Ministry of Environmental Protection's Voluntary Greenhouse Gas Registration and Reporting Program.
- **Waste Collection and Recycling Array** – including electronics waste, hazardous waste, paper, cardboard and plastic, and composters located in the dormitory areas for organic waste collection.

Main plans for the coming year:

- Continuation of all on-going projects
- Campus Thrift Shop – as a part of a civil engineering staff project
- Active involvement in sustainable development of the campus, and in the new campus master plan being defined
- Encouraging and supporting student activities



Public Affairs and Resource Development (PARD)

Technion's globalization drive of recent years intensified even further this past year. In New York, Technion and Cornell University launched the Jacobs Technion-Cornell Innovation Institute (JTCII) within Cornell Tech and started the difficult task of recruiting students and academic staff. Later in the year, Technion signed an agreement with Shantou University and the Province of Guangdong in China, to establish a joint venture known as Technion-Guangdong Institute of Technology (TGIT), an unprecedented move that was supported by a generous donation of the Li Ka Shing Foundation in Hong Kong. These strategic alliances continued to fuel international interest in the Technion, manifested by a large number of visits by individuals, delegations and missions from all over the world, as well as from within Israel.

PARD helped the Technion maintain the positive momentum created by its globalization efforts by producing high-quality informational and public relations content and distributing it around the world, responding to the needs of the Technion donors and societies in an ongoing effort to raise funds and promote the Technion globally, and by hosting a large and diverse stream of visitors.

PARD Leadership

Prof. Boaz Golany, Vice President for External Relations and Resource Development, continued to lead PARD along the strategic development roadmap that was established in 2012.

Fundraising: The number of fundraising projects produced by the Project Development Unit continued to grow. Most of these projects were prepared according to Technion needs and in some cases projects were prepared in response to specific requests from prospective donors. The projects were offered to our donors through the Technion societies, leading to a total of over \$80 million in donations. Thanks to these donations, the Technion maintained its leadership position in a climate where all other Israeli institutions continued to experience difficulties in their fundraising efforts in Israel and abroad.

Prof. Golany was personally involved in obtaining many of the donations last year. In particular, he made a number of extensive fundraising tours overseas, spending nearly two

months abroad. During these trips he visited several chapters of the American Technion Society, the two major regions of the Canadian Technion Society (Toronto and Montreal), two societies in Latin America (Argentina and Brazil) and four societies in Europe (UK, Italy, Sweden and Greece). In addition, Prof. Golany laid groundwork for a new Society in Hong Kong during a visit there in January 2014.

Work with Technion Societies: The strategic planning process that was initiated in 2012 continued through 2013. Most of the societies have drafted their multiyear strategic plans, formulating specific mission statements aligned with the overall Technion vision, and a set of objectives relevant to each country as well as setting strategies to realize those goals. These plans were discussed with the Technion and when necessary were adjusted to ensure full alignment with the Technion mission.

The presidents of the various societies were invited to attend a special "Presidents Day" – a new element that was added to the annual meeting of the Technion's Board of Governors. This meeting enabled free exchange and discussion of issues faced by the societies and comparing notes on ways in which different societies address their challenges.

Work with the Israeli Ministry of Foreign Affairs (MFA): PARD continued to cultivate the Technion's relations with the MFA in a series of meetings and joint activities aimed at supporting our public relations efforts while helping Israeli representatives from around the world present Israel as the Start-Up Nation. During the last year, these activities included coordinated events with the Israeli ambassadors and consuls general in Argentina, Canada, Italy and Greece, as well as close coordination with the consuls general in Hong Kong and Guanzhong to support the effort leading to the TGIT agreement.

Alumni Affairs:

Going Global: The effort of engaging Technion alumni living abroad and recruiting them to support the Technion continued throughout the year. Prof. Golany met with alumni in the various fundraising tours he made this year and encouraged them to connect with the Technion societies where they live and find suitable ways to express support for their alma mater. As a result of these efforts, more alumni registered as members of Technion societies and some have also donated generously to the Technion (including two who have joined

the growing number of Technion Guardians – donors who have given the Technion a cumulative amount in excess of \$1 million).

In Israel: PARD has continued to maintain close coordination with the lay and professional leadership of the Technion Alumni Association (TAA) contributing content and public relations material to some TAA activities in Israel. PARD continued to coordinate the meetings of the President’s Circle – a group of prominent alumni holding key positions in industry or government offices that are invited from time to time to provide valuable advice to the Technion president on strategic issues faced by the Technion in Israel and abroad.

Confronting the BDS movement:

This year we witnessed a growing level of activity of the Boycott, Divestiture and Sanctions (BDS) movement in various places around the world. One prominent realm for BDS boycott attempts is Israeli academia, and there have been instances in which the Technion has been targeted specifically. To confront this wave of hate and bigotry, PARD has established close collaboration with Stand With Us and AIPAC; has produced specific public relations content aimed at thwarting the BDS attempts; initiated a special discussion of this threat during the BOG; and is coordinating anti-BDS efforts with Technion societies.

Personnel Changes: Mrs. Naomi Bitansky was appointed director of the Coler-California Visitors Center, replacing Mrs. Yvonne Sagi, who retired after many years of devoted service. Ms. Lilach Shachar and Ms. Keren Malamoud have joined the Coler staff as visits coordinators. Ms. Liat Nov has joined as PARD secretary.

Selected Special Projects and Highlights

In addition to its ongoing, year-round mission to promote the Technion and support its worldwide resource development efforts, PARD is responsible for organizing and executing special initiatives, visits and events at the behest of Technion management. Here are some examples:

- 1. Technion and China: 2013 was a watershed year for Technion initiatives in China, and PARD played an important role in facilitating these developments.**

Visit of Mr. Li Ka-shing and his delegation; visit of the Governor of Guangdong Province; and the signing of the agreement for the establishment of the Technion-Guangdong Institute of Technology – all produced and executed by PARD:

- On September 29, 2013, Technion hosted the historic visit of Hong Kong business magnate and philanthropist Mr. Li Ka-shing, and a large delegation (~35) representing the Li Ka Shing Foundation (LKSF) – whose gift of \$130 million is the largest donation ever made to the Technion – Shantou University, and others. This complex and highly choreographed visit, which included a special science and technology exhibition, a meeting with Technion's three Nobel Prize laureates, and more, was followed later in the day, at the Hilton Hotel in Tel Aviv, by a festive ceremony to sign an agreement between Technion and Shantou University for the establishment of the Technion-Guangdong Institute of Technology (TGIT). This event was attended by Mr. Li, his delegation, the Governor of Guangdong and his delegation, Israeli Minister of Science Mr. Yaakov Peri, and many VIP guests and media. Two days later, on October 1, the Technion hosted a visit by the Governor of Guangdong, a visit of great importance to the success of the TGIT initiative.

- On June 17, 2013, Technion hosted Chinese businessman and philanthropist Mr. Zhao Hanqing, and the mayor of his hometown of Handan; the visit included a signing ceremony of an agreement for a major donation to fund Chinese students to study at the Technion.

2. **Visit of French President François Hollande:** President Hollande visited Israel in November 2013, and the Technion played an important role, including: organizing an extended and successful visit to the Technion by a large delegation of French ministers, top business people and entrepreneurs, who were part of President Hollande's entourage; signing of a collaboration agreement between Technion and the prestigious French university École Polytechnique – an agreement referred to repeatedly by President Hollande as a model for French-Israeli cooperation in academia and science; and the demonstration by Prof. Alon Wolf of his snake robot to President Hollande, President Shimon Peres and Prime Minister Benjamin Netanyahu. All this contributed significantly to the Technion's profile in France, and to its growing global stature in general.

3. **Visit by Israel President Shimon Peres:** On January 8, 2014, President Peres conducted a major visit to the Technion which included a science and technology exhibition; panel discussion with the three Technion Nobel Laureates, moderated by Dr. Yossi Vardi, in a full Churchill auditorium; presentation of Technion educational outreach programs; planting of a tree in the Nobel Garden; festive lunch; and more.



**Israel President Peres with Technion Nobel Laureates
Prof. Ciechanover, Hershko and Schechtman**

Public Affairs

The Public Affairs Department has established a strong presence for the Technion in the world of social media. Some 3,083 videos are currently online on the Technion YouTube channel including promotional films showcasing a wide variety of Technion scientists and achievements, donor-related videos, lectures, BOG and campus events, and academic courses. The channel has enjoyed an enormous leap in popularity: in early March 2014, the total number of views passed 10 million, more than all the other Israeli universities combined, and is growing at a pace of nearly four million views per year. The TechnionLive e-newsletter carries Technion highlights on a bi-monthly basis to our Societies and to a wide local and international audience. The TechnionLive Facebook page, which provides our global network of friends with multiple daily information feeds, now has over 20,000 "likes". The TechnionLive Twitter account currently has over 45,000 followers and is a hive of news and interaction. Both YouTube and Facebook feeds are synched in to the

Technion Twitter account - so if anything is happening at Technion, Twitter is the fastest way to discover it. All of these web-based promotional channels supplement the existing popular newspaper Focus, which was upgraded this year to be web responsive. The new English Technion website, launched this year, serves as a tool for promoting the institute as a global academic powerhouse. The PARD multimedia website, launched last year, showcases a diverse range of Technion-related content, and is increasingly used as a resource by global media, interested groups and followers. Integrating and synchronizing Technion's online presence across multiple platforms in English has created a responsive and prolific media and content machine that grows with every passing month. This dynamic network has given the Technion a leading online presence in the context of the "Start-up Nation", Israeli science and technology, branding the Technion as a recognizable emblem of world-class science and service to humanity whose logo is recognized across the planet.

Projects

The Projects Unit is responsible for translating Technion's funding needs, as determined by Technion management, into project proposals and materials for use by fundraisers and societies. This year, the unit prepared over 300 new projects. Approximately 80 projects were adopted in the past year, including: naming and support of the Jacobs Technion-Cornell Innovation Institute (JTCII); establishment of the Technion-Azrieli Sarona Campus in Tel Aviv and naming of the Azrieli Division of Continuing Education and External Studies; establishment of the Azrieli Start-Up MBA Program at the Technion; naming of the Prince Center for Neurodegenerative Disorders of the Brain; support of the MIT-Post-Doctoral Program for Engineers, Physicists and Chemists; renovation of the Multipurpose Student Center and Lounge in the Rappaport Faculty of Medicine; establishment of the Taub Distinguished Visitors Program and the Lehman Complex in the Technion Computer Engineering Center; support of the Fund for Excellence in Research; support of the Technion Integrative Cancer Research Center; naming of several floors in the Emerson Family Life Science Building; support of the Nanophotonics Research Fund for Advanced Light Detection and Sensing; as well as continued support of the top priority project, graduate student fellowships.

Events, Ceremonies and Donor Recognition

PARD'S Donor Recognition Department is responsible for a wide variety of donor-related, academic and general ceremonies and events, including those of the annual Board of Governors meeting. Over the past year, 51 such ceremonies have been held and 70 new recognition plaques were installed. Among the highlights: four special ceremonies/events related to China; a visit of the delegation of the President of France; President Shimon Peres's visit to the Technion; four tree-planting ceremonies in the Nobel Lane in the Lokey Park; two ceremonies in the new Sarona complex in Tel Aviv; and the conferment of an honorary doctorate on Maestro Zubin Mehta during a concert of the Israel Philharmonic Orchestra in Tel Aviv. Among special plaque projects were the Computech project in the Faculty of Electrical Engineering and plaques in the new D. Dan and Betty Kahn Mechanical Engineering Building. The department has undertaken two digitalization projects in the past year, which significantly streamline work processes: creation of a digital database for all donor recognition plaques, and a digital database of the numerous distribution lists for invitations for various Technion events.



Maestro Zubin Mehta Receives Technion Honorary Doctorate

Donor Relations

The Donor Relations Unit is responsible for maintenance and cultivation of long-term relationships between the Technion and our donors, provides a wide variety of services for Technion societies and individual donors, including periodic reports, special updates and summaries, pictorial overviews and short digests on donor-supported projects. In addition, the unit personnel take care of donor- and gift-related information requests, from both internal and external sources; prepare a variety of letters and other donor correspondence items; and maintain the division's computerized fundraising and donor information management system (CRM). In the past year, the unit handled more than 200 reports on chairs, research funds, capital development projects, reports to special donors, lectureships, and others. Some 1,700 scholarship and fellowship funds were administered, and reports and thank-you letters from students who benefited from these funds were sent to the societies for delivery to the donors. In addition, some 250 special letters were produced. The unit staff continued updating the division's CRM system introduced several years ago. As part of this effort, hundreds of new accounts have been created in the system, to enable efficient distribution of printed and digital publications, e.g. TechnionLive and Focus. With more and more PARD staff using the system for their day-to-day activities, inconsistencies are rectified and incomplete records get amended, as those users share the up-to-date information available to them.

Office of the Board of Governors

The Office of the Board of Governors, managed by the BOG Executive Secretary, ensures the fulfillment of governance obligations of the board, administers all aspects of the board's responsibilities, coordinates the annual BOG meeting and administers the honorary degrees process. The 2013 BOG meeting was well attended with over 250 participants. Progress has been made in the implementation of new procedures for the election of standing members of the BOG committees, and in streamlining the honorary degrees selection and announcement process. Online registration was introduced for the 2014 BOG meeting.

The Coler-California Visitors Center

The Coler-California Visitors Center is the portal for thousands of donors, academics, business people, industrialists, public officials, journalists and others, from around the world who want to learn about the Technion and its achievements. The Visitors Center

staff receives and processes all visit requests – individual and group – and coordinates all aspects of the visits. In the past year, the center hosted approximately 9,000 guests and coordinated 675 visits. (A list of selected visitors is attached as an appendix to this section.) One of the trends we have seen recently is the rise in the number of requests, particularly from national and regional governments across the globe, who want to learn about Israel's success in entrepreneurship and innovation, and Technion's leading role in the Start-Up Nation phenomenon. They seek answers to such questions as how, despite its small size, Israel's technological economy is so strong; how they can benefit from Israel's expertise in creating technological ecosystems; and how they can collaborate with Technion and its researchers. In terms of the physical infrastructure of the center, additional improvements have been made, such as the construction of a comfortable and modern conference room and the installation of WIFI throughout the Center. Planning continues for other improvements, with an emphasis on digital displays and information provision.

Technion Societies

American Technion Society (ATS):

The American Technion Society announced, at its March 2014 Board of Directors meeting in Houston, that it is once again performing above target. The ATS has raised \$416 million, or 80 percent of the \$520 million goal for the “Innovation for a Better World” campaign ending in October 2015. That leaves \$102 million to raise during the approximately one-and-a-half years remaining until the end of the campaign. These numbers are reflected in the growing roster of our Technion Guardians, whose numbers have reached 354, up from 341 a year ago.

The largest gift of the past year was an astounding \$133 million, to be shared equally between the Technion and Cornell University, that came from Joan and Irwin Jacobs of San Diego to create the Joan and Irwin Jacobs Technion-Cornell Innovation Institute, a key component of CornellTech.

On the professional front, Jeffrey Richard was unanimously approved by the Board of Directors to succeed Melvyn H. Bloom as Executive Vice President in May 2014. Mr. Bloom will become Executive Vice President Emeritus, and will assist in this transition over the next two years.

National and international events included:

Board of Directors meetings: October 12 - 14, 2013, Philadelphia;
and March 8 - 10, 2014, Houston.

Missions:

May 26 - June 7, 2013, "Expedition to Spain and Israel" Mission

October 26 - November 1, 2013, Transition Mission and "The Global Impact of Technion
Life Science Research" Mission

April 26 - May 7, 2014, "Pioneers of Progress" Mission

Argentine Technion Society

After a few years without an active presence in Argentina, Technion has gathered a group of individuals who are formally organizing an Argentine Technion Society, with the guidance of PARD. At this stage, the primary objective of the society is to create awareness of the Technion brand and its activities within the local community. The society initiated partnerships with top-tier Argentine universities aimed at facilitating exchange of students and researchers. The society also invests efforts in cultivating relationships with potential providers of funding for different activities. During 2013, the society hosted Prof. Dan Schechtman, who gave lectures and was declared honorary guest of the City of Buenos Aires; Prof Boaz Golany, who gave presentations to prominent local families and entrepreneurs; Prof Harry Yuklea who gave lectures on entrepreneurship. These visits have also led to positive media coverage.

The Technion Society of Australia (TSA) (New South Wales)

This has been a milestone year for the Technion Society Australia NSW (rebranded as Technion Australia NSW), which has continued to operate in accordance with its strategic plan. The highlights of 2013 were the funding and launch of the Technion-Sydney University-NSW Government Photonics Research Project in December by the NSW Minister for Health and Medical Research; the successful launch of the Technion-University of Technology Sydney-Stanford University Biomedical Engineering Innovation and Entrepreneurship Program made possible by a gift from the Graf Family; and the launch of the Technion-University of NSW Medical Exchange Scheme. Fundraising to enable these and existing projects totaled \$661,000 from all sources including pledges, donations,

releasing locked funds and government grants. Attempted BDS boycotts appear on an annual basis, however strong relations between Technion Australia and the NSW universities ensure that these are appropriately treated as fringe activities irrelevant to the academic environment. The major ‘battle’ is fought at Sydney University and undoubtedly the Photonics Project was a major victory both in terms of the significant financial commitment by the NSW Government and the proud commitment to it by Sydney University. The ongoing benefits have been continuing discussions with the NSW government as well as other Australian governments.

The Technion Society of Australia (TSA) (Victoria)

The year 2013/2014 has been an important one for the society. It concluded an agreement with University of Sydney to fund a collaborative research project in tissue engineering and regeneration, between the laboratories of Prof. Shulamit Levenberg of the Technion and Prof. Anthony Weiss of University of Sydney. Controversially, this university has been the subject of some adverse publicity regarding a rogue academic who attempted to implement a BDS policy against a visiting Israeli academic. Creating new ties that will prove academically rewarding for the university will help counter this threat. There has also been an initiative from Monash University in the health sciences area, further strengthening ties between Technion and Australian academic institutions. As part of the good relations between the society and the Israeli embassy, the society recently hosted the ambassador for a Shabbat, and he praised the work of the society in furthering Israel's interests. The society looks forward to the coming year, with a clear focus on raising more money for its main project. The society strongly stresses how important it is for us to have key Technion people visit. Because Australia is so far away, every opportunity to enable the Jewish community to hear first hand of the amazing research being conducted at the Technion is very important.

The Austrian Technion Society:

Being a small society, the Austrian Technion regularly takes part in all activities of the Austrian-Israeli Chamber of Commerce and of the Austrian-Israeli Society in order to promote the interests of the Technion. An example of this activity is the publication of articles about the Technion in relevant journals. Furthermore, and most importantly, the Austrian Technion Society is co-organizer of the Chamber Music Festival of “Forbidden

Music” at the Chateau Laudon in Vienna which has become one of the leading events in the international calendar of musical festivals.

The Brazilian Technion Society:

The year of 2014 will be very exciting for Brazil. It will host the World Cup Games in June and will hold presidential elections in October. The Brazilian Technion Society is scaling up its activities and seeking new members. As part of this effort, Mr. Helio Bruck Rotenberg, from Curitiba, and Mr. Shaul Shashoua have been elected to join the Technion Board of Governors. Together with the current members, they will improve the activities of the Brazilian Technion Society in promoting the Technion in Brazil. The society is actively promoting the effort to have the Israeli government join the Brazilian program called “Science Without Borders” which is slated to fund 100,000 academic years of Brazilian students abroad, in the areas of science and engineering, and should bring a substantial benefit to the Technion and to its International School of Engineering. The Brazilian Technion Society continued with ongoing efforts, with the very good cooperation of PARD, to involve the Technion in the many opportunities offered by Brazil's special environment.

Technion Canada

Prof. Peretz Lavie visited Canada in November 2013. Among his activities were: presentation of the Technion Medal to Mr. Peter Munk; lectures and meetings at the University of Toronto, hosted by U of T President Meric Gertler; dinner hosted by the Bank of Montreal; guest of honor and keynote lecturer at the University of Waterloo; dinner at the Canadian Ministry of Foreign Affairs in Ottawa.

While in Toronto, President Lavie, together with the Toronto-based University Health Network (UHN) the Peter Munk Cardiac Centre and the McEwen Centre for Regenerative Medicine, announced the inauguration of the Technion-UHN International Centre for Cardiovascular Innovation to develop new ways to treat heart disease. The center has allotted CAN \$75 million, with the initial \$9 million already raised.

Other important collaborations with Canadian universities include an agreement with the University of Waterloo for joint research and commercialization activities in the fields of quantum information systems, nanotechnology and water, and a partnership in

entrepreneurial engineering between York University's Lassonde School of Engineering and the Technion has been established. In August, 22 of Lassonde's top students along with three faculty members will travel to Technion to begin the eXpert Program exchange. There have been several significant visits to Technion from Canadian political, business and academic leaders this past year: the Canadian Prime Minister's Business Leaders Delegation; Mark Adler Canadian MP; Pierre Boivin, CEO of Claridge; Senior Academic Leaders from the University of Montreal; Dr. Barry Rubin, Medical Director of the Peter Munk Cardiac Centre; and several prominent supporters of Technion Canada.

The French Technion Society (ATF)

The ATF continues to develop in France and other French-speaking countries, and has made Technion an attractive partner for both industry and research communities. Also, the ATF has succeeded in demonstrating to the Jewish community how important the Technion is to the development of Israel, leading to an increase in major gifts. The ATF also continues to bring leading French companies to the Technion and have them fund Technion research. Other activities include: the annual ATF event in December 2013, on the theme of Innovation from Laboratory to Market Place, under the High Patronage of the President of the French Republic, which attracted 800 attendees both at the scientific Colloquium at La Maison de la Chimie and the gala dinner at the City Hall of Paris; the annual mission to the Technion, with high-level participants from industry, academia and philanthropic communities; events all over France, and the annual dinner at the Residence of the Israeli Ambassador in Paris, with the participation of Prof. Shlomo Maital. In addition, the many visitors to the Technion (more than 1,000 this past year) from France, Belgium, Luxembourg and Geneva have had an important impact as well. ATF is also very active in lobbying activities with the media and with major political figures on behalf of the ATF and Technion. Most significantly, the Technion had a prominent role in the November 2013 Israel visit of French President Francois Hollande. President Hollande, together with Israeli President Peres and Prime Minister Netanyahu, enjoyed a demonstration of the Snake Robot by Prof. Alon Wolf. Also, 150 high-level French participants visited Technion during this visit, and President Peretz Lavie signed two major agreements with the president of Polytechnique and with the president of the worldwide media group 'HAVAS'.

The German Technion Society (GTS):

In addition to 16 ongoing research projects in the Niedersachsen-Israel cooperation program, the GTS has started to administer two new projects (funding period 2014-16). In October the "First Conference of Scientific Cooperation between Lower Saxony and Israel" was held in Hanover's Leibniz House with the participation of 22 mixed teams of German-Israeli scientists. The "Life Science Network", initiated by GTS, completed its first year of exchange options for up to 50 students from the Technion and five German universities with more ideas and exchange opportunities than planned. A new symposia-series was prepared in the field of "Green Photonics", with the first international conference to take place in Haifa, conducted by Prof. Eisenstein, head of RBNI. This will be followed by a second symposium in Berlin in 2015, afterwards alternating. In February 2014, President Lavie was invited to deliver the keynote speech at Berlin's Technical University's Israel Day, focusing on Israeli science, the Technion and BDS. At this event, GTS director Marianne Krueger presented funding opportunities to potential students, and invited Technion alumni. GTS established a young DTG-section for all former scholars and German students at the Technion. The new branch will be provided with an individual summer-school or invitations to German-Israeli conferences (alternating).

The Hellenic Technion Society (Greece)

Another year of great difficulties for Greece has passed. This past year the society concentrated on promoting study at the Technion to Jewish youth, and there has been an increase in interest that will hopefully yield results. President Prof. Lavie visited Athens in November, and met with the Minister of Education, who is eager to develop cooperation between Greek universities and the Technion. Prof. Lavie also made a presentation to the S. F. Niarchos Foundation that supports young Greek entrepreneurs working on start-up projects and this was followed by proposals to the foundation to collaborate with Technion.

The Israel Technion Society (ITS)

In the past year, the Israel Technion Society (ITS) raised the sum of NIS 31 million (approximately \$9 million). The ITS also continued organizing visits to campus by potential donors, the results of which were reflected in their subsequent contributions to the Technion. The society endeavors to strengthen ties with Technion graduates who are interested in contributing to the Technion for new initiatives and in participating in activities organized by the various faculties.

The following are a sample of the ongoing activities of the ITS:

Since 2005, the ITS has supported the Israeli branch of FIRST, the international youth robotics organization. The organization continues to grow and flourish, engaging thousands of youth throughout Israel in science and technology through robotics. This year, FIRST Israel officially became part of the Technion. Companies such as Israel Chemicals and Oil Refineries Ltd. continue to support two youth programs held at the Schulich Faculty of Chemistry – the **Archimedes Program** which integrates talented and motivated high-school pupils into academic courses, and the **Chemiada Program** – the Israeli version of the Olympics in Chemistry. Many international companies such as Microsoft, Intel, Freescale, Google, IBM and CheckPoint support the Technion through their Israeli branches. They continue to contribute towards laboratories at the Technion, and to provide scholarships for students. In 2013 the **World Motorola Company**, for the fifth successive year, provided scholarships amounting to \$60,000 to students from four faculties.

The Italian Technion Society

Italy is a country in deep economic crisis, with a high rate of youth unemployment (40%). The society is leveraging this reality to promote studies at the Technion and deepen the relationship between Israel and the young generation. Society initiatives in the past year include: Israel University Day in Milan and Rome, February 2013, with over 300 students attending. It should be noted that Italy has the second largest number of students in Technion's International School (after China). On May 1, 2013, a symposium on Italian-Jewish Mathematicians under the Racial Laws was held at the Technion in the presence of the Italian Ambassador and Scientific Attaché, the Apostolic Nuncio in the Holy Land, the mathematicians' descendents, Prof. Lavie, Prof. Golany and many students. In July 2013, Prof Golany visited Rome and had contacts with universities and scientific organizations, and met with the head of the Israeli pavilion at Expo 2015 in Milan in order to propose that the Technion be represented at the exhibition. In November 2013: mission in Haifa of Innovation Lab -- young Italian start-up entrepreneurs and Roma3 university professors. In December 2013: signing of an agreement between the Italian Prime Minister and the Israeli Ambassador (framework agreement) involving Technion, Università Torino, Mauriziano Hospital Torino and Politecnico Torino for the exchange of experience and technology between the two nations. Also during the year, a visit of five Italian universities (Sapienza

Roma, Università Perugia, Università Messina, Università Salerno, Campus Bio-Medico Roma) for agreements on European projects.

The Technion Society of Mexico (Sociedad Mexicana Technion)

This was an active society until the middle of the '90s, when Mr. Max Shein, the longtime president and Technion supporter, passed away. The society was inactive until October 2012, when Markos Achar and Esther Alerhand, with the support of the Israeli Ambassador Rodica Radian-Gordon, took the initiative to revive Technion's presence in Mexico. To launch activities, Prof. Boaz Golany visited Mexico for several days. His visit included a meeting with Mr. Roberto Shapiro, grandson of Mr. Shein; a visit to Colegio Hebreo Tarbut, one of the leading Mexican Jewish schools where Prof. Golany had the opportunity to meet with professors and students from the Jewish community interested in medicine, mathematics and physics; a visit to an important technical university; and a reception for Technion alumni and Jewish community members, hosted by Ambassador Radian-Gordon. Alumni and friends expressed great enthusiasm about the revival of the society and look forward to participating in future activities.

The Technion Society of the Netherlands (TSN)

TSN has continued to develop collaborations with Dutch industry and academia. For example, during the year 2013, multinationals such as FEI and Shell have visited Technion to explore joint research opportunities. Furthermore, an MOU between Technion and Leiden University has been signed, paving the way for cooperation with the faculties of medicine and science. An additional workshop between Technion's Faculty of Industrial Engineering and Management and the Faculty of Economics of the Erasmus University has been planned for January 2014. TSN has also been assisting Technion in finding potential Dutch partners for joint projects within the European framework Horizon 2020. TSN continues to maintain a close relationship with the Israeli ambassador and pro-Israel organizations to promote Technion and its achievements in the Netherlands. With the help of Christians for Israel, TSN has sponsored the installation of two Step-Hear systems to guide blind and visually impaired people on campus. Three board members of our society participated in the 2013 Technion Board of Governors and another member, Prof. G. Krestin, has been appointed to the Technion Academic Committee.

Swedish Technion Society (STS):

The Swedish Technion Society aims to create goodwill for Technion in Sweden and in Swedish academia and industry, achieved mainly through conferences, seminars, exchange of students and researchers, industrial contacts, and, when possible, through fundraising. The society has built an active board consisting of seven members. There are 42 individuals and three companies that are dues-paying members of the society. A planned fundraising event had to be postponed due to a tragic personal circumstance of the board member responsible for fundraising. Instead, the society focused on a seminar on energy and environmental engineering, which took place in February 2014. The Technion scientists who took part in this seminar were Prof. Avner Bruchstein, Prof. Noah Galil and Prof. David Broday. Stefan Stureson, chairman of STS and Jozef Stern, treasurer, participated in the Technion Board of Governors meeting June 2013. STS cooperates with Israel-Sweden Friendship Association and other Jewish organizations in Stockholm and Västerås. STS distributes a bulletin “Från den ljusa sidan” (“Positive News from Israel”) among its members. A new webpage has been launched for STS and also a Facebook page. The web address is www.technionsts.se.

The Swiss Technion Society (STG)

The year 2013 started with a visit to Zurich by Prof. Peretz Lavie, who met the STG board and had meetings with potential donors. He also spontaneously participated in a lecture of the Swiss-Israel Chamber of Commerce, one of several organizations in whose events STG National Development Director, Eduard Rosenstein, participates in order to network for the Technion. At the 2013 BOG in Haifa, former STG President Alfred Baer received an honorary doctorate, which was particularly inspiring for the STG. Jon Medved was guest speaker at a luncheon on July 5, with many young professionals attending. On September 1, the annual STG summer event took place with Prof. Charles Weissmann and many celebrities. On October 29 and 30, STG, for the first time, had a booth at the ETH (Eidgenössische Technische Hochschule Zürich) student fair to promote exchange semesters at the Technion. Together with Israel Ambassador Yigal Caspi, the society visited Switzerland Global Enterprise, the federal organization for promoting exports and imports. Together with ETH we prepared the ground for ETH President Prof. Ralph Eichler to visit Israel and the Technion in 2014. In close cooperation with the Swiss-Israel Society, a highly successful visit to the Technion was organized for 30 young liberal politicians. Smaller events took place with Technion-related people such as Prof. Francois Diederich and others.

Technion UK

A number of high-profile events were organized with the objective of attracting new Technion supporters. A unique event was held at Microsoft London HQ, entitled “Predicting the Future”. Dr. Eric Horvitz, Managing Co-Director of Microsoft Research speaking from Seattle, and Dr. Kira Radinsky a graduate of the Technion, speaking from Israel, enabled the specially invited London audience to discuss the two scientists’ research program that can assist in forecasting future events such as natural disasters, epidemics and escalating violent activity. Prof. Mark Talesnick addressed an entirely new audience of young professionals about his “Engineers Without Borders” program, which was followed by a meeting with the British Israel Parliamentary Group in the House of Lords and a presentation to the newly formed Technion UK alumni group. Nearly 200 people attended the 12th Ron Arad event which was jointly given by Prof. Ehud Behar of the Asher Space Research Institute and Brig. Gen (res.) Prof. Chaim Eshed, head of Israel’s national space program, and Prof. Boaz Golany spoke to the audience about the establishment of the Technion-Guangdong Institute of Technology. This event culminated in a very successful fund-raising appeal which resulted in the purchase of much needed body simulators for the Technion’s medical school.

VIP Visitors to the Technion in 2013 - 2014

PLACE	POSITION	NAME
Ambassadors		
Republic of Korea	Ambassador to Israel	H.E. Mr. Ilsoo Kim
China	Ambassador to Israel	Mrs. Gao Yanping
Finland	Ambassador to Israel	Ms. Mikkola Leena Kaisa
European Union	Ambassador to Israel	Mr. Lars Faaborg-Andersen
Philippines	Ambassador to Israel	Mr. Generoso Calonge
India	Ambassador to Israel	Mr. Jaideep Sarkar
Australia	Ambassador to Israel	Mrs. Andrea Faulkner
Spain	Ambassador to Israel	Mr. Fernando Carderera
Government Officials		
Israel	President	Mr. Shimon Peres
Germany	Mayor of Mainz and delegation	Mr. Michael Ebling
New Zealand	Israeli Ambassador to New Zealand	Mr. Yosef Livne
Costa Rica	Israeli Ambassador to Costa Rica	Mr. Avraham Haddad
Japan	Israeli Ambassador to Japan	Mrs. Ruth Cahanov
Germany	Prime Minister of Brandenburg and delegation	Mr. Matthias Platzeck
France	Mayor of Grenoble and delegation	Dr. Michel Destot
Spain	Mayor of the City of Barcelona	Mr. Xavier Trias
France	Former CEO of the Chamber of Commerce and delegation	Mr. Jean-Claude Seys
China	Governor of Guangdong Province	Mr. Zhu Xiaodan
Israel	Minister of Science, Technology and Space	Mr. Yaakov Peri
Israel	Minister of Education	Rabbi Shai Piron
Taiwan	Deputy Minister of the National Science Council	Prof. Dr. Chung – Yuan Mou
Italy	Mayor of Turin	Mr. Piero Fassino
Israel	Mayor of Haifa	Mr. Yona Yahav

University Presidents, Administration and Academics

Canada	Canadian President of the National Research Council	Mr. John McDougall
China	Provost, Shantou University	Prof. Peihua Gu
Canada	Presidents	11 University Presidents
Germany	President and delegation	Prof. Dr. Bernd Scholz-Reiter
Australia	Director of Office for Research and Development	Mr. Charlie Thorn
China	Vice President USTB	Prof. Sun Dongbai
Mexico	Director of the National Polytechnic Institute	Dr. Norma Patricia Muñoz Sevilla
Australia	Vice President of International and Future Students, Swinburne University of Technology	Mr. Jeffrey Smart
France	President Ecole Polytechnique	Mr. Jacques Biot
Canada	President of University de Montreal and delegation	Prof. Guy Breton
France	President of University of Nice and delegation	Prof. Frederique Vidal
USA	President of the Johns Hopkins University	Roland J. Daniels, MD
Korea	Vice President, GIST	Prof. Kwan Heng Lee
USA	Universities Delegation	Chancellor Brian McCall
UK	Vice Chancellor Leeds University	Prof. Michael Arthur
Switzerland	President EPFL	Prof. Patrick Aebischer
China	President of Hong Kong University of Science and Technology	Prof. Tony F. Chan
Canada	Vice President Ryerson University	Mr. Adam Kahan
Singapore	President Nanyang Technological University	Prof. Bertil Andersson
Taiwan	President of National Tsing Hua University	Prof. Lih J. Chen
Other Special Visitors		
China	Businessman, philanthropist and President, Li Ka Shing Foundation	Mr. Li Ka-shing
China	Director, Li Ka Shing Foundation	Ms. Solina Chau
China	Director, Li Ka Shing Foundation	Mr. Frank Sixt
China	Businessman and Philanthropist	Mr. Zhao Hanqing
Israel	CEO of Partner Communications, Hutchison Telecommunications (with Li Ka Shing Foundation delegation)	Mr. Amikam Cohen