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“Social Responsibilities of Higher Education and Strategic Global Partnership” – that was the title of the 2016 International Presidential Forum of Global Research Universities which met in April in Seoul, South Korea. Organized by the Korea Institute of Science and Technology, it was attended by 82 universities from 35 countries.

In my keynote address which opened the Congress, I proudly shared the history of the Technion and the many contributions of our fine Institution and its incredible community of graduates to Israel’s economy and society. For many years, I told the audience, the Technion was the only Engineering school in Israel and its graduates took the leading role in building the physical infrastructure of the newly established state. I also revealed the origin of Israel’s “start-up nation” identity and the Technion’s major role in this phenomenon. I described how today, the Technion encourages hands-on entrepreneurship and innovation through multiple channels, in order to enhance students’ and graduates’ skills and motivation to engage in initiatives beyond their direct engineering expertise through multiple channels. For example, The Bronica Entrepreneurship Center (BEC) provides consultation, guidance and support to students and young alumni taking first start-up steps. The Technion offers a minor in entrepreneurship and students can pick among several entrepreneurship-related courses.

Beyond education, the BEC offers experiential activities, where students create their own companies and are mentored along the way, to improve and succeed. Among them are the 3DS [3 Day Startup] where students create new companies in ‘fast forward’ mode in 3 days and hackathons and workshops, like the Fintech financial app event, run in collaboration with a leading bank. The jewel in the crown of the experiential activities is BizTEC. This year, 115 teams applied and 35 were accepted to undergo extensive education and mentorship, as they refine their business plans. Graduates of past years raised over $200M in funding rounds and exits. Additional activities entrepreneurial activities include Technion For Life (TFL) run by the Technion Alumni Association, where experienced alumni coach inexperienced graduates. Last year, the Technion also hosted the first Israel-based Falling Walls Lab competition of applied research ideas. Of 42 inventions submitted, 20 were presented in an exciting event and 3 selected to represent Israel in the Berlin competition. Technion graduate student Shani Elitzur won first prize in the Israeli competition and third prize in the global event.
All these important entrepreneurial and innovative endeavors are of immense significance and contribution, however, as I elaborated in South Korea, economic contributions are not the be all and end all of academic institutions’ social responsibilities. Over the years, the Technion has made profound social contributions to the State of Israel and it continues to be a key value and priority. Today, through rich programming, the Technion promotes, advances and actively seeks to create future academic and professional opportunities for many diverse groups in Israeli society. Following is a representative sample:

The Technion Pre-University Education Center’s Unit for Pre-Academic Studies and Youth Division conduct a wide range of programs. Through Ofakim for High-Tech, students from low socio-economic strata in peripheral areas enroll after completing 12 school years and military service, without a matriculation certificate or psychometric exam. Atidim Leta’asiya [Future of Industry] is offered to students from peripheral areas, following full military service, who have completed matriculation studies, but attained low grades and have already taken the psychometric exam. Atidim students are graduates of high schools in peripheral areas who have a matriculation certificate and psychometric exam score, but insufficient grades for academic studies, requiring a year of preparatory studies to improve grades. The Ofanim Science Program encourages scientific and technological studies for 5th and 6th graders in outlying towns by bringing science to them using mobile laboratories.

The Future Scientists and Inventors Program, inspired and endorsed by former President of Israel, Mr. Shimon Peres, is a path to promoting scientific, engineering and technological excellence in Israel. The Technion also offers: Internet Courses, activities through The Harry and Lou Stern Family Science and Technology Youth Center, The ORT - Technion Classroom, the World ORT – Kadima Mada - Anier Program and a Mathematics Summer Camp. Each summer we host Summer Science Activities – a special intensive summer study program, lasting two and a half weeks for 5th to 12th graders from all over the world, aimed at familiarizing participants with academic science studies and with the Technion. This year, 950 students participated in the summer activities in 51 different groups.

The Technion runs programs specifically geared towards inclusion of all populations in Israel: we run programs encouraging girls to study at the Technion; we provide the Ultra-Orthodox community with preparatory and pre-academic programs that allow them to become Technion students. Similarly, we provide equal opportunities for Arab and Druze Students, as well as students from Ethiopian origin – by providing them with enhanced education and intervention programs to decrease dropout rates and cultivate academic excellence, aiming at increasing the
number and quality of minority students in graduate studies. Impressively, each year 65% - 70% of those who complete the Unit for Pre-Academic Studies enroll at the Technion. All this rich programming clearly demonstrates that the Technion continues, as it has done since its establishment, to fulfill its double responsibility: cultivating both academic and research excellence alongside upward mobility and inclusion of all groups of society. Each individual who is capable and willing to put in the necessary hard work and effort to acquire an academic degree, will encounter opportunities for self-advancement, a meaningful career and significant membership in the Israeli economy and labor force.

My participation in the University Presidents’ summit was a culmination of a very busy 2015/16 in the Technion, rich with events and achievements. Here are some of the highlights of 2015/16 about which you can read in the current report:

Faculty Recruitment – We’ve set an ambitious goal of increasing the number of faculty to ~600 by 2020 without compromising the quality of the new recruits. During the last academic year, we recruited more than 30 new faculty. We plan to continue recruiting about 25-30 new faculty each year until 2020. Two examples of outstanding new faculty are the two full professorships in cancer research. We have recruited Prof. Zeev Ronai, who served as the Scientific Director of the Sanford-Burnham Medical Research Institute at La-Jolla, San Diego and Prof. Eyal Gottlieb, Director of the Cancer Metabolism Research Unit at the Beatson Institute in Glasgow, UK.

Public Affairs and Resource Development (PARD) - This year, Technion has set new records in international visibility and fundraising achievements. PARD, using its own staff and extensive global network of volunteers and professionals orchestrated these efforts. Funds raised through this network reached an all-time high of over $100M; I commend the PARD team for this outstanding achievement.

American Technion Society celebrates 75 years – Since its founding in 1940, the ATS has raised more than $2 billion in support of the Technion. Its 75th birthday is an important landmark.

The Changing Landscape - Second to human capital, the physical area of the campus is the Technion’s most valuable asset. Alongside constructing new buildings, facilities and
infrastructures, we invest great effort in upgrading the current assets. New undergraduate dormitories will be ready in 2017, adding 500 more beds to the existing 4200, and soon we will start upgrading the visitor’s center and modernizing the Technion gates.

Globalization – International visibility continues to be a major strategic goal of the Technion. During 2015/16 we have seen progress and development both in the West – in New York, with the Jacobs Technion-Cornell Institute - JTCI and in the East, in China, with the Guangdong Technion Israel Institute of Technology - GTIIT. Both campuses will be inaugurated in the fall of 2017. The first JTCI class graduated in May 18, 2016. The Vice President for Strategic Projects (VPSP) reports details of progress on the Guangdong Technion Israel Institute of Technology GTIIT project, and Technion International programs.

Changes in Senior Technion Administration – Prof. Hagit Attiya from the Faculty of Computer Science has replaced Prof. Gadi Schuster as VP for Academic Affairs, and in September Prof. Moshe Sidi will complete his term as Senior VP and be succeeded by Prof. Adam Shwartz from the Andrew and Erna Viterbi Faculty of Electrical Engineering, currently Director of JTCI.

On a personal note, running the Technion is a team effort. During the last 7 years I have enjoyed leading an incredibly dedicated and talented team. Nothing could have been achieved without their contribution.

Prof. Peretz Lavie
June, 2016
Technion Governance - 2016

Lawrence Jackier - Chairman of the Board of Governors

Gideon Frank - Chairman of the Council

Technion Management

Prof. Peretz Lavie - President
Prof. Moshe Sidi - Senior Executive Vice President
Prof. Hagit Attiya - Executive Vice President for Academic Affairs
Prof. Wayne Kaplan - Executive Vice President for Research
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. Yachin Cohen - Dean of Undergraduate Studies
Prof. Ben-Zion Levi - Dean of the Irwin and Joan Jacobs Graduate School
Prof. Moris Eisen - Dean of Students
Prof. Zeev Gross – Dean of the Azrieli Division of 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. Anath Fischer - 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
Zehava Laniado - Deputy Director General for Operations
Dganit Shindelman - Deputy Director General for Finance
Ariel Hazan – Deputy Director General for Human Resources
Heads of Academic Units

Prof. Yaakov Cohen - Faculty of Aerospace Engineering
Prof. Yehuda Kalay – Faculty of Architecture and Town Planning
Prof. Yehuda Assaraf - Faculty of Biology
Assoc. Prof. Amir Landesberg – Faculty of Biomedical Engineering
Prof. Yuval Shoham - Faculty of Biotechnology and Food Engineering
Prof. Gideon Grader – Wolfson Faculty of Chemical Engineering
Prof. Noam Adir – Schulich Faculty of Chemistry
Prof. Oded Rabinovitch - Faculty of Civil and Environmental Engineering
Prof. Irad Yavneh - Faculty of Computer Science
Prof. Yehudit Dori - Faculty of Education in Science and Technology
Prof. Ariel Orda – Andrew and Erna Viterbi Faculty of Electrical Engineering
Prof. Efraim Lev - Department of Humanities and Arts
Prof. Avishai Mandelbaum – William Davidson Faculty of Industrial Engineering and Management
Prof. Eugen Rabkin - Faculty of Materials Science and Engineering
Prof. Eli Aljadeff - Faculty of Mathematics
Prof. Yoram Halevi - Faculty of Mechanical Engineering
Prof. Eliezer Shalev – Ruth and Bruce Rappaport Faculty of Medicine
Prof. Assa Auerbach - Faculty of Physics

Technion International School
Prof. Anat Rafaeli - Head of the Technion International School

Center for Pre-university Education
Prof. Dan Zilberstein – Head of the Center for Pre-university Education

Joan and Irwin Jacobs Technion - Cornell Institute
Prof. Adam Shwartz - Director, Joan and Irwin Jacobs Technion-Cornell Institute

Guangdong Technion - Israel Institute of Technology
Nobel Laureate Aaron Ciechanover - Vice Chancellor
Academic Affairs

Prof. 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.

Faculty Recruitment

Recruiting and retaining excellent young faculty members remains one of the most important challenges facing the Technion. During recent Board of Governors meetings, the Executive Vice President for Academic Affairs reported on the efforts to facilitate the recruitment process and to make it possible for the Technion to enlist the best faculty. We have set an ambitious goal of increasing the number of faculty to around 600 by 2020 without compromising on the quality of the new recruits. During the last academic year, we recruited more than 30 new faculty and it is likely that we will recruit the same number during the current academic year. We plan to continue recruiting about 25-30 new faculty each year until 2020.

To continue recruitment at this rate, the faculties are using widespread advertising and proactive recruitment. The Technion participated in very successful career fairs in the past 6 years in the Boston area, and have identified several excellent candidates. The Technion has made several Postdoctoral fellowships available to excellent candidates, who will hopefully be future recruitments as faculty members. In particular, 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 10 years, and they will then be recruited as faculty members (if they excel during their post-doctorate period).

The Technion has established several interdisciplinary programs, as well as special programs in nanotechnology, life sciences, autonomous systems and energy programs, which allow the increase in the number of faculty members recruited. This increase is also supported by a long-term policy implemented by the government of Israel, to provide significant additional resources to the Technion, for example, through the I-Core framework, supported by VATAT.

Fundraising programs like the renewed Leaders in Science and Technology Program, the Zuckerman Scholars Program in STEM Leadership (for which an agreement was signed a few months ago), and various Career Advancement Chairs, support the recruitment of excellent faculty members.

These programs offer support, infrastructure and equipment for 6-9 outstanding young faculty members each year, and they played an important role in ensuring that this excellent crop of brilliant young faculty members chose the Technion over attractive offers from other universities or industry, abroad and in Israel. It took significant efforts on behalf of faculty deans and Technion management, as well as substantial resources, to make this a reality.

The brilliance of our young faculty members is evident from the fact that each year, several of them win various prizes and distinctions, including the prestigious Allon Fellowship. This year, three of our new faculty members won this Fellowship:

**Assistant Prof. Yaron Fuchs** from the Faculty of Biology, received his PhD at the Technion. He returned to the Technion after being at the Howard Hughes Medical Institute at the Rockefeller University. His research studies stem cells that are responsible for replenishing different tissues in our bodies. Yaron seeks to elucidate novel stem cell populations and understand how cellular suicide regulates the function of these fascinating cells. His research has potential applications for cancer therapy and regenerative medicine.

**Assistant Prof. Reut Shalgi** from the Rappaport Faculty of Medicine, obtained a PhD in Biology from the Weizmann Institute of Science in 2009. During her time as a postdoctoral fellow at MIT, she received the EMBO and the Machiah foundation postdoctoral fellowships. Reut is interested in the dynamic interactions of chaperones and the ribosome, their regulation in various conditions, and their influence on translation dynamics. She has discovered a novel mode of translational regulation, *Ribosome elongation pausing*, which occurs when cells undergo a proteotoxic stress and is mediated by chaperones and their interactions with the ribosome.

**Assistant Prof. Matthew E. Suss** from the Faculty of Mechanical Engineering has obtained a PhD in Mechanical Engineering from Stanford University in 2013. After spending three years as a Lawrence Scholar in the Lawrence Livermore National Laboratory, he was a Postdoctoral Associate in the Department of Chemical Engineering at MIT. His research interests lie in developing next generation systems for energy storage and water purification. Matthew developed a novel water desalination technique, with patents pending worldwide.

This year, two past winners of the Allon Fellowship earned the prestigious national Krill Prize from the Wolf Foundation, awarded for excellence in scientific research to untenured faculty members:

**Assistant Prof. Keren Censor-Hillel** from the Faculty of Computer Science obtained a PhD in Computer Science from the Technion in 2010. After a post-doc at MIT, she joined the Technion in 2013. Keren studies the principles of distributed
computing. Her main goal is to form unifying frameworks that distill the essence of the tasks that need to be solved, in order to create a solid base for designing real systems.

Assistant Prof. Netanel Lindner from the Faculty of Physics, obtained a PhD in Physics in 2009, and joined the Technion in 2012 after a post-doc at CalTech. Netanel's research program combines condensed matter physics and quantum information theory. He explores the capacity to control and manipulate quantum matter, whose ultimate form is the ability to perform quantum computation.

The retirement of faculty members offers an opportunity for the Technion to recruit the most brilliant and innovative minds. Excellent academic institutes, domestic and international, are courting these people, and the Technion is facing tough competition. To attract talented faculty members, the Technion offers substantial start-up packages for equipping a laboratory shortly after the arrival of the new faculty member. New recruits have a reduced teaching and administrative load for the first 2 years. To ease the transition to a faculty position, the Technion offers generous help with relocation costs for new faculty members and their families, as well as on-campus housing at the Stanley Shalom Zielony Graduate Student Village for the first few years. In many cases, the Technion helps to identify employment opportunities for spouses.

One tactic for hiring excellent faculty members is to attract people who already have an academic position elsewhere. This year, we have recruited three mid-career faculty members at an Associate Prof. rank: Alex Bronstein joined the Faculty of Computer Science from Tel Aviv University; Anat Levin will join the Viterbi Faculty of Electrical Engineering from the Weizmann Institute of Science; and Carl Martens joined the Faculty of Architecture and Town Planning from Radboud University (Nijmegen, Holland).

To advance the cutting-edge research at the Technion, we significantly increased the number and the academic quality of foreign scientists who come to the Technion for their Postdoctoral training. Indeed, the number of non-Israeli post-docs tripled since 2008/9, and there is a marked increase in their academic excellence. We plan to continue along this trajectory in order to reach 500 foreign post docs in 2020.

Figure 1. New appointments vs. retirements and departures (* up to date).
International Review Committees

This year (2015), two types of International Review Committees provided evaluations of Technion Faculties; three were initiated by the Technion (the Faculties of Industrial Engineering and Management, Materials Science and Engineering and Aerospace Engineering), and the other two by the Council for Higher Education (CHE).

Faculty of Industrial Engineering and Management
The Committee, headed by Prof. David D. Yao (Columbia University) convened in April 2015. The Committee concluded that the Faculty “is an active and vibrant group within an eminent research university”. The Committee recommends to vigorously continue pursuing the launch of the new DSE (Data Science and Engineering) program. The Committee also advises to build the Startup MBA program as a distinctive and distinguished program. Finally, it is advised to re-examine the current organizational structure from a strategic planning perspective, while rebalancing staffing and other resources.

Faculty of Materials Science and Engineering
The Committee, headed by Prof. Gregory S. Rohrer (Carnegie Mellon University) convened in May 2015. Here too, the report praises the vibrant and excellent department, with national and international leadership
The Committee also points to the fact that the department is undersized in terms of faculty and graduate students. Internal and cross-campus collaboration are questioned, and related to issues of joint appointments and co-supervision of students. Another important recommendation is the establishment of a single MSE degree as opposed to the current dual degrees in Materials Science and another discipline.

Faculty of Aerospace Engineering
The Committee, headed by Prof. Peretz P. Friedmann (University of Michigan) convened in May 2015. The Committee praises highly the department, its faculty and their achievements. The unique

Figure 2. Number of Postdoctoral researchers 2008-2015.
national character of the department is outlined. But in view of recent evolutions in the field, the Committee notes that the department will have to adjust by hiring new faculty and staff, reflecting on the (obsolete) current group structure, and establishing a strategic development plan. Likewise, the Committee notes the dated nature of the Aerospace facilities by comparison with other departments at Technion.

**Business Administration and Management Study Programs**

This CHE review Committee convened in August 2015 under the leadership of Prof. Russell Winer (NYU). The report expresses a very positive view of the Faculty of Industrial Engineering and Management. The need for a strong business school, modelled after the world leading programs, is emphasized, outlining the Department’s ambivalence on this issue. The current state of the MBA program is discussed, and recommendations are made to either establish a strong MBA program, or adopt Stanford’s model of an M.S. in Industrial Management.

**Electrical and Electronics Engineering**

This CHE review Committee convened in January 2016 under the leadership of Prof. Alan Oppenheim (MIT). As of today, the report has not been received.

**Changing the Program of Medical Studies**

In the current 2015-2016 academic year the new Science program has started with 152 students (Sechem 92) together with Medicine program of 57 students (Sechem 93 and minimal MOR 211).

In the new curriculum, courses have been added to emphasize areas of exact sciences. All these are in addition to the revisions and modification of syllabi in all other courses. We believe that the content of this new program facilitates a unique medical program that will educate a new generation of physicians with broad knowledge and understanding of modern technology and basic sciences, with a drive for carrying out research and an ability to face the challenges posed by the modern medical arena.

The second year program of the new curriculum has started. These include totally new courses:

**First semester:** Molecular Biology, Human Genetics, Introductory to Project Planning Management, Philosophy for Life Sciences.

**Second semester:** Molecular Basis of Cancer, Evolution, Cellular Physiology, Development Biology.

**Training High School STEM Teachers – The MABATIM Program**

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 the MABATIM (Views) program. MABATIM is a tuition-free program, over two years part-time, for former graduates of the Technion who wish to obtain an additional BSc 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 third and fourth years – with about 300 Technion graduates enrolling in the 2015-16 academic year. About 50 students have already graduated, and most of them are employed as science, mathematics, and technology teachers in Israeli junior-high and high schools. Starting in the 2016-17 academic year, an additional program – MABATIM for Masters – will be launched for excellent Technion graduates, with the prospects of further improving mathematics and science education, as these teachers will be qualified to teach high school students for their matriculations examinations as soon as they start teaching.
Department of Humanities and Arts and Enrichment Studies

Prof. Efraim Lev, seconded from Haifa University, is successfully meeting the challenges as Head of the Department. The “enrichment courses” are proving a great success, amongst which students must choose at least 3 courses (6 credit points) during their undergraduate degrees. Based on the first three and a half years experience, both students and teachers have provided very positive feedback concerning this humanities enrichment program and the approach of the cooperation between the Technion and Haifa University. The Council for Higher Education, in its third 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.

Each semester the Department of Humanities and Arts offers students courses in drawing and art, photography, jazz, orchestra, choir and sports, as well as the wide variety of enrichment courses. The Technion and Haifa University are working to develop a further set of courses for the enrichment program beyond the 65 approved so far. This year alone, 25 courses are being taught by scholars from the University of Haifa and over 50 courses are taught by Technion adjunct lecturers. During the past year (2014 – 2015) more that 4,500 undergraduate students have studied in these enrichment courses.

In addition to the enrichment courses, the success and high demand for the arts, music and sports courses result in the fact that more than 6,000 students take courses in our department per semester.

We are gradually adding requested subjects of interest such as the Philosophy of Science and Technology, by means of introducing new courses and bringing new young talented lecturers to teach these courses, in the Technion.

The department is proud to announce the renewed cooperation with the Italian Embassy in Israel and the Italian Institute of Culture in Haifa. Thanks to this cooperation, high-level professional teaching of the Italian language will again be offered to Technion students in the forthcoming semester. The paper-work has already been filled in and sent to Italy in preparation for the subsequent academic year.

Another successful collaboration which the students will benefit from this semester, is the academic music course offered by the conductor Dr. Roy Oppenheim. As part of the course requirements, students will be invited to attend concerts by the Haifa Symphony Orchestra.

Furthermore, thanks to the support of the Tikva Foundation, seven successful courses dealing mainly with Jewish culture, history and the State of Israel, were added to the courses that the department offers Technion undergraduate students. Following a substantial donation pledged to the music section of this department, purchases are being made for the Technion Orchestra and Jazz band and students are already benefitting.

Center for the Promotion of Learning and Teaching (CPT)

The CPT’s mission is to support and promote the Technion’s commitment to excellence in teaching and learning, to promote cultural shift to student centered learning and to encourage and support pedagogical and technological innovation to improve instruction and to advance student learning.

Learning and Teaching activities: Each year, the CPT provides workshops for new staff (~25/year) and new TA’s (~300/year), individual consultation following class observation for TA’s and staff (especially for those who score lower than 3.5 on their teaching Survey), faculty-tailored workshops on teaching and learning [3-4/year] and workshops for expert TAs [6/year] to increase the involvement of students in class and change the format of the traditional teaching to active learning. Surveys are conducted each semester to gauge the level of students’ satisfaction concerning teaching and assessment.
Evaluation and Exam Center: The center’s main goal is to implement Learning Outcomes Assessment approach (formative assessment) which aims at improving the alignment between teaching and evaluation, especially focusing on large core courses, with special emphasis on first year service courses. The center provides workshops for faculties and TAs, addressing issues such as syllabus design, formulation of learning outcomes and test design. The center promotes the use of alternative assessment by providing help to design and implement rubrics for the evaluation of studio projects lab performance and the use of peer assessment in large courses. The center implemented new technology for exam scrambling, exam grading and statistical analysis of exam results (120 multiple choice exams/semester).

Educational Technology Support: The CPT provides assistance to support the design and the management of Moodle websites for 4000 courses, as well as the development and integration of online and hybrid courses for Technion undergraduate and Coursera courses. We support active learning and peer instruction with clickers (~20 – 25 courses/year). The CPT is also responsible for the production of video lessons for regular courses (~20/year) and for courses intended for Coursera, the International school and the EU Tempus Programme. A multimedia portal was developed to allow easy access and support to all the media services (YouTube, Panopto and the Video Server).

Educational Innovations: Three events were organized to spotlight novel approaches in teaching and assessment including a seminar with Prof. Eric Mazur from Harvard University who gave a seminar on assessment for learning. The center continues to give pedagogical and technological support for the development of MOOCs (~3 courses per year) and flipped classroom.

Mentor Program: The mentor program that has been running very successfully in five faculties (Computer Science, Biotechnology, Chemical Engineering, Biomedical Engineering, and Physics) has been expanded in the fall semester to three more faculties: Electrical Engineering, Mechanical Engineering and Aeronautical Engineering. The effort, which involved 117 mentors, provided assistance in the form of campus information, study tips and just a shoulder to lean on from a “big-brother/sister” to some 650 freshman students (about 30% of the total annual intake). The program was very productive with many freshmen students giving excellent reviews. This year we had in the Bio-Medical department students who had mentors in their first semester becoming mentors themselves. We plan to continue to expand this very successful program next year to additional faculties.

International Student Competitions

Internationally Genetically Engineered Machine (iGEM)
In 2015 the Technion competed for the third time in the iGEM jamboree. iGEM is the leading undergraduate competition in bioengineering, synthetic and quantitative biology, and has become a new paradigm for cross-cultural multi-university undergraduate research and education. In 2015, iGEM celebrated its 11th anniversary, and for the second time a giant jamboree was conducted in Boston, MA during the last week of September. 280 teams from universities world wide participated in the competition, and the Israeli contingency included the Technion and BGU teams as well as two high school teams (Technion - HS and Danziger - Kiryat Shmona). In brief, iGEM requires a group of undergraduate students to devise a synthetic and quantitative biology project, execute it in the lab, and conduct social outreach to examine ethical issues that arise from synthetic biology and to educate the general public. Projects often involve experimental aspects, a theoretical/modeling element, and a software development sub-project.

Our team included 10 students from four different faculties (6 Biotechnology and Food Eng., 2 Chemical Eng., 1 Electrical Eng., 1 Mechanical Eng.). The multidisciplinary team chose a challenging project of trying to engineer the scalp microbiota to secrete an enzyme that can treat male pattern
baldness. Their solution brought to light their respective, and orthogonal backgrounds. The basic idea relied on first identifying the most common bacterium on the scalp (B. subtilis), and then constructing a chimeric protein made of a B. subtilis secretion peptide fused to an enzyme (3α-HSD) derived from rat, which can hydrolyze DHT - the testosterone derivative that is thought to block the blood flow to scalp hair roots. In addition, the students had to engineer another bacterium to deliver the co-factor (NADPH) that is needed to facilitate the reaction on the scalp. Finally, the students designed and printed a special 3-D comb that can deliver the bacteria to the scalp in a user-friendly fashion.

During the past summer the group made substantial progress in proving that their concept can work, and showed that their secreted enzyme can indeed hydrolyze DHT. The group received many accolades and praise from judges during the competition, and won the prestigious Best New Application award, a gold medal, and were nominated for Best New Part, Best New Model, and Best Poster awards.

**AUVSI Annual Competition**

A joint team of students from the Aerospace Engineering (AE) and Electrical Engineering (EE) departments under the supervision of Dror Artzi, an adjunct senior teaching fellow from Aerospace Engineering, developed within 9 months a complete autonomous airborne system. The team participated in the annual competition, organized by the Association for Unmanned Vehicle Systems International (AUVSI) that took place in Webster Field USA on June 2015, and won the 2nd place out of 45 Universities. The airborne system is capable of carrying out reconnaissance missions, target acquisition, communication and dropping payloads on ground targets, all completely autonomously. The development work included aerodynamic configuration and building of two full-scale all composite (Graphite/Epoxy) airplanes in the AE department workshop.

The airplane accumulated many flight hours through which all the system’s components (photographing, computing, communication etc.) were tested. The full design and analysis were performed and presented by the students of the two Faculties in a Preliminary Design Review (PDR). The Technion team surprised the other contestants and the judges by ranking so high in its second time participating in the competition, and by winning the first place in the Technical Report (Journal Paper) that summarized all the development process. The team demonstrated the high academic level of the Technion’s future graduates, and once again showed Israel’s abilities in developing combined systems and unmanned aircraft.

**MOOCs (Massive Online Open Courses)**

The development of MOOCs and MOOC-style courses has become part of the strategy of the Technion and is being managed by the VP for Strategic Projects.

In July 2015, as part of deepening the relationship with COURSERA as well as expanding the creation of MOOCs to new fields in the Technion, we hosted Prof. Daphne Koller. She met with the Technion president and deans and then with specific groups of interested faculty members from the Faculties of Electrical Engineering, Computer Science and Education in Science and Technology.
Following this visit, we conducted a survey among faculty members to evaluate their willingness, as well as the potential incentives required, to develop MOOCs. Based on the results, we approached faculty members who showed interest in this process and as a result of all efforts we currently have four new MOOCs in various stages of preparation and production. They are:

1. **Medical Marijuana for Pain Control - Prof. Elon Eisenberg**, Rappaport Faculty of Medicine in cooperation with **Prof. David Meiri**, Faculty of Biology.

2. **Energy Systems, Power Systems, and Smart Grid, Prof. Yoash Levron**, Viterbi Faculty of Electrical Engineering

3. **Specialization on Creativity – 3 MOOCs, Prof. Shlomo Maital:**
   - Cracking the Creativity Code (online)
   - Action-Driven Business Plan: From the ‘Classroom’ to the World (ready to go online)
   - Innovation: Career Lessons from a Master (with Dadi Perlmutter) (filming)

4. **Managing New Product Development Projects, Prof. Avi Shtub**, Davidson Faculty of Industrial Engineering and Management

This in addition to the ongoing MOOC **Nanotechnology and Nanosensors - Part 1 + Part 2, Prof. Hossam Haick**, Wolfson Faculty of Chemical Engineering

We already have plans for 3 more MOOCs for next year:

- **Three-Dimensional Imaging and Reconstruction – Prof. Yoav Schechner**, Viterbi Faculty of Electrical Engineering

- **Human Embryonic Implantation – Prof. Etiezer Shalev and Dr Rawan Damouni**
  (2 MOOCs-English and Arabic), Faculty of Medicine

- **Sparse and Redundant Representations and their Applications in Signal and Image Processing – Prof. Michael Elad**, Faculty of Computer Science

Meanwhile we have upgraded the recording studio in the Center for Promotion of Teaching, and offered a workshop on “communication via the camera” for four of our MOOC presenters. The workshop was run by Michelle Stein Teer.

A new specialization by Prof. Shlomo Maital is of great promise, as his ongoing MOOC “Cracking the Creativity Code” has been listed as highly recommended by Class Central ([https://www.class-central.com/](https://www.class-central.com/)).

Ronit Lis-Hacohen, who works with Prof. Feigin, represented Technion at a COURSERA Specialization workshop in California, and attended the COURSERA partners’ conference in The Netherlands in March 2016. Meanwhile the initiative called Shvilei Yeda, to provide a centralized facility for universities to produce MOOCs, was dissolved. In its place, the Center for Learning Technologies (“Meital”), part of the Inter University Computing Consortium (IUCC), is trying to establish a support system that will encompass producing online learning resources.

Prof. Danny Lewin continues to extend his use of the “flipped classroom” format and received the coveted Yanai Prize for 2015 for his innovative teaching methods.
Programs for Ultra-orthodox Students

Pre-preparatory and Preparatory Programs
In order to be accepted into these programs, the students must be "Haredim" according to the definition of the Ministry of Education. The programs are marketed by the Pre-academic Unit’s staff in cooperation with an external representative who is familiar with the various ultra-orthodox frameworks. The male students undergo a four-month pre-preparatory program. After these four months, the eligible candidates are accepted into the 10-month preparatory program run by the Unit for Pre-Academic Studies. The weaker candidates are referred to the preparatory program of the School for Practical Engineers on the Technion campus. At the Technion campus there are currently about 41 male and 11 female students enrolled in these programs. At the Bnei Brak College for religious students there are about 42 male students enrolled in similar programs.

Academic Studies
The students who successfully complete the Preparatory course in Bnei Brak are accepted to continue their studies in geo-information given by the Civil Engineering department. There are currently 16 such students in their third and final year of this course, and another 24 students in their first year of this program.

Students who complete the Preparatory course at the Technion’s Pre-academic Unit with sufficiently high grades are accepted as students in various departments at the Technion. Those students who complete the program with lower grades are accepted to the School for Practical Engineers on the Technion campus.

There are currently 13 male students in their second year of academic studies, 10 male students in their first year of academic studies, and 4 female students in their first year of academic studies. These 27 students are spread out over about 7 different departments, including medicine.

All the above programs are supported by the Technion as well as by the non-profit organizations KEMAH and Atidim HALAMISH.

The Haredi Program of the Technion Pre-academic unit is active on two campuses
Mivchar College campus in Bnei Brak
Group A: 17 of the 24 students who began the introductory course completed it successfully. Of these, 16 students continued their studies toward a B.Sc. degree in geoinformation, one student continued in medicine.

Group B: All of the 28 students who began the introductory course completed their studies successfully, of which 24 continued toward a B.Sc in geoinformation.

Group C: [the current group] 21 students are in the second semester in the Unit for Pre-Academic Studies and are planning to continue their studies toward a degree in geoinformation.

The course is taught in the Mivchar College by male instructors. The Director of the Unit for Pre-academic Studies visits the college weekly and deals with academic issues related to course content and any other issues that may arise.

Marketing of the course is the responsibility of the Mivchar College.

Technion Campus
Haredi pre-academic studies at the Technion are divided into male and female classes and are taught by men and women instructors respectively.

At the Technion campus this year, the third course for men and the second course for women are in progress.
Haredi Program for Male Students
First course: 19 of 25 students who began their studies in the Unit for Pre-Academic Studies successfully completed the program, and 13 of these students continued their studies at Technion.

Second Course: 20 of the 25 students who began in the pre-academic center completed the program successfully and 11 of them continued toward a B.Sc. at Technion.

Third Course: 18 students are currently in the second trimester of the program in the pre-academic unit and it is expected that they will continue toward a B.Sc. degree at Technion.

Haredi Program for Female Students
Female students in the Unit for Pre-academic Studies learn in classrooms in the Faculty of Education in Science and Technology. Currently, the first group of students has completed the course and some of them are studying for degrees at Technion, the second group of students has begun the course.

First Course: 11 of the 19 students who began studying in the Unit for Pre-Academic Studies completed the course successfully, eight students continued toward a B.Sc in the Technion.

Second Course: 13 students are currently in the second trimester of the program and intend to continue their studies at Technion.

Following studies in the preparatory course the weaker students are permitted to the School for Practical Engineers.

The haredi students (male and female) are accompanied by a counselor who has been chosen especially for this job and who maintains an ongoing interaction with the students.

The students receive both individual and group tutoring.

The course of study is the same as in the regular Unit for Pre-academic Studies and all students take the same examinations.

Approximately 65% - 70% of those who express an interest in the course eventually begin to study in the Unit for Pre-Academic Studies.

Dropouts from the course: The course is intensive. The prepreparatory courses begin in the early afternoon hours and continue for 6-7 hours. In the pre-academic unit, studies begin in the morning and end in the evening.

Participation in this framework leaves no time for work, and consequently there is an incremental dropout rate as the course continues. The two main issues related to dropping out are academic challenges and financial hardship.

Students are financially supported by a scholarship of NIS 1300 per month given by the Technion as well as outside sources such as Halamish-Atidim. In addition, the pre-academic unit supports a number of students from its own scholarship fund.

The process of acceptance to the Technion is carried out in cooperation with the dean and the undergraduate staff of the Technion. Students are accepted based on the Unit for Pre-academic Studies grades without the psychometric examination scores. There are 100 students in the pre-academic unit and in the prepreparatory course combined.
<table>
<thead>
<tr>
<th>Actual Acceptance Procedure</th>
<th>Actual Acceptance Procedure to Technion</th>
<th>Acceptance to Technion</th>
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<tr>
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<td>Pre-academic unit certificate + Psychometric examination</td>
<td>M</td>
<td>Preparatory course and Pre-academic unit toward Faculty of Geo-information</td>
<td>Mivchar*</td>
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<td>2014-2015</td>
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</tr>
</tbody>
</table>

Comments:
* Studying in the third semester.
** Studying in the first semester in the Technion.

**Equal Opportunities for Arab Students**

Minority affairs have been given a top priority at the Technion in recent years. The Assistant to the Senior Vice President for Promoting Minorities at the Technion continues advancing a very well advanced intervention program among minority students at the Technion. The major aims of this program in 2015 were to decrease drop-out rates among minority students and to enhance academic excellence. Moreover, a major goal of the current program is to increase the number and quality of minority students in the graduate school. Importantly, huge efforts and various resources have been allocated in order to promote employment among minority undergraduates. The Assistant to the Senior VP for Minority Affairs conducted a new study among minority and the rest of the students at the Technion aiming at figuring out the profile of the excellent as well as the drop-out students. Eventually, this study aims to help us promote minority success and excellence at the Technion.
Undergraduate Studies

This year we continued the effort to implement the recommendations of the Committee for Review of Undergraduate Program Structure and Study Load, in order to affect a positive impact on the undergraduate learning experience at the Technion. The academic semesters were shortened by a week to 13 weeks of studies, with suitable adjustment to the syllabi of most courses. This allows both examination cycles of the winter semester to be carried out between the semesters, so as to minimize disruption to the studies in the spring semester. Most academic and administrative issues related to the narrowing of the teaching and examination periods were tackled, yet future adjustments will be considered.

In the current academic year we implemented the recommended measures aimed at improving levels of basic mathematics and science subjects of incoming students. Students were advised in advance about the need to pass classification examinations in mathematics, physics and chemistry (for relevant faculties) by those lacking a sufficient high-school record, before beginning academic studies in these subjects. Preparatory internet-based courses in were made available, and in-class sessions were provided. Several examination periods were also offered. Preliminary evaluation of this process is currently being conducted.

The faculties continue the effort to review and improve their disciplinary academic program and maintain ongoing activities in conjunction with the Center for Promotion of Learning and Teaching, and its Evaluation Center, to improve teaching and evaluation methods on an individual basis as well as by workshops. A pilot trial of a novel “Grade Management” scheme was started, to provide teachers with information on past history of the course to enact better stability of the grading.
On the administrative side, the service provided by the centralized unit for scanning examinations was further extended to the majority of faculties, with full coverage expected next year. A student accessibility center will be opened shortly, in conjunction with the Dean of Students and the Student Promotion Unit. It will include spaces for counseling, studies, and examination (computerized), as suited for students with disabilities. Ceremonial robes with the Technion colors are now provided for undergraduate students at their graduation ceremony.

Number of students 2015/2016
Irwin and Joan Jacobs Graduate School

The main goal of the Graduate School is to strengthen the Technion’s standing as a leading research university. To achieve this goal we need a significant increase in the number of research students in general, and PhD students in particular, doubling the PhD student body by 2021.

An “unhealthy” ratio of PhD students per faculty member (~2) was reported in last year President’s Report to the BOG. As of March 2016, the PhD student body is 1,188 and the number of faculty members is close to 560. The ratio is slightly higher in science oriented Faculties and lower in engineering Faculties. Additionally, in the past five years, the total number of graduate students was similar to the figures presented in last year’s report. Yet, some changes in the composition of the graduate students was noted, a slow decrease in the number of MSc students with thesis, with a concomitant slow increase in the number of PhD students.

It is estimated that the graduate student body was not significantly changed due to a national steady-state level among the seven research universities in Israel. The slow increase noted, might reflect the annual growth rate of the Israeli population.

This year’s report focuses on steps taken by the Graduate School to increase the number of graduate students (particularly PhD students), and diversify the graduate student base by attracting more applicants from other Israeli universities and from abroad.
"i) Proactive approach to encourage more MSc (with thesis) students to move to the direct PhD track"

New guidelines were approved by the Technion senate during the last academic year. MSc students are considered to be PhD students once their candidacy for move to direct PhD track is approved by the academic unit as well as by the Graduate School. This resulted in a change in the students' self-perception, as well as entitling them to an immediate raise in their scholarship level and an increase in their teaching assistant’s salary.

A sharp increase in the number of MSc students moving to a direct PhD is evident in the above chart during the academic year of 2013-14 when the new guidelines were implemented. However, this trend is not seen in the 2014-15 academic year, and the number of students admitted to the direct PhD track decreased compared to previous years. Interestingly, after four years of gradual reduction in the number of PhD applicants, an increase is evident in the academic year of 2014-15 (from 130 to 160).

Additionally, the chart below indicates that the total PhD student number is increasing at a slow pace. At this rate, it may take more than ten years to double the number of PhD students and thus more proactive steps are needed.
ii) Reducing the number of required courses in interdisciplinary study programs or Faculties with interdisciplinary research programs

Modern research is characterized by interdisciplinary collaborations. Consequently, there are increasing numbers of graduate students who turn to research areas different than that of their undergraduate specialization. These students were obliged to take a much higher load of required courses in comparison to the load of required courses, had they not opted to continue their education in an interdisciplinary study program. For example, students coming from a three year BA study program had a load of 20-30 credits of prerequisite courses instead of 30 graduate credits when pursuing a degree in the same areas as their BA specialization track. As a result, students avoided such programs and those who chose such programs complained about the heavy course load. Such programs suffered from the fact that many excellent students avoided this career path.

To resolve this, the number of prerequisite courses was reduced to 10 credits and accordingly the MSc title was changed from an engineering degree to a science degree. It is anticipated that this change will encourage students coming from science oriented Departments such as Physics, Chemistry and Biology, to turn to interdisciplinary studies in Interdepartmental/Engineering Departments at the Technion. Also, in addition to the compulsory graduate courses, some students were required to take undergraduate courses as well. These are usually undergraduate courses that are quite demanding and challenging for graduate students coming from other disciplines.

This may result in a lower GPA, which might not meet the required GPA for moving to the direct PhD track. New graduate school guidelines enable the academic units to exclude these supplemental course grades from the GPA of the MSc degree. This change in guidelines enabled more outstanding students who modified their specialization track to be eligible for moving to the direct PhD track.

iii) Increase in scholarship level

Scholarship level at the Technion is not the same for all graduate students. They vary from four to six monthly portions per student. Each monthly portion for a PhD student is equivalent to 1280 NIS. To stay competitive, the Technion should gradually increase its scholarship level. Indeed, the Technion is on the right track. It is clear that since 2010 until today there is a significant reduction in the number of students who receive the minimum four scholarship portions. The number of those receiving five portions is stable, while the number of students receiving six portions is increasing and the number of those receiving seven portions was even doubled. This is a welcome change in the right direction, however, in order to be even more competitive the Technion should top the scholarship level of other universities such as Weizmann Institute that allocate an equivalent of six portions to all its PhD students. The graduate school has recently changed its policy to enable the academic units to allocate up to eight monthly scholarship portions to outstanding PhD students. That said, in order to stay competitive it is highly recommended that the basic scholarship for most PhD students, especially after passing the candidacy exam, will be six portions.

![PhD Students Scholarship Level](image-url)

1 monthly Portion = 1280 NIS = 320 USD
iv) Intensive recruitment of international students – Graduate study programs to be taught in English.

Last year’s Graduate School report to the Board of Governors elaborated on the fact that the number of research graduate students at the Technion is increasing at a very slow rate, and that the low ratio of PhD students to Faculty members is not healthy for a research university such as the Technion. Furthermore, job opportunities for PhD level graduate students in certain disciplines in Israel are limited. The bottom line was: “the Technion should open its gates and be more attractive to international students seeking graduate studies at the Technion, which is ranked very highly among the world’s leading technical universities”. To achieve this goal, the Technion graduate study programs and the Technion campus should become ‘internationally student friendly’.

- The Technion must offer graduate studies in English. Currently, the official teaching language is Hebrew, and teaching in English is based on the willingness of the lecturer and/or the students. While some departments are committed to teach in English, not all departments are able to impose teaching in English and therefore the Technion must use a proactive approach and change the academic guidelines. Switching to teaching in English is in-line with the globalization policy of the current Technion management. Clearly, transition from teaching in Hebrew to English should be implemented gradually. Yet, the decision in favor of teaching in English should have been made already.

- Encourage more faculties to teach in English. The Graduate School proactively encourages more Faculties to commit to teaching in English. Currently, seven Faculties committed; Chemistry, Chemical Engineering, Biology, Physics, Aerospace Engineering, Education in Science and Technology, and Materials Science and Engineering. Unfortunately, the larger Faculties are not yet committed to teaching in English.

- Flexible policy in the requirement for GRE examination. In general, all PhD students who studied abroad are required to take the general GRE examination. However, MSc students with thesis, holding a degree from a renowned university with an excellent research record may be exempt from this requirement provided that the potential Technion advisor interviewed them and positively reviewed their MSc thesis or publications. This is in addition to submission of three excellent recommendation letters, including from the MSc advisor. This conditional GRE
exemption, places the Technion in a similar position to top-notch European universities that do not demand such GRE tests from potential excellent European graduate candidates.

- **Creating a friendly atmosphere for international students.**
  - **Graduate school website** – a new website was launched last summer. It is updated frequently and contains all relevant information for graduate students.
  - **International students are exempt from taking Hebrew language courses** - Until recently, graduate students who did not graduate from an Israeli university or high school, were required to take two basic Hebrew language courses. This requirement was waived. However, it was not accompanied by the availability of campus wide graduate studies in English as anticipated at that time.
  - **E-mail contact in English** – Most correspondence with international applicants and the registration process is held in English. However, the Technion computer main-frame system is very old and should have been replaced a decade ago. Therefore, only some “important correspondence” concerning fellowships are e-mailed in English to international students. To bridge the gap, each e-mail includes a headline stating: “for an English version, please send request by replying to this letter” and we translate each e-mail accordingly.

- **Technion International** – Technion International assists the international students from day one by providing them with an Israeli guide who accompanies them upon arrival and helps them in getting around the Technion’s campus and their initial arrangement of life in Israel (shopping, banking, cellular connection, etc.). All international students are welcome to participate in extracurricular activities offered by the Technion International Center that are held mainly during the weekends.
- **Accommodation** – Currently, all international students qualify, upon request, to accommodation at the Technion dormitories, located on-campus. This is not the case for Israeli students. Only 25% of the Israeli graduate student applicants are granted with dormitory accommodation on-campus. If no additional graduate student accommodations are built in the near future, the Technion International Center should prepare to professionally
assist international students with rental opportunities in Haifa. The Technion should be the guarantor for the international student, holding their last month scholarship as collateral. Finally, the Technion dormitory website should be translated to English.

- **Graduate student seminars** – Close to 90% of all research theses are submitted in English. We encourage all our graduate students to deliver their final departmental research seminar in English. Additionally, in order to create a vibrant international atmosphere that is more suitable for the ‘Y generation’, the Graduate School lecture series “Plenty New Under the Sun” (usually delivered in Hebrew with a limited audience) was replaced by a new lecture series event in a “TED talk” like format named “Tech-Talks”.

This half-day event is held each semester and includes eight short talks in a TED lecture format. Each event includes two sessions with different topics. Each topic covers research areas shared by several academic units. Each session consisted of four 12 minute talks with five minutes for questions and comments. The audience voted on-line for the best presentation. The top three presentations received modest prizes of 1000, 500 and 250 NIS (250, 125 and 62 USD), respectively. These lectures are taped and uploaded to the Technion’s YouTube channel. This type of event is promoting an exchange of ideas between students coming from different academic units and working on related research areas. Naturally, it will attract more students and faculty members at the same time and raises the bar for research excellence. These lectures are held in English and therefore promote an international atmosphere.
Technion International & Strategic Projects

The main task of the Vice President for Strategic Projects (VPSP) Office, established in November 2013, has been to advance the Technion Guangdong Project in China: namely, the establishment in the city of Shantou of the “Guangdong Technion Israel Institute of Technology” (GTIIT or Guangdong Technion) as it has been officially named by the Chinese authorities. This new institute will be established as a joint venture with Shantou University (STU). In April 2015 the Ministry of Education of the PRC (MOE) approved the “preparation” of the new university. This allowed the governments of Guangdong Province and Shantou City to allocate funds and commence the building of the new campus. A very festive Cornerstone Laying Ceremony was held in Shantou on December 16, 2015, in the presence of dignitaries from Israel and China, as well as many guests from the Technion and its supporters from around the world.

The VPSP Office is also responsible for Technion International, reported on below.

Jacobs Technion-Cornell Institute (JTCI)

In 2010 Mayor Bloomberg (New York) started a competition for a technological campus that will catalyze the startup eco-system, specifically around digital technologies. Cornell (as lead) and Technion (as partner) won the competition, and established Cornell Tech - a graduate school. The new campus is operating in the Google building, and will move to its new campus -now under construction at Roosevelt Island - in summer 2017.

The Jacobs Institute is a key component of Cornell Tech. It is a partnership of two leading academic institutes - Cornell and Technion - and as such places excellence in research.
and education at the top of its priorities. It participates in Cornell Tech’s mission of creating leaders and technologies for the digital age. The Jacobs Institute constitutes a quarter to a third of Cornell Tech in various metrics, including number of faculty members, students and budget. The Jacobs Institute is charged with pushing the emerging frontiers of the digital age, and bringing a global perspective to Cornell Tech. The first mission - of pushing the boundaries - is enabled by the Technion-Cornell partnership in Jacobs, and by Jacobs unique legal status as a separate non-profit. These enable Jacobs to experiment, beyond the comfort zone of academia. The global perspective includes, first and foremost, building comprehensive collaborative relations between Technion and Cornell - which are especially manifested at Cornell Tech.

During the 2015-2016 academic year the Jacobs Institute recruited a new faculty member - Nicola Dell - specializing in technologies for underserved communities. We are now in the middle of recruitment season for additional faculty members. We expect the Jacobs Institute to recruit 1-2 new faculty members each year - and as per our Founding Agreement, about half of our faculty have Technion as their academic home.

In the 2015-2016 academic year the Jacobs Institute offered two concentrations, within its Master of Science in Information Systems degree: Connective Media and Health Tech. This is a two-year, dual degree - the students are both Technion and Cornell students. The first cohort of Connective Media students consists of a dozen students, who will graduate in May 2016. The second cohort - of 21 Connective Media students, and the first cohort of half a dozen Health Tech students - are now completing their first year of studies. We are now in the process of recruiting students for both concentrations for the academic year 2016-2017, and we expect to grow. As part of their education, Jacobs students spend two weeks, during their second year, in Israel, in a trip combining education and introduction to Israel. During this past January the students spent eight days in Technion laboratories doing projects, together with Technion students, heard lectures from Technion faculty and interacted with Technion students. In addition, they participated in tours of Jerusalem, Massada, and the Dead Sea area, together with 45 MBA students from Cornell Tech.

Our “Startup Postdoc” Runway is a unique program allowing aspiring entrepreneurs - with a PhD - to convert deep technology into impact on the world. We are now recruiting to the fourth cohort. Of the first cohort - which started January 2014 - we now have two companies that raised considerable funding (one is a Technion PhD), and by the time of this meeting of the board, both would have launched deep-technology, high-impact products. Additional companies of later cohorts are also showing evidence of potential success. This program continues to evolve, innovate and push out of the comfort zone of academia - in line with the Jacobs Institute vision. Runway companies now have over 60 employees (mostly in the US and Israel), and have raised millions of US $.

The tenure of the current Director - Prof. Adam Shwartz, from the Technion, ends in early 2017. According to the Founding Agreement, the next Director is nominated by Cornell, and approved by both Cornell and Technion. Cornell initiated an international search, thus expressing confidence in Jacobs as an emerging high-impact entity in the academic realm. We have garnered interest from academic leaders, and I expect a new Director to be announced during the summer. With the Cornell-appointed Director, the Chairman of the Board of the Jacobs Institute will be the Technion Senior Executive Vice President.

Governance and management:
The Jacobs Board meets regularly to oversee Jacobs direction and activity. Our new Finance and Audit subcommittee provides professional support in these areas. Our Steering Committee (previously called Advisory Council) continues to follow and provide advice on strategy. We continue to develop academic and administrative processes that will support our mission, emphasizing cooperation between Cornell and Technion. There is still much to design and build in this direction, since the Jacobs Institute is a unique entity in the academic world.
Development:
We are evaluating our next steps with regards to academic programs and concentrations: this is informed in part by our ability to recruit academic leaders - faculty members - who will create, launch and run new academic programs. We are working to develop our resources. These include:

- Tuition, mostly from the Master Program, which is becoming a large part of our resources as we grow.
- Philanthropy (both Cornell and the American Technion Society are involved) - which remains a challenge.
- Grants, which typically in the US provide a substantial part of the resources of universities
- Commercialization, through the Runway Companies - which is at its infancy, but we are already seeing some small revenues.

The Jacobs Institute is establishing itself as a unique academic entity. It is developing rapidly, establishing its identity and activities, and growing in size. Using a high-tech metaphor (which is quite appropriate) - we have launched an academic startup, and we are starting to work on scaling up and stabilizing some of our activities, while keeping in mind our role as the drivers of change for Cornell Tech, Technion and Cornell.

Technion Nobel Laureate appointed Vice Chancellor of GTIIT

Distinguished Prof. and Nobel Laureate Aaron Ciechanover has accepted the role of first Vice Chancellor of the new university and will thus administer Technion’s academic authority over the new campus. In September 2015, after an interview in Israel, prominent Chinese economist and planner Mr Li Jiange was approved to become the first Chancellor of GTIIT – a post that must be held by a Chinese citizen. He and Prof. Ciechanover have established a good working relationship, including the delegation of certain legal authorities to the Vice Chancellor.

In November 2015 Prof. Ciechanover accompanied President Lavie, together with colleagues from Shantou University, on a personal visit to Governor Zhu Xiaodan in Guangzhou. The purpose was to explain his vision for GTIIT and lay the foundation for obtaining support for it from the Governor, and the Guangdong Government in general. This was followed by meetings with Li Ka Shing Foundation representatives and Shantou University colleagues.

In December 2015, Prof. Ciechanover attended the GTIIT cornerstone laying ceremony in Shantou, and used the opportunity to forge a new research collaboration in Life Sciences and Human Health between Technion and Shantou University Medical College.

In February 2016, Prof. Ciechanover made another trip to Shantou during which he met with Shantou
University colleagues as well as with the Li Ka Shing Foundation officials. He presented his revised budget estimates (see below) and discussed options for recruiting faculty and for extending research collaborations between Shantou University, Technion and the future GTIIT.

**Formal Approval Process**

The next stage in the process, after approval to “prepare”, is to obtain approval to “establish” the new university and enroll students. Under pressure from the Guangdong government, an application was submitted to start some programs as early as September 2016. The MOE decided that without more significant progress on readying the new campus, it was premature to start enrolling students to GTIIT in 2016. We plan to submit a revised application in the summer of 2016, in order to be able to enroll students in three programs in 2017 – Chemical Engineering, Biotechnology and Food Engineering, and Materials Engineering.

During the preparation stage, we will therefore need to show significant advance in campus construction which is progressing well, in the recruiting of faculty and staff, and in the detailed description of proposed study programs.

**Recruiting Faculty**

The major challenge before us is recruiting Technion quality faculty to the Guangdong campus. An announcement was prepared, approved and then published on a range of high profile academic recruiting sites. So far some 140 responses have been received – of which the promising candidates are being actively followed up. An attractive brochure has been prepared, as has an information site on the Technion’s server. Equally importantly, the procedure for academic appointments to GTIIT has been established. The model is such that for the purpose of recruiting faculty GTIIT will be treated like a Faculty (Department) of Technion in that it will have its own Preparatory Committee, and its decisions will then be passed on to the Technion Executive Vice President for Academic Affairs who will apply the same procedures as for all Technion academic appointments. Prof. Ciechanover chairs the GTIIT Preparation Committee.

Note that the model we employ distinguishes between the academic appointment (according to Technion criteria) and the employment contract (which will be issued by GTIIT).

We received detailed information about faculty salaries and their costs in China and Hong Kong, and based on this information competitive salary packages were formulated for all academic ranks at GTIIT. Moreover, we re-evaluated the planned research facilities and their funding in order to ensure our ability to attract top scientists and engineers to GTIIT.

Other topics that are being dealt with include housing, health insurance and campus emergency health care, taxation regulations, education for international families, as well as employment options for spouses. The information gathered and solutions provided will help create a comprehensive framework for recruiting and settling-in of international faculty and their families.

Meanwhile Pro-Vice Chancellor Ehud Keinan has made two trips to North America, visiting campuses and conducting information sessions and one-on-one interviews with potential new faculty for GTIIT.

We continue to offer Postdoctoral fellowships to recent PhD graduates from top schools in the West and who show high potential as future candidates for tenure track positions in the new institute. Several have delivered seminars and some will hopefully be offered positions in GTIIT starting 2017.
Proposed Programs and Gaining Experience

We plan to initially open the Guangdong Technion campus with three Technion engineering degree programs to be taught in English.

In order to prepare for teaching Chemical Engineering in English to a class of Chinese students in Shantou, Dr Moshe Marom and his team helped recruit some 21 students to the Technion, mainly from Guangdong, for the current academic year. This cohort will study in Haifa for 4 years. They spent a 6-week preparation period before starting their degree studies in October. This cohort has already helped us gain insight into how to prepare Chinese students for Technion studies. Whereas their mathematics background is good, a topic in high school physics was found lacking. Their English skills were formally good, yet it nevertheless took till the end of the first semester for them to start being confident enough to actively participate in class discussion. We therefore believe our admission process is basically fine, but we do need to spend some of the preparation period explaining study habits and what Technion expects when solving homework assignments and doing tests and examinations.

In August 2016 we plan to admit another cohort to Technion International in Haifa to study in the Biotechnology and Food Engineering program. The motivation is similar to that for bringing the current Chemical Engineering cohort to Haifa.

As a result of these two cohorts, we will have the relevant materials translated and tested for two out of the three programs to be launched in GTIIT in 2017.

Designing and Building the Guangdong Campus

The tender to design the North campus was won by the Guangdong Nanya Design company, after the bid by the Mochly–Eldar Architects (MEA) office in China was disqualified. However, Technion insisted that an architect who had experience building technical facilities for the Technion should be part of the design team. An arrangement was reached between Nanya and MEA whereby they worked together on much of the design.

In June of 2015, Governor Zhu of Guangdong, whose government is the major financer of the campus construction, approached Architect He Jingtang of South China University of Technology to suggest alternative design concepts for the North and South campuses of GTIIT. He proposed three options for the first phase [North] campus. One was chosen and Nanya and MEA revised their plans to match this new design concept. By November of 2015 a construction company had been selected and work on preparing the building site had begun. The official cornerstone laying was conducted in December 2015.

The construction and furnishing of the North campus will be completed by April 2017, at an estimated cost of some USD 120 Million. Meanwhile we are working on supplying specifications for furniture, technical installations, and laboratory equipment – including for centralized research facilities – and working with some Israeli planners on the interior design requirements.
During the coming months we will also need to provide the programmatic requirements for the South Campus. These will be based on the goal of reaching 5000 students and some 300 academic faculty in 20 years' time, as well as providing co-location facilities for start-up companies and R&D centers of larger companies.

Administration

The Board of GTIIT was formally constituted and comprises 4 directors from the Technion (President Lavie, Vice President Englman, Vice President Feigin, Dean Shalev) and 4 from the Chinese side – Chancellor Li, Provost Gu and Vice President Lin from STU, and Ms Wang, formerly a Shantou City councilor. The Board met in July 2015 before Chancellor Li was appointed, and then again with all members present in December 2015. It deals with some issues by correspondence and the next face-to-face meeting is scheduled for June 22, 2016.

Prof. Ciechanover established the Guangdong Technion Management Committee, consisting of himself as Chair, Pro-Vice Chancellors Prof. Ehud Keinan and Dr Moshe Marom, Dean of Engineering Prof. Moshe Sheintuch, Program Coordinators Profs. Moshe Eizenberg and Yuval Shoham, and Technion management representative Prof. Paul Feigin. This committee meets regularly, mainly focusing on planning and implementing procedures for the recruiting and appointing of academic faculty and staff for GTIIT, but also for dealing with a variety of issues related to establishing a new university.

In order to represent the Technion in Shantou Dr. Moshe Marom, who was appointed in February 2014, was recently approved to the position of Pro-Vice Chancellor and Director General of GTIIT. As well as liaising with the STU and government leadership, Dr Marom also liaises with the Shantou Municipality officials who are responsible for the campus construction.

Project Manager of the Technion Guangdong Project, Ms Ronit Lis Hacohen, has been managing the operations of the project in Haifa and organizing support staff for various aspects of the project, such as support for recruiting faculty and branding of Guangdong Technion.

The local Technion Guangdong Project Steering Committee, consisting of senior Technion faculty and officers, now meets approximately once every three weeks and continues to provide a source of ideas and feedback as the project unfolds.

Visits to Shantou and Research Collaboration

The Cornerstone Laying Ceremony brought some 30 faculty from the Technion to Shantou. This gathering provided opportunities for initiating research collaborations with STU faculty and as a result a program in Life Sciences and Human Health was formally initiated between Technion and the Shantou University College of Medicine.

The Helmsley Foundation support for a joint Technion-China project in the field of Environmental Health has provided the basis for another research collaboration that will be focused on the cleaning of the badly polluted Lianjiang River which flows near Shantou.

Another area of research cooperation is with the Business School of STU, and a joint workshop was held in December 2015 between the School and Technion faculty, mostly from Industrial Engineering and Management. This workshop followed several visits by Prof. (Emeritus) Shlomo Maital to give courses in the Business School.
Promoting Technion in China

Over the past six years, Technion International staff have been actively marketing Technion’s international programs in China, and have therefore helped promote the Technion brand name in China. While this activity is continuing, and while the materials and branding of Guangdong Technion are being largely developed in Haifa, during the current year more and more of the marketing and promotions responsibility is being transferred to the GTIIT preparations office in Shantou.

Technion International (TI)

Technion International (TI), directed by Prof. Anat Rafaeli, handles the development, management, and marketing of various programs involving studies and visits of international students at the Technion. The key goal of TI is to promote the multicultural and global nature of Technion. TI also manages the Technion student exchange program, allowing Technion students to spend a semester abroad, and international students to spend a semester or a year at Technion. In addition, TI oversees academic agreements between Technion and international universities, as well as Technion membership in multi-university and multi-country umbrella organizations. In 2015/16 Technion maintained academic collaboration agreements with 189 universities in 36 countries, and maintained membership in umbrella organizations including CLUSTER (Consortium of Leading Universities of Science and Technology), GE3 (Global Engineering Educational Exchange), and CMU (Community of Mediterranean Universities). In the past two years, TI has been instrumental in the development of the Guangdong-Technion program.

A key program managed by TI is a full undergraduate program in Civil Engineering. This program is in its seventh year, with current enrollment of 105 students. This program served as the foundation for a parallel program in Chemical and Environmental Engineering, opened in August 2015 as part of the Guangdong-Technion program, with 22 students. In August 2016, TI will open a new full undergraduate program in English in Mechanical Engineering. International students who started their studies in one of the full time TI programs in English can opt to transfer into one of the regular (Hebrew) programs of the Technion, if their grades in their studies in English are excellent, and they have sufficient mastery of Hebrew. In October 2015 10 students transferred from TI to one of the Technion faculties.

In 2014/15 (the last academic year for which complete data are available), Technion hosted a total of 636 international students. This includes 126 students in full-time TI programs (BSc in English in Civil Engineering or Chemical Engineering and first year in Russian); 192 study-abroad students and visiting research students; 58 students in one of the full-time undergraduate programs in Hebrew; 107 students in one of the full-time graduate programs; and 189 post-docs.

Technion International also offers several short-term programs in English: A Summer School of Engineering and Science allows international students to spend 6-8 weeks in Haifa studying one or more academic courses in one of the Technion faculties. In the summer of 2015, 180 international students participated in one of the TI summer courses.

Two spring semester programs are managed by TI, one allows French students to spend a semester studying at Technion [PREPA, sponsored by UJA]; a second allows MIT students to spend a semester conducting research in one of the

Yale University brought the Global Network for Advanced Management to Technion for a week in March 2016
Technion Labs (MISTI, sponsored by Technion donors). During 2014/15 we hosted 31 PREPA students and 6 MISTI students. Moreover, TI facilitates a program of Engineering for Developing Communities (EDC), conducted through the Technion Chapter of Engineers without Borders (EWB). In addition, TI provides the (non-academic) support to postdoctoral Technion visitors, their families, and their hosting Technion faculty members, working with the Vice President for Academic Affairs who is responsible for academic screening and appointments.

In recent years, TI has been a hub of multi-university programs sponsored by the European Union and the Israeli Government. TI hosted over 300 students from China and India, with funding provided by the Planning and Budgeting Committee (PBC) of the Israel Council for Higher Education (CHE). In addition, TI participated in three EU academic programs involving collaborative efforts with 88 universities from 46 countries: The ECOMMIS project focused on the teaching of electronic commerce; the SYSERMO project focused on the teaching of space system engineering; and the EMAIL III Erasmus Mundus Program provided funding for student and researcher mobility.

TI also strives to enrich the global experience of Technion students. A student-exchange program allows excellent undergraduate Technion students to spend a semester studying abroad. In 2014/15, 74 Technion students spent a semester in one of our partner universities in Europe, North America, South America, Australia, and Asia; In addition, five students visited China to study Chinese, and 55 Technion students participated in the IAESTE summer internship program, which allows students to spend a summer working in another country in their field of study.

In 2015, TI developed a new service to international affiliates, of study tours for groups of students from a specific university who visit the Technion for a short period (five to 21 days). Over 118 students already visited Technion in such tours in 2014/15, from 12 institutions, and TI looks forward to approximately 150 students who will visit Technion in the next few months.

A new initiative, sponsored by the generous support of the Neubauer family, allows TI to promote Technion as a location for study abroad for US students. Through the Neubauer American Study Abroad Semester program, TI increased the number of courses available at Technion in English; in the 2015/16 spring semester, Technion will offer courses in English in Engineering, Sciences, Medicine, and Entrepreneurship, and 27 students from US universities will take these courses along with full time Technion students, which will encourage integration of international students with Israeli students. As part of the Neubauer program, TI increased its presence in leading universities in the USA, including Johns Hopkins, Brandeis, Tufts, Cornell, Columbia, and the University of Florida.
Pre-university Education Center

The Center for Pre-university education consists of two branches: the Unit for Pre-academic Studies and the Youth Division, both of which hold many annual activities with the objective of attaining scholastic excellence in the domains of science and technology. Students participating in the various programs are focused on the goal of pursuing the study of Engineering. The unit offers various programs related to Science and Technology for high school pupils.

The Unit for Pre-academic Studies

The main function of the pre-academic unit, which includes approximately 550 students, is a preparatory school. 25% of the students in the preparatory school arrive at the Center independently. The other 75% are part of programs supported by various philanthropic bodies.

Programs Receiving Support

1. Ofakim for High-tech – The students enrolled in this program come from peripheral areas and low socio-economic backgrounds. They arrive at the Center after completing 12 school years and military service; however, they do not have a matriculation certificate and have not taken the psychometric examination yet. This program is recognized by the Ministry of Defense – The Fund for Demobilized Soldiers. The essential criteria to be accepted into this program is to pass a personality test administered by the Adam Milo Institute as well as the results of a mini psychometric examination. Those who are accepted into the program begin a four month pre-preparatory course in order to prepare them to participate in the subsequent preparatory course. After completing examinations at the end of the pre-preparatory course, the qualified students are accepted into the preparatory program where they also participate in a course which prepares them for the psychometric examination held at the end of the preparatory program. Each year about 70 students are admitted to Ofakim for High Technology programs. They are supported by the Ministry of Defense, the RASHI Foundation and Yehuda Zisapel. These students receive a monthly stipend for living expenses as well as general support including tutoring, counseling and employment guidance.
2. **Ultra Orthodox Yeshiva Students (Haredim)** – In order to be accepted into this program, the students must be “Haredim” complying with the Ministry of Education’s definition. This program is recognized by the staff of the Pre-academic Unit in cooperation with an external representative who is familiar with the various ultra-religious frameworks. The “Haredim” students participate in a four month pre-preparatory program after which the suitable graduates of that program are accepted into the Unit for Pre-academic Studies. The weaker students are referred to the preparatory program of the School of Practical Engineering of the Technion; thus all of those, who begin the program, are encouraged to complete it with some area of training in the scientific or technical field. At the Technion campus there are currently 17 male and 13 female students enrolled in this program. The Bnei Brak College for religious students has enrolled an additional 19 students who will continue their studies in the Geo-Information course. Furthermore, 22 students have completed the pre-academic program at the Technion this year, 18 of them have been accepted by the Technion: Electrical Engineering – 2, Computer Sciences – 5, Civil Engineering – 3, Industrial Management – 3, Mechanical Engineering – 4, and Medicine – 1. This program is supported by the Technion as well as the non-profit organization KEMAH and Atidim HALAMISH.

3. **Atidim Leta’asiya (“Future Engineers”)** – This program consists of students from peripheral areas following their full military service, who have completed their matriculation studies but attained low grades, and have already taken the psychometric examination. These studies consist of a 12 month period program. The program includes 33 students who are supported by the Technion “Atidim” program under the auspices of the Rosman Foundation. The students receive a grant for daily living expenses as well as extensive support to assist them in their studies.
4. **Atidim** – These students are graduates of high schools in peripheral areas who have a matriculation certificate and psychometric examination scores, but their grades are not sufficient to be accepted into academic studies. Consequently, they require an additional year of preparatory studies in order to improve their grades. 41 students study in this program and are supported by “Atidim” under the auspices of the Ministry of Defense. Because of their young age, these students are supported by a staff of counselors who accompany them in their extracurricular hours, offer them appropriate support, and help them in finding the best combination of academic and free time activities.

It should be noted that 65% to 70% of those who complete the Unit for Pre-Academic Studies enroll at the Technion to continue their studies. Furthermore, each year 17% to 20% of the students enrolled at the Technion are graduates of the pre-academic program.

**Program for Students from the Ethiopian Community** – Approximately 100 students from the Greater Haifa Area participate in this weekly program. They receive enrichment in several areas of study in order to advance them to the highest scholastic levels of their schools. This program is supported by a private individual. Last year the Technion agreed to join in the financial support of the program.

**Internet Courses** – The Unit for Pre-Academic Studies in cooperation with faculty members from the faculties of Chemistry, Mathematics and Physics has begun an online course for students who have been accepted by the Technion, assisting them in certain academic areas requiring reinforcement. The course in chemistry is intended for students who have been accepted into faculties in which chemistry is a required subject, offering necessary tools for their studies. The mathematics course is designed for students who have not attained the five point matriculation level in mathematics. Its goal is to raise the students’ level of knowledge in this area before starting their Technion studies, free them of any excessive pressures during the academic year as well as reduce the number of students who are not able to maintain an acceptable academic standard. The physics course is designated for students who do not hold a five point matriculation level in physics.

The staff of the Unit for Pre-academic Studies includes 30 administrative staff, 32 instructors and approximately 40 tutors who provide students with additional academic support as well as 60 staff members in the Division of Youth for Science.

**Harry and Lou Stern Family Science and Technology Youth Center**

The Harry and Lou Stern Family Science and Technology Youth Center focuses on making Science and Technology attractive to youth and encourage junior and high school youngsters to study. The activities take place in the morning during special science days and in extra-curricular clubs and courses. This is the ninth year in which the Center has been operating in the Arie and Jacqueline Carasso Youth Wing with their nine well-equipped laboratories, modern classrooms and the large Amos and Shoshana Horev Auditorium, all of which enable the Center to expand and enrich its programs. This year more than 35,000 students have taken part in a variety of science activities. There have been 330 special science days, and 80 groups that have taken part in the extra-curricular clubs and courses.
**Additional Special Projects**

**Future Scientists and Inventors Program** - This program was inspired and endorsed by the former President of Israel, Mr. Shimon Peres, as a path to promoting scientific, engineering and technological excellence in Israel. Under the leadership of the Rashi Foundation and in cooperation with the Ministry of Education, the vision has been developed into an ambitious program to cultivate the next generation of R&D leaders in universities and industry.

The program identifies exceptionally brilliant and creative 8th grade students, who show strong motivation and passion for science and technology, along with social commitment. They are offered optimal conditions for realizing their potential through academic studies combined with hands-on work in research laboratories.

They acquire tools and skills for coping with complex programs in a cross-disciplinary approach, while also enjoying personal and group empowerment. 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 a week for a four-year period. This year 63 students participated in this special program (27 students from the 9th grade; 20 students from the 10th grade and 16 students from the 11th and 12th grades).

**TeLeM - Technion Promotes Mathematics** - The TeLeM program is a joint program between the Pre-Academic Center and the Department for Education in Technology and Sciences. Its objective is to strengthen the potential of children from sixth grade and up to study the highest level of mathematics, to enhance their understanding of the subject and finally to encourage them to apply to the Technion. This is the 16th year of the program’s operation.

Mathematics teachers who participate in the program receive special training on a regular basis. 600 pupils participate in this program from eight schools in the North; the program is jointly sponsored 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 a chance to participate in academic studies at the Technion within the special framework for gifted high school students.

**The program for integrating exceptional high school students into Technion studies** - This program concentrates on the development of exceptional high school students in order to prepare them for academic studies at the Technion in conjunction with their high school curriculum, and allows them to receive credits toward an academic degree. We are aware of the great importance of the school environment and its central function in the framework of 12 years of mandatory study leading toward success in matriculation examinations.

The academic integration of exceptional high school pupils is designed for those who are truly outstanding and are able to successfully integrate both high school and Technion studies. This program is especially challenging and requires maximum effort on the pupil’s part in order to meet the demanding requirements of both high school and academic studies.
This year 168 students who took a variety of academic courses participated in this special program. The program consists of “from high school to Technion” program which is carried out in cooperation with the Faculty of Mathematics. Similarly, this program includes a cooperative effort with the Faculty of Chemistry in the framework of the “Archimedes Program”.

Sci-Tech - This annual international research summer camp for 11th and 12th graders, held at the Technion, is now entering its 22nd year. This is a lifetime opportunity for gifted students to experience serious research opportunities guided by top-notch Technion researchers. The 46 participants in 2015 came from eight different countries. They enjoyed the sports facilities at the Technion as well as touring Israel.

The ORT-Technion Classroom - This program is a joint effort between the Technion and ORT Schools for outstanding pupils. 15 classrooms operated in 2015 in the framework of the program with a total of 300 pupils.

The program maintains a follow-up of the pupils from 7th to 10th grades until they enroll as full time Technion students and includes preparatory courses for academic studies such as scientific research skills, logical thinking, scientific and mathematical thinking, introduction to the Technion and 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.

The Youth Center expanded this special program for additional three schools in the northern part of Israel. This year the program included six classrooms with a total of 187 pupils.

World ORT–Kadima Mada-Anier Program - The idea of this program is to expose 9th to 12th grade pupils to the pre-academic scientific content and together with ORT – Kadima – Mada Program and Nahallal High School to continue the program for 10 years.

The program caters for groups of boys and girls who immigrated to Israel without their parents, starting in 9th grade. They live in a residential setting in the Nahallal Youth Village. In 10th grade this group is joined by an additional group which comes from the peripheral areas of Israel. This year the program included 34 students from the 9th grade and 27 students from the 10th grade.
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 cooperate to make a difference for many talented and disadvantaged groups of junior and high school students in their aptitudes as well as their 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 Center, focused on advancing the level of talented pupils. This year 20 students participated in the Summer Camp.

Ofanim Science Program - This program, which was launched last year, is jointly sponsored with the Ofanim Organization and is designed to encourage scientific and technological studies for 5th and 6th graders in outlying towns. There were 101 participants this year from Tiberias and Migdal Ha’emek that took part in activities held in the Technion Youth Laboratories as well as in a bus that has been constructed as a Robotics Lab which travels to outlying towns.

Summer science activities - Special intensive summer study lasting two and a half weeks for 5th to 12th graders from all over the country, aimed at familiarizing participants with academic Science studies and with the Technion. This year 950 students participated in the summer activities in 51 different groups.
Student Affairs

The Dean of Students is responsible for dealing with issues relating to the welfare of Technion students. Prof. Moris S. Eisen from the Schulich Faculty of Chemistry has been dean for the last three years.

The Office of the Dean of Students has six professional units whose responsibilities are to support and help the advancement of the students. In all the activities, these units serve approximately half of the total of the students. Our goals include: helping to ease the gap for minority groups, helping students deal with difficult times and crises, increasing the number of students from peripheral areas, decreasing the dropout rate, raising point average and integration into the marketplace.

We do our best to assist as many as possible students in all possible ways, including, tutorial programs, counseling, housing and financial assistance.

Unit for Personal Assistance offers help and guidance to students in financial distress. We have a unique project for high potential new students, which has been run successfully by personally accompanying the new students from the registration stage till the end of first academic year.

Among the aid that the Unit offers to all undergraduate students are: scholarships for students from low socio-economic backgrounds, interest-free loans, 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 disabilities 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 to find efficient ways to cope with the 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 operates social projects aimed to minimize academic and social gaps between freshmen at the Technion. A unique comprehensive model of absorption was developed to meet student’s special needs. The model of absorption is based on three elements - personal tutor (mentor), academic workshops and individual counseling.
Professional Career Unit and IAESTE (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 spot days and many major activities.

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 found ourselves urgently in need of expansion. Via the Southern Palm Beach Chapter of the American Technion Society, we are in the progress of adding an adjacent building to the center.

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. It is in our vision to continue these important social operations to ease the academic pressure and to enhance the Technion the time quality.

Student Housing Unit offers housing solutions to approximately 3,800 students. Although the Technion provides housing to a large number of its students, we are still missing many “beds” to accommodate demand. We are aware that living in the dormitories allows students to obtain much higher achievements in their academic studies. If we will be able to increase the number of beds, we will be able to easily increase the number of the undergraduate and graduate students at the Technion.

Ongoing Special Projects

Student Housing – The new undergraduate village housing project is underway. The outline stage has been completed and we expect occupancy to commence by the 2017/2018 academic year. A new plan for an additional 142 apartments for singles, couples and families has been initiated and has been submitted to the Haifa municipality for construction permits. We are continuing our long-term project to upgrade the old dormitories and to install air-conditioning in most dormitories. All office services have been made more accessible for the students with new and updated computerized systems that provide an up-to-date friendly approached to all services on the internet.

A new community center has been opened at the Shalom Zielony Graduate Students Village. The community center includes four kindergarten and nursery schools that will be fully operational by the 2016/2017 school year. The center operates a variety of activities for children and adults.
Phillip and Francis Fried Counseling Center Expansion - The building of the psychological service unit extension began in April 2016 and is expected to take approximately 12 months. We are doubling the capacity of the unit allowing six additional treatment rooms for individuals and ancillary group treatment areas. Furthermore, the station will be modified allowing easy access for the disabled. The renovation will allow us to reach the target students quickly and efficiently. During the construction, the unit will be transferred to the Gross Dormitories to continue to provide the dedicated care for students who need it on campus.

Scholarships – About 30% of the undergraduate students are eligible for scholarship. The maximum amount that can be covered by Technion’s scholarships is 85% of the tuition fee. 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 and the Technion’s good reputation. Unique scholarships are provided, as a result of our successful collaboration with external funds, to students who are discharged soldiers and reservists.

Over the past few years, excellent prospective students from lower socio-economic backgrounds and/or from the periphery of Israel have been admitted to the Technion. As they receive financial aid (scholarship assistance), they have started their studies at the Technion. Most of those students receive intensive assistant throughout their studies.

Loans – The Technion offers interest-free student loans of 18,000 NIS. Last year we awarded loans to 370 undergraduate students. In addition, Geller Foundation loans in the amount of $3,000 each, were awarded to 30 students.

Reservists – The Technion is recognized by the student community as a supportive and considerate institute. This past year we assisted more than 900 reserve students throughout the academic year. We provide a wide range of services from the period before they go on service (V.A.L.T.A.M), during their reserve service (Net Sticks), and immediately after their return to the Technion. We offer a wide variety of special services as personal consulting, tutoring to help with the study material that was missed, academic credits, non-tuition summer semesters and scholarships. We offer our student net sticks, cell modems with a secure ID for remote access to the Technion to be connected to all internet services that are provided to students on campus including online lectures, videos, mail etc.

The ATIDIM (future ones) 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 98 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. Those students face many difficulties due to language problems, cultural unfamiliarity, feeling 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, 450 students were assisted by this project. The Israel’s Council for Higher Education adopted our model as a working model for all Israeli Universities. We translated our special “Study Differently” booklet into Arabic and distributed it to all students who speak Arabic as their mother tongue. In addition, we carried out a special program aimed at encouraging outstanding Arab students.

The Support Center for Students with Disabilities – A new support center for students with special needs and disabilities was opened in the 2016 spring semester. The center has been established by the Technion, in cooperation with the National Insurance Office. The center includes
professional staff members who specialize in helping individuals with disabilities. The center contains two exam rooms, a computer farm and a workshop room with the unique necessary equipment.

**Rosman Atidim for Industry** - The project aims to facilitate the absorption of discharged soldiers from the periphery and underprivileged backgrounds. It operates with the collaboration of various industries and companies' members of the Israeli private and public sector. This unique program has assisted 45 students in the current year.

**Haredim (ultra-orthodox) students** - At the Technion we have 30 undergraduate students from Ultra-Orthodox backgrounds, 14 are new students who started their academic studies this year, five of them are women some of whom are mothers to small children.

The Technion and other government and private organizations provide a wide range of assisting tools – Financial aids, counselors support to adjust to the Technion’s loaded study system and individual counselling, tutors and group discussions.

**Freshmen Mentoring Project** - According to the resolutions taken by the Study Load Committee, a special new mentoring project aimed at facilitating the adjustment of freshmen is carried out in the following faculties: Computer Science, Physics, Biotechnology and Food Engineering, Biomedical Engineering, and Chemical Engineering, Electrical Engineering, Aerospace Engineering, and Mechanical Engineering. The counsellors support the project by providing training of mentors, guidance, and follow up.

**Professional career projects** - This year we organized two “Job Fairs” with the participation of more then 100 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, 11 career “Spot Days” for recruiting and interviewing potential employees were held. Six lectures and workshops for C.V. writing and job interviews were held.

**Technical training aboard** - The IAESTE exchange students program unit helps to place students who wish to go abroad for technical training over the summer months and allows students from abroad to gain experience at the Technion. 75 students took part in internships last summer.

**Social and Cultural Activities** – This year we gave first priority to Faculty parties and continued bus trips and excursions, Kabbalat Shabbat events and Students Club meetings. In addition, we provided wine and cheese appreciation events and sushi making workshops for campus students, international students and off campus medical students.

**“Lively Campus”** – This year the “Campus Toses” program has promoted cooking classes, garden planning and planting at Tu Bishvat. A Hanukah event with a stand-up performance, hosting of international students at Israeli homes, trips to the north of Israel (Mount Hermon, Beit Shean valley and more), sing-along events. The Technion challenge competitions are unique. This year “Campus Toses” updated the Technion’s interactive map.

**Community Projects** – About 350,000 hours of community service were contributed by about 30% of the undergraduate student population. The community-related activities were associated with various frameworks such as PERACH – Big brother program.
Technion Students Association TSA

TSA operates to ensure the welfare of Technion students through a wide range of channels and services:

**Academics:**

1. Publishing exam books at the Technion: The basic rights of students states that every student has a right to receive a copy of an exam book that he/she has completed (for a fee where necessary). Allegations have been brought about the incorrect application of this clause at the Technion. TSA views this as a fundamental right, especially since Technion studies are complex and intensive. A significant part of the acquisition of skills occurs when a student reexamines the mistakes they have made; this process can help them better decide what to focus on when preparing for future exams to improve their grades. Being able to revisit a solution to test questions coupled with the right mindset during an exam are vital tools for learning and self-improvement.

2. Free viewing of scanned exam books – student exam books are scanned and published for the most part on the Internet. For a 5 NIS fee, a student can download the scanned exam book in order to compare their answers and see where they went wrong. Due to the large number of exams and incremental cost per student, steps were made to make this a free service. As part of the process that began in 2014, this year another station for free viewing of scanned exam books was set up at the medical school campus (located in Bat Galim). The establishment of this station is a continuation of the efforts establishing the first station on campus at the Shalom Zielony Student Center in cooperation with TSA and the Dean of Students. However, it must be noted that there are many other Israeli universities which have gone a step further, enabling students to view exam books for free from any computer.

3. Student Disciplinary Regulations – accompanying disciplinary proceedings is one of the most sensitive issues carried out by TSA. The nature of the disciplinary law and its wide implications for students caught in such proceedings are serious, and can range from a reprimand to a permanent expulsion from the university. In striving to provide students with a fair chance for receiving clear and impartial justice, TSA has worked towards establishing a set of rules and regulations that will allow students to turn to the disciplinary tribunal in situations where measures have been taken against them outside the disciplinary court. In cases where a student chooses to appeal the disciplinary court, all proceedings by the faculty will be suspended until after the investigation of the incident. In short, the authority to determine the penalty or acquittal belongs to the disciplinary tribunal exclusively. Furthermore, TSA also offers Technion students a large pool of student attendants with experience in private proceedings and rulings of the disciplinary tribunal who are available for guidance, so that students who have disciplinary proceedings brought against them have direct access to knowledgeable parties with their best interests in mind.

4. Updated teaching staff evaluation – student evaluations of lecturers and teaching assistants (TAs), which are a longstanding tradition at the Technion, is an undisputed tool (by students and teachers alike) with regards to its effectiveness and implications. However, both parties have expressed that the evaluation does not optimally serve its objectives from the viewpoint of its respondents. This year, TSA asked the special committee of faculty and students charged with evaluating teaching staff evaluations to establish a professional committee consisting of representatives from the academic staff, the Center for the Advancement of Teaching, and students, in order to test and validate teaching evaluations that will ensure its return to being the effective tool it was designed to be. It should be noted that this proposal was submitted after consultation with professionals at the Center for the Advancement of Teaching and other leading Israeli professionals in the field, who claim that there is room for improvement of both the survey itself and how the results are analyzed.
5. Accommodation for students serving in reserve duty – student soldiers serving in Israel’s reserve forces are a sensitive population group that is entitled to our full appreciation; we must minimize any academic disadvantages caused to them as a result of their service to defend the country. TSA works hard to maintain the rights of student reservists and even held this past semester a Stand-Up comedy evening, in their honor, in conjunction with the Dean of Students; the event included a show and refreshments. Student reservists were also given a modest gift from the TSA for their selfless services to the state.

6. Awards of Excellence – TSA has made it its primary goal to improve the quality of teaching and learning at the Technion. As a result, TSA believes the Technion must first and foremost properly acknowledge its outstanding lecturers and ensure that the awards are distributed in a manner that is representative of the institute’s various faculties and teaching roles. For years the awards ceremony for outstanding lecturers has been held in conjunction with the ceremony for outstanding employees, which contributed to a decline in the drive to strive for excellence and even an outright evasion by some faculty members to attend such ceremonies. This year, TSA and the Technion, in cooperation with the Executive Vice President for Academic Affairs, issued a statement that two separate ceremonies will be held. Moreover, a position paper was prepared calling to change the awards structure at the Technion, so that awards will also be given for the following criteria: implementation of innovative teaching methods, individual faculty initiatives that promote teaching excellence, and syllabi assessment and revision to reflect current information. In general, awards of excellence should be divided in a representative manner among the wide teaching population at the Technion, rather than exclusively to faculty members.

7. Satisfaction for quality of academic instruction – as a result of steps led by the Technion, with support of TSA, as of last year, the Technion ranked top among all other Israeli universities for the highest level of satisfaction in the level of academic instruction. TSA is proud of and welcomes this great progress and wishes to leverage this to improve other areas of instruction in which Technion has yet to reach first place.

Learning Aids:

1. New floor in the Shalom Zielony Student Center – during the summer of 2015, the fourth floor was added to the Student Center. The new floor was planned by TSA and constructed with the assistance of the Technion. The new floor contains two designated classrooms for tutoring services operated by TSA. In addition, study rooms were allocated for group work/study and tables for individual study were set up. Many students are making use of this vast study space, both for group and individual study, and the space remains full during the course of the semester and particularly during exam periods. TSA has been examining others options for furthering the expansion of the 4th floor in order to be able to provide services and cater to the needs of all of its students.

2. Tutorials – Technion coursework is at a very high level. Often lectures and practice tutorials are not sufficient for understanding course content. To assist students who find coursework particularly hard and to help them successfully navigate through the exam period, TSA operates a wide array of tutorials for a nominal fee in subjects including various fields of mathematics, physics and chemistry. Many students have attested to ‘surviving’ the exam period due to these services.

3. Tutoring project – as part of the free tutoring project run in cooperation with the Dean of Students, outstanding students provide tutoring services in the subjects of physics, chemistry and programming languages, assist students in understanding coursework throughout the semester, and guide them through the exam period. Students meet at one of the various study areas at the Technion at a set time; tutors pass between tables helping students better understand and solve exercises.
4. Exam Booklets Store – the bookstore, located at the Shalom Zielony Student Center, contains over 600 exam and tutorial booklets on courses offered at different Technion faculties, including books written by lecturers and TAs. The booklets are for the most part based on student lecture notes and exams edited by a TSA team. The team is composed of editors and typists from all faculties working closely with faculty and students. Exam booklets sold at the store typically accompany students in their first two years of studies and provides them with the assurance and guidance that will help them prepare correctly for exams. The Exam Booklets Store also provides a variety of other student services including: laundry service payments, event ticket collection, issuance of student cards, course and workshop registration, and more.

Cultural Life:

1. In recent years, TSA has expanded its activities and is investing more resources in sponsoring events for students with families, such as activities geared for children, screening of animated films, holiday happenings and after-school programs. Last year TSA activities reached its peak when it produced the first children’s festival at the Technion over the summer months, featuring famous children’s artists from across Israel. As part of the festivities, a variety of activities for kids and their parents studying or working at the Technion were held.

2. Student Festival – the 2015 Student Festival was a great success. The festival, which took place over 3 days last spring, included 2 nights of live music on a massive stage built on the central lawn of the university, and two pool parties. The festival was attended by 20,000 students from several universities and colleges in and around northern Israel, and included performances by some of the country’s best artists. TSA exclusively produced the festival; although the ticket price for Technion students was less than $10 (US), the festival maintained a high level without incurring any major financial losses.

3. Volunteering – TSA operates towards and is responsible for the social aspects of student and university life of all students. Alongside the monthly parties organized by TSA, which are considered to be the best and largest in northern Israel, the association also regularly runs a number of smaller events such as themed parties, dances, enrichment lectures by the top professors, screening of popular movies and miniseries, sports games, and more.

4. Theater – as part of the enrichment of cultural life on campus, TSA invested last year in bringing theatrical performances, stand-up comedy shows, acoustic performances and more to the Technion, with the support of the Technion President. Also, with the support of the Dean of Students, special events were held over the past year including sushi as well as cheese and wine tasting workshops. It is important to note that all the cultural events are appropriately priced for the student population.

5. Wednesday Afternoons – the two-hour break on Wednesday afternoons has developed into a...
longstanding Technion tradition when at 12:30 all Technion students enjoy a well deserved two-hour break from their studies. TSA organizes different activities for this break, including sport competitions, concerts, craft fairs and more. Last year a new tradition began – “President’s Afternoon”. At the event, produced by TSA and supported by the Technion President, a famous Israeli artist performed at the university. The performance was a huge success and greatly appreciated, and has inspired other academic institutions to hold similar events.

Social Life and Community:

1. Environmental Protection – TSA is committed to protecting the environment and natural resources. The association has established waste collection systems at a variety of faculties across campus - including separate colorful bins for the collection of waste and paper. In addition to this, as part of TSA’s ongoing commitment, the association sets up waste collection bins for the collection of plastic cups at all social events. During the 2015 Student Festival, TSA ran a recycling competition that awarded a high-end camera to the student who collected the largest number of used beverage cans. In addition, in order to promote a ‘green’ environment and help combat air pollution, TSA is leading the GreenTech competition that encourages innovative ecofriendly concepts and designs. The competition is run over the span of six months, and at the end of which the winners present their ideas in the hope of making a genuine improvement on campus.

2. In order to improve everyday life, TSA, in cooperation with the Dean of Students, works towards establishing and cultivating community gardens around the dormitories and the development of comfortable public spaces on campus that invite social interactions. Typical examples include the installation of JNF benches and shade structures near dormitories.

3. Donating activities – TSA is a socially active student association. Over the past year TSA launched a used clothing collection drive at laundry rooms throughout the campus to be donated to the second-hand campus store “Moed Bet.” In addition, it provides logistic support of MADA blood donation stations set up once every semester at all Technion faculties and on every Wednesday at the Student Center. In order to further expand student community contributions, TSA is leading and promoting the Dean of Students project “Volunteering= Privileges,” which enables students to volunteer at a foundation affiliated with TSA; in return for putting in a required number of hours students receive academic credits recognized by the Office of the Dean of Undergraduate Studies.

4. Fitness classes and more – in cooperation with the Dean of Students, TSA runs a variety of fitness classes (such as kickboxing, yoga, Pilates, etc.) and other wellness related classes such as prenatal classes for the benefit of students on campus. The classes offer students a welcomed distraction from their grinding routine and hectic academic course load, and cater to a wide range of ages and interests. The classes are taught by experienced professionals recruited by TSA employees.

5. Shabbat dinners – TSA, in cooperation with the Dean of Students, hold traditional Shabbat dinners for Technion students who observe the custom. The meals are subsidized and support a traditional Jewish lifestyle in a warm and nurturing environment on campus.

6. Non-academic courses – the Technion offers its students non-academic courses in subjects such as housing, first aid, and car maintenance. These courses provide important tools for its student body that will help them improve their life skills.

7. Delegation to Poland – TSA, in cooperation with the Technion President, conducts and leads the
student delegation to Poland to commemorate the memory of the victims of the Holocaust. The delegation represents the Jewish and Israeli nation. Before their journey, students go through several days of preparation and discuss past and present ethical dilemmas relating to the memorialization of the Holocaust.

8. Israeli holidays – TSA celebrates Israeli holidays by contributing good deeds for the betterment of the environment and human welfare. On Tu BiShvat, TSA organized the planting of seedlings, and over the Purim holiday arranged “mishloach manot” (traditional gift baskets) to children at Rambam Children’s Hospital in Haifa, where Technion students study medicine.

9. Advocacy groups – TSA supports the causes of social advocacy groups including LGBT organizations, Astronomical Society and Disabled Persons Organizations for Equal Access. TSA works towards integrating the various groups at its social events and imparts tools and resources to advance social equality.

Campus Life:

1. Food – TSA continues to lead the university mission across the country in setting uniform pricing throughout the campus on coffee/baked goods at the price of 5 NIS, and ensuring that the Student Union restaurants offer a variety of cheap low calorie meals. TSA ensures the lowest prices in Israel at the vending machines operated throughout the campus, with prices lower than $1 (US) for a bottle of water or canned beverage. This year, as part of the campaign for affordable living in Israel, TSA set fixed pricing between 5 to 10 NIS for 120 consumer products sold at campus grocery stores.

2. Additional Services – TSA concerns itself with all aspects of student welfare within the university. Today, the Student Union houses an insurance company, pharmacy offering services to all (four) national HMO plans, optician’s store, print shop, travel agency and dental clinic – the newest addition to the Student Center this year, offering services to students. TSA strives to add dental coverage for students as part of their tuition in the future.

3. Transportation – TSA offers campus transportation solutions. The Technion offers campus shuttle services that operate from the early morning hours until the evening, enabling students to travel from their dormitories to their classes and the center of campus. Last year, following the TSA request to extend the operational hours of the shuttle, students were able to study and work extended hours at the library/study halls/laboratories. In addition to the shuttle services, TSA is also promoting the operation of new city routes: last year the #1 bus line was launched, leaving the central Carmel Beach bus station from the southern area of Haifa to the Technion via the Carmel Tunnels, a new and fast transportation route in Haifa. In addition, Line # 112 was launched – an express route that runs from the Technion to the Hadar neighborhood in Haifa, where a sizeable Technion student population currently resides.

4. Kosher campus – up until last year kashrut supervision of vendors at the Student Union was under the Haifa Rabbinate, which worked on a fulltime basis and charged exorbitant fees – three times higher than the rates businesses outside of the Technion were being charged. TSA contested the Haifa Rabbinate and replaced the kashrut supervision of its food vendors with the Technion Rabbi, thereby effectively lowering the charges for kashrut supervision on campus. This important action triggered wide media coverage for being the first large organization to appoint an in-house kashrut supervisor and won the general support of its orthodox student body. Today, after significantly reducing its charges, kashrut supervision at the institute has returned to the Haifa Rabbinate.
5. Dormitories – TSA responds to student needs and welfare issues at the dormitories. Following the request by students to add a community center, members of the student union, in cooperation with the Dean of Students and the Maintenance Department of the Student Dormitories, renovated a shelter in the area near the American Technion Society Palm Beach Village, turning it into a community club fitted with furnishings, parquet flooring, Wi-Fi, cable and TV. The club currently serves the study, social and cultural needs of hundreds of students living in the area.

6. Printing – TSA operates one of the largest networks of printing services in the country. It is possible to obtain printing and photocopying services for competitive prices at all Technion faculties. TSA is continuing to expand these services by providing a range of scanning to email options and remote printing – sending documents to print from personal computers via email. A number of printing options are available: black and white, color and duplex printing.

7. Remote printing – with the understanding that learning in 2020 and beyond will move from paper notebook and lead pencils to the exclusive use of computers, shared summaries and network documents, this year TSA launched remote printing services which allow for the ordering of all types of printing, color and binding options, ready the following morning at the Student Center for the fee of 9 Agorot (ILS/100) per page.

8. Laundry machines – TSA continues to operate the cheapest laundry system in the country – 3 NIS for a washing cycle.

9. Local authorities – TSA hosts an “Authorities Event” twice a year that brings representatives from municipalities that cooperate with TSA to the campus to address student issues. The representatives respond to students on different matters, such as property taxes, social security benefits, financial and legal advice, and much more. TSA has recently begun to coordinate social security benefits for students who work a number of jobs.

10. Parking – to promote green transportation initiatives on campus, TSA, in collaboration with the Construction and Maintenance Department of the Technion, ensured the set-up of bicycle parking infrastructure in many areas on campus, namely at dormitories, faculties and main gates.

Sports:

1. Courses and sport teams – the Sports Unit at the Technion currently runs 115 sports courses that accredits one academic credit, and manages 42 competitive sports teams in 34 different sport branches [ranging from fencing to basketball, soccer, chess, swimming and others], that accredits 1.5 academic credits each. About 6,000 students each year join a competitive sports team or partake in a sports class. In 2015 several new courses opened, including a new karting (kart racing) course for men and women, beach volleyball for beginners and advanced levels, and squash, tennis and chess classes. In the same year a competitive karting team opened.

2. National tournaments – each year Technion’s competitive sports teams compete in national championships attended by university and college teams, which brings together student teams from 32 academic institutes. In 2015, TSA sports teams won first place in the general rankings for men’s and women’s sports; it is noteworthy to mention that at the Technion there is a lower percentage of female students in relation to the student populations at other academic institutions and therefore this placement is even more remarkable.
3. European championships – the TSA soccer team participated in the European championships this year where representatives from universities across 24 European countries competed. The members of the TSA team, made up of Technion students, made us proud and came in 11th place, which is a very respectable standing.

4. The TSA beach volleyball team participated in the European championship that was held in Cyprus; they came in 15th place out of 24 European championship teams.

5. “Technion Challenge” – the fifth campus-wide “Technion Challenge” sports tournament was held over the spring semester involving nine different sporting events. Thousands of students from various faculties across the Technion participated in the challenge. The Technion President awarded the winning faculties with the “Technion President Challenge Cup” and a monetary award of 15,000 NIS to be used towards holding a cultural event. Scholarships were distributed amongst the winners of the various sporting competitions in the amount of up to 45,000 NIS by the Dean of Students.

6. Technion Race – in 2015 the TSA Sports Unit initiated the “Technion Race” as part of the “Technion Challenge” events. The race was a first of a kind event aimed at empowering and enriching the whole sports experience on campus. The race was attended by students, faculty members, professors and Technion employees who ran together, side by side, a distance of 5 km within the campus. The winners of the race won outstanding awards, worth an estimated 15,000 NIS, courtesy of the Dean of Students as a means through which to promote athletic activity on campus. TSA plans to continue to support the Technion Race initiative for many years to come and to expand on it.

7. Computing – in 2015 the TSA Sports Unit underwent a basic computer processing upgrade. From now on all managerial and administrative processes will be made in real time and online.

8. Scholarships – sponsored by the Dean of Students, each year scholarships are awarded in three categories: exemplary sportsmanship, outstanding sportsmanship and sports champion scholarship. Last year about 100 sport scholarships were awarded in the amount of 100,000 NIS. The purpose of the scholarship is to honor student athletes for their invested efforts and
contributions to the university’s competitive sports teams that have in turn honored the Technion in sports achievements. The scholarships are awarded at an awards ceremony at the end of the year attended by board members and representatives of the Technion; at the ceremony, students graduating from the institute receive a medal of appreciation for their contributions to their respective sports teams.

9. Dormitories for outstanding student athletes – in 2015, the TSA Sports Unit and the Dean of Students agreed to reserve 5 beds in student dormitories for outstanding student athletes without having to meet the requirements of regular student housing criteria. The Sports Unit believes that such a move will encourage outstanding athletes to take part in competitive sports teams and bring honor to the Technion in future tournaments. TSA welcomes this viewpoint and would like to see it expanded further by investing additional resources to attract national Olympic champions interested in studying engineering and science fields and who meet the entrance requirements through full scholarships to the Technion.
Research

Funded Research

Research contracts signed by the Research Authority in 2015 amounted to $83.25 million. Technion’s research contracts totaled $83.7 million in 2013 and $86.3 million in 2014.

Activities to encourage the submission of research proposals for competitive scientific funds continue. In the past few years there has been an increase in submissions to the three main competitive funds (ISF-Israel Science Foundation, BSF-Bi-National Science Foundation, and GIF- German Israeli Foundation). From the ISF the Technion received a total sum of approximately $20.2 million in grants in the past year.

In January 2014 the new funding framework (Horizon 2020) from the European Commission was launched. Horizon 2020 is the largest EU Research and Innovation program ever initiated, with nearly €80 billion available over seven years (2014 to 2020). In the period of October 2014 to September 2015, the Technion was awarded $19.1 million in funding from the Horizon 2020 framework. Overall, there was an increase in EU funding of $1.8 million from the previous year.

Funding in the past year for projects from the Office of the Chief Scientist of the Ministry of Economics and Planning was in the amount of $6.3 million. This includes 16 projects in the “Kamin” program that received $1.5 million. Kamin, funded by the Israeli Ministry of Industry, Trade and Labor, promotes fields of science and technology that have commercial potential for Israeli industry. Kamin serves as a bridge between basic research and applied research that has not yet been recognized by business entities as ready for funding for commercialization.

From October 2014 to September 2015, 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 $7.5 million.

External Aid for Research

In addition to the external funding mentioned above, which consists 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) in the total amount of $14.86 million, and assistance for purchasing equipment for new faculty members in the amount of $12.51 million. In addition, the Technion received assistance from the government for programs for new immigrant absorption (Shapiro, Giladi, and KAMA) totaling $3.58 million.
Internal Technion Financing

Over the past year the Technion allocated approximately $700K to encourage competitive research activities (including internal grants, bonuses for researchers submitting proposals to competitive funds and the promotion of research among new faculty). The sum of $464k was granted via academic chairs and approximately $27 million was allocated to finance fellowships for graduate students engaged in research. The total investment in research, including all sources (external funding, contributions from donors, external aid, internal funds, and graduate fellowships) amounts to $115.39 million.

International and Industrial Collaboration

The Umbrella Program (Aachen University, the Jülich Research Institute and the Technion):

Last year’s symposium was held at the Technion in February 2015, on the follow-up topic of the 2014 symposium, named “When Life Sciences and Engineering Converge.” After the symposium, a number of seed research grants were awarded to research teams from the three participating universities. This year’s symposium will be held in Jülich on a new topic, “From Quantum Matter to New Materials.”

Technion Center of Excellence in Exposure Science and Environmental Health was established at the end of 2010. The Technion was awarded $1 million for five years funding from the Foundation for Environment and Health for establishing a Center of Excellence: “From Airborne Stressors through Risk Assessment to Health Outcomes.” This is a joint center for scientists from various Technion departments run by the Faculty of Civil and Environmental Engineering and the Faculty of Medicine.

The Center’s activities in the past five years included research in four areas: exposure to air pollution in the heterogeneous urban environment, the effect of air pollution from agricultural sources on the population of neighboring communities, air pollution within the built environment, and developing tools and methods for remote detection of air pollutants and for analyzing air quality databases from monitoring stations in order to evaluate the level of exposure of the public to airborne pollutants.

The Center directs research in a wide variety of subjects, among them wireless distributed sensor networks for air pollution monitoring, the use of satellite remote sensing of aerosols for environmental management and public health applications, development of advanced models for assessing the effect of traffic on air quality in urban areas, developing methods for evaluating the influence of exposure to residues of agricultural pesticide spraying, establishing a national database of air pollutant concentrations, and developing novel methods for Fourier transform poen-path remote sensing of gaseous and particulate pollutants, using both active and passive modes of operation.

The Center consists of five Israeli Postdoctoral researchers, approximately ten graduate students and a number of faculty members. In the five years since its establishment, Center members have published approximately 60 papers in leading scientific journals, and have been active participants in approximately 80 national and international conferences.

Agreement between the Technion and the Agency for Management of University and Research Grants (AGAUR):

This collaboration was implemented through the Catalonia-Israel joint program, called TWINS (Towards Interrelations in Science). TWINS is based on the promotion of collaboration between two research teams from the two countries to strengthen relationships and develop strong ties to advance the commercialization of research results.
Joint symposia grants are part of the Catalonia-Israel TWINS Program which were developed over a period of two years (2014-2015) to promote networking through events around a specific scientific topic of interest, to explore, develop, strengthen, and exchange knowledge that leads to future scientific collaborations. Allocations for workshops were approved, and they took place during 2014-2015.

**Waterloo - Technion Cooperation:** The University of Waterloo and the Technion have undertaken a number of highly successful reciprocal visits led by the respective Presidents, and Directors of the institutions’ leading research institutes. In addition, scientists from both institutions participated in several joint Canada-Israel conferences and workshops to explore collaborative research and commercialization opportunities in priority areas of national and international importance, namely Water, Nanotechnology and Quantum Computing and Technology. Both institutions have identified this collaboration as being strategically important.

A call was issued to foster and enhance the cooperation in research between the two institutions. The program’s time-scope is planned for three years. The priority areas of joint collaboration include, but are not limited to, the multi-faceted aspects of:

- Quantum Computing and Technology
- Water
- Nanotechnology

Of the ten collaborative projects that were approved for funding last year, eight received a second year of funding.

**NTU-Technion Collaboration on Recycling:** Nanyang Technological University and the Technion signed a Master Research Collaboration Agreement in 2015. NTU and the Technion will pursue collaborative research and development activities by undertaking research projects in the research areas of material life cycle management, waste treatment and recycling and energy production from waste. The establishment and conduct of the collaborative research projects and the protection and commercialization of the resulting intellectual property will regulated according to the Master Agreement. Within the framework of this agreement, six seed grants were allocated to collaborative research projects, where the total funding from the Technion was $45,000.
**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, 11 research grants were continued this year.

The wide-ranging research center in cooperation with Intel, the Hebrew University and the Technion continues its activity. The activities in the center are mainly conducted by faculty members from the Viterbi Faculty of Electrical Engineering and the Faculty of Computer Science in the field of computational intelligence. Within this framework and in 2015 a fourth portion of research grants (9 research grants) was received.

There is continued intensive activity in the building of three nano-satellites within the framework of the Asher Space Research Institute (Samson Project).

The Focal Technology Area (FTA) Program, with a total investment of $10 million (of which 60 percent is Technion funds), continued its activities within the framework of RBNI on the subject of: "Nanophotonics Research Fund for Advanced Light Detection and Sensing".

**Pre-clinical Research Authority**

A focused and vigorous drive was launched last year 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. The Deputy Executive Vice President for Research for the Pre-Clinical Research Authority, who was appointed for that purpose, is ensuring the swift continuation of the process. In the near future, accreditation will be imperative for obtaining research grants from leading funding agencies such as the European commission and the NIH. This issue has been labeled as critical for life sciences oriented research on campus and has to be met by 2018.

In order to ensure accreditation, and efficient management of the Pre-Clinical Research Authority, a Deputy Executive Vice President for Research was appointed starting January 2015. A special consultant for the necessary requirements and new regulation implementation was also hired to accompany the process. The Technion has allocated a first investment of $5.5M (including $1M from TRDF) to build the new facilities required for AAALAC accreditation, as well as renovating and adjusting the two existing animal facilities at the Rappaport Medical School and Technion Gutwirth upper campus. Nonetheless, given the estimated continued rate of increase in the need for small animals for research, it is predicted that the Technion facilities will soon reach 100% capacity.

The use of animals in Technion leading research areas has expanded immensely over the past ten years. This path of expansion is expected to continue in the upcoming five years, as new alliances between the engineering disciplines and life sciences are constantly emerging, a new Cancer Research Center is being constructed, and life sciences in general continue to expand. The Technion is therefore investing additional efforts to raise additional funding in the range of $12-15M to expand the animal facilities as well as invest in state of the art imaging technologies and equipment and new surgical modalities to accommodate these developments and to be fully engaged with the AAALAC accreditation demands.
Nancy and Stephen Grand Technion Energy Program (GTEP)

The Grand Technion Energy Program (GTEP) was established to foster basic and applied energy research and advance graduate education in energy, leading to the adoption of clean and efficient energy technologies. This is accomplished by investing in the promotion and development of appropriate infrastructure. Since its establishment in 2007, GTEP has become a national hub and center of world-caliber research and education in energy. GTEP-led activities have generated significant scientific discoveries, forged strong industrial and academic ties in Israel and abroad, and attracted first rate faculty members and students.

The following GTEP central laboratories are equipped and fully active:

- 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 (temporary location).
- The Bioenergy Laboratory.
- Temperature Controlled Greenhouse for Growing Transgenic Plants.

The Nancy and Stephen Grand Energy Laboratories and Headquarters are currently under construction on the upper floor of the Faculty of Chemical Engineering building. The new floor will house two central laboratories - the Fuel Cells Research Laboratory and the Hydrogen Research Laboratory, in addition to GTEP’s administrative offices and workspaces for graduate students and visiting scientists.

Today, there are over 50 Technion faculty members partially supported through GTEP’s various funding channels such as seed money grants, support of graduate students fellowships and use of GTEP central laboratories, equipment, seminars and more.

GTEP researchers participated in various national collaborations funded by competitive and philanthropic sources such as:

- A project on PV, biofuels and optics with WIS, supported by the Helmsley Charitable Trust.
- A project on renewable energy technologies with BGU, supported by the Adelis Foundation.
- A national Solar Fuels project (I-CORE) with WIS and BGU supported by the ISF.
- A national Electrochemical Propulsion project (INREP) supported by the ISF.
We continue to seek opportunities for establishing joint research projects and international exchange of faculty and students with other world leading universities.

This year we have continued to focus on expanding multi-disciplinary research projects and promoting collaborations on campus as well as with other Israeli and international scientists.

- The UConn-Technion Energy Collaboration Initiative
- The McDonnell Academy-Technion Energy Cooperation
- Cooperation with the University of Calgary (UoC), Canada
- Cooperation with Aix Marseille University (AMU), France

In the 2015 academic year, GTEP funded activities yielded significant developments in the field, with 140 publications published in high impact scientific journals and 12 patent applications.

In addition, in the current reporting period two start-ups have been founded by GTEP faculty:

- InEnSto - Co-founded by GTEP researchers under the mentorship of Prof. Yair Ein-Eli, InEnSto is a start-up company being established through a Technion accelerator program developing an Aluminum-Air (Al-Air) energy storage technology to be implemented in extremely high energy density, primary (non-rechargeable) batteries.
- RealView Imaging Ltd. is introducing the world’s first 3D holographic display and interface system.

GTEP researchers received over $8 million in external research funds and industrial support for research. This level of external funding and scientific papers would not have been possible without the infrastructure that GTEP has created on campus.

One of the program’s achievements has been its effective role in the recruitment of fourteen excellent new faculty members who have joined Technion with GTEP support since 2010. One new member has joined us in 2015: Dario Dekel (Chemical Engineering). Two new members have joined us in 2016: Lior Kornblum (Electrical Engineering) and Yachin Ivry (Materials Science and Engineering).

In the 2015 academic year, GTEP’s Graduate Program in Energy Studies supported 42 excellent students of whom 25 were MSc students and 17 were PhD students. One measure of the students’ quality is the competitive external prizes and scholarships won by nine of them last year and six additional prizes in the current academic year (which is still ongoing). In the last academic year nine students graduated the program. This year we expect an additional 24 graduates. The program is supervised by a 12-member faculty committee, headed by Prof. Yoed Tsur from the Faculty of Chemical Engineering.

In 2012 GTEP and the Wolfson Department of Chemical Engineering launched an ME graduate study program in Natural Gas & Petroleum Engineering. So far, 37 students have graduated from the program. A third class with 13 students was opened in October 2014. Those 13 students will graduate this year.

To further expand its educational activities and support channels in energy research on campus, GTEP has recently launched the GTEP Fellowship Program for Outstanding Postdoctoral Fellows.

As part of the program, GTEP proposes to support successful applicants for up to two years with a matching stipend.

GTEP supports projects in outreach and general education as an integral part of its global mission. This year, GTEP supports the Technion Formula Student activity, and the ¼ Scale Tractor International Student Design Competition.

Finally, GTEP provides an essential framework for seminars, workshops and academic guests. This enrichment is open to faculty, graduate students and guests from industry and academia. In the 2015 academic year, GTEP held and supported 19 seminars and workshops.
Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering

The Technion has long recognized the value of interdisciplinary research in advancing scientific discovery and its applications. Today’s researchers tackle complex problems that cannot be resolved within a single academic discipline—and the Technion constantly creates and evolves academic organizations that foster interdisciplinary work. Interdisciplinary research is the pillar of modern scientific research, as the borders of scientific disciplines converge, merge, and are intimately dependent on each other.

Mr. Lokey’s monumental gift to the Technion, and the vision behind this - stewarded by Nobel Laureate Prof. Aaron Ciechanover - made possible the establishment of the the Lorry I. Lokey Interdisciplinary Center for Life Sciences and Engineering, which was launched in 2006. In February 2013, Prof. Yoram Reiter took up his appointment as director of the Lokey Center.

The center fosters collaborative research, provides state-of-the-art research facilities, and contributes to educational opportunities in biotechnology. The diversity of faculty research is reflected in the wide range of disciplines including biology, biomedical engineering, chemical engineering, chemistry, computer science, materials science, mathematics, mechanical engineering, and physics. This convergence has led to the emergence of new disciplines in the center such as Biomedical Optics and Imaging, Systems Biology, Synthetic Biology, Bioinformatics and Computational Biology, Metabolomics among others, which are a reflection of how convergence is a serious and increasingly important development in science.

Aiming to facilitate convergence endeavors and to develop partnerships, synergies and collaborations with universities across the world, we hosted the First Pearl Seiden International Meeting in Life Sciences in 2015. The meeting featured 18 speakers; ten international speakers from the U.S. and Europe and eight local speakers from the Technion, the Weizmann Institute, Tel Aviv University, and the Hebrew University, Jerusalem. Attended by 150 researchers, students and professionals from the private sector in Israel and around the world, the conference was truly an international gathering.

The meeting was the first of its kind, bringing together both synthetic and system biologists, to discuss the latest developments in their fields, and to jointly discuss how both fields can move forward. This framework was enthusiastically embraced by our invited speakers, who gladly attended the meeting.

In April 2015 the Bioinformatics Knowledge Unit [BKU] at the Lorry Lokey Interdisciplinary Center for Life Sciences and Engineering held a five-day international workshop on Molecular Dynamics. The workshop was organized by Dr. Fabian Glaser from the BKU unit joint with the AMBER Development Team and NVIDIA Inc, USA. The course was led by one of the world experts in molecular dynamics,
Prof. Ross Walker from the San Diego Supercomputer Center & Department of Chemistry and Biochemistry and the University of California San Diego, USA. Prof. Walker is among the main developers of algorithms for parallel computation of Classical, Quantum Mechanical and hybrid Quantum/Molecular Mechanical (QM/MM) techniques. The course was jointly taught by Prof. Walker and two other molecular dynamics experts, Dr. Adrian Roitberg from the Department of Chemistry, University of Florida, and Dr. Tom Kurtzman from Lehman College New York. We had 38 participants eight from Europe and the rest from different universities in Israel. The majority of participants were graduate students and postdoctoral fellows, studying in the field of biomolecular simulations. In the course, the participants were introduced to the broad collection of computational tools implemented in the AMBER software packages for molecular dynamics (MD) simulations. The course consisted of a combination of lectures and hands on tutorials that provided comprehensive introduction to molecular dynamics and molecular simulation. The highlight of the course was the poster session in which the students and post-docs presented their own projects in the field of Molecular Dynamics.

In its efforts to expands its global reach, this year the Lokey Distinguished Lecture Series hosted world scientists: Prof. Richard Lenski from University of Michigan, Prof. Pamela Silver from Harvard Medical School, Prof. Susan Margulies from University of Pennsylvania, Prof. Yohanns Bellaïche who is the director of the Genetics and Developmental Biology Unit in the Curie Institute in Paris, Prof. Hans Clevers from Hubrecht Institute –a leading figure and pioneer in the field of intestinal stem cells.

The center also hosted a mini-symposium on “Mechanisms of Protein Misfolding and Degradation in Disease” leaded by Prof Goldberg from Harvard Medical School - a world leading expert on the ubiquitin-proteasome system who made several scientific breakthroughs and Prof Michael Sherman from Boston University an expert on molecular chaperons, and was the first to define their roles in degradation of abnormal and misfolded proteins in various aspects of physiology including apoptosis, inflammation, glucose tolerance, neurodegeneration and cancer development.

The center management understands the need for engineers and for technological advances– the promise to provide Technion students with an exciting education that will prepare them for emerging technologies and to be adaptable and flexible for the rapidly changing world. In 2015, the Technion competed for the third time in the iGEM jamboree. iGEM is the leading undergraduate competition in bioengineering, synthetic and quantitative biology, and has become a new paradigm for cross-cultural multi-university undergraduate research and education.

In 2015, iGEM celebrated its 11th year anniversary, and for the second time a giant jamboree was conducted in Boston, MA during the last week of September [see page 19].

At the frontline of technology for the service of researchers in life sciences and engineering we continued this year to focus on the development of the various units within the clusters: the Technion Genome Center, the Infrastructure Center including the Microscopy and Imaging Unit, Flow Cytometry Unit, Bioinformatic Unit and the Structural Biology Center that have been growing rapidly over the years and are one of the main triggers for the blossoming of life sciences at the Technion. Our achievements over the last year are many, and include the following:

- In August 2015, the first Light Sheet Fluorescence Microscope in Israel was installed at the LS&E Microscopy Unit. Light sheet fluorescence microscopy (LSFM), is a relatively new technology that became commercially available only at the beginning of 2013.

- The Bioinformatic Unit at the center (BKU) has purchased a new workstation with four Graphic Processing Units, dedicated exclusively to perform AMBER simulations. This powerful new workstation will allow us to take advantage of one of AMBER’s new features; the ability to use accelerated computing via NVIDIA GPUs (Graphics Processing Unit) to massively accelerate PMEMD for both explicit and implicit solvent simulations.

- Organizing workshops and seminars in the fields of Light Microscopy, Flow Cytometry and Next Generation Sequencing, Bioinformatics, a three day course on molecular modeling techniques and long-term dynamics and analyzing ChIP-seq data. An increased number of publications were published in peer-reviewed papers, that utilized the Infrastructure Center for their research.
The number of labs and research groups using the Infrastructure center has increased to more than 122 in 2014, with more than 500 users.

The Lokey Center team comprises 19 people, who are highly trained and experienced and are dedicated to delivering all necessary support and knowledge to the Technion research community most importantly students, postdoctoral fellows, and all other users, including those from other institutions and industry.

Additional activities on campus are coordinated by the Lokey Center and the Russell Berrie Nanotechnology Institute (RBNI) such as providing general guidelines for optimizing the impact of large scale equipment on campus and to provide centers of expertise. The centers also help to support users by financial match.

**Russell Berrie Nanotechnology Institute (RBNI)**

This year marked an important turning point for RBNI as we entered the second of five years of the third phase. The funding of the institute has undergone some changes so as to ensure the sustainability of the institute. RBNI has reached an agreement with Technion management that ensures an annual operating budget of about $950,000 through to September 2019. RBNI started also a major equipment upgrade project to replace several systems that were bought in the early days of RBNI. The funding source for the upgrade is the infrastructure fund established in phase one of RBNI. The upgrade project will cost $7.3 million, of which RBNI will fund $5.5 million. Additionally, Technion purchased a state of the art electron beam writing system at a cost of €4.5 million, funded by the FTA program. The combined purchases revolutionize the infrastructure and the fabrication as well as characterization capabilities across the campus. Finally, the responsibility for the cost of the Norman Seiden Graduate Program in Nano Science was taken over by Technion management.

The research at RBNI continued to flourish with many researchers achieving important scientific results and international recognition. Examples include: Prof. Moti Segev - elected to the National Academy of Sciences (USA) as a foreign associate, Prof. Yonina Eldar - awarded the IEEE Kiyo Tomiyasu Award. Prof. Moshe Narkis - granted, a Life Time Achievement Award by the PAT Journal (Polymers for Advanced Technologies) and John Wiley & Sons, in July 2015 in Hangzhou, China. Prof. Ilan Marek – awarded the Weizmann Prize for Exact Sciences. Prof. Moran Bercovici – awarded the Krill Prize for Excellence in Scientific Research, Wolf Foundation.

The FTA program on nano technology for detection and sensing continued successfully. This $10 million program which comprises 10 Technion and three non Technion researchers is in its final year and will end in September 2016.

RBNI has completed the planning of its future directions. Two main directions will dominate the activities: Nanomed which is a joint program with the Lorry Lokey Center for Life Sciences and Engineering and Quantum Science Matter and Engineering. The Nanomed program underwent an evaluation by a panel of international experts last year. Several important recommendations are in the process of being implemented. The quantum center is envisioned to become a major entity which will encompass essentially all nano technology research areas which are not related to the life sciences. The center for Quantum Science Matter and Engineering will be officially inaugurated in June 2016 when RBNI will hold the Diane and Mark Seiden Symposium on Quantum Technologies. 20 prominent researchers including 12 international and eight Israeli world leaders will participate in this highly acclaimed event. Additional activities in the quantum field include a collaboration with Waterloo University on a satellite based secure quantum communication link and an agreement with Wuerzburg University to hold five annual symposia to be funded by the Reinhard Frank Foundation.

RBNI continued its global activities this year. We held several international events including:

- July 2015 – Joint symposium with the Catalonia Nano Cluster at Technion.
- October 2015 – The second annual joint symposium with KAIST in Korea.
Technion Autonomous Systems Program (TASP)

Autonomous Systems represent the next great step forward in engineering, involving the fusion of mechanics and electronics with sensors, computers, and communication capabilities. The objective is to develop intelligent systems that can interact dynamically with the complexities of the real world.

The Autonomous Systems Program was founded in 2008 in order to form a melting point for studies in different disciplines, thereby gaining from the synergies and bringing the Technion to the forefront of this exciting field. The program includes over 80 faculty members from nine faculties, and is divided into three major centers (air and space systems, ground systems and marine systems). We relied on initial donations, enabling a buildup of expertise and infrastructure to attract later funding from government and industry in order to sustain the center.

This year we intensified our activities in the marine and ground centers with several major projects:

i. Autonomous Underwater Vehicle. The project goal is to develop and produce a 3m long, modular, autonomous marine underwater vehicle, which will serve as a technology demonstrator and platform for various research programs. This project is partially supported by RAFAEL and MOD. The design has been finalized this year, and production has started.

ii. Autonomous landing of a Quad-Copter drone on a moving marine platform. The goal of this project is to build a hybrid system that will protect as much marine area as possible so eventually it will act as a virtual fence protecting and monitoring a marine or coastal asset, or will perform search missions.

iii. Autonomous Ground Vehicle for a smart stretcher. The main goal of this research is to provide a system for rapid and continued medical treatment and remote monitoring of an injured soldier using the “Smart Stretcher”. The vehicle has autonomous stabilizers so as not to exacerbate the injured person’s situation and approach the frontline location without risking more lives and extract the wounded soldier to a safe location, all while initial medical care is administered.

We support over ten different studies, in the areas of aerial, ground and marine vehicles, and autonomous subsystems. In addition to Technion donor funding, we are supported by grants from industry and government ministries in the sum of several million shekels. This is a good sign for the future sustainability of the program.

We have an outstanding graduate studies program, with almost 50 students. Most of them are full-time, including six PhD students. The first eight students have graduated our Master’s programs.

Technion Computer Engineering Center (TCE)

The Technion Computer Engineering Center (TCE) was inaugurated during the first annual TCE conference in June 2011. It is now open for new members and more than 60 faculty members from the Technion and other universities are TCE members. A significant effort has been invested into reaching out to leading companies in Israel and to date, over 20 companies are industrial members of TCE, among them Intel, Amdocs, Qualcomm, and Rafael. R&D staff from these companies may bring up new research agendas and enjoy the wealth of knowledge available at the Technion. TCE has titled these researchers ‘agents of knowledge’ who can benefit both industry and academia, on whose collaboration the center relies.
In May 2016 TCE will hold its sixth international conference. Since 2014, the conference has been named after Henry Taub, a great friend and benefactor of Technion. This year the conference focuses on 3D Graphics and Geometry and will feature speakers in these areas from international and Israeli universities, as well as industry representatives. The conference won a grant from the Israel Science Foundation. Last year’s conference on Scalable, Reliable and Secure Systems was a major success and drew in over 500 participants, a record number for an academic conference at Technion. The conference included a special Scala programming language workshop, by Prof. Martin Odersky from EPFL which drew in a huge number of open source developers. The open source community also held its annual Reversim Summit at Technion in March, drawing in a huge crowd.

During 2015 and into 2016 TCE continued its goal of knowledge dissemination with numerous workshops and talks. A talk series by top Intel speakers is taking place this year and features a deeper understanding of new Intel technologies as well as marketing strategies. Some conferences have turned into an annual tradition and are back this year, such as two Crypto Days and a joint Amdocs NFV conference at the Amdocs campus in Ra’anana. A workshop on Coding for Emerging Memories and Storage Technologies took place in May. The 4th Summer School on Computer Security in took place in September 2015, and the Light Weight Crypto day in February.

The Henry Taub Distinguished Visitors Program continues this year with distinguished speakers such as Daniel Kroening from Oxford University who visited TCE and met with students and faculty. The Viterbi Leaders in Science Programs continues in supporting new faculty members, and the Viterbi Faculty Chair is bringing in two prominent researchers this year for a semester long visit: Prof. Uzi Vishkin from the University of Maryland and Prof. Ken Birman from Cornell.

TCE is participating in the new Technion Cyber Security Research Center, a multiyear research program by the Cyber Center in the Prime Minister’s office, headed by Prof. Eli Biham from the department of Computer Science. The center is issuing call for proposals for research, and is aimed at enhancing cyber security beyond its trivial research areas, to a much wider perspective. TCE was awarded a research donation from AOL, where six members from the Technion are already jointly working on research with Cornell Tech faculty members.
Samuel Neaman Institute for National Policy Research (SNI)

The Samuel Neaman Institute for National Policy Research is a unique think tank in Israel which allows exploration, discussion and the making of informed national policy recommendations. This is the fourth decade during which SNI has realized the vision of its founder, Samuel (Sam) Neaman, by gathering experts in various fields in which informed decisions, discussion, and analyses of the problems on the public agenda are required and where recommendations for national policy are needed. The researchers leading the study at the Institute are highly experienced experts in their field and provide a broad view of issues that require national decisions and in which long-term, as well as short-term, guidance is needed.

Research at the Samuel Neaman Institute is integrative and researchers are independent in choosing their research topics, while the Institute is able to leverage their skills, their multi-dimensional expertise and the database accumulated over the years as a result of hundreds of infrastructure research studies.

Apart from active research, SNI organizes various seminars, expert workshops and lectures clarifying the topics addressed.

In Israel, in contrast to other developed countries, it is difficult to find a parallel study center that deals with such a wide range of issues and provides a roof under which experts can conduct objective in-depth research on the important issues and challenges facing the State of Israel that require decisions and guidance, while agreeing that steps that are taken or not will have an impact for many years to come.

Work on such a broad variety of topics would not have been possible without the efficient and well-designed use of the basic research budgets of the Institute, together with competitive research grants originating in Israel and abroad. SNI has more than once found itself an active partner of strategic government programs, and parts of the published research reports are frequently intertwined in various government decisions and operational government programs. However, some of the Institute’s activities are dedicated to understanding and clarifying long-term thinking processes that do not concern today’s policymakers, but no doubt will prove useful and valuable in the future. The subjects addressed by SNI in 2015 include:

- R&D and innovation while examining Israel’s developmental outputs, led by Dr. Daphne Getz
- Environment: examining the external costs of environmental damage, such as the Evrona oil leak, led by Prof. Ofira Ayalon
- Agriculture: overproduction of food and an attempt to examine the waste of food in the industry, also led by Prof. Ayalon
- Industry: upgrading the Israeli industry through the Industrial Excellence Center at SNI, headed by Dr. Gilad Fortuna;
- Infrastructure: the continued research of Generation Y through the People of Israel Project, led by Dr. Tamar Almog and Prof. Oz Almog
- Mathematical education in schools through the Traffic Light Project, led by Prof. Nitsa Movshovitz-Hadar
- Israel’s land policy and housing prices, led by Prof. Rachelle Alterman
- The integration of the Haredi society in the labor market, led by Dr. Reuven Gal
- The continued publication of the Wheels of Life report of Israel, led by Prof. Shlomo Maital
- National projects, such as the Overarching Strategy Forum for the State of Israel, led by Prof. Tadmor, designed to enhance the national resilience of Israel
- A chapter in a book by the World Bank which examines the Israeli innovations, written by Dr. Daphne Getz and Dr. Izhak Goldberg, and other diverse topics that are part of a multi-dimensional spectrum of layers, in which the SNI is involved, in addition to the operation of data centers for “Magnet” projects.
Outstanding Research and Scientific Achievements in the Past Year

No. 1 paper in 2015 on solar fuels

A paper by Prof. Yeshayahu [Shay] Lifshitz of the Faculty of Materials Science and Engineering and his Chinese colleagues, published in *Science*, received significant international praise. The article describes a breakthrough in the production of hydrogen through solar energy driven water splitting. Hydrogen is considered a most promising future fuel source because of its potential use in powering motor vehicles and generating electricity without the involvement of unwelcomed by-products and greenhouse gas emissions.

It was rated the top solar fuels paper of 2015 by the Solar Fuels Institute (SOFI) based on the number of citations it gained in scientific journals and on internet downloads. The study honored its authors with a prize from the Chinese Science and Technology Office as one of China’s top ten technological progresses of 2015. It is the most cited article (with about 195 citations in the Science Citation Index) out of all Israeli (about 20,000) and Chinese (about 300,000) articles printed in 2015.

Prof. Lifshitz is listed as one of the world’s top 100 researchers in materials science in 2000-2010 by Thomson Reuters and *Times Higher Education*.

Cyanobacteria’s Automatic Sunshade

A study published in *The Proceedings of the National Academy of Sciences (PNAS)* by Prof. Noam Adir, dean of the Schulich Faculty of Chemistry, and doctoral student Dvir Harris, shows how bacteria protect their photosynthetic system from overexposure.

Photosynthesis, with which we are familiar from the plant world, is essential to the animal kingdom – not only for organisms that perform photosynthesis themselves, but for all living things. This is because even animals that do not perform photosynthesis consume the primary product of photosynthesis – glucose.

Due to the importance of this process, these organisms have developed mechanisms that protect them from overexposure to sunlight. Just as film in pre-digital cameras can be overexposed, natural photosynthetic systems are also liable to become impaired as a result of overexposure, leading to the death of the organism.

One of these defense mechanisms has now been revealed in their study conducted in collaboration with Dr. Diana Kirilovsky and her laboratory at I2BC-CEA, in France. The defense mechanism was deciphered in cyanobacteria (formerly known as “blue green algae”).
Connected to Life

Technion researchers deciphered the mechanism of cell-cell fusion, which is vital to embryo formation and development. This process is apparently involved in inflammatory and cancerous processes as well. The study was published in the journal Cell Reports.

Prof. Beni Podbilewicz of the Faculty of Biology, who led the study, explains that “it is clear that such a critical process must be closely controlled in space and time. However, despite its importance, this control mechanism has not yet been completely deciphered, and that was our mission in this study: understanding the genetic and cellular mechanisms responsible for controlling fusion.”

Cell-cell fusion is a process in which two cells cling together, their membranes merge in the contact area, and the two cells become one. First the outer layers of the cell membrane fuse, and then the inner layers.

Prof. Podbilewicz, who has been studying the above mechanism for quite some time, discovered that the key player in the process is EFF-1, a developmental fusion protein. In the current study, conducted in Prof. Podbilewicz’s laboratory by Dr. Ksenia Smurova, it became clear that successful fusion requires the presence of EFF-1 in both cells that are destined for fusion.

Moreover, the researchers found that in order for fusion to occur, the EFF-1 protein from both cells must meet in the contact area between the cells. However, in order to prevent excessive fusion that can cause the death of the entire organism, these proteins must be kept away from the cell membrane and reach it only at the desired stage. Dr. Smurova discovered that two proteins (Rab5 and dynamin) are responsible for constantly keeping the EFF-1 away from the cell membrane.

Technion Breakthrough Improves Tissue Grafts

Technion researchers and colleagues in the U.S. have developed technology to tailor grafted tissues that can respond to certain natural forces affecting blood vessels. The researchers also found that matching the structure of the engineered vessels to the structure of the host tissues at the site of implantation helps the tissue implant integration, improving the chances that grafted tissues will survive. The findings were published recently in The Proceedings of the National Academy of Sciences (PNAS).

“Developing functional and mature three-dimensional blood vessel networks in implantable tissues is critical when using these engineered tissues to treat a number of conditions, such as cardiovascular disease and trauma injuries,” said lead researcher Prof. Shulamit Levenberg of the Faculty of Biomedical Engineering. “Matching the tissue structures will improve the long term viability and strength of tissue grafts when new blood vessel growth — called ‘angiogenesis’ — can be manipulated and exploited for the purpose of attaining optimal blood supply.”

This study was conducted in collaboration with Prof. Dave Mooney, of Harvard University, who hosted Prof. Levenberg during her sabbatical year. The project was carried out by Dr. Dekel Dado-Rosenfeld as part of her PhD thesis, under the mentorship of Prof. Levenberg. Dr. Dado-Rosenfeld is currently a postdoc at the Massachusetts Institute of Technology, under the auspices of the MIT-Technion Postdoctoral Fellowship.

A Muscle is Born

A study conducted by Assistant Prof. Peleg Hasson at the Technion’s Rappaport Faculty of Medicine and recently published in Developmental Cell sheds light on the embryonic development of the muscle-tendon interface, the myotendinous junction, which is vital to the organism’s motor activity.
The ability of muscle to move the skeleton is essential to the movement of human beings and other vertebrates. Therefore, defects in the aforementioned junction – i.e. the interaction between muscle fibers and tendon – harm its motor ability. Despite the importance of this interface, and in some cases its impact on degenerative diseases of the muscles, the molecular mechanisms that form it during the embryonic developmental stages have not yet been deciphered. Hence, the importance of this study, which sheds light on a few essential steps in this process.

In experiments with mice, Assistant Prof. Hasson found that when the enzyme LoxL3 is abnormal, the whole chain of processes is disrupted. This disrupts the implementation of the “anchoring plan”; the muscle fibers continue to migrate and become excessively long, thereby “missing” the correct anchoring point. The result: the muscle-tendon interface does not develop properly.

Hasson stresses that “This is basic research, and it’s still difficult to predict its clinical implications. However, the new revelations concerning the development of the connection between muscle and tendon may lead to further studies that will paint a more accurate picture of this critical process.”

Live Imaging

Prof. Yonina Eldar’s lab at the Viterbi Faculty of Electrical Engineering is developing a minute and efficient innovative ultrasound system that transmits scans to the treating physician immediately. With such a system, ultrasound scans can be performed in disaster areas, in the case of road accidents in developing countries with limited medical infrastructure, and the team at the site can be given medical instructions based on the findings.

At present, ultrasound examinations are performed at clinics and hospitals using a probe connected to a large, cumbersome and expensive ultrasound device. The results of the scan are collected in the computer and interpreted by a radiologist, who sends the diagnosis to the patient’s doctor (generally the family doctor). This process takes several days, which could be critical in some cases.

The SAMPL lab has developed an advanced probe that eliminates the need for the large ultrasound devices that we know from clinics and hospitals. The probe acquires only the relevant data, which is transmitted to a remote processing unit or cloud. The resulting image is then transferred to the treating physician’s smartphone (or tablet).

Herbal Medicine Risk for Cancer

Nearly two-thirds of the herbal medicines used by cancer patients in the Middle East have potential health risks, according to a new survey led by Prof. Eran Ben-Arye.

The study published in the journal Cancer concludes that herbal remedies such as turmeric may increase the toxic effects of certain chemotherapies, while gingko biloba and green teas could increase the risks of bleeding in some cancer patients. Other herbs including black cumin and turmeric can alter the effectiveness of chemotherapy.

“In the Middle East, herbs are commonly used as part of traditional medicine, based on the impressive affinity of the people here to the herbal heritage that continuously prospers from the time of ancient Egypt and Mesopotamia,” Ben-Arye said.

Patients most often turn to the herbs to enhance their quality of life and to cope better with the effects of their treatment, Ben-Arye added, rather than use them in an attempt to cure their cancers.
Hydrogen Breakthrough – Water Splitting at Technion

The scientific journal Nano Letters reported a significant breakthrough in the field of hydrogen fuel production. A major discovery occurred at the laboratory of Assistant Prof. Lilac Amirav of the Schulich Faculty of Chemistry, demonstrating a perfect 100 percent light-to-hydrogen gas conversion efficiency through solar water splitting.

The search for environmentally clean and renewable energy sources is indispensable in face of a looming energy crisis, and environmental problems such as global warming. One promising approach to address these challenges is the use of photocatalytic systems, which harvest sunlight and split water, producing molecular oxygen and hydrogen.

Amirav, together with Dr. Philip Kalisman and Dr. Yifat Nakibli have set a record for one of the half-reactions in this process, reporting 100 percent efficiency for the reaction that utilize the negative charges for the production of hydrogen from water. These results shatter all previous benchmark conventions for all systems, and leave little to no room for improvement for this particular half reaction. The impressive efficiency was achieved through utilization of a unique nanoparticle photocatalyst, operating in basic environment.

The research was conducted in the framework of the Russell Berrie Nanotechnology Institute (RBNI) and the Nancy and Stephen Grand Technion Energy Program (GTEP).

A Game-changer in Retina Research

Innovative imaging technology developed at the Faculty of Biomedical Engineering captures fine, high quality optical images of retinal structures in vivo. The system, which can be easily integrated into any existing two-photon microscope without requiring adaptive corrections, could potentially be transformative for retina research.


This new imaging technology was developed at the Neural Interface Engineering Laboratory by doctoral student Adi Schejter Bar-Noam, the laboratory head, Associate Prof. Shy Shoham, and research associate Dr. Nairouz Farah.

The system’s simplicity effectively opens up a new range of potential applications for two-photon excitation microscopy – an advanced fluorescence imaging technique already installed today in numerous laboratories.

“The broader context of our work is Optogenetics,” says Shoham, “a scientific area that has flourished over the past decade and allows us to study neurons over time using fluorescent proteins, or to use light-sensitive proteins to activate cells. The new system allows us to make use of the two-photon microscope in both aspects, that is, in the imaging of retinal neurons or for cellular activation by light. Indeed, the extended design process demonstrated its effectiveness for imaging nerve cells and blood vessel.”

Shoham is researching a new approach to the artificial stimulation of blind retinas, developing devices that could bring more sight to the visually impaired. “Our work is at the interface of neuroscience and engineering,” he says. “The field of Neuroprosthetics involves the development of solutions for bypassing compromised neural systems,” says Shoham. “The goal is to interface with the nervous system.”

The research team’s novel approach toward non-invasive vision restoration in blind retinas, by combining holography and optogenetics, could be a first step toward noninvasive sight restoration in cases of degenerative retinal diseases. The study reporting a proof of principle for the new approach was published in the multidisciplinary journal, Nature Communications.
Cardiac Cells Trained as Pacemakers

In a breakthrough that could change the future of pacemakers, Technion researchers have used mechanical stimulation to "train" cardiac cells to beat at a given rate.

The team’s findings, published in *Nature Physics*, also demonstrate for the first time that direct physical contact with the cardiac cells is not required to synchronize their beating. As long as the cardiac cells are in the tissue being mechanically stimulated, they are trained by the stimulation, with long-lasting effects that persist even after it is stopped.

"Cell-cell communication is essential for growth, development, and function," explains Assistant Prof. Shelly Tzlil, of the Faculty of Mechanical Engineering. "In this study, we show that an isolated cardiac cell can be trained to beat at a given frequency by mechanically stimulating the underlying substrate. Mechanical communication plays an important role in cardiac physiology, and is essential for converting electrical pacing into synchronized beating. Impaired mechanical communication will lead to arrhythmias even when electrical conduction is working properly. The medical implication is that adding mechanical elements to electrical pacemakers will significantly improve their efficiency."

Detecting DNA Sequences at Technion

Technion researchers have developed an innovative method for detecting DNA sequences with high sensitivity – over 1,000 times higher than that of existing methods. The study was highlighted on the back over of the leading journal *Advanced Functional Materials*. The principles of the study could enable the development of a wide range of simple and relatively inexpensive medical diagnostic systems, for example in order to identify known mutations in DNA.

The research is a multidisciplinary collaborative effort of the research groups of Associate Prof. Ester Segal (Faculty of Biotechnology and Food Engineering) and Assistant Prof. Moran Bercovici (Faculty of Mechanical Engineering). Doctoral student Rita Vilensky, who conducted the study under their guidance, built a lab-on-a-chip device combining (1) a biosensor for optical detection of DNA molecules; and (2) a system of microchannels enabling the concentration of DNA by applying electric currents on the chip.

Through precise design of the silicon’s structure and controlled growth of insulating oxide layers, the researchers were able to apply high electric voltages on the chip while preserving its unique nanostructure. "Combining the technologies has enabled us to improve the sensor’s sensitivity by a factor of between 1,000 and 10,000 compared with existing devices." *The study was supported by the Russell Berrie Nanotechnology Institute.*
Sleep Well for Stem Cells

Sleep deprivation can decrease the success of bone marrow cell transplantation by up to 50 percent, according to a study by Prof. Asya Rolls of the Rappaport Faculty of Medicine published in the journal *Nature Communications*. Rolls conducted the study as a postdoc at Stanford University and continued it at her Technion lab, together with graduate student Ben Korin.

Tens of thousands of bone marrow transplants, more accurately called hematopoietic stem cell transplants, are performed each year. This is an effective practice to treat certain types of cancer. Stem cells injected into the patient’s blood “migrate” to specialized niches in the patient’s bones and replenish the blood system.

“Our study was conducted in mice, and therefore it’s still too early to draw conclusions about humans,” explains Rolls. “However, the study indicates the importance of sleep in medical procedures.”

If we find that donor sleep deprivation does indeed impair the success of the transplant in humans as well, we will need to think carefully about how to ensure a good sleep – something which is currently difficult to achieve during a hospital stay.”

The study, supported by the US National Institutes of Health (NIH), was conducted in collaboration with researchers at Stanford Medical School and the department of Biology at Stanford.

Early Warning of Cancer Metastasis

Innovative technology developed at the Technion Faculty of Biomedical Engineering will enable the prediction of cancer metastasis after the appearance of breast cancer. The technology, whose efficacy has been proven in preliminary laboratory-trials, is entering into advanced testing using cells from patients undergoing surgery.

Assistant Prof. Daphne Weihs recently achieved a research breakthrough: the unique technology that she developed – a biomechanical method for early detection of metastatic cancer – was approved by the Ethics Committee. This means that the technology that was found to be effective in tests on cell lines will advance to trials with tumor cells collected directly after surgery, in cooperation with Rambam Healthcare Campus.

According to Weihs, the practical concept is that “during or immediately after a biopsy or surgery on a malignant tumor, the system will enable the medical team to quantitatively evaluate the likelihood of the presence or development of tumor metastases in other organs, and to propose which organ or organs are involved.”

“In fact, most cancer-related deaths are caused by metastases rather than by the primary tumor, and therefore vast resources are invested in developing methods for early detection of metastases,” explains Weihs. “Early detection means timely and more effective treatment.”

Threat Information Causes Indifference

A study by Prof. Eldad Yechiam of the Davidson Faculty of Industrial Engineering and Management reveals that, counterintuitively, information about key dangers can actually have a calming effect.

Intuitively, if we have to choose between a city where life is dangerous and a city where life is safe, we will choose the latter. This is refuted in a new study published in the journal *Nature Climate Change*. The study, conducted by Yechiam together with colleagues from England and Australia, reveals that the more information about the danger there is, the more the “appetite for risk” actually prevails. In other words, intense coverage of unusual adverse events may actually have a calming effect.
According to Yechiam, the explanation is simple. “Whenever there’s a rare natural event such as an earthquake, detailed information only emphasizes its rarity, and the person who has to make a decision will choose the dangerous village because it’s a better place in normal times. The good daily routine is perceived as an advantage that outweighs the rare risk, and therefore the person will prefer a good and slightly dangerous life to a safe but not so good life. He knows that if he chooses the safe and bad life he’ll feel like a sucker – because most of the time the detailed information will emphasize the disadvantages of his choice.”

Artificial Lung Demonstrates How Aerosols Behave

A life-sized artificial human lung, created by Assistant Prof. Josue Sznitman of the Faculty of Biomedical Engineering, is the first diagnostic tool for understanding in real time how tiny particles move and behave in the deepest part of the human lungs (alveolar tissue). The patented platform could provide a better understanding of the health risks associated with airborne pollution, and be used for the evaluation and design of drugs for the respiratory system. The results were published in *Scientific Reports*.

Inhaled particles (also known as aerosols) are tiny particles that can originate in nature, and from industrial and transportation sources, and which enter the lungs via inhalation. Although they are just a few microns in size, i.e. one hundredth of the size of a grain of sand – increased and prolonged exposure to these particles may interfere with the activity of the body’s organs (including neurons in the brain), and in some cases even lead to the onset of cancers.

“This is the first diagnostic tool that enables quantitative monitoring of the dynamics of aerosols at such small scales,” said lead researcher Sznitman. “It gives us the ability to directly observe airborne particle trajectories and their patterns of deposition in the alveoli in real time.”

“Nanopore” Scanners to Find Early Signs of Cancer

Using tiny “nanopore” scanners that can detect individual DNA molecules, Prof. Amit Meller of the Faculty of Biomedical Engineering and colleagues are on the hunt for biological markers in cancer cells that may help clinicians diagnose colorectal and lung cancers at their earliest stages.

Meller leads a research group that is a partner in BeyondSeq, an international research consortium looking for new methods of decoding genetic and epigenetic information from medical samples. BeyondSeq, supported by a €6 million grant from Horizon 2020, the European Union’s framework program, was one of only eight consortia chosen out of 450 submitted proposals.

“We are the only lab in the consortium working on early diagnosis of cancer biomarkers, which...will allow doctors to combat the cancers much more effectively and save human lives,” Meller explained. “Currently there are no good ways to diagnose colorectal cancer and lung cancer at early stages. Usually these cancers are diagnosed at later stage (stage 2 or above) in which the patients may already have multiple secondary tumors, hence highly complicating treatment.”

The Illuminated Heart

Technion researchers have developed a new approach for the treatment of abnormal heart rhythms by using a light-based therapy (the optogenetic approach). This technology was reported in the journal *Nature Biotechnology*. The study was conducted by Dr. Udi Nussinovitch at the laboratory of Prof. Lior Gepstein in the Rappaport Faculty of Medicine. Gepstein is the director of the Department of Cardiology at Rambam Health Care Campus.

The conventional medical treatment used today relies on the implantation of an electronic pacemaker, which corrects the dysfunction of the natural pacemaker mechanism using electrodes inserted into
various areas of the heart. The optogenetic technology employed here allowed researchers to selectively activate light-sensitive proteins (such as the ion-channel ChR2, first identified in algae), which were overexpressed in excitable cells (such as nerve or muscle cells), in an attempt to modulate (either augment or suppress) their electrical activity. Optogenetics has become an important tool in brain research and the current study is the first to translate this important innovation to pace and resynchronize the heartbeat.

Prof. Gepstein stresses that this is a preliminary study, and that “in order to translate the aforementioned approach to the clinical arena, we must overcome some significant hurdles. We must improve the penetration of light through the tissues, ensure continuous expression of the protein in the heart for many years, and develop a unique pacing device that will provide the necessary illumination. But despite all of this, the results of the study demonstrate the unique potential of optogenetics for both cardiac pacing (as an alternative to electronic pacemakers) and resynchronization (for the treatment of heart failure with ventricular dys-synchrony) therapies.”

Gates Foundation Awards Funding for TBDiagnostic Plaster

Prof. Hossam Haick of Technion’s Wolfson Faculty of Chemical Engineering and the Russell Berrie Nanotechnology Institute received Phase II funding through Grand Challenges Explorations (GCE). The GCE initiative, created by the Bill & Melinda Gates Foundation, enables individuals worldwide to test bold ideas to address persistent health and development challenges.

Haick is developing a “Self-Administered Adhesive Plaster for Detection of Tuberculosis” – a sensing plaster that can be stuck on the chest to detect volatile biomarkers emitted through the skin for self-diagnosis of tuberculosis even at early stages. The presence of tuberculosis will be signaled by colored LEDs.

This two- to five-minute examination, either in the clinic or at home, results in either a GREEN light when the user is healthy (i.e., has no TB) or RED light when active TB is present.

“With the support of the Gates Foundation, we are developing an array of rapid, accurate, and affordable tools that shall contribute to increasing the survival rate of tuberculosis patients, and, also, in arresting the disease transmission. Ultimately, we hope these advances could contribute to the democratization of health globally,” said Haick.

Promising Results: Alzheimer’s Drug Trial

Avraham Pharmaceuticals Ltd. announced in July 2015 successful second interim results in a Phase 2b clinical trial for the evaluation of the safety and efficacy of ladostigil, a unique, multifunctional drug for the treatment of mild cognitive impairment (MCI). The primary goal of the current clinical trial is to determine whether ladostigil can delay or prevent the onset of Alzheimer’s disease (AD). After two years of treatment, both biological markers and behavioral measures indicate positive trends of the ladostigil-treated group in comparison to the placebo-treated group.

“We are looking forward to the final results when they become available in Q3 2016, following three years of treatment,” says Prof. Moussa B.H. Youdim of Technion’s Rappaport Faculty of Medicine. “We are thinking of the patient because ladostigil is the first AD drug that slows down the atrophy of the AD brain as shown by functional MRI analysis.”

Ladostigil was designed by Youdim and Prof. Marta Weinstock-Rosin of the Hebrew University of Jerusalem. The drug was exclusively licensed to Avraham Pharmaceuticals by Yissum Research Development Company Ltd. and by the Technion Research and Development Foundation Ltd.
Impressive Student Achievements

Robodrink: The Automatic Bartender from Technion

Three students from the Technion Faculty of Computer Science have developed ROBODRINK, a robot for mixing alcoholic beverages. The robot was designed by Michal Friedman, Yoav Mizrahi and Zorik Gechman as part of an Arduino systems programming course, under the guidance of Prof. Yossi Gil, tutorial teachers Boris van Sosin and Marina Minkin, and Dr. Nir Levy, academic relations director at Microsoft.

This is essentially an automatic bartender, explains Michal Friedman. “It can mix drinks from a built-in list and prepare cocktails based on personal preferences. We built a machine that has brackets for holding eight bottles. We programmed it to mix drinks using combinations from three bottles of juice and five alcoholic beverages. Users choose a cocktail from the menu in the application we developed. When a glass is put on the platform at the edge of the track, the robot prepares the drink within seconds, based on a precise recipe.”

“We built everything from scratch,” says Zorik Gechman. “This is a project that combines both hardware and software. We assembled the electronic components and built the electrical circuits. We wrote the software for an Arduino processor and developed app that communicates with the robot via Bluetooth, based on recipes located on the cloud.”

The Arduino systems programming course is held in conjunction with Microsoft R&D, and provides students with the opportunity to use innovative technologies and software during their studies, including smartphones and tablets for running their applications during the development stage.

Smart Helmet for Formula Racing

For the first time in the Formula competition for students: a helmet with a head-up display, enabling the driver to read the status of the car’s systems without taking his/her eyes off the road

This innovative invention was installed in the third Technion Formula car, that represented the Technion in the FSAE student world championship held in Varano, Italy, in September 2015. This is the third car built by Technion students, after the previous two recorded impressive accomplishments: two years ago (2013) the Technion Formula team won first place in the rookies category, and last year won first place for car design and improvement over the previous year.

The project is headed by Yevgeny Guy, a BSc student, who last year headed the engine division. “Participating in this project is a tremendous investment,” said Guy, “but there are things that are worth more than a few grade points, and the practical experience we are getting here is one of them.”

“The multidisciplinary cooperation is also excellent preparation for the real world, where you will need this kind of cooperation in almost every industry,” said Senior Executive Vice President Prof. Sidi. “One day, when you are supervising a large project of national importance, or working on the development of a product that will change the lives of millions, you will remember where it all began.”
**BizTEC 2015 National Entrepreneurship Competition:**

Technion’s Peekaboo team won first prize at the BizTEC National Entrepreneurship Competition for students with innovative technology for non-invasive collection of sterile urine from baby girls, receiving a 10,000-shekel prize from the Technion, the main financier of the competition.

The winning team, Peekaboo, whose members are Janna Tenenbaum-Katan, doctoral student at the Faculty of Biomedical Engineering, and Lior Har-Shai and Yoel Angel, graduates of the Rappaport Faculty of Medicine, was created in the Medical 3DS Competition held at the Technion’s Rappaport Faculty of Medicine on the initiative of Faculty Dean Prof. Eliezer Shalev.

According to Tennenbaum-Katan, the mother of two little girls, “the current collection method is inconvenient for both the child and the parent, and invasive collection is clearly even more unpleasant. Every year 1.8 million baby girls undergo invasive urine collection in the United States alone, and our interviews with medical personnel indicate that our product has significant medical and economic potential, with sales of over 17 million units per year in the US alone.” After winning, Tennenbaum-Katan said: “It is very exciting to know that not only do we believe in ourselves, but the judges also believe in us.”

**Keep Your Hair On!**

The Technion 2015 iGEM team won gold medals in several categories and was designated “Best New Application,” for their application to tackle male pattern baldness at its roots.

“Our solution aims to target the real, scientific cause of the problem,” states Alexey Tomsov, captain of the Technion team competing at the 2015 international iGEM synthetic biology competition. “We aim to show convincing evidence of DHT (dihydrotestosterone) breakdown, providing a promising platform for treatment of male pattern baldness. We have created a system in which two different engineered bacteria are combined in a custom-made comb, manufactured with a 3-D printer, that work together to break down DHT, treating the problem at its root.”

The team comprised 10 students from a variety of disciplines: biotechnology, chemical engineering, mechanical engineering, biochemical engineering, and electrical engineering.

According to Prof. Roee Amit of the Faculty of Biotechnology and Food Engineering, who supervised the Technion team, iGEM “has evolved into the most exciting, innovative and dynamic experiment in scientific education from high school through to the postgraduate level.”
Administration and Finance

Israeli Economy in 2015

Slowly, and perceptibly, Israel’s economic growth is slowing. From Gross Domestic Product (GDP) growth of 5.5 per cent (2010) and 5.0 per cent (2011), despite the global Great Recession, in 2015 GDP grew by 2.5 per cent, compared with 2.6 per cent in 2014. GDP per capita increased by only 0.5 per cent, as population growth was about 2 per cent.

GDP growth was unevenly spread over the year, with almost no growth in the second quarter and 3.9 per cent (annual) growth in the fourth quarter.

Israel’s economic growth is generally export-driven. The weak global economy caused a 3.1 per cent decline in exports of goods and services, after a 1.5 per cent rise in 2014. Imports rose by 0.6 per cent (3.0 per cent in 2014), so that overall, Israel’s foreign trade sector, normally a growth engine, was a growth retardant in 2015. Although exports declined overall, exports to China and India each rose by over 20 per cent. Israel’s main export to China is electronics components, largely the microprocessors produced by Intel’s huge Kiryat Gat plant. The United States remains by far Israel’s best export market, purchasing $11.2 billion worth of Israeli goods and services, compared with Israel’s second largest customer, United Kingdom, which bought $3.7 b. worth of exports.

Another reason for the export decline was the exchange rate; the shekel rose in value relative to other main currencies by about 20 per cent between 2012 and 2015, making Israeli exports more expensive in terms of foreign currencies.

The main growth engine in 2015 was personal consumption, which grew by a strong 4.9 per cent, while public consumption grew by 3.1 per cent. Gross fixed capital formation (investment in buildings and equipment) declined by 1.4 per cent in 2015, although a component, residential housing investment, increased, reflecting the continued strong demand for housing and persistent rise in housing prices, despite the efforts of the Finance Ministry.

Compared to the 34 nations of the OECD (the developed nations), Israel’s GDP per capita, measured at purchasing-power exchange rates, remains about 15 percent below the OECD average.

According to the Central Bureau of Statistics, GDP per work-hour declined slightly in 2015; labor productivity in Israel is relatively low, compared to OECD averages, and has stagnated since 2013. Unemployment remained low in 2015, at 5.2 per cent of the labor force, down from 5.9 per cent in 2014.

Israel recorded a budget deficit of 2.2 percent of GDP in 2015, well below its target due to higher-than-

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1 This report was prepared by Prof. [emer.] Shlomo Maital, senior research fellow at the S. Neaman Institute for National Policy Research, Technion.
expected tax income and lower spending, in turn due to a technical cause – a long delay in Knesset approval of a new budget, following national elections, freezing spending at existing levels. Net government debt remains stable, at about 62 percent of GDP, significantly below the OECD average.

An official OECD report on the Israeli economy in 2015 noted: “Israel is characterized by high poverty and large gaps...of wellbeing [second, in the OECD, only to Mexico]. Poverty is especially high among the elderly, in part because of low basic pensions. Rising housing prices impose an additional affordability burden.” Inflation-adjusted housing prices have risen by 60 per cent between 2008 and 2015.

At the same time, however, the same OECD report noted that “the Israeli economy is enjoying its 13th consecutive year of growth [despite the 2008-12 global Great Recession], demonstrating remarkable resilience”.

Consumer prices actually declined in 2015, after rising slightly in 2014, and inflation remains below the minimum target level of the Bank of Israel.

Immigration from Western Europe hit an all-time high in 2015, as some 10,000 French Jews made aliyah, in the wake of anti-Semitic attacks in that country. In total, nearly 30,000 people made aliyah in 2015, the highest number in over a decade.

Israel’s dynamic startup sector remained vigorous in 2015; Israeli startups were sold for a total of $9.02 billion in 2015, a 16 percent jump from 2014.

With regard to capital and money markets, the Bank of Israel maintained interest rates at historically low levels. The Tel Aviv Stock Exchange TA-25 index rose 4.4 per cent in 2015 (10.2 per cent in 2014), while the TA-75 index declined by 5.4 per cent (9.8 per cent decline in 2014). Market capitalization of listed shares was $244 b., up from $201 b. in 2014. TASE listed companies numbered 461, down from 473 in 2014 and 508 in 2013.

In contrast, the S&P 500 index fell by 0.7 per cent in 2015, the NASDAQ 100 index rose by 8.4 per cent, and the FTSE 100 index fell by 9.6 per cent.

What does 2016 hold in store? Official Bank of Israel forecasts predict 2.8 per cent GDP growth in 2016 and 3.1 per cent growth in 2017. Exports will recover, growing by 4 per cent in 2016 and 6.3 per cent in 2017, according to Bank of Israel experts. Interest rates will remain low, with gradual increases beginning only toward the end of 2016.

Geopolitical risk and uncertainty in the Mideast remain high; Israel has always lived in a bad neighborhood, and it has gotten worse in 2015. Oil prices fell sharply in 2015, to 12-year lows, but failed to stimulate global growth, in part because low prices of oil and other commodities reflected weakness in Asian economies (mainly China), which in the past were strong engines of global growth. Israel’s natural gas windfall, a source of major political controversy, with the major Leviathan field due to come on line in three or four years, has been impacted by the steep fall in natural gas prices.

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 and used to develop and upgrade the Technion’s infrastructure, research and teaching facilities and establish new research centers and programs.

The financial activities cover also Technion’s investments and pensions.
Operating Budget

About seventy percent of budgeted expenses are for staff emoluments and pension payments. On the other hand, about the same percentage of this budget covered by the government’s allocation. 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.

The Technion managed to recruit 150 new senior academic faculty members over the past five years. In 2015/2016, the Technion continued with a moderate increase in senior academic positions, which reflects new management priorities and an adjustment to the PBC’s new budgeting model.

Last year, the Technion’s student body has numbered around 13,900 (undergraduates and graduates), with continuing tendency of increasing the number of doctoral students. The increased senior academic positions and new faculty recruitment will reflect on the students per faculty ratio to result in enhanced academic quality and strength. During the last ten years, the technical and administrative staff was reduced by about 7%. The general approach is to reduce administrative positions and navigate part of them to engineering positions.

The 2014/2015 Budget Year

The 2014/2015 budget year ended with a deficit of NIS 35.7 million, NIS 1.4 million over the budgeted deficit. The deficit will be covered by withdrawals from Technion’s reserves.

The 2015/2016 Budget Year

The 2015/2016 budget framework is NIS 1,429 million. It includes an increase of NIS 6 million for growth and expansion of academic and other related activities and a NIS 30 million deficit (about 2.1% of the budget framework). The expenditures are classified into five main categories, as shown below (in NIS million):

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salaries</td>
<td>742</td>
<td>52%</td>
</tr>
<tr>
<td>Pensions</td>
<td>264</td>
<td>18%</td>
</tr>
<tr>
<td>Student fellowships, scholarships, etc.</td>
<td>107</td>
<td>7%</td>
</tr>
<tr>
<td>Maintenance</td>
<td>123</td>
<td>9%</td>
</tr>
<tr>
<td>Others</td>
<td>193</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,429</td>
<td>100%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>P&amp;BC</td>
<td>981</td>
<td>70%</td>
</tr>
<tr>
<td>Tuition</td>
<td>121</td>
<td>9%</td>
</tr>
<tr>
<td>Societies</td>
<td>68</td>
<td>5%</td>
</tr>
<tr>
<td>Self-income</td>
<td>229</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,399</td>
<td>100%</td>
</tr>
</tbody>
</table>
The main changes in the 2015/2016 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 increase in graduate students fellowships, pension payments and literature cost. 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 2014/2015, the Technion invested (cash and obligations) NIS 135 million ($35 million) in development projects. Income for development projects amounted to NIS 184 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 10 years was NIS 1,730 million. At the same period, the total income sources amounted to NIS 1,930 million.

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

<table>
<thead>
<tr>
<th>Category</th>
<th>Invested in Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buildings, renovations, infrastructure</td>
<td>64</td>
</tr>
<tr>
<td>Multidisciplinary research centers</td>
<td>40</td>
</tr>
<tr>
<td>Equipment and Laboratories (not including laboratories establishment for new faculty members)</td>
<td>31</td>
</tr>
<tr>
<td><strong>Total (NIS million)</strong></td>
<td><strong>135</strong></td>
</tr>
</tbody>
</table>

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 on a periodically basis by a public committee. The value of the portfolio on September 30, 2015 was NIS 6,073.0 million ($1,548.0 million). About 51% of the portfolio was in Israeli index-linked investments, 8% in foreign-exchange linked investments, 26% in shares, and 15% in liquid assets.

Pension Payments and Actuarial Liability

Pension payments to most of the Technion employees provides from the operating budget. In 2014/2015, pension payments were NIS 256 million, representing 18% of the operating budget; this year, they expected to reach a total of NIS 264 million. This percentage is expected to remain unchanged 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, 2015 is NIS 7.5 billion (obligation of 8.2 billion including TRDF).
Physical Development

Next to its human capital the physical area of the campus is the most valuable asset Technion has. Building and the continuous development of the campus helps to create a continuously improved academic environment enabling students, researchers and faculty to better promote teaching and research activity. Along with new buildings, facilities and infrastructure, great effort is invested in upgrading the current assets. The upgrading includes both safety enhancements and new regulatory alterations of older buildings, mainly for new faculty members labs, as well as renovations for new usage such as self-study or learning centers in most of the faculties, libraries and dormitories.

Continuous effort is invested in the challenging mission to recruit 30 new faculty members yearly. Most of them need “wet” laboratories with special equipment and fittings to perform their research. The location of these labs, mainly in the older campus buildings requires many renovations and adoptions to updated health, safety and accessibility requirements. Moreover, a series of relocations and replacements within the faculty’s neighboring labs and facilities is usually required. Innovative solutions through joint collaboration between faculties are needed when there is no available space within a faculty. By now it is evident that some of the faculties have to be enlarged and have additional space.

The 2015 Board of Governors meeting adopted “TechCity21”, the 6th master plan for the Technion City campus and authorized the Technion management to implement its guidelines and proceed with the approval process of the new proposed zoning. These plans, together with modules of initial implementation, propose a framework for doubling the campus built space, adapting its infrastructure, and enhancing its indoor and outdoor spaces. It also calls for a better integration into the urban fabric and surrounding natural environment. Above all, the plan promotes the combination of a “forest image” with a “city image” – green and wooded, while being well-serviced, well-connected, and vibrant.

One of the management’s goals, as reflected in the strategic plan, is to increase the numbers of students and new researchers living on campus. A new undergraduate village with almost 500 beds is being built, two more towers housing families, couples and singles have received statutory approval. A competition for rebuilding the existing dormitory tower for medical students in the city of Haifa is being initiated. All the plans include supportive facilities. Also in the existing dormitories a continuous effort is being implemented to improve living conditions.

The Rappaport Faculty of Medicine has undergone a major renovation. Clinical and experimental research labs were established, classrooms auditoriums and the cafeteria were renovated and expanded. The library is being renovated along with more research laboratories, more infrastructure and air conditioning system improvements. A new building for the Cancer Research Center is in the approval stage. Together with Rambam Hospital, a request for the enlargement of the site for both institutes is being presented to national authorities as part of the new zoning plan of the Bat Galim neighborhood where they are both located.
Outdoor developments including landscape and reforestation, traffic and pedestrian transportation system infrastructure are being implemented to improve the environmental quality of the campus. The project of fire prevention of the wooded campus is going into its 3rd stage, concentrating on the inner areas of the campus after the completion of campus edge woods, the wooded hill and along the ring road. The entire ring road has been adapted to be accessible for pedestrians and more accessible access was developed. The plan for the new entrance gates was presented to statutory authorities for approval and is now in the detailed planning stage before tender. Water, sewage and drainage systems as well as AC and power supply systems are continuously being replaced and improved for the benefit of a technological institute’s needs.

Projects Completed

1. Schulich Faculty of Chemistry – Renovation of laboratories, offices.
2. Zielony Graduate Student Village – Community Center including 4 kindergarten classes, a playroom, a multipurpose hall, courtyard, covered parking.
3. Zielony Student Union Bldg. – Completion of Learning Center on the 4th floor.
4. Rappaport Faculty of Medicine – Renovation of Pre-Clinical Research Authority, Renovation of experimental research labs, Renovation and expansion of cafeteria.
5. Wolfson Faculty of Chemical Eng. – Renovation of laboratories, offices and Public areas.
7. Faculty of Architecture – “Hadarion” – Renovation and Restoration of former Library Bldg. in HADAR Campus to house studios, public clinic, lecture hall and exhibition – stage A.
8. Microelectronics (Wolfson) Bldg. – EBL lab and AC upgrades.
10. Rivkin Dormitories – Renovation of communal areas in buildings 115, 117
11. Fire prevention zone – along the ring road - stage “B”.
12. Various research Facilities – Renovation of Labs as part of recruitment of new faculty members.
13. Accessibility for Physically Challenged Individuals in various projects in campus buildings and outdoor areas.
14. Campus Infrastructure Projects and Safety Upgrades.

Projects under Construction

1. Undergraduate Student Village – 4 dormitory buildings with 112 apartments mainly for single students, total of 488 beds.
2. Schulich Faculty of Chemistry– Renovation of laboratories and public areas, Renovation of library.
3. Wolfson Faculty of Chemical Eng. – Renovation of laboratories in the "Pilot" – Stage C Auditorium Renovation.
4. Grand Technion Energy Program – research labs on an additional floor including “reinforced shelter tower”.

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5. Faculty of Architecture – “Hadarion” – Renovation and Restoration of former Library Bldg. in HADAR Campus to house exhibitions on entrance floor, building an exterior elevator and site development – stage B.

6. Rappaport Faculty of Medicine – Renovation of library, Renovation of experimental research lab, Air conditioning systems improvement.

7. Southern Palm Beach Chapter Expansion of student’s Counseling Center – Additional Wing and accessibility for Physically Challenged.

8. Dejur Dormitories – Renovation of communal areas – bldg. 116

9. Canada Dormitory Village – Renovation and AC systems in building 932

10. Various Research Facilities – Renovation of Labs as part of recruitment of new faculty members.

11. Fire Prevention Zone – stage “C” including pavement of roads and security improvements.

12. Accessibility for Physically Challenged Individuals in various projects in campus buildings and outdoor areas.


14. Campus Infrastructure Projects and Safety Upgrades.

Projects in the Planning Stage

1. Technion Campus Gates – Susan and David Wilstein Main Gate (Neve Shanan) and Nesher Gate.

2. Ullmann Teaching Center – Building reinforcement, additional elevators, addition of classroom floor (8th floor).

3. Tower Dormitory Buildings – Two high-rise buildings for families, couples and singles – Statutory approval, detailed design stage.

4. Medicine Student Dorms at Allenby 85 – Demolition of existing Dormitories and planning a modern Dorm tower instead.

5. Danciger Labs. – Mehoudar Center on the ground floor – public laboratories and elevator.

6. Polak Visitors Center – Additional wing for exhibitions and Renovation of existing bldg.
7. Cancer Research Center – New building near Rappaport Faculty of Medicine.
8. Andrew and Erna Viterbi Faculty of Electrical Engineering – New Wing within the existing buildings.
11. Faculty of Materials Science and Engineering – Additional new wing.
12. Henry and Marylin Taub and Family Science and Technology Center – Multipurpose learning center and Rooftop Terrace.
13. Sports Center – New Multifunctional Hall, Sport Court Shading Roof, Jacuzzi enlargement.
15. Various Research Facilities – Renovation of Labs as part of recruitment of new faculty members.
16. Accessibility for Physically Challenged Individuals in various projects in campus buildings and outdoor areas.
17. Campus Infrastructure Projects and Safety Upgrades.
Technion Sustainability Hub

Following the recommendations of the Technion’s strategic master plan, approved by the board of governors in the summer of 2015, the Green Campus project has evolved to a sustainability hub. The main goals as described in the master plan, states that the Technion will establish itself as a leading university in environmental policy and as a sustainable campus in Israel and worldwide by:

- Preserving and nurturing the unique natural environment in which the campus is situated.
- Striving to become a zero-carbon emissions campus through energy conservation and increased use of renewable energy.
- Drastically reducing the use of non-renewable resources.
- Increasing its role in environmental research and innovation and becoming a global leader in the field.
- Educating students, staff, and faculty members in environmental leadership and responsibility.

With these goals in mind, activities through 2015 included awareness raising and education, saving resources (water, energy, waste recycling etc.), definition and prevention of pollution and establishing the new sustainability hub. Focus was given to coordinating and integration of different environmental and social activities on campus. This serves as a meeting place for entrepreneurship as well as a communication tool for the different activities taking place on campus.

Main projects in 2015:

- **Environmental leader course**: took place through the first half of 2015, with fifteen Technion employees and three 1st degree students who took part in lectures and operated green projects in the campus, such as bike parking mapping, green walls in classrooms, organizing earth day activities around the campus, and more.

- **Advising the campus master plan planning team**: on green campus operation for the future vision of the Technion campus and addressing all sustainability issues resulting in the TechCity21 master plan.

- **Executing yearly “MALA” activities**: students for the environment organization leading several engineering research and operational projects. Some projects involve community engagement and receive academic scoring through the Dean of Students volunteer program.
Resource saving: taking part and supporting energy and water saving projects in the Technion, and raising awareness through lectures and material such as newsletters and stickers throughout the campus, promoting the use of 100% recycled paper on campus in cooperation with procurement department.

“Green Campus” website: serves as a center for updates and information on environmental activities on campus, http://greencampus.technion.ac.il/. Soon to be transformed to “sustainability hub website”

“Green Campus” Facebook page provides updates, green office tips and links to relevant articles from around the web. URL of the Facebook page “Technion Green Campus”. Soon to be transformed to “Technion sustainability hub”

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 report for the fifth 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 – upgrading of “yellow” trashcan infrastructure for small plastic bottles and aluminum cans – in collaboration with ASAT.

Main plans for the coming year:

- Continuation of all on-going projects,
- Cooperation with “MALA” – ongoing and new projects.
- Cooperation with the student society – waste collection, bicycle facilities, students’ activities.
- Integration and better involvement with other sustainability projects and issues on campus
- Mapping sustainability issues according to GRI methodology
- Green tech competition – cooperation with ASAT and the Bronica Entrepreneurship Center – February 2016 through April 2016.
Human Resources

Our Vision

Shaping an organizational culture that is committed to the Technion’s vision through the excellence and self-actualization of its employees.

General

1. Maintaining excellent cooperation with the Chairman of the Employees Association – which in turn enables us to jointly and responsibly further the needs of the Technion.

2. Employment of persons with disabilities – following the extension order to encourage the employment of people with disabilities by the Ministry of Economy, employers with 100 or more employees are required to achieve fair representation of individuals with disabilities in the workplace of at least 3%. To this end we are making great efforts to promote the employment of people with disabilities on campus. We are working on a plan that will map existing Technion employees with disabilities and are looking into identifying job opportunities within the organization that can be suitable for individuals with disabilities (supported employment). In addition, the Technion has appointed an HR representative to head up this initiative, who will be responsible for promoting the employment of people with disabilities at the Technion.

   By employing people with disabilities we are promoting employment diversity at the Technion that encourages tolerance, openness, creativity and innovation, and strengthens the image of the Technion as a social organization.

3. Adding/updating HR policies – over the course of the past year, a number of Technion policies were added/updated and approved including: a policy on the employment of relatives, and a policy for handling the death of a member of the Technion family. In the coming year we will continue to work on adding and updating HR policies.

4. Establishment of professional leadership forums – for different stakeholders on campus, including: the forum for external and industrial relations, the forum of laboratory engineers, microbiology forum, management forum (for various management teams on campus), and others.
5. Finalizing the implementation of the SAP personnel management system on campus – the implementation of the SAP system was completed with workflow troubleshooting and debugging exemplifying the efforts of the department over the past year:

- The automated process for opening a new user on SAP for new employees was completed.
- The system is now capable of handling exemption and tuition reimbursement for academic staff.
- The recruitment system for managing tenders has been automated on the SAP and can generate reports on the state of the tenders in real time.
- The employee welfare unit installed an automated process to help in the promotion of administrative staff based on the obtainment of recommendation letters from their supervisors. In addition, an automated system generating automated letters to members of staff eligible for tuition waivers was set-up.
- The training unit completed the installation of an automated employee training system that generates letters sent to employees and their supervisors about courses/workshops they have signed up for.
- To effectively monitor employee productivity and attendance, a system has been set-up that can generate multiple reports based on attendance data collected; the upgraded presentation of these figures in the attendance sheet of employees has improved clarity with supervisors.
- In the employee relations unit two hours have been completed in the automated system for generating letters about length and scope of employment. In addition, parameters for the extension of employment of hourly employees were set-up.
- In the retirement unit, the implementation of an assessment system calculating pension rights of academic and administrative staff, as well as redemption of sick pay for administrative staff, was completed.
- In the upcoming year we intend to advance the transition to virtual employee personnel files by scanning documents to a “Documentum” (Document Management System), and adding employee photos to personnel files on SAP. In addition, we intend to work on adding an assessment system for calculating redemption of sick pay for academic staff.

Recruitment

In the past year, the Recruitment Unit focused on resolving personnel issues in the various departments, and in identifying staffing needs. We recruited for senior positions, among them a new Internal Auditor and Head of the Construction and Maintenance Division.

In 2015, 125 new positions were added. We recruited 113 new employees, and 9 staff members moved into new positions after successfully competing in recruitment tenders and directed mobility initiatives.

The majority of the new employees are academics, engineers and microbiologists. Of the new hires, 67% are women.

Column in the HR Newsletter

The section on recruitment and placement in the HR Newsletter [published between 4-5 times yearly by the HR Department for Technion employees] now features a column on new employees who have recently joined the Technion. Through the narrative of an employee’s personal journey and job description, Technion staff members are exposed to new fields and Technion units. Reaching people on such a personal level can build a sense of belonging and community and may lead to unexpected work relationships.
Employees Development

In 2015, the Unit continued to focus on developing processes to promote excellence at the Technion to advance the HR department’s vision.

Review process for employees seeking tenure:

The decision granting Technion employees tenure is a significant matter that has a direct impact on the functioning of individual units and the Technion in general for many years to come.

The process consists of 4 review sessions over a period of two years, when the final decision is determined by a committee composed of representatives from the unit in question and the Human Resources Department.

2015 Statistics:

- 124 employees have begun the process for tenure
- 77% of the employees under review received tenure

Outstanding Employees

As part of Technion’s employee excellence program, each year the institute awards rewards and certificates of appreciation in recognition of outstanding contributions to the Technion.

The excellence program is divided into two parts: outstanding employees of individual units and outstanding employees of the Technion. In recent years, recommendation forms were revised in order to shorten the process and make it more efficient. In addition, changes were made to the selection process of outstanding employees of the Technion, to facilitate the validation of the process and selection of the most exceptional employees from all of the candidates recommended by individual units.

The validation process is conducted by a representative from the Human Resources Department together with a former outstanding employee of the Technion. It includes a visit to the employee’s workstation, a short interview, and a summary report submitted to the Technion Outstanding Employees Committee. Individuals selected as outstanding employees will receive certificates and an award at a prestigious ceremony, and a short clip that will be made of their daily routine at Technion.

This year, another way to recognize outstanding employees was proposed. Outstanding employees were invited by the HR Deputy Director General to a “Brunch for Outstanding Employees”. This special gathering afforded outstanding employees an opportunity to express their views on excellence in the workplace with their direct supervisors and representatives of the Technion’s management team. The meeting was very successful and the discussions were especially fruitful.
Training

The 2015 training program included professional courses, special workshops for academic faculties and administrative units, tailored campus-wide training programs and specialized programs for administrative directors and unit heads. The training program was formulated with the help of a steering committee, in accordance with requested subject matters and sectors.

This year new workshops were added designed to strengthen teamwork and improve employee effectiveness, and administrative directors and unit heads responded to our request to examine employee needs. In addition, creative employees shared new ideas yet to be realized at the Technion – some of these initiatives have shown promise and are being added to the training programs this year.

The success of these courses and workshops lies in the practical application of the study content, which empowers employees on both personal and professional levels alongside their peers at the Technion.

Key objectives in 2015:
- Imparting professional knowledge and management tools.
- Increased human capital development and effectiveness.
- Executive training.
- Establishing professional leadership forums.

Goals achieved over the 2015 training period:
Expansion of management courses – adapting content and practical tools to separate sectors.
Professional courses – reviewing updated content in various fields.
Deepening connections between employees within the various academic faculties and administrative units.
Cultivating a leading executive team.
Strengthening the corporate culture.
Enhancing fruitful cooperation between the various managers by holding joint courses.

Employees Welfare

The Welfare Unit invests many efforts and resources in taking part in important occasions touching the lives of Technion employees throughout their employment at the institute.

At various milestones throughout the year the Technion distributes gifts to Technion employees and faculty members – on Rosh Hashanah (Jewish New Year), birthdays, birth of a child, wedding, and when a child begins their IDF or national service. In addition, as in every year, the unit reinforces efforts in helping staff members get through difficult times such as: lengthy illness, death of a close friend/family member, and emotional distress.

Events:
Throughout 2015 the Unit hosted a number of events geared to increase employee motivation and organizational pride, and connection to the Technion (of employees and their family members).
In April 2015, a Bar/Bat Mitzva event was held at the Harry and Lou Stern Family Science and
Technology Youth Center – a unique day of science designed for children and staff was enjoyed by all.
In July 2015 a festive family happenings was held to celebrate the start of Grade 1.

In August 2015 a large happening was held to celebrate the end of the summer holidays in cooperation with the Technion Student Association (TSA). The event included concerts, amusement rides, creative art workshops and more.

During the month of September 2015 a general employee benefit was held at the International Convention Center of Haifa in cooperation with the Employees Association. Employees were invited to bring a date to the event which featured artistic performances by Miri Mesika and Israel Katorza.

In December 2015 a traditional Hanukah celebration was held for Technion pensioners.

Culture and Sports:
In 2015 a singing group was established for the first time composed of employees of the Technion and the Technion Research & Development Foundation. The singing group has begun regular rehearsals and should be ready to perform at future Technion events soon.

Sports teams – over the past year two new teams were established: a men’s soccer team and women’s netball team. The new teams compete in the national workplaces league and join the two other sports teams – basketball and running teams (reported on in the previous President’s Report).

Community Outreach:
The community outreach program includes approximately 80 volunteers from the Technion workforce, who work with two youth drop-in centers in Nesher and Haifa. The daily volunteering activities consist mainly with helping children at the centers with their homework, celebrating birthdays and leading enrichment activities. The volunteers celebrate every holiday with the children at the centers. On two holidays each year children from the youth centers are invited to celebrate at the Technion: on TuBishvat they participate in the planting event held at the Ecological Garden, and on Purim the HR Department hosts a unique activity with the participation of the Technion President, the Deputy Director General of Human Resources and volunteers.

Retirement
Up to the end of 2015, the number of administrative and academic staff employed by the Technion with a budgetary retirement plan was 961, while the rest of the employees are on a pension savings plan.

Retirement from the labor market is a significant event in one’s life. Based on this understanding, the Technion, through the Welfare Unit, offers employees up for retirement to join a series of informational meetings to help prepare for retirement.

With the steady increase in life expectancy, there are a growing number of retirees and individuals leaving the workforce who require support services to the end of their days (estimated at an average of 17 years after retirement). As a result, during 2015, a reallocation of the Unit’s activities was undertaken in order to ensure that this population group will receive the attention they deserve.

Technion termination data for 2015:

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<tr>
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<th>Termination of Employment</th>
<th>Retirement</th>
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<tbody>
<tr>
<td>Administration Staff</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>Academic Staff</td>
<td>9</td>
<td>35</td>
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Academic Staff

Over the past year, 63 new academic staff members were recruited, of which 28 are clinical track faculty at the Ruth and Bruce Rappaport Faculty of Medicine. The Academic Staff Unit focused on improving the absorption process of new faculty to facilitate ease of immersion to their new role and their family’s integration to the Technion. The relationship with new faculty members starts long before the commencement of their appointment at the Technion, in order to provide them with as much information available about the conditions of their employment, and offer assistance that can meet the unique needs of each family on issues ranging from housing and primary education options, to helping their spouse find a job.

In addition, the Unit continues to strengthen its relationship with long-standing Technion faculty members while improving the implementation of the SAP system and academic staff portal. The ongoing issues handled by the Unit includes: tuition fees, sick leave, dormitory housing, work accidents, unpaid leave, maternity leave, ID cards, position increments, personal data entry and more.
Computing and Information Systems

The Computing and Information Systems Division, created in 2011 by merging the Information Systems Department and the Taub Computer Center, operates as one unit. One major concern continues to be the fact that the new unit still operates out of two buildings located across campus from each other. Significant efforts are being made to find the necessary funding to move the two units into one building. This will improve the functioning and the daily operation of this unit.

The plans for the new building also include upgrading the outdated Data Center that is 40 years old and requires major renovation.

The most significant projects are outlined below:

**HR Module Implementation (SAP)**

The Human Resources module went live in January 2014. This application covers three HR offices: HR Division of the Technion, HR Department of TRDF and the Academic Staff Office. This was a major project that had and still has a significant impact on a very wide population (actually – all employees).

At the beginning, right after going live, we had a long list of open issues to deal with, but as the time passed the system was stabilized. The ongoing operations are working fine and now we are dealing with adding more functionality to this application.

**Payroll System**

The Payroll System that was operating on the Technion’s IBM Mainframe computer was changed to a different mode of operation. The process has been completed and now the Payroll activities are provided as a service by an outside vendor. The outsourcing project took about a year and now the system is operating on the vendor’s computer, interfaced to the SAP HR module of the Technion.
Campus Management Module (SAP)

The Campus Management Module is the last major function that still operates on the old IBM Mainframe after outsourcing the Payroll services.

An Academic Project Manager has been appointed for the Campus Management project – Prof. Moshe Shpitalni. A public tender for the Blue Print stage had been published and now we are evaluating the solutions that were offered by the vendors.

We expect to start the Blue Print project by July 2016.

Data Communications Infrastructure

The project of upgrading the data communication backbone infrastructure is complete. The equipment was installed and now we have a modern high-speed communication at the band-width of 10 GB/Sec.

Website Development and the New Accessibility Regulations

During the last three years the CIS Division created a new and modern infrastructure for developing new websites, based on Word Press technology.

We created a development environment, in which end users with basic computer skills can develop their own website, based on a few templates that had been created.

Last year new rules and regulations to assist disabled people were legislated in Israel.

In order to comply with these new regulations we are making a huge effort to adapt the existing websites. This is an important project that requires significant resources.

We made the required changes to the main Technion’s website www.technion.ac.il which now complies with the new accessibility regulations. We received formal certification from the Access Israel Organization for this website.

Servers Virtualization

We moved the majority of our servers to a new environment using virtualization tools from VMWare. About 90% of the servers at the CIS Division are virtual servers. This allows us to provide improved and more reliable services using less hardware, and to significantly reduce electricity consumption.

Improving Data Security infrastructure

One of the major challenges of the computer world today is Data Security.

We invest a significant percentage of our annual budget and resources in order to integrate cutting edge technology to detect and prevent security attacks.

A large project to implement a new SSL-VPN from Juniper has been completed. This is state-of-the-art infrastructure that allows secure access for all researchers, employees and students to our servers. In the data security arena, fighting malicious software is a constant and daily battle.
**Mobile Applications**

Two years ago we developed a new application for mobile devices. The target users are the Technion students, and the application aims to provide many daily services that the students use, such as viewing grades, the academic calendar, and so on. The new mobile application was adopted immediately by the students and is in wide use.

We are in the process of translating the application into English, and later into Chinese.

**Cloud Computing**

We started to use Cloud services for email. The first stage was moving the email services for all alumni to the cloud. The second stage was moving the student email services.

We are now in the middle of the third stage, of moving the email services of the Technion staff to the same cloud: Microsoft 365.

There is no doubt that providing IT services over the cloud is a valuable and an inevitable process and we are planning to implement more cloud services in the near future.

**Disaster Recovery Plan (DRP)**

We have completed the detailed design of a Disaster Recovery framework, and are about to publish a Public Tender for our preferred solution.

The amount of data that we defined as critical for the Technion is about 70 Tera Byte (as of today).

We will invest significant funds in this process, and we believe that the competition via a public tender will decrease the cost along with an improved technical solution.

**Transition into Online Forms**

Last year we developed a few more electronic forms to replace exhaustive manual processes. These forms have work-flow capabilities embedded, so they can automate a full process from A to Z.

The electronic forms that have been developed are targeting the most popular and complicated Academic Staff processes. They significantly improve and expedite the old manual process, shortened the cycle time required for completing the process, and receive excellent feedback from the Technion’s academic staff.

**Implementation of Single Sign-on for all Major Applications**

For many years we faced a situation that various applications had unique user names and passwords for users to log-on. This means that each user had to remember a significant number of user names and passwords for his daily operations.

Last year we implemented a mechanism that enables using one user-name & password combination for most of the Technion’s central application. This SSO tool was developed in-house and provides a reliable and comfortable solution at no significant cost that is required for commercial SSO software solutions.
GIS Implementation

The Construction and Maintenance Division implemented a new Geographic Information System and is leading this complicated project. This division is collecting the large amount of data that is required for mapping the entire campus.

The Computer and Information System Division is providing the required infrastructure for this application.

All current constructing projects on campus are presented on detailed maps of the GIS with various layers that represent various types of information.

Technion Libraries Portal

The IT team at the Central Technion Library developed a new portal for the Technion’s libraries. This portal has some robust search capabilities and provides a variety of services to students and academic staff.

This portal is going these days through a modification process in order to comply with the new accessibility rules and regulations.

The IT infrastructure and computer hosting is provided by the Computer and Information Systems Division.
Organization and Systems Unit

The Organization and Systems Unit is a staff unit with professional authority on matters of organization and operations; it provides services to managers at the Technion and its various units and departments, 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 the needs and defining the demands of the information systems, integrating designated off-the-shelf systems, accumulating and processing data, updating and writing regulations, and handling and publishing data relating to candidates for admission, students and alumni.

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 Technion units and departments. During 2015 we completed the following activities:

Operational Reviews

- **Mail Unit**: Examining mail handling processes.
- **Affiliated Units that have Undergone Organizational and Operational Assessments**
- **International School**
  - Reviewing work processes, including workload at peak times during the year.
  - Assessing responsibilities and defining roles in the operational units.
  - Providing recommendations for improving image and cooperation between internal departments and Technion units.
- **Student Accounts Department – Loan Funds**
  - Continued guidance and support in the formulation of writing internal work procedures.
  - Improvement of work methods, defining aids supporting transparency in work processes and supporting teamwork efforts.
- **Writing, Amending and Publicizing Technion Regulations**
  - 95 subject areas were identified as requiring new regulations, according to the priorities which were set by the Director General and by those responsible for each of the subject areas in question.
  - A three-year work plan (2016-2018) was prepared based on the subject areas identified above requiring new/amended regulations.
Writing new and making amendments to Technion regulations – in 2015, a total of 37 regulatory codes were written and updated of which 16 were finalized and published on the Organization and Systems Unit website.

Scope of work: Unit efforts consisted of numerous meetings with professionals in charge of the regulations, those associated with the subject area (at the Technion and the Technion Research & Development Foundation) and administrative officials, consultations with legal advisors, obtaining approval from unions (in cases where regulations touched on aspects involving workers) and receiving approval from senior management.

Central Technion Projects

■ The Technion’s Risk Management System
  ■ Two risk factors identified to be dealt with in 2015 were examined. Efforts included:
  ■ Defining and describing associated risks.
  ■ Holding meetings with those responsible for the subject area in order to examine the current response to the above mentioned risks.
  ■ Presenting findings and recommendations for managing the risk, to prevent the future occurrence of associated risks defined.
  ■ Presenting interim status reports to the Steering Committee
  ■ Tracking the status of the implementation of recommendations approved by the Steering Committee.
  ■ Preparation of senior management towards the implementation of ongoing Technion risk management processes:
    ■ A meeting on the topic of risk management, chaired by the Director General, with Executive Vice Presidents and Department Heads was held.
    ■ It was decided to hold a forum on the subject once a year, for the purpose of keeping informed about central risks.

■ Routine Management of Data Relating to Candidates for Admission, Students and Alumni
  ■ Classification of new tracks and curricula for future reporting to the National Bureau of Statistics.
  ■ Response to problems/questions posed by the National Bureau of Statistics.
  ■ Preparing Reports for the National Bureau of Statistics.
  ■ Preparing statistical analyses in accordance with the needs of the Technion administration and other unit heads, to be used as tools in decision-making (for example: evaluation committees).
  ■ Response to problems/questions posed by internal Technion bodies (Finance Department/Academic Faculties).

Accessibility of the New Internet Website of the Unit

The Organizations and Systems Unit website posts all Technion regulations as well as data relating to candidates, students and alumni.

The website has been made accessible according to the new website accessibility regulations in Israel to enable people with disabilities to access the information contained in it and thereby reach a much broader population.
Technion Research and Development Foundation (TRDF)

There are four bodies administering different types of activities that come under the umbrella of the TRDF: the Research Authority (which handles Technion-sponsored research, research ties with the European Union, research with industry, and universities abroad); the Unit for Continuing Education and External Studies; the Israel Institute of Metals, and the Technion Technology Transfer (T^3) Office which deals with the commercialization of intellectual property and patents, technological accelerators, and Ministry of Economics programs. These four TRDF units are complemented by the TRDF Human Resources and the TRDF Financial Management teams. More detailed information about research activities and the Research Authority can be found in the report on research at the Technion.

Finance

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, 2010. The projected profit for the period October 1, 2014 to September 30, 2015 is approximately NIS 33 million, not including the estimate for the actuarial maintenance of pensions. The financial balance of this period is influenced by the nearly NIS 33 million in pension payments to 377 retired workers. The continued improvement in the financial situation is a result of growth in income from intellectual properties and of increased research activity.

Israel Institute of Metals

The role of the Institute of Metals is to serve local industry in the development of modern material systems. While in the past this focused on metals and alloys, modern materials engineering now includes, for example, corrosion and batteries, high performance ceramic systems, and microelectronic materials. As a result, the Institute of Metals has several activities within the framework of its laboratories such as corrosion, metallurgy, casting, tribology, surface treatments, and vehicles, and additional functions in the areas of quality control and authorization, and steel testing. Most of the activities at the institute are conducted with active participation of industry.
45 percent of the institute’s income is derived from research funded by government offices, industry, the European Union and international industrial projects. Approximately 55 percent of the income comes from testing for industry. In 2015, the institute’s turnover stood at approximately NIS 20 million and the operational profit stood at NIS 2 million.

In order to play a pivotal role in materials development in Israel, towards the end of 2014 the Metals Institute purchased an industrial level 3-D printing system for printing metal alloys. The system uses an electron beam to melt metal powders, and can be utilized to fabricate intricate shapes from a multitude of metal alloys.

During 2015, the Metal Institute has lead several activities in the field of metal 3-D printing (Additive Manufacturing), including the establishment of an Israeli consortium for development and production of titanium aero-structures ("AATiD"), multilateral collaboration project for improvement of metal 3-D printing processes and national activities for implementation of advanced manufacturing processes in the Israeli industry.

**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 Real Estate (MRE), Master of Urban Engineering (MUE) or Master of Industrial Design (MID) are carried out in collaboration with the relevant Technion faculties and interdisciplinary committees. In January 2015 Prof. Zeev Gross replaced Prof. Yoram Halevi who served as the dean of the division during 2014.

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 Prof.s 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 Sarona Campus in Tel Aviv, and 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 Sarona Campus in Tel Aviv was opened in July 2013 and teaching began soon after. The campus consists of three buildings in historic Sarona, 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 students is very positive and preliminary data indicates a substantial increase in prospective students for the summer and fall of 2016, and up through January 2016 more than 1,350 students have used the facilities in the campus.

The programs offered in the current academic year are:

**Programs leading to academic degrees:**
- 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
- MUE - Master of Urban Engineering

All the programs, except MUE, are offered in Tel Aviv and the programs in MRE, MUE and ME in System Engineering are offered at the Haifa campus as well. More than 600 students are currently studying in the 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, 2015 the students that studied in the Division of Continuing Education and External Studies were approximately 38% of all Master’s degree graduates, excluding direct PhD. In the June 2016 ceremony, we expect a similar number.

**Programs leading to a certificate:**

The Azrieli Division of Continuing Education and External Studies offer a large variety of non-degree programs and single courses. 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 six main categories.
- Computers
- Design
- Management
- 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 Aerospace Industries.

About 2,600 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 400 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 three diploma programs that are sponsored by MASA and NATIV agencies, for students from Russia and the former Soviet republics, who hold a bachelor’s degree in information management, computer science or related fields. During 2016 more than 350 students will graduate from these programs.

International Collaboration

The Azrieli Continuing Education and External Studies Unit is developing programs in collaboration with leading academic institutions worldwide, to provide professional services for students in Israel who want to obtain the leading tools in their field. During 2015, the unit conducted a unique oil and gas related study program in cooperation with the University of Austin, Texas (UT). Furthermore, during April 2016 a negotiation workshop will be held in collaboration with Harvard Law School, which will take place outside of Harvard for the first time.

**Unit for Business Development and Commercialization of Intellectual Property: T³ - Technion Technology Transfer Unit**

The year 2015 was strongly marked by the broadening of efforts towards establishing T³ as a one-stop-shop for global innovation and the deepening of Technion’s role not only as a world leader in science, innovation and research but also as powerhouse of economic development, a hub for entrepreneurship, company formation and commercialization. Two underlying drivers have fueled these efforts: (1) Education is becoming more of a ‘commodity’ and universities that will not be able to demonstrate their impact on the market place by creating jobs and companies, will become, to some extent, less relevant. (2) Entrepreneurship is not an in-born quality. It is not a ‘gift’. It can be taught. It can be ‘engineered’. It arises through the cultivation of a certain culture of consciousness, collaboration and connectivity. It is an education in itself. T³, through its various programs and initiatives aims to provide just this.

The Technion community is rich, vast and making a global impact. It includes faculty, entrepreneurs, students and alumni. Today, to be part of the Technion community, whether as student, faculty, or as alumni is to be part of an elite unit of global innovation. In 2015, T³ made a concentrated efforts towards serving and “capitalizing” on these unique assets. Towards that end parallel efforts in different fronts were carried out. These included:
Technion Accelerator: T-Factor

T-Factor is setting itself out to be the manifestation of Technion’s vision to serve an ever expanding audience of not only students and faculty, but also alumni, which has proven to be an almost infinite source of ingenuity and innovation. T-Factor’s mission is to help Technion students, faculty and alumni to create their jobs and pursue their vision by providing proof of concept funds, mentoring, fundraising support, educational programs, physical space, administrative support etc. During the passing year vast infrastructure work has been carried out to transform the 4th floor of the MALAT building into a state of the art 300 square meter facility that will become home to new start-up companies formed by Technion students, faculty and alumni. In tandem, a fundraising campaign by the ATS was initiated, and albeit unsuccessful, vast fundraising activity was done. T-Factor is no longer funded as a philanthropic activity, and instead a business plan is being prepared to manage the accelerator based on an ‘angel’ club concept.

2015 concluded with two companies entering T-Factor, each with a $15K investment by TRDF. The first, Vigor Medical, develops life saving devices for the treatment of chest trauma and thoracic/abdominal drainage. Vigor was chosen the Winner of iNNOVEX 2016 Disrupt Competition. The second company, Nanovtion–SG, specializes in development, integration and utilization of nanomaterial-based sensors, towards medical applications and general purposes.

In October 2015, the first call for proposals of the SPIRA Fund was published. The mission of the SPIRA Fund (generously funded by Pierre Eric Spira) is to support the development of innovative technologies in the field of ENERGY via the advancement of the technological readiness level of selected projects from the level of experimental proof of concept (POC) to prototypes demonstrated in operational environments. The collaboration of SPIRA with the GRAND Technion Energy Program and the T-Factor aims at maximizing the potential innovative technologies to be commercialized. The subject of interest includes any of the renewable energy tracks, alternative fuel generation, and energy conservation. The call for proposals consists of two interrelated tracks:

**Track 1:** Applied research POC projects that once completed may join the T-Factor (within the 2nd track described below). Track 1 is similar to existing POC projects awarded to Technion faculty, which serve to support development of fundamental science resulting from research conducted at the Technion towards applied technology.

**Track 2:** R&D projects of companies hosted by the T-Factor. The T-Factor is an accelerator located on the Technion campus in the Malat Building, which provides for assistance in the translation of technological concepts developed by Technion faculty, students, or graduates. Aid includes office space, patents, legal, business plans, and prototyping. In Track 2, the SPIRA funds will be used for a specific project enabling the entrance of a new company.
into T-Factor, or the advancement of an existing T-Factor company, which has submitted a proposal in the defined field.

Under the 2015 call for proposals, two projects were approved for funding ($25,000 each):

- Prof. Avner Rothschild (Department of Material Science & Engineering) and Prof. Gidi Grader (Faculty of Chemical Engineering): Chemical-Electrochemical Electrolyzer
- INENSTO – Alumina Air Battery, a spinoff company from the lab of Prof. Yair Ein Eli, Department of Materials Science and Engineering

An agreement was signed in 2015 between the Ecole Polytechnique accelerator and the Technion’s accelerator, T-Factor, regarding startup companies at both institutes. According to the agreement, both institutes are committed to help startup companies in networking and in opening doors, as well as to host the companies for a limited period of time.

**AMIT – Alfred Mann Institute at the Technion**

2015 is marked as a year of transition for AMIT, transforming it from a Technion BioMedical R&D company into a hub of innovation that is supporting biomedical company formation by Technion students, faculty and alumni. During 2015 AMIT’s Board of Directors approved investment in five new companies. Three such investments were completed all in companies formed by Technion alumni. In total, over $1.1 million was invested. These companies include: Next-generation neurovascular treatments; Hybrid catheters for interventional procedures and surgical robotics.

In addition, a new program within AMIT called “Grassroots” was initiated, which aims to help translate state-of-the-art biomedical innovations into successful companies.

Sealantis (biomimetic glue), an AMIT graduate company, completed in 2015 a $3 million investment from local and foreign investors. Accellta, another AMIT graduate company (commercializing Technion stem-cell technologies) which signed a number of licensing agreements and raised $1.9 million during 2014, has raised an additional $700,000 in 2015.

**Technion Venture Capital Fund**

During 2015 an exhaustive effort was conducted to approve the formation of a “Technion Related” venture capital fund. Towards the end of the year the Technion Management Committee approved the establishment of such a fund in principal, although the details of its implementation are still under review.
Although the efforts within T-Factor, AMIT and Technion Venture Capital Fund consumed considerable attention and focus, T3 continued with its more ‘traditional’ responsibilities which in addition to patenting and commercialization also include:

- protecting the share of Technion ownership in existing companies (particularly companies in the field of life sciences) via the Technion Investment Opportunities Fund (TIOF);
- broadening activities aimed at identifying patents that are suitable for sale on the “fast track”, i.e. via direct sales;
- broadening activities aimed at securing the Technion’s intellectual property rights through alternative means (including examining the possibility of instituting legal procedures in relevant cases).

**Number of patent applications:** During the past year, approx. 100 (96) Technion researchers’ invention disclosures were submitted. Of these, 76 were approved for registration. Unfortunately, this year as well there was a significant shortage 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. As in the past, this year the split between T3 and the Rappaport Institute and BioRap on the one hand, and the Rambam Medical Center on the other, creates difficulties to effectively protect and commercialize Technion life science IP. This fragmentation is handicapping Technion’s ability to effectively capitalize on its ingenuity in these fields.

To date, Technion’s patent portfolio includes over 640 active patent families of which 460 patent families are available for commercialization. We continue our efforts to quickly identify patents with the highest potential for commercialization in order to maximize the exploitation of our limited resources.

**Licensing Agreements:** In 2015 T3 signed over 40 commercialization agreements. Of these 10 MOUs were signed in various fields including oncology, nitrate removal, drug delivery for aquaculture, spectrometry for homeland security, hydrogen production and storage, lung and gastric cancer diagnosis, ER management software, functional food, and others.

Eight license agreements were signed with new companies in different fields, including: sleep disorder sensors, medical e-assessment software, feces recognition sensor, natural machine interface system, drug delivery for aquaculture, slim load system and new species of yeast. In addition six license agreements were signed with companies licensing technologies in different fields including diagnostics, organic iodides compounds, nitrate removal, bacterial diagnostics, and organic semiconductors.

Six “Magneton” agreements were approved (three signed and three are in the process of signature) with leading companies in Israel, among them Rafael and Elbit, and four “Nofar” agreements were approved (three signed and one is in the process of signature) with companies such as CI Systems and Flextronics.

**Income from Commercialization:** In the past year, the TRDF’s income from commercialization and/or the monetization of the Technion’s intellectual property rights by other means amounted to approximately US $29 million (including the researchers’ share). It is important to note that this income does not include income arising following the enforcement of Technion IP rights via legal or semi legal procedures, income from research agreements resulting from commercialization agreements, income arising from patent expenses reimbursement, and more. In year 2015, income from these sources totaled over US $4 million.
Proof-of-Concept Grants: A total of US $40,000 were invested from the Uzi and Michal Halevy Fund (2 projects). 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. During 2015, 19 Technion projects were supported by the “Kamin” Fund (new and continuing projects) for a total annual amount of NIS 7.5 million, a fact that well demonstrate the importance of the fund as well as the commercialization potential of technologies developed by Technion researchers.

Fundraising by Technion Companies: During the past year, 16 Technion companies (i.e. companies based on Technion IP or in which TRDF holds equity and / or royalty rights) raised over US $200 million. Among the companies which raised considerable amounts are: Novocure (oncology company pioneering a novel therapy for solid tumors) Elminda (assessment of brain health and brain-related disorders in order to enhance diagnosis and treatment across a full spectrum of neurological and psychological disorders), Nutrinia (drug products for treating acute to chronic intestinal failure based on its proprietary oral insulin technology) and Eloxx (compounds for the treatment of genetic diseases caused by nonsense mutations).

As in previous years, this year the TRDF made considerable efforts to protect its share in the various companies by participating in follow-on investment rounds and maintain its pro-rata share (in full or in part). The full amount invested by the TRDF within this framework in affiliated companies totaled more than US $635,000. Additionally, the Technion Investment Opportunities Fund (TIOF), whose function is to invest in Technion–related companies in order to preserve the scope of Technion’s holdings, invested over US $1.8 million (in six companies). The two largest investment this year were in Sealantis (biomimetic glue) and Eloxx (compounds for the treatment of genetic diseases caused by nonsense mutations).

Infrastructure: In 2015 the setup of T-Factor facilities was completed. Consequently, three of the six floors in the MALAT building occupying over 1200 sq.m accommodate Technion’s commercialization activities for students, faculty and alumni (T³, T-Factor, and AMIT). Two of the three remaining floors are home to two AMIT graduate companies (Sealantis and Accellta), thus transforming the MALAT building into Technion’s Commercialization Hub.
Safety and Health

The main goals of the Safety and Health Unit 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. A comprehensive Safety and Health action plan has been developed and implemented.

Continuous Improvement: Work Related Accidents and Incidents Indicators

The number of reported work related accidents in the year 2015 was 21 (27 in 2014) with an accident rate of 1.52 (1.95) per 200,000 working hours.

This accidents culminated in the loss of 295 (368) working days and a severity rate of 21.12 (26.6) lost workday cases per 200,000 hours.

Figures no. 1 and 2 reflect the annual number of accidents and severity rates in the years 2012-15.

From figure no.1 we can see that in the year 2015 the accident and severity rates have declined by 21% on average since 2014.

Analyzing the annual accident rate from the year 2012- 2015 shows that this rate has declined in 4 years by 60%.

The severity rate has declined during the same period by 48%.

30% of these accidents were not related directly to activities at Technion but to other causes (e.g. on the way from/to work).
Risk Assessments and Implementation of Standards

Continuing last year, a systematic risk survey was carried out in laboratories and work areas and in zones which have undergone major change or renovation, to identify main risks and implement risk control measures. An overall of 44 risk surveys were carried out including surveys of laboratories and areas after renovation or construction prior to occupancy.

Renovation and Construction Safety Guidelines

The Safety and Health Unit participates in all renovation and construction activities. As part of these activities the Safety Unit issued, in 2015, 47 safety guidelines for planning new or renovated laboratories.

Most of the safety planning guidelines, 7, were for Renovation of Laboratories in the Faculty of Medicine. More guidelines were submitted for the Faculties of Biology and Aerospace Engineering-[6] and for the faculties of Chemical Engineering 4, and the Viterbi Faculty of Electrical Engineering and the Faculty of Civil and Environmental engineering [3 each].
Emergency Preparedness

In the area of emergency preparedness, a major emergency drill for the Technion management with the participation of the Technion President was carried out. The drill was planned and executed by the Safety and Health Unit with the assistance of the Security Unit.

This drill simulated an earthquake that caused several HazMat scenarios as planned in the Emergency Response Plan for Hazardous Materials.

The Emergency Operation Center (MOC) was activated and the President and the MOC members had to take decisions and manage the emergency crisis according to the relevant scenario.

In addition, 11 Faculty and buildings evacuation drills were carried out during 2015.

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.

Promoting Safety and Health at the Technion

Technion Safety Unit Internet Site - The Safety unit operates interactive internet and intranet sites. The Safety and Health site serves the Technion community for all issues related to safety and health. This site contains professional procedures regarding safety, laws and regulations; health and safety topics for biological and chemical laboratories; forms, and publications.

Additional Safety and Health information can be found on the Unit’s Facebook page.

Safety Unit’s Monthly Report - In order to increase safety awareness, a monthly activity and information report is sent to all managers of the Technion. The report contains information about safety activities, work-related accidents, incident rates, and new information about procedures, emergency reports and more.
Safety Awareness and Training

One of the main activities of the Safety and Health Unit in 2015, was the development of a new CBT- Computer Based Training for Chemical and Biological laboratories staff and students named: “The Technion safety studies program for laboratory employees and students”. This program is an E-learning interactive system aimed at providing information regarding risks in the Technion's Chemical and Biological laboratories, complying with Israeli Safety Laws to prevent accidents and injuries of staff and students.

The tutorial is narrated both in Hebrew and English.

Safety trainings courses were carried out during 2015 which included 26 (22 in 2014) courses with 2221 (1842) participants out of 2720 invited. 88% (82%) participation rate. In addition, the Safety and Health Unit issued two Safety Courses with the participation of 199 Contractors and 2123 of their workers, and 10 (8) Courses for Fire Safety practice with 302 (124) participants.

The figures above reflect a continuous growth in participation in Safety and Health courses.

SOP -Safety Operation Procedures

As part of the master plan for writing and publishing Safety and Health standards the unit published 4 new standards in 2015.

Identification of legal and other safety requirements

- Safety documentation and data control
- Safety and health management review
- Safety equipment periodical checkups

Safety and Health Comprehensive Plan

For the year 2016 the Safety and Health Unit developed a comprehensive Safety and Health Action Plan that was presented and approved by the Director General and the Technion’s Safety and Health Committee. The plan comprises timelines and budget for Safety and Health activities in 2016.
Since early October 2015, Israel has been in the midst of a wave of terrorism in which, 169 terrorist attacks and attempted attacks have been recorded to date in the form of stabbings, shootings, premeditated hit-and-runs, stone-throwing, and Molotov cocktails.

In view of the situation, the Technion Security Office carried out a systematic assessment of the campus, resulting in increased campus security. Security guards have been armed, and the security level in and around the buildings on campus has been reinforced, as well as in both day-care centers located in the junior staff housing and graduate village dormitory zones.

The security unit has focused this year on construction projects and on upgrading various security aspects. Following is a summary of the main projects:

- Security policy and strategy: The security unit has been restructured to comply with the Israel Police guidelines taking into account the potential threats and scenarios for 2015-16. The security directives for 2016 have been implemented and approved by the Israel Police Haifa Station.

- Security devices have been installed in the Pepp Daycare Center to increase the security of the children. Access control systems have been installed as well as cameras and panic buttons, which are connected to the security unit’s situation room. Security guards have been deployed at the two kindergartens.

- The relocation of the security situation room to the Taub Computer Center is proceeding in accordance with the Technion Security Unit’s plan, as approved by the Israel Police. This relocation project to the center of the campus is part of an ongoing effort to improve the efficient operation of the center during emergencies. This project is being funded by Richard and Kenneth Skodnek.

- Technion Gates Project: the Technion Gates renovation project has been approved. The architect has been selected following a nationwide competition. The program for the project was approved by the Projects Committee and was presented to the Council. The project is in its advanced planning stages and the construction is expected to begin this summer. A $5,000,000 donation has been raised from the Wilstein family for this purpose.

- Rappaport Faculty of Medicine Security Plan: A security plan for the faculty was prepared which required purchasing and installing surveillance and security equipment (cameras, gates, barriers, access control system) and some construction work. The project budget is NIS 500,000, of which $100,000 are a donation from the Morton and Beverley Rechler Family Foundation. The project is near completion.

- Security tender: The “Modiin Ezrahi” security company replaced G4S, after many years of service to Technion.
The Security Unit invested considerably in the planning, integration and smooth deployment of the security guards at the guard posts. The handover was successfully completed.

- The new tender is significantly different from the previous one. It has substantially improved the capability of the security unit to provide effective response to different threats.

- Communication equipment: state-of-the-art, digital communication equipment has been purchased to support Technion security in its daily routine and in emergencies. Advantages include:
  - Significantly improved reception throughout the campus including the school of medicine.
  - Panic buttons on each mobile device to improve security and the safety of the security guards.
  - Ability to manage two communication frequencies simultaneously, thereby achieving improved control in handling incidents.
  - GPS location of each security guard.

- Canada Gate: The gate, which was old, rusty and unsafe has been replaced by a new, “smart” gate linked via remote control to the security situation room, enabling the gate to be controlled remotely. All widely accepted security features have been installed at the gate.

- Training: The security company employees have undergone training in the following fields:
  - First aid
  - Safety training
  - Safe driving
  - Fire-fighting
  - Elevator evacuation
  - Self-defense training (krav maga)
  - One-day refresher courses in accordance with Israel Police guidelines
  - Situation room operator course: a special 4-day course in accordance with Israel Police guidelines
  - Shift supervisor course: a special 4-day course in accordance with Israel Police guidelines
  - Social welfare activities for the unit: The security unit employs approximately 60 security guards as contract workers via an external security company and approximately 80 students (mostly Technion) as employees. In order to strengthen their loyalty to the Technion and create team spirit, group activities were organized such as team-building workshops and bonuses for outstanding security guards.

- The Israel Police has approved the Technion’s security policy for the Neve Sha’anan and Bat Galim campuses.

- Routine investigation of all suspicious incidents on campus has been instituted, some of which have led to the apprehension of suspected perpetrators. The security unit has invested considerable effort and resources in apprehending a serial car thief who was caught and handed over to the police.

- The security unit’s website was upgraded to include detailed information on the unit’s activities and guidelines for emergency situations. The Unit’s website has also been made accessible to the visually impaired in accordance with the new legislation.

- The security unit has handled 300 requests from the Ben Gurion Airport security unit, making it easier for overseas guests to enter and leave the country.

- As instructed by the Information and Technology Authority of the Ministry of Justice, we have implemented a new procedure to centralize the handling of all security unit cameras on campus.

- The security unit has worked to raise the salaries of the security guards, which was lower than that of other similar institutions. The raise in salary enables the unit to retain senior workers and recruit higher quality personnel.
Public Affairs & Resource Development (PARD)

This year Technion has set new records both in terms of its international visibility and in terms of its fundraising achievements. PARD, using its own staff and relying on its extensive global network of volunteers and professionals orchestrated these efforts. Funds raised through this network reached an all-time high of over $100M; the Technion presence in New York and Guangdong continued to attract world-wide attention; collaboration agreements with leading universities added strength and recognition to the Technion’s brand name.

An ever-increasing number of visitors to the Technion campus experienced first-hand the special Technion “touch” – the unique ecosystem of innovation and entrepreneurship that has become a role model for numerous organizations trying to follow our footsteps. All this could not have been achieved without the hard work and devotion of an extraordinary group of people who are highly motivated and dedicated to the cause.

Technion continued to advance and expand its global profile during the past year. In New York, the cornerstone for Cornell Tech – the home of the Jacobs Technion-Cornell Institute was laid on June 16, 2015. Construction of the new campus is now in full gear and the Jacobs Institute is scheduled to move to its new home on Roosevelt Island in late 2017.

In China, the cornerstone for the new campus of the Guangdong Technion Institute of Technology (GTIT) was laid on December 16, 2015 in a major ceremony attended by over 5000 participants including dignitaries from Israel (former president Shimon Peres, Minister of Science, Technology & Space Mr. Ofir Akunis and others) and from China (four vice ministers from Beijing, the governor of the Guangdong province and others).

On October 25, 2015, the presidents of the Technion, Weizmann Institute and the University of Michigan in Ann Arbor signed an unprecedented $300M collaboration agreement. The cooperation among the three universities that started about 5 years ago through the support of the late D. Dan Kahn and was originally limited specifically to cardiovascular research, has become so successful. It naturally led to a drastic expansion of the scope of this cooperation.

On December 8th, 2015 we celebrated the naming of the Viterbi Faculty of Electrical Engineering (EE) for Erna and Andrew Viterbi. Dr. Viterbi has long been associated with the faculty as a visiting Prof. and a donor and the theories he has developed, most notably the Viterbi Algorithm, have been taught for years in EE courses. Dr. Viterbi’s recent gift of $50M is one of the largest ever given to the Technion and it will help us maintain the status of EE as one of the leading departments of its kind in the world.
PARD Leadership

Prof. Boaz Golany continued to serve as the Vice President for External Relations and Resource Development, a position he has held since January 2012. At the end of 2015, PARD entered a process of organizational change. The position of Director was redefine and Mr. Danny Shapiro left the Technion after 5 years of service. Three new units were established – “Resource Development”, “Events & Hospitality” and “External Relations”. At the time this report is being written, effort is underway to recruit new staff that will head the three units. The responsibility of Secretary to the Board of Governors was assigned to Advocate Asaf Binder, Secretary of the Technion Senate.

Fundraising

The number of fundraising projects produced by the Project Development Unit continued to grow and the portfolio of available projects became more diverse than ever before. To provide Technion more flexibility in allocating philanthropic support and ease the reporting requirements, PARD has launched a new line of “basket” projects in major areas of interest such as bio-medical innovations, defense-related research, student welfare etc. Donors who wish to give funds under a certain threshold are encouraged to designate their gift to one of these baskets. Another new and important trend is the increased number of joint fund-raising efforts with other universities in Israel and abroad. The number of such projects has more than doubled his year and many of them proved quite successful. It appears that such joint proposals are becoming quite attractive to a growing number of donors.

Selected Initiatives and Special Projects

PARD has undertaken a number of initiatives in the past year, aimed at diversifying our efforts to promote the Technion and upgrade our abilities to do so. Here are a few examples:

Digitization: PARD is determined to move quickly into the digital era by reducing its printed output and increasing the content it offers through digital media. A new website was launched for the Board of Governors. This site already contains a wealth of information and we will continue to expand it and use it as an important vehicle to communicate with Board members throughout the year. Invitations to BoG events will no longer be sent through regular mail. Instead, e-mail and mobile phone applications were introduced to provide Board members with accurate and timely information. Experiments are underway to move a growing portion of our donor recognition activities to digital format – starting with a special video installed on one of the screens in the visitors center that pays tribute to the supporters of the Jacobs Institute in New York.

Display of the Technion Nano Bible at the Smithsonian Institute in Washington DC: A copy of the Nano Bible, first created in 2007 by the Russell Berrie Nanotechnology Institute, was put on display at the Smithsonian Institute in early November. This follows the introduction of the Nano Bible to the Shrine of the Book in the Israel Museum last year.

A new edition of the Technion Nation: Since the first version of this book was printed in 2012 the Technion has made some giant steps forward and there was an urgent need to update and revise the first version. Thanks to Prof. Emeritus Shlomo Maital who oversaw this effort, we will have an up-to-date book that we will proudly give away to numerous dignitaries that visit the campus and to many supporters worldwide.
Aiding collaboration between the Technion Alumni Association (TAA) and Technion Societies: Over the years, thousands of Technion graduates have left Israel. Most of those who left established themselves in the USA. While Technion, being a Zionist organization, would prefer to see all of them come back to Israel, we realize that many will stay where they are. With this in mind, a new initiative started in the Fall of 2015 to hire a person through the American Technion Society that will serve as an alumni liaison in the US. This person will help the TAA reach out to alumni, re-connect them to Technion and create a vibrant community of loyal and supportive graduates of the Technion.

Public Affairs

The Public Affairs Department continues to cultivate a strong presence for the Technion in the world of social and digital media.

This year we integrated the Technion LIVE twitter feed so visitors get an immediate and fresh impression of Technion impact world-wide. We also integrated a global events calendar into the PARD website to function seamlessly with the main Technion website in English. At the heart of online outreach in English the e-newsletter Technion Live, which highlights research developments, student activities and significant events taking place at Technion, is being taken to “mobile first.”

Technion follows a social media philosophy of reciprocity, sharing and engagement across the social media. The Technion LIVE Facebook page, which is a hub for our global community of friends and supporters, has 21,600 active followers. On Facebook, Technion LIVE uploads videos as well as other media, with remarkable success and hits reaching into the millions.

On Twitter, Technion has close to 50,000 followers with close to 9000 tweets. The account is a hive of news and interaction. Technion Twitter also plays a hospitality role in welcoming international guests to Technion and retweeting them, as well as an informational role in answering questions and sending Twitter users to relevant links. As Technion’s main and most notable account on Twitter, Technion LIVE is also vital in supporting and promoting other Technion initiatives through mentions and retweets.

Some 3,500 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, Board of Governors and campus events, student creativity, alumni achievements and academic courses. The channel continues to be highly popular, with viral videos, nearly 20,000,000 views and 22,000 subscribers, by far the most popular of any Israeli university

All of these web-based promotion channels supplement the existing popular newspaper Focus, which is a highly valued resource both in print and online.
Technion’s dynamic, engaging and responsive online presence continues to serve the dual purposes of promoting inspiration in science and technology, while branding Technion as a globally recognized leader in innovation, for the sake of all humanity.

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 again, the unit prepared over 300 new projects. Of this number, about 5% were projects over $10M, 5% in the $5-10M range, 10% in the $1-5M range, and 80% under $1M.

Over 150 projects were adopted in the past year. Included in these are: the Zuckerman STEM Leadership Program a cooperation of Technion, Hebrew University of Jerusalem, Weizmann Institute of Science, and Tel Aviv University, which will be comprised of the Zuckerman Postdoctoral Scholars Program and the Zuckerman Faculty Scholars Program; naming of the Andrew and Erna Viterbi Faculty of Electrical Engineering; faculty recruitment and Histopathology Core support within the Technion Integrated Cancer Center (TICCI); continued support of research within the Prince Center for Neurodegenerative Disorders of the Brain; naming of facilities within the completed Zielony Graduate Student Village and support of the Undergraduate Student Village, currently under construction; support of the Technion-University Health (UHN) International Centre for Cardiovascular Innovation; support of diverse security related projects – the fund to counter the tunnel threat, an endowment fund for applied technology development for the defense and security of Israel, renovation of the wind tunnel complex in the Faculty of Aerospace Engineering; continued support of the Nanophotonics Research Fund for Advanced Light Detection and Sensing; support of diverse student-related activities, including the 2016 International Space University (ISU) Space Studies Program to be hosted this summer by the Technion, student workshops and travel stipends, the Shabbat Dinner project, renovation of the Ohel Aharon Synagogue, the girls empowerment initiative, student counseling services, enhancement of the Technion campus with artistic sculptures and seating areas; 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. Furthermore, the department handles the installation of plaques honouring donors.

Over the past year, 51 ceremonies were held including those for Technion alumni who generously gave to their alma mater as well as Technion former employees who were also generous in supporting Technion projects.

The change in the format of the Honorary Doctorate Ceremony proved successful and we are continuing with the new concept.

Among many other events, we organized a Viterby Day to salute and recognize the major gift to name the Andrew and Erna Viterbi Faculty of Electrical Engineering as well as the Erna Finci Viterby Plaza. Special two day scientific workshops were organized to honor Norman Seiden. A unique event was the Nano-Bible exhibition in the Israel Museum in Jerusalem

We prepared 20 gifts with dedication plaques. We installed 58 new recognition plaques and continued to refurbish the existing plaques on campus.

We continue to provide donors for major projects, visualization of their donor recognition plaques before final installation, and we are preparing digital imaging of plaques for information.

The project of digitization of old and new photographs of plaques within the PARD database progresses.
Donor Relations

The Donor Relations Unit is responsible for the maintenance and cultivation of long-term relationships between the Technion and its donors. As such, it provides a wide variety of services to 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 processed approximately 200 reports on chairs, research funds, capital development projects, reports to special donors, lectureships, and others. Some 1,500 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 300 special recognition or appreciation letters were produced. The 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. the TechnionLive newsletter 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.

Visitors Center

The Technion 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 close to 7,000 guests and coordinated 562 visits. (A list of selected visitors is attached as an appendix to this section.) The trend 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 continues. In addition, we see an increase in the interest of Academic Institutes around the world to establish collaboration with the Technion resulting in many visits of an academic nature. As a result of the growing interest in the Technion and in the hope of exposing the Technion to an even greater population of people, a donation was received for building a new Visitors Center. The hope is that this will greatly enhance the centers’ attractiveness and ability to convey the Technion’s story and key messages.

His Excellency the Japanese Ambassador Shigeo Matsutomi at Technion
### VIP Visitors to the Technion 2015-16

<table>
<thead>
<tr>
<th>Presidents Report Category</th>
<th>Name</th>
<th>Affiliation</th>
<th>Country</th>
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<tbody>
<tr>
<td><strong>Ambassadors</strong></td>
<td>H.E. Mr. Conte Jean Cornet d’Elzis</td>
<td>Ambassador of Belgium to Israel</td>
<td>Belgium</td>
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<td>H.E. Mr. David Quarry</td>
<td>Ambassador of Great Britain to Israel</td>
<td>UK</td>
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<td>H.E. Mr. Francesco Maria Talo’</td>
<td>Ambassador of Italy to Israel</td>
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<td>H.E. Mr. Patrick Maisonnave</td>
<td>Ambassador of France to Israel</td>
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<td></td>
<td>H.E. Mr. Shigeo Matsutomi</td>
<td>Ambassador of Japan to Israel</td>
<td>Japan</td>
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<td>H.E. Mr. Spyridon Lampridis</td>
<td>Ambassador of Greece to Israel</td>
<td>Greece</td>
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<tr>
<td><strong>Government Officials</strong></td>
<td>Dr. Ludwig Spaenle</td>
<td>Bavarian Minister of Education, Science and the Arts</td>
<td>Canada</td>
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<td></td>
<td>Dr. Simone Schwanitz</td>
<td>Permanent Secretary of the Ministry of Science, Research and the Arts Baden-Württemberg</td>
<td>Germany</td>
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<td></td>
<td>DRC officials sponsored by LKSF</td>
<td>Development Research Center of the State Council of the People’s Republic of China (DRC)</td>
<td>China</td>
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<td>Mayors from Capitol Cities around the world</td>
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<td></td>
<td>Menachem Kidron</td>
<td>ISA ministry of Science</td>
<td>Israel</td>
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<td>Mr. Anthony Foxx</td>
<td>U.S. Secretary of Transportation</td>
<td>USA</td>
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<td></td>
<td>Mr. Bodo Ramelow and Mr. Wolfgang Tiefensee</td>
<td>Prime Minister of Thuringia and Minister for Economic Affairs, Science and Digital Society of Thuringia</td>
<td>Germany</td>
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<td></td>
<td>Mr. Emmanuel Macron</td>
<td>Minister of Economy, Industry and Digital Affairs</td>
<td>France</td>
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<td>Mr. Guillermo Acosta</td>
<td>Minister of Industry, Commerce, Mining and Science Technology Development</td>
<td>Argentina</td>
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<td>Mr. LIU Limin</td>
<td>Vice Minister of Education</td>
<td>China</td>
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<td>Mr. Reza Moridi</td>
<td>Minister of Research and Innovation &amp; Minister of Training, Colleges and Universities</td>
<td>Canada</td>
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<td>Mr. Shiferaw Shigute</td>
<td>Minister of Education</td>
<td>Ethiopia</td>
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<td>Mr. Stanislaw Titlich</td>
<td>President of the German Bundesrat, and Prime Minister of Saxony</td>
<td>Germany</td>
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<td>Mr. Thomas P. DiNapoli</td>
<td>New York State Comptroller</td>
<td>USA</td>
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<td>Mr. Wyatt Roy MP</td>
<td>Assistant Minister for Innovation, with Australia Israel Chamber of Commerce</td>
<td>Australia</td>
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<td>Mr. Zhan Yongxin</td>
<td>Ambassador of the People’s Republic of China to Israel</td>
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<td>Mr. Zheng Renhao</td>
<td>Mayor, Shantou Municipality</td>
<td>China</td>
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<td>Ms. Genevieve Fioraso</td>
<td>Former Minister for Higher Education and Research</td>
<td>France</td>
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<td></td>
<td>Prof. Stefania Giannini</td>
<td>Minister of Education, Universities and Research</td>
<td>Italy</td>
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<td>Prof. Yang Wei</td>
<td>President, National Natural Science Foundation of China (NSFC)</td>
<td>China</td>
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<tr>
<td>University of Toronto Senior Representatives</td>
<td>Prof. Janice Stein, Senior Presidential Advisor on International Initiatives; Ms. Judith Wolfson, Vice-President, International, Government &amp; Institutional Relations; Prof. Vivek Goel, Vice President, Research and Innovation; Mr. David Palmer, Vice-President, Advancement</td>
<td>Canada</td>
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<tr>
<td>University of Waterloo</td>
<td>Prof. Jean Jacques Van Vlasselaer, Senior Advisor to the President, Strategic Initiatives</td>
<td>Canada</td>
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<tr>
<td>University Presidents from India</td>
<td>Prof. Dr. Uday Salunke - Group Director, WeSchool Dr. Sanjay Deshmukh - Vice Chancellor, University of Mumbai Dr. Vijay Khole - Vice Chancellor, Amity University Mumbai</td>
<td>India</td>
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<tr>
<td>Prof. Eugenio Gaudio</td>
<td>Rector, La Sapienza University</td>
<td>Italy</td>
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<tr>
<td>Prof. Lam Khin Yong</td>
<td>Vice President Research and Chief of Staff, Nanyang Technological University [NTU] Singapore</td>
<td>Singapore</td>
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<tr>
<td>Prof. Meric Gertler</td>
<td>President, University of Toronto</td>
<td>Canada</td>
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<td>Prof. Partha Pratim Chakrabarti</td>
<td>President, IIT Khargapur university</td>
<td>India</td>
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<tr>
<td>Prof. Song Yonghua, and Prof. Ying Yibin</td>
<td>Executive Vice President and Assistant President / Executive Associate Dean, International Campus, Zhejiang University</td>
<td>China</td>
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<td>T.E. Ed Schlesinger</td>
<td>Dean, Johns Hopkins Whiting School of Engineering</td>
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<td>University of Michigan</td>
<td>Prof. Jack Hu, Vice President for Research Prof. Dave Munson, Dean of Engineering</td>
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<td><strong>Other Special Visitors</strong></td>
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<td>Allen and Jewel Prince</td>
<td>Technion Supporters</td>
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<td>Barnett and Roslyn Loiter</td>
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<td>Bob &amp; Ruth Magid</td>
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<td>Bob and Joyce Starr</td>
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<td>Carniol Family</td>
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<td>Christine Shervington</td>
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<td>Dalia &amp; Daniel Farkas</td>
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<td>Dan and Arlene Fisher</td>
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<td>Dan Maydan</td>
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<td>David and Karen Shatz</td>
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<td>David Cohn</td>
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<td>Ed Satell</td>
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<td>George Elbaum</td>
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<td>George Feldenkrais</td>
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<td>Gilbert Foundation</td>
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<td>Havas Media Group Labs</td>
<td>Association Technion France</td>
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<td>Inge Marcus</td>
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<td>James Blum</td>
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<td>Joel S. Rothman</td>
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<td>Leonarad Sherman</td>
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<td>Les Seskin</td>
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<td>Li Ka Shing Foundation (LKSF)</td>
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<td>Lorry Lokey</td>
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<td>Mark and Trudy Klein</td>
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<td>Martin and Grace Rosman</td>
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<td>Michael and Morven Heller</td>
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<td>Nicole Yakatan</td>
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<td>Oliver North</td>
<td>Political commentator and television host and former U.S. Marine Corps Lieutenant Colonel</td>
<td>USA</td>
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<td>Paul and Rodica Burg</td>
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<td>Philippe Ricoux</td>
<td>General Director Scientific Division, Total S.A.</td>
<td>France</td>
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<td>Robert Hainsee</td>
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<td>Rochlin Foundation</td>
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<td>Sandy Hittman</td>
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<td>Senior Delegation, Jacobs</td>
<td>Jacobs Technion Cornell Institute</td>
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<td>Sonia Marschak</td>
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<td>Steve and Rita Emerson</td>
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<td>Steven Sherman</td>
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<td>Uzi Halevy</td>
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<td>Vincent Meyer</td>
<td>President, Meyer Foundation</td>
<td>USA</td>
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<td>Yuri Milner</td>
<td>Russian entrepreneur, venture capitalist and physicist</td>
<td>Russia</td>
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<td>Zack and Lindsay Rechler</td>
<td>Technion Supporters</td>
<td>USA</td>
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</table>
Awards and Honors

International Awards and Honors

ACADEMIA EUROPÆA
Member
Prof. Craig (Chaim) Gotsman
Faculty of Computer Science

ACM
Fellow
Prof. Orna Grumberg
Faculty of Computer Science
“For contributions to research in automated formal verification of hardware and software systems.”

Distinguished Visiting Prof. Judea Pearl
Faculty of Computer Science
“For contributions to artificial intelligence through the development of a calculus for probabilistic and causal reasoning.”
Prof. Assaf Schuster
Faculty of Computer Science
“For contributions to cloud computing.”

ALEXANDER VON HUMBOLDT FOUNDATION
Humboldt Research Award
Prof. Hossam Haick
Wolfson Faculty of Chemical Engineering and Russell Berrie Nanotechnology Institute
AMERICAN PHYSICAL SOCIETY
Fellows
Prof. Michael Gronau
Faculty of Physics
“For incisive contributions regarding tests of the Kobayashi-Maskawa theory of CP violation and searches for new physics in the decays of particles containing heavy quarks.”

Prof. Yakov Krasik
Faculty of Physics
“For contributions to the understanding of the physics of plasma cathodes, the generation of high-current electron beams and nanosecond-timescale gaseous discharges, and converging strong shock waves.”

Prof. Leonid Pismen
Wolfson Faculty of Chemical Engineering
“For pioneering and ingenious contributions to fundamental fluid dynamics, particularly interfacial flows, dynamics of moving contact lines, and the analysis of instabilities and pattern formation in diverse systems.”

CARNEGIE MELLON UNIVERSITY
Dickson Prize in Science
Distinguished Visiting Prof. Judea Pearl
Faculty of Computer Science

IEEE
Fellow
Prof. Avinoam Kolodny
Viterbi Faculty of Electrical Engineering
“For contributions to VLSI design and automation tools.”

Assoc. Prof. Alon Wolf
Faculty of Mechanical Engineering

IEEE International Workshop on Information Forensics and Security (WIFS 2015)
Prof. Neri Merhav
Viterbi Faculty of Electrical Engineering
Best Paper Award

IEEE Kiyo Tomiyasu Award
Prof. Yonina Eldar
Viterbi Faculty of Electrical Engineering
“For outstanding early to mid-career contributions to technologies holding the promise of innovative applications.”
IEEE Signal Processing Society
Prof. Yonina Eldar
Viterbi Faculty of Electrical Engineering

Best Paper Award

INSTITUTE OF PHYSICS
Isaac Newton Medal
Distinguished Visiting Prof. Eli Yablonovitch
Viterbi Faculty of Electrical Engineering
For “his visionary and foundational contributions to photonic nanostructures” which have spawned the research field of photonic crystals.

INTERNATIONAL CONFERENCE ON COMPUTER-AIDED VERIFICATION
CAV Award
Prof. Orna Grumberg
Faculty of Computer Science
“For the development and implementation of the localization-reduction technique and the formulation of counterexample-guided abstraction refinement.”

INTERNATIONAL SOCIETY OF BIONIC ENGINEERING (ISBE)
Outstanding Contribution Award (2016)
Distinguished Prof. Emeritus Daniel Weihs
Faculty of Aerospace Engineering

NATIONAL ACADEMY OF ENGINEERING
Draper Prize
Distinguished Visiting Prof. Andrew Viterbi
Viterbi Faculty of Electrical Engineering
“For development of the Viterbi algorithm, its transformational impact on digital wireless communications, and its significant applications in speech recognition and synthesis and in bioinformatics.”

NOMINET TRUST
2015 Nominet Trust 100
Prof. Hossam Haick
Wolfson Faculty of Chemical Engineering
“SNIFFPHONE: A phone so smart, it sniffs out disease.”

POLYMERS FOR ADVANCED TECHNOLOGIES (PAT)
2015 Menachem Lewin Senior Award for Lifetime Achievement
Prof. Emeritus Moshe Narkis
Wolfson Faculty of Chemical Engineering
“For outstanding work in the field of polymers.”

THOMSON-REUTERS

Highly Cited Researcher 2015
Prof. Michael Elad
Faculty of Computer Science

Distinguished Prof. Mordechai (Moti) Segev
Faculty of Physics and Solid State Institute

Distinguished Prof. Shlomo Shamai
Viterbi Faculty of Electrical Engineering

TORINO ACADEMY OF SCIENCES
2015 Gili Agostinelli Prize
Prof. Daniel Rittel
Faculty of Mechanical Engineering
For his contributions in Applied Mechanics

WORLD AQUACULTURE SOCIETY (WAS)
Honorary Life Award
Prof. Emeritus Yoram Avnimelech
Faculty of Civil and Environmental Engineering
“For a longstanding and significant contribution in aquaculture.”
Research Funding and Awards

HORIZON 2020
THE EU FRAMEWORK PROGRAMME FOR RESEARCH AND INNOVATION
EXCELLENT SCIENCE

**European Research Council Grants**

**ERC Consolidator Grant**
Nir Ailon
Faculty of Computer Science

**ERC Proof of Concept (POC) Grants**
Distinguished Prof. Mordechai (Moti) Segev
Faculty of Physics
Assoc. Prof. Shy Shoham
Faculty of Biomedical Engineering

**ERC Starting Grants**
Asst. Prof. Moran Bercovici
Faculty of Mechanical Engineering
Asst. Prof. Avi Schroeder
Wolfson Faculty of Chemical Engineering
Asst. Prof. Reut Shalgi
Rappaport Faculty of Medicine
Asst. Prof. Josué Sznitman
Faculty of Biomedical Engineering

**Future Emerging Technologies (FET) Grants**
Asst. Prof. Roee Amit (Coordinator)
Faculty of Biotechnology and Food Engineering
Assoc. Prof. Alexander Leshansky
Wolfson Faculty of Chemical Engineering
Visiting Prof. Avi Mendelson
Faculty of Computer Science
Assoc. Prof. Boaz Pokroy
Faculty of Materials Science and Engineering
ISRAELI AWARDS and HONORS

COUNCIL FOR HIGHER EDUCATION
Allon Fellows
Asst. Prof. Yaron Fuchs
Faculty of Biology
Asst. Prof. Reut Shalgi
Rappaport Faculty of Medicine
Asst. Prof. Matthew Suss
Faculty of Mechanical Engineering

FOOD INDUSTRIES ASSOCIATION
Lifetime Academic Achievement Award
Prof. Emeritus Shmuel Yannai
Faculty of Biotechnology and Food Engineering

ISRAEL MATHEMATICAL UNION
Erdős Prize in Mathematics
Assoc. Prof. Emanuel Milman
Faculty of Mathematics

ISRAEL PLANNERS ASSOCIATION
2016 Outstanding Planner Award
Prof. Emerita Naomi Carmon
Faculty of Architecture and Town Planning

ISRAEL POLYMERS AND PLASTICS SOCIETY
Honorary Member
Prof. Yachin Cohen
Wolfson Faculty of Chemical Engineering

MINISTRY OF DEFENSE HEAD OF RESEARCH AND DEVELOPMENT
Toren Prize
Distinguished Prof. Emeritus Daniel Weihs
Faculty of Aerospace Engineering
“For his long-standing contributions to unique academic research highly important for the defense community.”
MUNICIPALITY OF TEL-AVIV-JAFFA
2015 Chaim Weizmann Prize for Exact Sciences
Prof. Ilan Marek
Schulich Faculty of Chemistry
“For his extraordinary achievements in the development of innovative methods for the synthesis of organic compounds.”

THE MARKER
40 Most Promising under 40 in Israel
Asst. Prof. Moran Bercovici
Faculty of Mechanical Engineering
Asst. Prof. Reut Shalgi
Rappaport Faculty of Medicine

WOLF FOUNDATION
2016 Krill Prize for Excellence in Scientific Research
Asst. Prof. Keren Censor-Hillel
Faculty of Computer Science
Asst. Prof. Netanel Lindner
Faculty of Physics
TECHNION AWARDS and CHAIRS

ALEXANDER GOLDBERG RESEARCH PRIZE
Assoc. Prof. David Elata
Faculty of Mechanical Engineering
“On the Notion of a Mechanical Battery”

HENRI GUTWIRTH FOUNDATION RESEARCH GRANTS
Asst. Prof. Ofer Manor
Wolfson Faculty of Chemical Engineering
“Pattern Deposition at MHz to GHz Surface Acoustic Waves for 3D Printing of Nano-structures out of Solute Molecules and Colloidal Particles”
Asst. Prof. Alex Hayat
Viterbi Faculty of Electrical Engineering
“High-Temperature Superconducting Optoelectronic and Topological Nano-devices”
Asst. Prof. Yaron Amouyal
Faculty of Materials Science and Engineering
“Defects and Interfaces in Thermoelectric Materials”

UZI AND MICHAL HALEVY INNOVATIVE APPLIED ENGINEERING AWARD (2015)
Assoc. Prof. Avner Rothschild
Faculty of Materials Science and Engineering
“Tandem Cells for Solar Energy Conversion and Storage”

JULUDAN RESEARCH PRIZE (2015)
Prof. Alon Wolf
Faculty of Mechanical Engineering

SANFORD KAPLAN PRIZE FOR CREATIVE MANAGEMENT IN THE 21ST CENTURY HIGH TECHNOLOGY
Prof. Hossam Haick, Gady Konvalina, and Meital Segev-Bar
Wolfson Faculty of Chemical Engineering

RAYMOND AND MIRIAM KLEIN RESEARCH PRIZE
Assoc. Prof. Doron Shilo
Faculty of Mechanical Engineering
“The Kinetic Relation for Twin Wall Motion in NiMnGa”

HILDA AND HERSHEL RICH TECHNION INNOVATION AWARDS (2015)
Prof. Yonina Eldar, Tanya Chernyakova, Noam Wagner
Viterbi Faculty of Electrical Engineering

“Fourier Domain Beamforming: the Path to Compressed Ultrasound Imaging”

Asst. Prof. Amir Gat
Faculty of Mechanical Engineering

“Solid-Liquid Composite Structures as Lighter-Weighted and Enhanced Performance Aircraft Wings”

Prof. Benveniste (Benny) Natan
Faculty of Aerospace Engineering

“A Rocket Engine that Uses Green Hypergolic Gel Propellant”

Prof. Israel Schechter and Dr Valery Bulatov
Schulich Faculty of Chemistry

“A New Analytical Technology: Laser Multiphoton Electron Extraction Spectroscopy”

Prof. Avraham Shtub
Davidson Faculty of Industrial Engineering and Management

“Decision Support System for Project Management: The Project Team Builder (PTB)”

Dr Moshe Tordjman
Russell Berrie Nanotechnology Institute and Solid State Institute

“Novel P-type Dopant for Superior Diamond Surface Conductivity”

DANIEL SHIRAN MEMORIAL PRIZE
Assoc. Prof. Ester Segal
Faculty of Biotechnology and Food Engineering

“Nanostructured Porous Silicon as Drug Carriers and their Behavior in Neoplastic Tissues”

HENRY TAUB PRIZES FOR ACADEMIC EXCELLENCE (2015)
Assoc. Prof. Oren Cohen
Faculty of Physics

Prof. Michael Elad
Faculty of Computer Science

Prof. Yonina Eldar
Viterbi Faculty of Electrical Engineering

Assoc. Prof. Itai Yanai
Faculty of Biology
MOSHE YANAI AWARDS FOR EXCELLENCE IN EDUCATION (2015)

Prof. Joseph Avron
Faculty of Physics

Prof. Shlomo Bekhor
Faculty of Civil and Environmental Engineering

Prof. Joseph Ben-Asher
Faculty of Aerospace Engineering

Asst. Prof. Ayelet Baram-Tsabari
Faculty of Education in Technology and Science

Asst. Prof. Moran Bercovici
Faculty of Mechanical Engineering

Assoc. Prof. Ran El-Yaniv
Faculty of Computer Science

Prof. Daniel Lewin
Wolfson Faculty of Chemical Engineering

Prof. Ilan Marek
Schulich Faculty of Chemistry

Prof. Ross Pinsky
Faculty of Mathematics

Prof. Danny Raz
Faculty of Computer Science

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