JCT Perspective

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JCT's Femtech Revolution

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Staff
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Design & Production
Hagit Bodenstein - Swissa

Printing House
Old City Press Ltd.

Jerusalem College of Technology – Lev Academic Center

Department of Development and External Affairs

P.O.Box 16031, Jerusalem 9116001
Tel: 972-2-6751269
Fax:972-2-6751190
Email: development@jct.ac.il
Website: www.jct.ac.il/en

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President's Message

Life at JCT is full of challenges. The daily challenge is to maintain educational excellence and student satisfaction while living within our budget. An exciting upcoming challenge for us is the construction of a new, state-of-the-art, women's campus. The enormity of this challenge is matched by its potential to transform higher education for women in Israel. Such challenges are simply part of good institutional management and strong growth.

A special challenge that JCT undertook some 20 years ago was to provide higher education and hi-tech training for women and for the Ethiopian community. While accommodating the academic and social needs of these groups without sacrificing educational quality was challenging, it created an enviable record of achievement, part of which is described in this magazine.

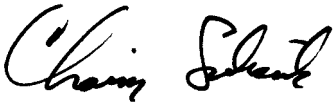
Our most interesting current issue is also the leading controversy in contemporary Israeli public discourse: There are almost a million Haredim in Israel and they are Israel's fastest growing demographic. Given the critical importance of a college education to earning a living, it is essential that they be provided with academic opportunities. The Torah-centered, gender-separated JCT campuses are Haredi-friendly and thus the natural place to meet this challenge.

Can we bridge the cultural and educational gaps between the Israeli mainstream and the Haredi world? Can we create a college-educated Haredi man/woman in a way that neither the academic establishment nor the Haredi community must sacrifice its core values? The academic world embraces an open pluralism; how should it accommodate the more sheltered world of the Haredim? How do we reconcile a Haredi woman being a principal breadwinner and functioning at a high level in the public domain, with the modest and self-effacing manner in which she has been raised?

The high levels of academic achievement and job placement that we have achieved in nursing, accounting and engineering are a good start, as are recent inroads into the world of Israeli Hassidim. But, there is still a long way to go. The task of creating the right academic conditions for this population and providing them with good jobs are currently at the forefront at JCT.

JCT is blessed with over 8,000 graduates, many of whom have overcome substantial challenges of their own and are having a hugely positive impact on the technological and religious well-being of the State of Israel. We are confident that these successes will continue as we confront our new challenges. We hope you will join us for this exciting journey.

I wish you and your families a healthy new year. May we all be blessed with success in overcoming the challenges of the coming year.



Prof. Chaim Sukenik, President

Taking their Place in the "Start-Up Nation"

JCT's FemTech Revolution

By Lisa Samin

It is said that perception is reality. But the perception of Haredi women as insulated and poorly educated, working minimum-wage jobs, is definitely not the reality today. This is due in large part to the Jerusalem College of Technology (JCT) - Lev Academic Center, leaders of the FemTech revolution for Haredi women.

In 2000, following the Israeli government call for increased involvement of women in high-tech, JCT, with its finger on the pulse of the growing need for religious women to earn academic degrees, established the Tal Campus in Jerusalem and the Lustig Campus for Haredi women in Ramat Gan. It was the first institution of higher education to offer a program enabling religious women to combine Judaic and academic studies in the fields of science and high-tech. The goal was to nurture talented women in a fitting environment and help them integrate into Israel's flourishing high-tech and science industries.

Four years later, the Da'at program was launched for Haredi women at the Tal Campus.

"There are many obstacles that stand in the way of Haredi women wanting to study at an academic institution," says **Eti Stern**, Head of the Tal Campus. *"We worked very hard to meet these challenges and create a fitting academic, spiritual and social environment for them. These programs for women were groundbreaking."*

"I don't believe it is an exaggeration to say that Haredi women are leading the way out of a cycle of poverty in their communities, and at the same time helping to grow the start-up nation," says **Aurora Cassirer**, senior partner in the law firm of Troutman Sanders, LLP and a JCT board member who recently attended a JCT graduation ceremony for Haredi women. *"It is nothing short of a silent revolution."*

"Despite my familiarity with the school, [this graduation] upended all my preconceptions and certain prejudices about the status of Haredi women in Israeli society," continued Cassirer.

The challenges faced by Haredi women include closing learning gaps in math and English. Despite completing high school, many of these women do not have college level math and English, both essential for STEM (science, technology, engineering and math) studies. Thus, Tal Campus established a highly successful six-month preparatory program.

At the same time, members of their community looked askance at young women who chose to study at an academic institution rather than at one of the Haredi women's seminaries. Part of this was the feeling that the religious studies were not on a high enough level.

"We started out with 30 young women in the Da'at program for Haredim, and we now have 700," says Stern. *"Our religious studies are on a very high level, and this is becoming recognized in the community."*

"The change for Haredi women is a slow, steady process. We see this as more women advance in high-tech and are able to support their families with dignity and higher earnings. Studying for a degree and working in high-tech is now more acceptable."

If in the past most Haredi women received teaching certificates, or worked as nursery school or

kindergarten teachers, many are now excited about the new options available to them at Tal.

They can choose from a broad range of engineering degrees, accounting or business administration. Of the more than 1400 Haredi women currently studying towards degrees, 41 percent are enrolled in engineering programs.

"In addition to our increased enrollment, 93% of our graduates are working in their fields," says Stern. *"This is a statistic that is hard to find anywhere else."*

"Studying at the Tal Campus was a great experience, both in view of what I learned and the fact that I don't have knowledge gaps in my field. This is not necessarily the case with students from other universities and colleges," says **Adva Pachima**, who graduated Cum Laude with a B.Sc. in electro-optic engineering and is an assistant developer at Real Imaging. Pachima is now studying towards her M.Sc.

Yael Samet, who majored in software engineering and is now a software developer at Intel Jerusalem says, *"I don't regret my choice to study software engineering at the Tal Campus, not for a moment. I greatly enjoyed the curriculum as well as the atmosphere and I graduated with a great skill set for entering the workplace. This contributed to my being where I am today."*

JCT's Haredi graduates comprise a significant percentage of the female Haredi graduates and students in the high-tech field in Israel today. Of the 800 Israeli Haredi women who completed certification and degree studies in high-tech in 2015, 23% are graduates of JCT. With over 3,000 women currently studying towards certification in high-tech, close to 20% of them are studying at JCT. The main difference between JCT graduates and the other Haredi graduates is that while many Haredi women earn technical certificates rather than academic degrees, all students who graduate from JCT do so with a full B.Sc. degree.

According to a recent survey conducted by the Israel Democracy Institute, Haredi women are becoming increasingly qualified and their role inside their communities is evolving.

This is clearly seen in the story of **Rinat Zadok**, a courageous Haredi woman who has forged a new path for herself and her children as a result of her studies at Tal.

Zadok went to a seminary in B'nei Brak. When she moved to Jerusalem she began working at the offices of JCT. Despite coming from a non-academic

Rinat Zadok (center) and her prize winning project

background, Zadok was inspired to get a college degree. She began taking classes at the Tal Campus. Three years ago, at the age of 36 and as a divorced mother of two, Zadok became a full time student.

"Haredi women grow up multi-tasking. At a young age, I was taking care of my six brothers and sisters and my grandmother. I felt that I could balance things in my life if I wanted to move ahead, and education was the key."

With the support of JCT and her parents, Zadok worked hard to get her B.A. in business administration with a focus on high-tech. She and two other classmates won the Heller Family Foundation Prize for Outstanding Entrepreneurial Final Project, working with one of Israel's hottest new tech companies, BeyondVerbal.

*"We had an amazing lecturer, **Eitan Eliram**, who is very connected to the tech industry. When we told him that we wanted to do an innovative project, something out of the box, he recommended we contact BeyondVerbal."*

The company, which analyzes emotions from vocal intonations, enables voice-powered devices, apps and solutions to interact with people on an emotional level, just as humans do. Zadok and her team suggested using this technology in human resource departments for screening people for work.

Based on this project, Zadok is now customer service manager for a high-tech company, Smart Interviews, created by entrepreneur **Dan Merom**, one of the researchers at BeyondVerbal.

For Zadok, studying at Tal gave her the push, the confidence and the support to be a Haredi woman in the high-tech world.

"We grow up in insulated communities, with an emphasis on modesty and humility," says Zadok. *"We are not taught to put ourselves out there. It takes a lot of courage to step out of this and to try to advance in high-tech."*

Zadok found a pivotal role model at JCT in **Prof. Joseph Bodenheimer**, President Emeritus of JCT. *"He told us that we needed to maintain our values-oriented lives, but that there was a price for this. If our Torah way of life was important to us, we needed to integrate this with our professional life."*

Zadok does this, and she feels that her co-workers and other people she meets respect her as a result. *"I don't go in to work and make demands. I explain what is important to me, what I need in order to keep my lifestyle, and I find that people are mindful of this,"* says Zadok.

"The one thing that I would teach young Haredi women going into high-tech is not to be afraid to say what you think and to stand up for your principles; to be yourself."

Malka Segev, 29, a Lustig Campus graduate, is now sales manager for Realcommerce. She is one of two Haredi women employed by the company, which has 150 employees.

"It's often difficult to get accepted into a company," says Segev. *"But once you are there, they accept you as you are; they will be considerate and will promote you as they would anyone else."*

"I believe that what you project to others is what you get in return," says Zadok.

Zadok encourages her two sons, ages 18 and 16, to take advantage of education so that they will have opportunities to choose from.

On the Tal Campus, management and staff work diligently to ensure that Haredi women have good job opportunities to choose from. They assist graduates to find employment and enter the work force as smoothly as possible.

"We have seminars that teach our students to write resumes, interview for jobs and conduct job searches, and we take them on tours of high-tech companies like Intel and HP to introduce them to the work culture and environment," says Stern. *"We also have our Rabbis speak about boundaries in the workplace, and how to handle different situations. This is all very valuable."*

"We are there for these young women from the time they enter our campus until way after they graduate," says Stern.

JCT's Job Placement Department works closely with students to find quality jobs in leading companies. Tal graduates are working in high-tech, security, defense and financial companies such as Cisco, Amdocs, Israel Aerospace Industries, Elta, Bank Mizrachi, KPMG, Intel and others.

According to Ha'aretz newspaper, *"since 2000, Haredi women's participation in the labor market has increased by 30%. Seventy-five percent of them now have jobs, in line with the country's overall female population."*

"An estimated 5,000 to 10,000 Haredim work in the high-tech sector and about 75 percent of them are women. And more and more ultra-Orthodox women want to break into the field, and earn the higher

salaries that places of employment outside the Haredi community can provide."

Intel Israel employs hundreds of Haredi women. **Yishai Fraenkel**, Vice President of Intel International and initiator of the Intel Israel Haredi project, says: *"What interests us is what the candidates have in their head and not what's on their head."*

Maxine Fassberg, CEO of Intel Israel and Vice President of Intel International, spoke to the participants of a conference held by JCT. When Fassberg asked who wants to be the 10,086th employee at Intel, over half of the young Haredi women in the auditorium raised their hands.

Fassberg stated during the conference: *"In order to succeed, you need an excellent education and hard work. It's not impossible to get into Intel. The more you study, the more you'll learn and the more you'll succeed, and we will accept the best. We want the Haredi sector in our company and we want it in the workforce. Without integrating all sectors of Israeli society, the Israeli economy will not succeed."*

Approximately 100 of the 350 employees of the software company Unilink are Haredi women. *"One of the most important aspects for integrating Haredi women is having a supervisor who is familiar with their needs who can guide the employees"* advises **Tomer Nussbaum**, Vice CEO of the company.

"There are many elements that we, as secular people, aren't aware of," explains Nussbaum. *"For instance, the various Kashrut levels, or Rosh Chodesh, which is basically the 'Happy Hour' for Haredi women. Why not order pizza for them, as we do for the secular employees on Thursday? Or familiarize ourselves with the days on which it is more problematic for them to work, such as fast days and the Intermediate Days of Succoth (Chol Hamoed)?"*

"In order to succeed, we must be prepared, and we must remember," continues Nussbaum, *"they work eight hours, but those are net work hours, which are often equal to 10-11 hours for non-Haredi employees. They don't socialize, and they don't take coffee breaks, or go off for lunch or to the mall. Their work ethic is extremely high. After three months of maternity leave, they return immediately, unlike those in the secular community who sometimes extend the leave to 4-6 months, especially with their first child."*

Cassirer echoes this sentiment. *"My take-away from speaking to our Israeli clients – with whom I discussed this graduation at length – was that they were eager*

to hire Haredi women (and men). It is a goal-oriented, mature, work force which is ready to produce and add real value to any company."

"I can definitely say that JCT was like a family to me throughout my degree," says **Shira Stern**, who majored in accounting and information systems and is now employed by one of the largest CPA firms in Israel.

Stern continues: *"I felt that this wasn't just 'another' academic institution, but a place that first and foremost saw us as human beings. Each and every one of the lecturers gave their all in order to advance their students. They did this by maintaining direct communications with the students, including fast responses to any question in any area – via email or by phone. Thank G-d, I managed to find a job. It is clear to me that without the support of the JCT staff, I wouldn't have reached where I am today."*

Tal Campus graduates have reached top high-tech and managerial positions, and they often contact the JCT Placement Center to recruit candidates for jobs in their companies.

With the success of its program for Haredi women, the Tal Campus launched another groundbreaking initiative three years ago: the Tvuna program.

Tvuna serves the extremely insulated Hassidic Haredi community. Started by **Chaya Vagshal**, a mother of 10 who was head of a boarding school for girls from the former Soviet Union, Tvuna is serving a critical need in the community.

"Two episodes gave me a wake-up call as to the need to give our young women opportunities to get an academic degree and steer them toward high-tech," says Vagshal. *"I put an ad for a very minimum-wage job for young women to care for children. When I came*

into the office the next day the fax was filled with paper. I thought there was a technical problem. But it was hundreds of resumes from young women who had all received teaching certificates, or were kindergarten or nursery school teachers."

"I realized that we had a glut of non-academic teachers in our community, and many, who would be the sole supporters when they got married, would not have work," says Vagshal. *"I did not want to see more poverty among our families. I knew we had to do something."*

This also struck home when Vagshal saw a resume of a girl who received outstanding marks on her college entrance exam but was working as a seamstress.

"I was familiar with JCT and its Tal Campus, and I felt that this would be the most appropriate place to start a program for our women who live in a highly closed society; a society afraid of change."

Tvuna created the right atmosphere for these women to study: filtered internet, a high level of religious study, Rosh Chodesh activities, *Shabbat* seminars, a teacher/counselor from the community to work with the women and advise them about integrating study and taking care of their families.

The pilot program began with 18 girls between the ages of 18-20, majoring in computer science or business administration. Now in its third year, the program has 120 students. All of the girls from the first cohort are married, with an average of two children. It is only with the help of extensive scholarships that they are able to afford to go to school.

"The level of studies is very high, and the students must invest a great deal of time. They are not able to work during this time, and it is very difficult for their families," explains Vagshal. *"Some of the young women tell me that they are very frugal when food shopping or buying anything new. But they understand that when they graduate, and earn higher wages, it will pay off. These are smart, determined women."*

"Tvuna gives these students the chance to realize their potential," says Vagshal.

With its pioneering programs for Haredi women and advanced programs for religious women, Tal Campus has grown by leaps and bounds. Today, there are a total of 1860 women with 440 faculty members. Academic degree studies include software engineering, computer science, industrial engineering and management, bioinformatics, electro-optics, nursing, accounting and information systems, business management and MBA.

However, the Campus' physical facilities are sorely lacking. Presently situated in temporary rented quarters in Jerusalem's northern industrial zone, the space is insufficient for the Campus' growth, and the rent has become exorbitant.

On Jerusalem Day 2013, Prime Minister Benjamin Netanyahu announced a government decision to allocate land to JCT for the building of a permanent Tal Campus adjoining the JCT Campus. In July 2016, JCT received permission from the Israel Land Authority to develop the Tal Campus.

JCT has launched a $100 million dollar capital campaign to fund the new Campus 27,000 sq. m. construction. This will include academic buildings, laboratories, recreational facilities and a day-care center. With this new Campus, Tal projects a student population of 4,000 by 2030.

This project is supported by the Israel Council for Higher Education, which highly values JCT's contribution to the high-tech workforce as well as the opportunities it provides to diverse segments of Israeli society.

The Tal Campus will continue the realization of the dream of JCT's founder, **Prof. Ze'ev Lev** (z"l), who said, *"The institute I envision has as its raison d'etre to educate students who see the synthesis of Jewish values and a profession as their way of life: to provide manpower for Israel's developing high-tech industry, who will establish industries of their own and to produce industrial leaders strongly committed to Israel and the betterment of the Jewish people and the world."*

Dvar Tora

In the town of Lviv, about four hundred years ago, **Bila Falk** revives a *halacha* that will later lead to discussions and disagreements among the *poskim*.

Every Friday night, the women light candles and then say "*Asher kideshanu bemitzvotav vetzivanu lehadlik ner shel Shabbat*" – "Who makes us holy with *mitzvot* and commands us to kindle the light of *Shabbat*." (*Rammah psak, Rasag, 5*). With all *mitzvot,* the blessing occurs before the *mitzvah* takes place, but when lighting candles, the lighting occurs before the blessing is made, since some consider the uttering of the blessing (*"lehadlik ner shel Shabbat")* as acceptance of the *Shabbat*.

On the night of *Yom Tov* (holiday), Bila stands and thinks: This custom is understandable on *Shabbat*, but why on *Yom Tov*? One can transfer fire during *Yom Tov* itself, thus it stands to reason that one should make the blessing and then transfer the fire to light the candles!

Bila was the wife of **Yehoshua Falk**, author of the *Sema* (*Sefer Meirat Einayim*) He also wrote *Drisha* and *Prisha*, a commentary on the *Tur*. Her *halachic* suggestion was mentioned by her son in his foreword for his father's book on the *Tur* (*Ben Drisha*'s Introduction to the *Tur Yoreh Deah*):

> Look please, and see what women wrongly thought when lighting the *Yom Tov* candles...
>
> The custom [of women] is to light the candles on the *Yom Tov* itself, and it is best to make the *b'racha* as usual, i.e., saying the blessing before performing the act...

And her son, the son of the *Sema* continues, mentioning that he studied the *poskim* against her suggestion, and found:

> That the *din* (ruling) is in her favor…and I said to put it in words, in her name…and so she directed her mind and heart to know the reasoning of the *Torah*…

The *poskim* discussed this new idea from the *Sema*'s wife at length. The ***Magen Avraham*** (*Rasag, sub-section 12*) adamantly rejected her assumption, stating that the *chachamim* did not differentiate between the various types of lighting, and it seems that this is due to the fact that they wished to maintain uniformity among the various forms of lighting, and in order to prevent mistakenly lighting in this manner on *Shabbat* (stating the blessing and lighting after).

***The Dagul Mirvava*, Yechezkel ben Yehuda Landau,** (*Rasag, sub-section 12*) supported the words of the *Sema*'s wife (although it mistakenly mentions there that she is the mother of the *Sema*). He states that since the wording of the *b'racha* differs, then the lightings differ from one another and there is no reason to worry that confusion might occur. He finishes by stating that the wife of the *Sema* is "a woman who carries her heart wisely."

> And in my humble opinion, the ruling is with the mother [wife] of the Gaon Drisha [*Sema*]…
>
> [since] the *b'racha* of the lighting of the *Shabbat* candle is not equal to the wording of the *b'racha* for *Yom Tov* lighting…and so I believe that it should be ruled as suggested by the wife of the Gaon Drisha, and she is a woman who carries her heart wisely.

The Chatam Sofer (in his words there) also writes that the wife of the *Sema* is right, stating that "the spring inside, will show that she herself felt this," and that when lighting *Chanukah* candles, the blessing is made before lighting, which is proof that one can perform various lightings in different ways.

Almost all the *Achronim* stated that the *halacha* should be as suggested by the wife of the *Sema* and rejected the opinion of the *Magen Avraham (Dagul Mirvava, Chatam Sofer, Rabbi Akiva Eger, Chayei Adam,* and as deduced from the Mishna Brura, Rasag subsection 27). And so the tradition of the women of Israel is to act as the wife of the *Sema*, so that on Yom Tov, they first make the blessing and then light.

This important change was made by all women. The woman is the one who undertakes the *mitzvah* of

lighting of the candles every *Shabbat* and *Yom Tov*, and it is possible that it was due to her learned nature, combined with the continuous performance of the *mitzvah*, that it was a woman who arrived at this conclusion.

The learning of a woman has significant meaning, and it can have significant influence on the *mitzvot* that she carries out. However, there is a deeper meaning to a woman's learning.

With the changing reality, there is a unique importance for women to have in-depth knowledge of the *Torah*. (I will not go into the details and nature of the learning, but to the importance of in-depth and serious learning, and higher education.)

This was always true, but is far more accurate today, particularly in institutions such as JCT's Tal Campus. When a woman undertakes significant academic education, her *Torah* education should be in accordance therewith. The *Torah* learning cannot end at the high-school level, while secular education advances to the academic!

The Lubavitcher Rebbe (*Sefer HaSichot 1989, volume B, Parashat Emor*) viewed this as one of the signs of the *Geula*:

> It is important to note that in the last generations we were blessed with the added *limud* of women…since at the end of the time of exile, there is an emphasis on preparation for the *Geula*…that in those days the knowledge and wisdom will flourish.

It is specifically in our generation, nearing the time of the *Geula* that women are able to learn more *Torah* in a way they could not do so in the past. In-depth *Torah* learning that fills them with unique spiritual wisdom.

There is an additional goal for a woman's learning. "The wisdom of women buildeth their house" (*Mishlei, 14, 1*) – The woman's strength in the *Torah* is significant not only for herself, but also for the education of her children. Today, there is a significant and important contribution to the study of *Torah* especially in the *binyan habayit* (building of the home). The children of today know much more than in the past, in various areas. In order to educate our children, it is particularly important that women have the tools with which to meet the challenges of the times.

In-depth *Torah* learning by a woman is important not only for the education of her children but also for the relationship with her husband. Spiritual tools, enable a deeper spiritual connection with her husband[1].

Indeed, we must remember all the time what lies at the heart. Learning is of tremendous importance, but the main goal is the education of the home. *Torah* learning or academic studies that disregard the education of the home and view education as a secondary goal, will, heaven forbid, bring destruction of the home.

In-depth *Torah* learning, *midot* and piety and gaining in-depth knowledge of the world around us, are an important basis for building an exemplary home of Torah and good deeds.

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1. And so stated the Lubavitcher Rebbe (*Sefer HaSichot 1989, volume B, Parashat Emor*): "This also poses the additional benefit of making it possible for the mothers to assist in their sons' and husbands' studies. More than the portion and merit they receive for 'escorting their children to school and awaiting their husbands' return from the house of study,' they can actually help by taking part in the learning itself."

Rav Yosef Zvi Rimon is the Rabbinic Head of the Jerusalem College of Technology – Lev Academic Center and the Head of its Batei Midrash. He is the community Rabbi of Alon Shvut South in Gush Etzion and teaches at Yeshivat Har Etzion and Migdal Oz Girls Seminary as well as lectures in communities in Israel and abroad. Rav Rimon is a prolific author of Halachic works that take the reader from the sources to the practical application of Halacha in modern times. He is Founder and Chairman of the Halacha Education Center which develops innovative educational curricula for Jewish studies, using state-of-the-art, cutting edge technologies. He also founded JobKatif shortly after the disengagement from Gaza to help Gush Katif evacuees re-integrate into the work place, and today continues to serve as its Chairman.

Campus News

Hundreds Participate in Shiurim with Rav Rimon, Rabbinic Head of JCT

This past year, the Rabbinic Head and Head of Batei Midrash at JCT, **Rav Yosef Zvi Rimon** held two shiurim for the public which were attended by hundreds of people. The first Shiur was held before Pesach on "Preparation for Seder Night." Using his unique educational style, Rav Rimon focused on the methodological structure to emphasize the central themes on which the Haggada is based. A shiur entitled, "A Study of the Essence of Jerusalem Liberation Day" was held in preparation for Yom Yerushalayim. Further Shiurim are to be held before Rosh Hashana and Chanuka.

New Head for Lustig Campus

Rabbi Dr. Zvi Ilani

After seventeen years of dedicated service, **Rabbi Dr. Zvi Ilani** has retired from his post as Head of Lustig Campus. From the beginning of the 2016/17 academic year, **Rabbi Zvi Schreiber** will serve as Head of the Campus. Rabbi Zvi Schreiber has served as Deputy CEO of the KEMACH foundation since 2008 and has an MBA from JCT.

JCT wishes Rabbi Schreiber success in his new position and thanks Rabbi Dr. Ilani for his significant contribution to Lustig Campus.

JCT Welcomes New CEO

JCT welcomes **Mr. Yosef Zeira**, who will become JCT's new CEO in October. For the last sixteen years Mr. Zeira served as CEO of the Netanya Academic College, and previously held senior positions at Bar Ilan University. We wish him success in his new position and hope that he will help to continue to advance the Jerusalem College of Technology – Lev Academic center as the flagship institution of religious academia in Israel.

Knesset Education Committee fights for additional JCT dormitories

Representatives of JCT were invited to address the Knesset Education Committee in June, where JCT issues were the sole agenda item of the day. The topics discussed were our work with the Ethiopian community, as well as the shortage of student housing in Israel in general, and at JCT, in particular. As a result of the meeting, MK **Merav Ben Ari** of the Kulanu party, Chairwoman of the Lobby for Students and Higher Education in the Knesset, visited JCT in order to assess how to remove bureaucratic blocks and to advance programs for students in Israel. During her visit, she met with President **Prof. Chaim Sukenik**, Vice President **Stuart Hershkowitz** and members of the student union at JCT. *"I was extremely impressed with the activities of the Jerusalem College of Technology – Lev Academic Center, which combines academic studies on a high level with a national mission of integrating the Haredi sector into the workforce,"* said Ben Ari. *"We will work to build dormitories for students and to reduce the cost of living."* Prof. Chaim Sukenik added: *"We are pleased that MK Ben Ari has committed to assist the institution in order to help relieve our students from the pressures of the cost of living."* She has already begun to assist us in the planning and construction of additional dormitory space, which is sorely needed on JCT's campus. Planning is well under way and we hope to receive significant government funding, which will allow us to begin construction.

News from our Friends around the Globe

FinTech conference

In May, American Friends of the JCT, together with Troutman Sanders LLP and Cross River Bank, hosted a FinTech conference entitled "The Future is Now: A Forum on Business and Legal Issues Related to FinTech." Fintech, also known as financial technology, is poised to become a major promoter in the financial services industry, with a variety of innovative solutions for applications, processes, products and business models. The Keynote Speaker of the event was **Tobias Levkovich**, Chief U.S Equity Strategist of Citigroup.

During the conference, several meetings were held regarding, inter alia, regulatory and legal issues, data breach and privacy issues.

This event was co-sponsored by Cross River Bank, Friends of the Jerusalem College of Technology, KPMG, The Prime Grill, IDT Corp., Bank Leumi USA, Corporate Lawyering Group and Morgan Stanley.

JCT UK

JCT Friends in the UK recently appointed a CEO as part of a new strategy to re-engage with the UK community. **Avi Gillis**, formerly of UJIA, is leading the organization, newly branded as JCT UK, and is focusing on supporting the work of the college and showcasing the achievements of its faculty and graduates.

"This is an exciting time for JCT and an opportune moment to get our message out to the broader UK community, that is, that JCT is a driver of change in Israeli society," says **Daniel Baum**, Chairman of JCT UK. *"This is particularly true for the Haredi student population, whose communities will no doubt look very different in generations to come as a result. This is not a 'give a man a fish' institution; it is one that equips its students with the metaphorical 'fishing rod' to become self-sufficient in their future endeavors, no longer relying on charity to subsist."*

"After visiting the campus and meeting the faculty and students, I knew this was an organization I wanted to be involved with" said Avi, on his return to London. *"There aren't many places where you can walk into a lab and see two Hassidic women discussing computer algorithms in Yiddish. The profound effects of the college's education and, in turn, its graduates impact on Israeli society and its economy, is startling and will become even more apparent in years to come."*

Mazal tov to **Shraga Zaltzman**, a graduate of JCT's, who has recently been awarded an MBE (Member of the Most Excellent Order of the British Empire) in recognition of his outstanding work as CEO of Work Avenue, a non-profit organization in London, assisting people in becoming more self-sufficient by providing access to training and business opportunities.

In Memorium

JCT mourns the passing of **Prof. Solomon W. Golomb** z"l, a pioneering scholar in the fields of mathematics and engineerin, Prof. Golomb spent more than 50 years at the University of Southern California, where he was a distinguished Prof. of electrical engineering and mathematics. In 2013, he received the National Medal of Science from President Barack Obama for his work in mathematics and communications. Prof. Golomb was the sponsor of the Yehuda Leib Golomb Annual Lecture held at JCT in memory of his father.

JCT mourns the passing of **Mr. Amram Blum** z"l , a member of JCT's Board of Trustees since 1995 and a member of the Executive Board from 2007. A Jerusalem attorney who held leading positions in government service, Amram was a genuine, caring personality who used his skills to promote the institution and contributed greatly to the benefit of students and future generations of the people of Israel.

JCT mourns the passing of **Prof. Avraham Greenfield** z"l who was a member of JCT's Board of Trustees between 1988-2007. Prof. Greenfield was Prof. Emeritus of Physics at Bar Ilan University.

JCT mourns the passing of **Mrs. Sarah Lev** a"h, the widow of Prof. Ze'ev Lev z"l, the founder and first President of JCT.

Visits and Events

Jerusalem Science Contest Winners Visit JCT

The finals of the annual Jerusalem Science Contest were held in March, sponsored by the Walder Science Center in Chicago in partnership with JCT. Thirty high school juniors and seniors from across North America took part in the competition, which focused on Light, Optics and the Human Eye, in conjunction with the UNESCO International Year of Light.

The winners received a week-long trip to Israel, during which they visited JCT together with **Dr. Yosef Walder** and **Rabbi Heschel Weiner**. The top prize was awarded to **Yaakov Schectman** from the Hebrew High School of New England, who won $1,000 and a four-year tuition scholarship to JCT.

Dr. Yosef Walder, Rabbi Heschel Weiner, Prof. Chaim Sukenik and finalists

IT Innovation Conference

The "IT Innovation Conference – Myth or Truth," took place at JCT, in collaboration with the Israeli Information Systems Data Analysts Bureau. During the event, MSc and MBA students met with Senior Vice President and Strategical Advisor for Nes Israel, with member of the Board of the Israeli Information Systems Data Analysts Bureau, **Aryeh Amit**, as well as with the Head of Technological Internships and Information Systems at JCT's Faculty of Management, **Dr. Golan Karmi**. During the conference, the students were exposed to technological innovation as a way for creating a competitive advantage in the business world. In addition, the speaker presented the difficulties with which his company is faced and the challenges that managers are expected to face in the near future.

The Fourth Annual Jerusalem Conference on Research in Mathematics Education

The Fourth Annual Jerusalem Conference on Research in Mathematics Education was held at the Jerusalem College of Technology in February. More than 150 scientists and educators participated in the two-day conference, which dealt with issues related to educational methods in Israel and around the world which incorporate mathematics. The conference initiated by **Prof. Noah Dana-Picard**, President Emeritus of JCT and colleagues, is the largest forum of its kind in Israel, enabling researchers to share their work with their peers in Israeli universities and colleges.

Volunteers give Students a Chance to Speak their Minds (in English)

With heavy emphasis on academic reading, the English courses at JCT leave students with little time to practice speaking in class. Conversational English skills, however, are crucial for finding a job and for professional advancement. In an effort to provide JCT students with an opportunity to practice these skills, volunteer retirees who emigrated to Israel from English-speaking countries were recruited last semester to lead weekly discussion groups, each with two to four participants. Students were given the option of choosing between various themes that especially interest them: computers (led by a former NASA scientist who specializes in this field), business and accounting (led by a volunteer who had run a successful business), Jewish studies (led by a rabbi), and even history and politics (led by a former Prof. in these fields). Other students opted for more general discussions in areas ranging from job interviews to CV and email writing. The English Department plans to build on this year's success, and expand the program next year.

JCT Hosts Third Annual Physics Olympics

The Finals for the Physics Olympics for Religious High Schools were held earlier this year at JCT with the participation of over 100 students from religious high schools throughout Israel.

As part of the competition, contestants attended lectures, visited JCT labs and enjoyed fascinating demos of physics experiments. First prizes went to **Eden Rachel Matat** from Netiv, Rishon Lezion, and **Elad Magad** from Kiryat Herzog, Bnei Brak, who received scholarships to study at JCT.

Yazam BaLev Completes 2nd Cohort

Dozens of entrepreneurs, venture capital investors, private investors and hi-tech and technology personnel from a number of companies participated in the "demo day" for JCT's *Yazam BaLev* accelerator program for encouraging entrepreneurship among Haredim.

The *Yazam BaLev* accelerator provides Haredi entrepreneurs, even those in the initial stages of their venture, with the tools they need to develop their ideas and transform them into viable products and startup companies. As part of the accelerator, the entrepreneurs receive one-on-one guidance and mentoring from top executives and investors from the hi-tech community to help them launch, fund and expand their startups. The program which has been developed understanding the special needs of the Haredi community, helps them with any lack of background in technology and education, as well as any marketing difficulties.

Ben Weiner, Manager of the Jumpspeed Ventures Fund, who runs *Yazam BaLev*, said: *"We place emphasis on the entrepreneurs. Unlike other accelerators, the purpose of the program is to teach its participants what they need in order to build a start-up, as well as demonstrating that Haredi entrepreneurs can dream and pursue success in the entrepreneurial field."*

Employment Fair

Over 450 students attended employment fairs on the Lev and Tal campuses in June. During the event, students presented their CVs and were interviewed on the spot.

30 companies, leaders in their fields, participated in the event. The companies included titans of software engineering, electronic engineering, electro-optics and accounting, with representatives from companies among the four largest CPA offices in Israel.

Rachel Atias, from OrCam, a subsidiary of Mobileye, stated: *"We have several graduates of JCT [in our company] and they are extremely talented and capable. JCT also has a very good reputation; the level of academics is of high quality and we want to snatch up anyone who graduates [from JCT]."*

Awards and Achievements

93% Placement Rate for JCT graduates!

JCT reviewed the results of a survey of 500 graduates from 2014 and learnt that 100% of the Nursing graduates and 93% of the graduates from the Engineering, Business Administration and Accounting departments are employed. 90% are employed in their field , earning an average salary of approximately NIS11,000 for Engineering, NIS10,000 for Electronic Engineering and NIS8,000 for Business Management and Industrial Engineering in their first or second year (in the event that they began working whilst continuing with their studies). Among the companies employing the graduates are Intel, IAI, Cisco, and Elbit.

91.5% Success in National CPA Exams

The grades for the winter 2015 final exam in advanced finances of the CPA board revealed that JCT attained first place amongst all academic institutions in Israel. JCT's Lustig Campus achieved 100% success on the final CPA exams. This achievement is the result of significant efforts that have been undertaken over the past few years in the establishment of a unique curriculum in the Accounting Department, characterized by great emphasis on connecting the material studied in lectures to its practical application in the workforce. Dean of the Management Faculty, **Prof. Herzl Patal** added, "In addition to the great achievement in success rates, the student graduates were 20% over the national average, which is currently 70%."

"Seeds of Innovation" - JCT students and the Ministry of Economy

JCT students have been accepted into the Technology and Business Innovation "Seeds of Innovation" project, held by the Ministry of Economy. The project is sponsored by the Chief Scientist and aims to advance industrial companies in Israel. In collaboration with the students and as part of the final projects, the companies will implement a process of innovation. The participants in the program include students in their fourth year in the department of Industrial Engineering and Management from a number of academic institutions including, inter alia, the Technion, Tel Aviv University and JCT.

Heller Competition for Outstanding Final Projects

The first annual prizes established by the **Heller Family Foundation** for Outstanding Entrepreneurial Final Projects were recently awarded. The prizes aim to inspire students to strive for excellence when conducting their final projects in BA (Business Administration). The final projects enable students to use the skills gained during the degree and play a significant role in preparing them for the transition from academia to business organizations. **Rinat Zadok**, a first prize winner in the MBA category, presented her project and spoke to the students about the process of executing a final project.

Heller Family Foundation for Outstanding Entrepreneurial Final Projects

Special Programs

JCT and University of Toronto bring Health Informatics to Israel

Through the efforts of **Dr. Judith Shamian**, the President of the International Council of Nurses and a Member of JCT's Board of Trustees, a memorandum of understanding has been signed between JCT and the University of Toronto which will enable JCT to open Israel's first Health Informatics program.

There are currently no degree programs of this nature in Israel and the University of Toronto, which has a successful and well-established program in this field, will contribute from its experience in order to develop a comprehensive program.

The new health informatics program will utilize JCT's excellence in software and industrial engineering together with healthcare education, to further understand and develop information and communication technologies (ICT) that support clinical care and improve health-related developments in industry. The program is multi-disciplinary, incorporating knowledge from the fields of health, information technology, engineering, business and computer science.

JCT is grateful to the Canadian Friends of JCT for its support of this program.

Lev Bakehila (Lev in the Community) – JCT's Community Engagement Project

Lev Bakehila (Lev in the Community) established this year at JCT with support from the Council of Higher Education, is a new project designed to assist disabled persons. Students and staff work to assist people with disabilities in the Haredi and religious communities in Jerusalem, by raising awareness of their rights, in order to help them integrate as equals into society. As part of the project's pilot, the students volunteered with a number of foundations, including *Yad Sarah, Bizchut, Lishma* and *ALEH*.

50 students from the Tal and Lev campuses volunteered for the project and in return received scholarships as well as certificates of participation. The pilot project, established and headed by **Dr. Adi Finkelstein** and **Tzvika Or** from the Nursing Department, was so successful that students were offered scholarships in order to continue activities during the summer and maintain the continuity of the activities. The project has received further funding from the Council of Higher Education for the upcoming academic year.

Optical Engineering 2016 Conference

In February, the Optical Engineering 2016 Conference was held at JCT. 350 participants from academia (Tel Aviv University, Technion, Hebrew University, etc.), hi-tech companies (Ophir, Civan, Rafael, IAI, El-Op, Elbit, etc.) and from various units of the IDF dealing with the development of defense solutions attended. Over 30 CEOs from industry also took part in the conference and 25 companies and start-ups exhibited. The Head of the Bureau of Industry and Commerce of Jerusalem, **Mr. Dror Atari** also attended the event.

The conference also hosted the BOLEO Pitch Presentation Competition, in which 10 electro-optic start-up companies competed. "BELKIN Laser," a company developing a unique non-invasive treatment for Glaucoma, won first place.

The John N. Insall Orthopedic Track

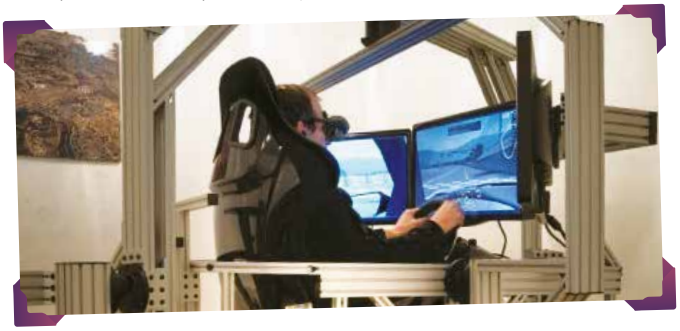
With the support of the **John N. Insall Foundation**, JCT opened an orthopedic course in order to enrich the orthopedic experience of our nursing students. This course offers a series of lectures and provides scholarships for students taking part in research projects in the field of orthopedics, with particular emphasis on the elderly. The research conducted is related to both assessing and treating orthopedic problems, which range from anticipatory care to treating the complications of various orthopedic conditions in all age groups. Additional research is also being conducted regarding the fear of the elderly falling during rehabilitation after a hip fracture.

Research

JCT Ensures Road Safety

Students from Tal Campus developed a new system, based on Game Theory, using cameras for enforcing speed limits on the roads. An experiment conducted by the Israeli Police revealed that the system was more effective in lowering the speed limit and increasing road safety than the existing method. The new system can utilize the same resources to produce more effective reinforcement, prevent traffic offenders from misleading the enforcement system and thus reduce the level of risk.

An additional contribution to road safety was developed by JCT researchers, **Dr. Moti Reif** and **Dr. Yehuda Badihi**. The two developed a virtual reality simulator that simulates extreme situations while driving (bad weather, irregular roads etc.) The simulator helps the driver hone skills that could prevent potentially fatal accidents. An experiment was conducted with dozens of participants who found this to be superior to the existing models. The participants were able to learn faster and felt as if they were really driving.



Variations in Single Gene affects Blood Pressure

JCT's **Dr. Eli Hefetz** was a member of a team which discovered that variation in a specific gene, MTHFR (an enzyme that creates nucleic acid), affects blood pressure values. The team, led by **Prof. Ruth Birk** from Ariel University, found that an abnormality in the MTHFR gene greatly increased diastolic blood pressure in humans. This is the first study to demonstrate such a correlation. This finding is significant for detection, diagnosis and treatment of hypertension in the new field of personalized medicine. The research was published in the American Journal of Hypertension.

JCT Researcher among AAMAS Winners

JCT researcher **Dr. Avi Rosenfeld** was a member of the Southampton University team from Electronics and Computer Science (ECS), which received the 'Best Innovative Applications Paper' award at the annual AAMAS conference, the international conference on Autonomous Agents and Multiagent Systems, held in Singapore.

The winning paper, "Bid2Charge: Market user interface design for electric vehicle charging", focused on a simple auction-based interface for electric vehicle (EV) smart charging mechanisms that could be used by non-expert users, or, to put it more simply, the drivers of the electric vehicle.

AAMAS is the main international conference on intelligent agents, as well as one of the most prestigious AI conferences.

Credit: ECS

On far right Dr. Avi Rosenfeld together with his team being presented with their award

Prestigious Research Grant Awarded

Prof. Ivy Kidron, the head of JCT's Mathematics department has been awarded a significant three year grant by the Israel Science Foundation (ISF) for her research "Students' construction of mathematical knowledge by means of analogy".

The proposed research is expected to be a valuable contribution to the mathematics education research community. In addition to its theoretical aspects, this research is expected to improve students' mathematical thinking.

Move Over, Einstein

By Adi Grasiel, BeSheva newspaper, July 21, 2016

Over the past few years Prof. Yaakov Friedman and his team at the Jerusalem College of Technology – Lev Academic Center have been working tirelessly on revolutionary research, which is set to upgrade Einstein's Theory of Relativity. In an interview with BeSheva, Friedman discusses the unique experiments and international collaborations, recalls his childhood as a mathematical genius in a hostile communist environment, and reveals the unusual influence the Lubavitcher Rebbe had on his academic path.

In his pictures from the experiments in the particle accelerator, Prof. Yaakov Friedman of the Jerusalem College of Technology – Lev Academic Center is seen wearing a white shirt, black kippah or a hat, with researchers with a distinctly non-Jewish look about them avidly following his every word. Even when meeting him in person, his soft tone and Chabadnik attire stand in contrast to his challenging one of the greatest physicists of all times, Albert Einstein. If Friedman's theory is correct, Einstein's Theory of Relativity will have to be altered. The consequences of the change may revolutionize a number of technological fields, including the computers and cellphones we use on a daily basis.

Obviously, it requires quite a bit of moxie to suggest corrections to the Theory of Relativity, but it seems that even as a child Friedman was not afraid to swim against the tide.

The Boy Was Bored in Math Class

Yaakov Friedman was born in Munkatch, Hungary, 68 years ago, when the region was under Soviet rule. His parents survived the Holocaust. However, it was a difficult time for the Jews who remained in the area. His father was one of the leaders of the group that revived Judaism in the area. They trained *shochtim* (butchers) in order to provide kosher meat. At the onset of the Doctors' Plot in 1953 (when Jewish doctors were accused of attempting to poison the leaders of the Soviet Union), the leaders of the community were imprisoned. Since his father had come to the town relatively late, the secret police had no file on him, so he was left on his own to head the community of about 2,000 people. The large synagogue in the town was shut down. The Russians permitted prayer in a synagogue at the edge of town, which was closed two years later. As a result, the Jewish community had to conduct clandestine services.

Friedman in the laboratory

"I was lucky," Friedman recalls, "because the apartment next door had an improvised synagogue, and I could hear the praying through the wall."

The slaughterhouse the Jewish community used was actually a feather factory that provided stuffing for pillows. *"The community bribed whomever necessary in order to ensure that they could continue to provide kosher meat,"* Friedman adds.

Why did you choose mathematics?

"When I was very young, when we walked to the synagogue at the edge of town it was, of course, forbidden to speak divrei Torah, so my father would take advantage of the time to practice

math problems with me. By the time I entered elementary school, I was bored during math class. The problem was that I was unfamiliar with Russian because we only spoke Yiddish at home. But we could not reveal that fact, so my parents said that I was incapable of speaking. And if a seven-year-old cannot speak, it is a bad sign. No one in school wanted to accept me. Until one of the teachers, an anti-Semite of all people, understood and offered to take me into her class in the Russian school", he recounts.

The math teacher was Jewish. When he saw that Friedman had an affinity for the subject, he gave him textbooks with math problems.

Friedman excelled in the field as a child and won several math competitions. He even won the Ukraine Mathematics Olympiad but because he was Jewish, he was barred from continuing to the next stage -- The All-Russian Mathematics Olympics. *"They took the boy who came second,"* he says.

Upon completing his high school studies, Friedman was accepted, "through divine intervention," to Moscow University, which he says was considered one of the best academic institutions in the world. The Faculty of Mathematics and Mechanics was the only one that still accepted Jews.

"Stalin wanted an atom bomb, and he realized that in order to do so, he had to take students according to their abilities and not by their party affiliations. There were only two such places in Moscow, one of which was the Mathematics Department of Moscow University," he explains.

Friedman began to study at the university one year before the Six Day War. Immediately following the war, the faculty was closed to Jewish students.

"In 1971, the year I graduated, 150 Jewish students graduated, all with honors," he says. *"The problem was that they had nowhere to go because job placement at that time was assigned by government decree. When non-Jews graduated, all the government representatives would fight over them. But if they were Jews, no one wanted them."*

But that discrimination actually worked in his favor.

"I found a factory in Munkatch, my hometown, which was willing to hire me. It was a factory that manufactured school laboratories. I didn't actually have much to do there, so they let me do the calculations when the machines needed to be fixed. I asked, 'How do you do it now?' They replied, 'We fix them when they break.' I collected the data, and after several hours I created a plan for overall maintenance. The astounded manager said, 'Why so fast? This is work for a year.' That's how it worked in Soviet Russia," he says.

That year Freidman's family, by then a family of six, began trying to escape.

"The fact that I studied in Moscow helped me because I knew how to speak their language. No one believed it would happen, but we received permission to leave. We had to organize everything within two weeks and leave. It was truly an unbelievable feat," he says.

While studying at university in Moscow, Friedman connected with a Chabad family and often had meals with them and prayed in their apartment.

"I had no private place in the dorms where I could pray. And, of course, there was no kosher food. So I would travel an hour each way every day to that family, to pray and eat. Since then, I have had no trouble having only one meal a day," he says.

During his university studies, which were part of the Russian army's Atuda (combining academic studies and army service), he took an officers' training course during the summer vacation. It took place on a large base where they developed and trained the team's anti-missile divisions. The base also had groups from Arab countries, but there was no communication between the teams.

"*The course was the most trying time in my life in regard to maintaining a Jewish lifestyle. No tefillin, siddur or kosher food,"* he says. *"Once when I was I davening Shemoneh Esrei in the corner, an officer walked by and because I didn't stop to salute , I was punished and had to spend the day cleaning toilets."*

However, other than that incident, the officers' relationship with Friedman was quite positive.

"I helped them plan the class scheduling, which was very complicated on that base up to that point. There were four officers in charge of assigning soldiers to various jobs. I created software for them – there were no personal computers at the time, only large ones – and the officers were pleased."

As a result, he received better treatment. In other words, as Friedman puts it, *"I was punished less."*

When his family arrived in Israel, Friedman went to visit a friend at a yeshiva in Kfar Chabad. He was 23 at the time, and his friend suggested that he study with a boy from Jerusalem who was only 17.

"I discovered that he was at a much higher spiritual level than I. Every question that I raised was met with a well-organized and convincing answer. For me as a scientist, that was extremely important. After less than an hour of studying together, I called my parents to tell them that I was staying at the yeshiva. I learned there for a year and filled in the gaps. It was one of the best years of my life," he recounts.

Friedman wanted to continue at the yeshiva. Like any good Chabadnik, he wrote to the Lubavitcher Rebbe and was sure that the Rebbe would approve his decision. But the Rebbe's response was surprising: "Continue with academia, get a doctorate and combine it with *Torah* learning," he advised.

Friedman moved to Bnei Brak, where he studied and taught half a day at Tel Aviv University and spent the other half learning in a kollel.

"*The university was not an easy place for someone from the yeshiva with a kippah and tzizit,"* Friedman says. *"There were no religious people at all, and when I walked through the hallways, I received remarks such as 'What are you doing here?' and 'You must have gotten here by accident.'"*

While Friedman was studying for his doctorate, the Yom Kippur War broke out. He was conscripted, completed a rushed basic training and was sent to Syria with his division. He spent the winter in Khadr (which was recently usurped by ISIS). His technological abilities were put to good use there when he helped calculate the routes for the mortars and cannons, in an age before such processes were computerized. In exchange, the commanders made sure that he was given permission to go home every *Shabbat*, despite the stoppage on leaving.

Friedman completed his doctorate in 1979, specializing in Theoretical Mathematics: the Geometry of Infinite Dimensional Spaces. He completed his doctorate in collaboration with a boy from a kibbutz who was doing his doctorate at Hebrew University on the same subject. "We received rare approval to work together," Friedman recounts. "Later on, it turned out that the problem we were trying to tackle was actually considered to be unsolvable."

After a year, the young researchers managed to solve it, having to devise new concepts and tools to do so. The accomplishment earned each of them prestigious post-doctorate positions. The boy went to Texas University, and Friedman went to California State University in Los Angeles. Quite a few of the faculty members were Jewish, says Friedman, but none of them were religious.

The early 1980s was a rough time for academia. In Israel and abroad, available jobs were reduced, and there were no new openings. However, the hi-tech field began to flourish. In addition to his university work, Friedman served as a consultant for start-up investors. He was later involved in establishing several start-ups himself, one of which was sold to IBM. A big investor offered him a job at his company with a salary that was three times what he was making as an academic. The investor was willing to donate a hefty sum to Chabad institutions and asked Friedman to consult with the Lubavitcher Rebbe. The Rebbe

said no: *"Stay in science."*

For eight years, Friedman worked at the University of California. Then he received offers from the Jerusalem College of Technology – Lev Academic Center, as well as from several other universities in the United States.

"I asked the Rebbe, and he answered: 'Come to Jerusalem permanently!'" Friedman says.

Ever since, that is where Friedman has remained. He started off as a lecturer at JCT, and then continued to advance as a faculty head, deputy rector, rector and vice president for research. He later received an explanation from the Rebbe for his response.

*"The Rebbe said that he was against telling people to make a change that eradicated part of their lives. We need to take advantage of all that we have done and learned in order to worship G-d. So if Divine Providence directed me toward studying mathematics, then I must use it. The Rebbe also explained that working with science and its development was an important part of preparing the world for Geula [*redemption*]. So we will see the world come together not only on a spiritual level but also on the physical level. That changed the way I view academic activity. It later encouraged me to change my focus. Math is only a tool for other sciences; but if you want to understand the world, you must learn physics,"* he says.

Some 25 years ago, Friedman began to try to make a connection between math and natural sciences. *"Until that point, they only taught theoretical science, in a way that disconnected it from other sciences. I made changes in the curriculum in the field,"* he says.

"When I teach a course in mathematics," he explains, "instead of beginning with theory or writing mathematical proofs, I open with a practical problem. I present its constraints and arrive at the equation from there. I do that in order to create a connection between reality and math. It is only after that stage that I explain how to solve it and how to use the solution to understand better the problem. That way, the students learn how to approach problems in the real world."

A good example of the success of this approach is one of Friedman's students who chose to specialize in brain sciences. *"I taught him how to analyze data that comes from brain research data. He wanted to see if depression could be identified by mapping brain activity, and we managed to find that connection. Today, that student is a leader in the field at MIT, and several patents on the subject have since been filed,"* Friedman says.

Later, as a natural progression for someone so interested in the practical world, Friedman shifted his focus to physics.

"Everyone said it was academic suicide," Friedman recounts. *"In mathematics, if a certain theory seems feasible and logicaly correct, it is considered accurate. It is not uncommon for some mathematic model to hold for dozens of years, finance dozens or hundreds of researchers, earn them doctorates and professorships, and then someone comes along and disproves it. But physics is tested in real life. It is perceived in an entirely different way."*

How did you learn physics?

"Most of it I learned on my own, and some through teaching. For example, Quantum Theory, which deals with the world of small particles within the atom. The mathematical model used in this area differs from that of regular physics. I decided to teach a course in Quantum Theory at JCT, and that forced me to know it well," he says.

Over the past several years, Freidman has been dealing with a problem that he defines as central to the unification of the universe. In physics, he explains, there are two areas: the regular world, the realm of the usual laws of physics; and the quantum region, the world of small particles, which behave differently.

"Scientists built a description of this behavior that differs significantly from the description of normal physics. But that does not make sense. It is, after all, the same world," says Friedman. *"At a certain point, I decided to try to connect the two. It is a common belief that the difference between the areas is due to size. But that is not very convincing, since the classic laws of physics [Newton's laws] are applicable to vast stars in the same way as they are to grains of sand. So, supposedly, the size is not responsible for the change in rules.*

My proposition is that the main factor is acceleration, meaning the change in velocity. Immense forces operate in small particles and, when following the famous equation of force equals mass times acceleration, the small particles reach tremendous accelerations. However, the Special Theory of Relativity only describes the effects on high speeds on the laws of physics. Einstein said that as you approach the speed of light, the regular laws of physics change: Time slows down, and the body expands. In practice, however, it is hard to achieve such velocities. Particle accelerators are almost the only place where such speeds can be reached. Whereas, the General Theory of Relativity deals with gravity and acceleration generated by it and shows that gravity can warp space," he says.

"My idea is to develop a model that also addresses the effect of any type of acceleration on the laws of physics. It may contradict one of Einstein's hypotheses ['the clock hypothesis,' which claims that time is only affected by speed], but that hypothesis is disputed among physicists in any case," he says.

Prof. Friedman with colleagues at the ESRF synchrotron in Grenoble

"In order to test my hypothesis, I needed a particle accelerator. Not the kind that creates collisions, such as the famous accelerator at CERN [the European Organization for Nuclear Research], but the kind that creates powerful radiation with qualities that enable high precision measuring. Such accelerators are called synchrotrons," he says.

"The world has several influential synchrotrons. The best synchrotron is in Hamburg DESY, and the European Union's synchrotron ESRF is located in Grenoble, France. Along with my colleagues Prof. Israel Felner and Prof. Israel Novik from Hebrew University, as well as a German team, I sent a request to the German accelerator, and it was approved. The results were that acceleration was indeed the catalyst for changes, but they were more complicated than we expected. To date, we still do not have a full explanation for those findings," he says.

Friedman, along with the team from the previous experiment, decided to conduct the experiment a bit differently. This time, in the accelerator in France.

"For this experiment, with the help of a team of scientists from the nuclear center in the Negev and Ben-Gurion University, we developed and constructed a unique centrifuge," he says.

The experiment yielded better results, and still the effects of acceleration were far greater than what Friedman's model predicted.

"I brought some of my students with me. They quickly integrated and proved themselves. Everyone there was convinced that they were doctoral students. They had no idea that they were undergraduates. If they had known that they were undergraduate students, they might not have let them in," he says.

The results of the experiment were published in leading European journals.

What are the applications of your theory?

"If we understand the effect of acceleration, we will be able to understand the particle world, as well as the world of astrophysics, since a large number of astrophysical phenomena relate to high acceleration. For instance, neutron stars, which are particularly heavy stars, or black holes. Since today there is a vast amount of information from shuttles and telescopes, one can say that it is a natural, completely sterile lab that G-d created for us.

With my theory, I managed, along with Prof. Menachem Steiner from the Jerusalem College of Technology, to solve a 150-year-old problem related to Mercury's orbit. It is the only planet that does not clearly adhere to Newton's laws, and its orbit around the sun has a precession of 43 arc-seconds over 100 years which cannot be explained by classical physics. That was the first piece of evidence that Newton's laws are not absolute. Einstein solved this

with the General Theory of Relativity 100 years ago and said that it was the greatest achievement of his life. With my theory on the effect of acceleration on space and time, I also managed to reach the right answer using a quick and direct method, without warping space like Einstein did.

"My project also has great potential in the hi-tech field, as the technology constantly increases the frequencies. An example of this is with computers. In such frequencies, acceleration has a significant effect. Without understanding what the effect is, we will never be able to advance to higher frequencies. On the other hand, the devices and components are getting smaller and smaller. Today, the conversation revolves around nanotechnology, and we cannot reach quantum-atomic levels, since we do not fully understand the rules at those levels."

Despite the success of the experiments to date, Friedman needs more investments and more researchers.

"It isn't something that you can raise funds for from investors. It must be funded by the government," he says. *"This is an opportunity to reach the forefront of international research, which can push us forward. I am certain that the industry in Israel can translate our results to attain greater achievements and reap the benefits."*

The Jerusalem College of Technology: "The Religious Community Has What to Contribute to Scientific Breakthroughs"

For over 40 years, the Jerusalem College of Technology (JCT) - Lev Academic Center offers academic studies in the fields of science, technology, computers and management. Today, there are 4,500 students, men and women, in separate campuses for women (Tal and Lustig Campuses) and men (Lev Campus) for undergraduate and graduate degrees, supplementary years and pre-academic programs. The areas of study are engineering, computer science, accounting and information systems, business administration, bio-informatics and nursing. JCT has over 8,000 graduates, with a 93% employment rate, some of whom are placed in key positions in the market and industry.

JCT has a staff of over 500 lecturers, including Professors and scientists operating in highly advanced laboratories. The Jerusalem College of Technology is at the forefront of scientific development and conducts scientific research in various fields in 11 research centers. These include The Center for Nano-Optic Adaptive Research; The Center for Medical Optic Research; The Center for Immune System Disorders; The Optic Center for Photovoltaic Solar Energy; The Center for Mathematic Models for Physical Processes and their Applications and more. In addition, JCT has a Research Authority, which aims to encourage academic and applied research for developing multi-disciplinary projects, with the goal of advancing the level of research and commercializing the acquired and developing knowledge of the academic center. JCT also conducts joint research projects with leading companies in industry and the labor market.

President of JCT, Prof. Chaim Sukenik, says: *"The nation of Israel was blessed with a human resource of sharp minds, which earn international recognition and are in high demand by leading companies around the world. Israeli researchers, such as Prof. Friedman, are breaking ground with a variety of technologies and developments, which were considered to be unattainable only several years ago.*

It is important that a scientist possess curiosity as well as the need to thoroughly examine things, even if it means that they must swim against the stream and challenge the common way of thought in their field. Prof. Friedman was gifted with such a quality, and his personal story summarizes the story of the Jewish people, who must fight for its freedom and independence while reaching breakthroughs and leading in innovation.

"In order to continue to be one of the leading countries in the world, Israel must invest in the growth and development of new generations of scientists so that they will have the tools and abilities to push ahead, and we, at the Jerusalem College of Technology, believe that the religious community has what to offer in this area to Israel and the entire world".

Commentary

It's been over fifteen years since JCT made one of its most important decisions and opened up its academic programs to women. Both the Tal Campus in Jerusalem and the Lustig Campus in Ramat Gan have been hugely successful and have had a profound effect on Israel's economy. Initially, the mission was simple: provide an orthodox environment in which academic studies at the highest levels as well as serious Judaic studies are provided for women. At that time, no one had ever thought that young Haredi women could become engineers or business leaders. With a great deal of apprehension and significant opposition within the Haredi community, we stepped in and opened our doors while maintaining the highest academic standards.

We now have a perspective of almost two decades as to how this social and academic experiment has developed.

Tal and Lustig Campuses have over 3000 graduates who are an integral part of Israel's start-up nation! These alumni have attained senior positions in the defense establishment and in private industry. The results are beyond our most optimistic projections.

There are now some 2400 women at JCT, compared to 2100 men. The women consistently score as well, or better, than the men on their exams. More importantly, orthodox women now have more options than they had in the past. They are excelling in engineering, which is a far cry from the conventional female occupations. We now have Haredi women graduates who are, inter alia, managing partners in major accounting firms, professors in brain science, and senior engineers in the defense establishment. The orthodox and Haredi communities are more open to women being employed in various occupations and working in some of the world's largest companies. Recently, I met with some of our Haredi graduates who are working at Texas Instruments and Intel. They are happy to be a part of leading world class companies and are respected amongst their peers.

I'll end with a short story about a woman from a Hassidic family who received permission from her Rebbe to study at JCT. I asked her what she would have done if her Rebbe had not permitted her to study with us. Her response was that she would have continued to work as a seamstress. She is now graduating with a B.Sc. in Computer Science and she is at the top of her class.

This, in a nutshell, is what we have accomplished. Offering highly capable women the opportunity to enter challenging new fields and excel as never before.

Stuart Hershkowitz

Vice President

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Jerusalem College of Technology — Lev Academic Center

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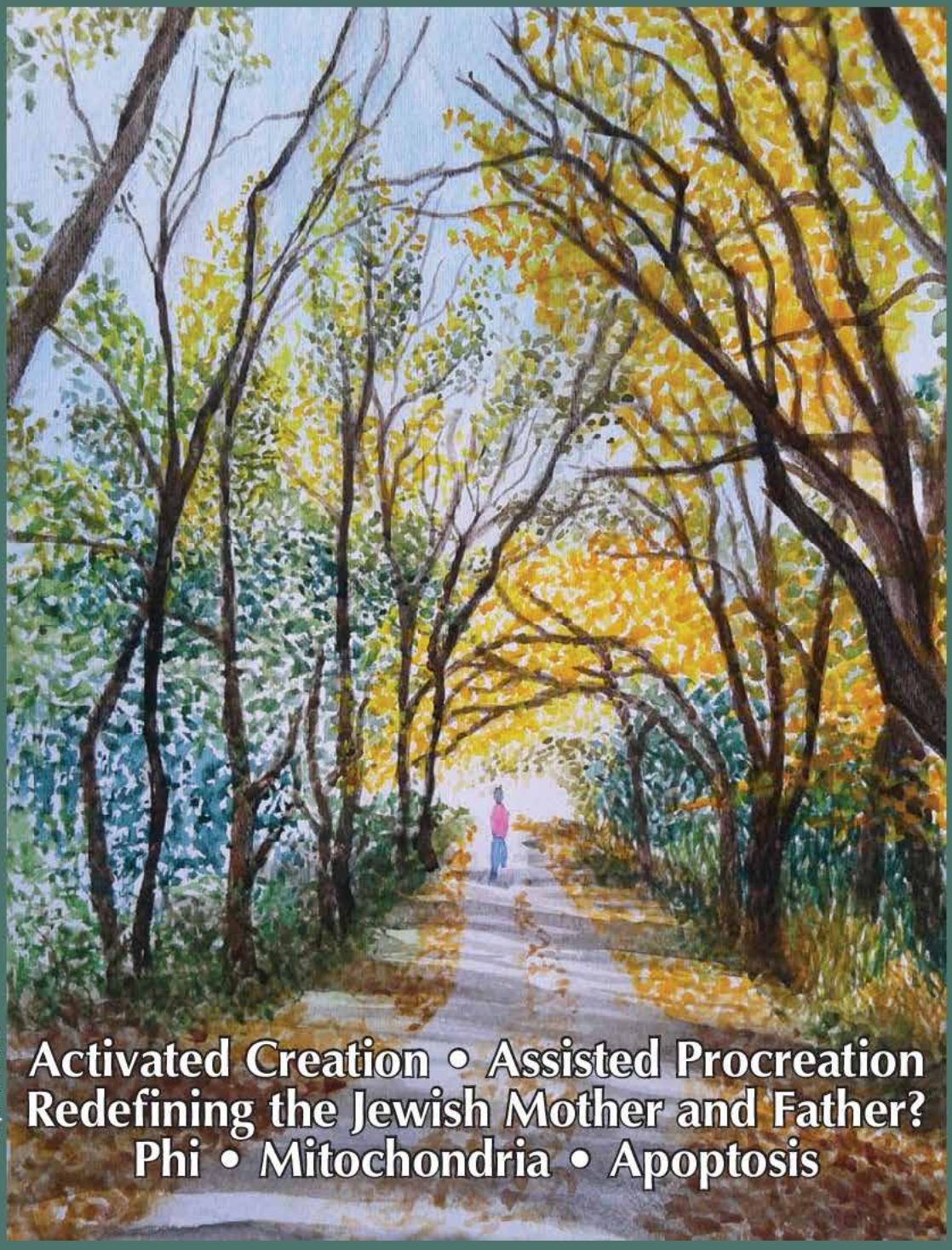

Daphna Wexler

Activated Creation • Assisted Procreation
Redefining the Jewish Mother and Father?
Phi • Mitochondria • Apoptosis