

# NEWS FOR A BETTER WORLD

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Ravit Berdichesky receiving her deceased son Itay's diploma, a graduate of the Department of Electrical & Electronics Engineering, murdered in Kfar Aza on October 7, 2023.

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**A WORD FROM THE PRESIDENT**



The October 7 incidents and the "Iron Swords" War have cost us very dearly. As such, the College is doing everything it can to provide a broad and supportive academic envelope for our I.D.F. reservists, and those serving in the security and rescue forces, as well as for our I.D.F. career soldiers, and for all our evacuees - our goal being to help them successfully close any gaps in their studies and gain any missing knowledge.

We continue to do innovative research and development, with an emphasis on high-quality teaching and interaction with Israel's advanced industries. I am also glad to report that today SCE is the largest public college in Israel that grants Bachelors' Degrees.

As usual, SCE allocates many resources for the development and incorporation of the best teaching methods and laboratories, for research and development, for the enrichment of our libraries, and for the support of our students, in various ways, including the granting of scholarships.

I wish you all a Happy New Year, good health, productivity, and innovation - a year full of successful teaching, learning, research, and development.

Sincerely,

**Prof. Semyon Levitsky**  
SCE President



**An SCE Delegation Goes to Promote the Opening of an Extension in Eilat**

**The visit to Eilat happened following a discussion held by Israel's Council for Higher Education (CHE) regarding the establishment of an SCE extension in Israel's southernmost city, Eilat, in which, initially, Computer Science, Software Engineering, and Industrial Engineering and Management would be taught. Prof. Jehuda Haddad said: "We are examining the idea, towards the goal of enabling the residents of the region to acquire an academic education in the technological worlds and to attain key positions in Israel's future economy."**

To promote the establishment of an SCE extension in Eilat's new Academic Quarter, the SCE Administration set out to visit the southernmost city. This delegation included: Prof. Jehuda Haddad, Rector and Founder of the College; Prof. Semyon Levitsky, SCE President; Zohar Wohlfarth Cohen, SCE's General Director; and Dr. Avshalom Danoch, Head of the Academic Administration.

The visit came about following a discussion held by the CHE regarding the establishment of an SCE extension in Israel's southernmost city, Eilat, in which, initially, Computer Science, Software Engineering, and Industrial Engineering and Management would be taught.

The Mayor of Eilat presented SCE's representatives with a review of the opportunities and challenges in Eilat in the fields of: medicine, transportation, academia, diversification of employment sources, innovation, renewable energy, as well as his vision of transforming Eilat into a full free trade zone. His talk focused on academia, emphasizing the fields thought to be 'those of the future', that also respond to the city's needs.

Prof. Haddad replied, "We are examining the idea of building an SCE extension, that will enable the residents of the region to acquire an academic education, while becoming professionals in new technological worlds and attaining key positions in Israel's future economy."

**A WORD FROM THE RECTOR**



Israel's academia is a safety net for the State of Israel and one of the cornerstones of its national, economic, social, and international robustness. As such, I am proud of SCE's achievements, its students, its graduates, and its faculty members - and to express my great appreciation.

We have just experienced a very complex and challenging year, but everything we have endured has only strengthened my belief that now is the time to come together, to combine our positive energies - and I am certain that, ultimately, we will come out of this even stronger and more united. We must do so for the sake of our friends and loved ones, for the heroes and heroines on the battle fronts, and for the sake of our hostages in the Hamas tunnels - for whose speedy return we so yearn.

These days, the world is changing and developing so rapidly, and challenges face us that require novel solutions and more advanced technologies. I am sure that this generation of young students will dictate the direction, will become leaders of innovative development and the creation of helpful solutions for a much better world.

I wish all our students, from freshmen to post-graduates, a happy and successful New Year at SCE. May we know better and more tranquil days!

With warm blessings,  
**Prof. Yehuda Hadad**  
Rector of SCE

# The Best for Outer Space

**In an advanced laboratory recently dedicated on the Ashdod Campus, students will begin with a new course on satellites and outer space - learning about the SCE-SAT-1 nano-satellite and its miniaturized atomic clock. Uri Oron, General Director of the Israel Space Agency, told the students, "The future is satellites and space."**

The advanced laboratory for the teaching and development of nano-satellites was dedicated this week at SCE's Ashdod Campus. In cooperation with the leading companies in the Israeli aerospace industry, the SCE-SAT-1 nano-satellite will be developed and fitted with a miniaturized atomic clock produced by "AccuBeat" in Jerusalem - a world leader in the field of precision time and frequency solutions. After cutting the ribbon, those present at the ceremony enjoyed the first tour of the premises.

This project, established and managed by Ori Onn, a lecturer on "Orbital Satellite Systems" in the "Satellites and Space" track, was initiated on the Ashdod Campus five years ago as part of the SCE Department of Electrical & Electronics

Engineering, assisted and accompanied by Department Head, Dr. Irit Juwiler.

The "Satellites and Space" track is meant to provide young engineers with the required knowledge and methodologies for work in the aerospace industry - considered an engine, driving global growth. Israel has a well-developed aerospace industry, both in the security sector and in the civilian sector, thus, there is a shortage of young engineers.

This laboratory contains a clean room, in which the students will develop the nano-satellite. Among other things, they will test the performance of the miniaturized "AccuBeat" atomic clock under outer-space conditions - a process that will enable its future incorporation into operational satellites. To date, no

atomic clock exists that is small enough for use in outer space; as such, this project may yield technological and scientific breakthroughs.

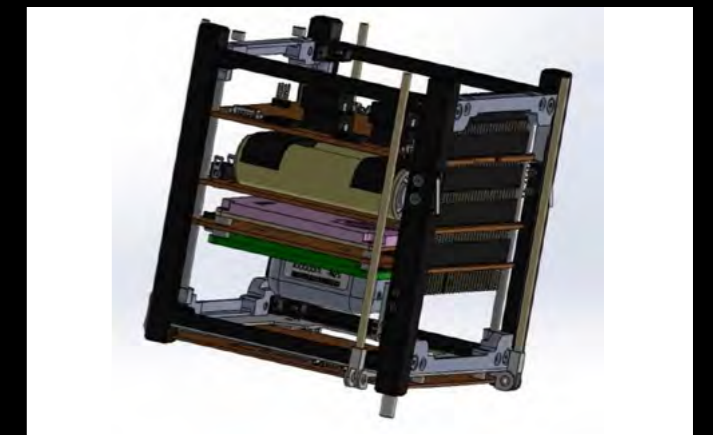
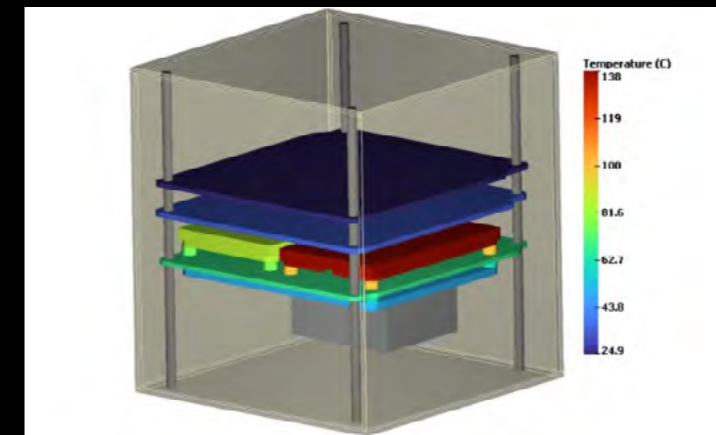
The participants in the ceremony included members of the departmental faculty, guests from the industry, and the SCE Administration. Among the well-wishers were Prof. Jehuda Haddad, Dr. Irit Juwiler, and Ori Onn. Then, there was a lecture by Uri Oron, the General Director of the Israel Space Agency, entitled "The Subject of Space as a Locomotive and Engine for Economic Growth;" a talk by Benny Levy, General Manager and Head Engineer of "AccuBeat," on "The "World's Most Accurate Atomic Clock on the JUICE Mission to Jupiter's Moons;" and finally, Yossi Yamin, Chairman and Founder

of "SpacePharma" spoke about "The Development of Innovative Medications by Means of Nano-Satellites."

Oron stated that "The future is satellites and space [...] It's no longer an abstract need, rather it's mandatory." The targeting of missiles in space, during the Iranian attack on the State of Israel, was made possible for Israel thanks to it being one of 12 countries that know how to develop, send satellites into orbit, and operate them. With his closing words, Oron turned to the students in the "Satellites and Space" track and told them, "You made the right choice!"

Dr. Juwiler added that this project - the construction of a nano-satellite and its launching - is "unique, intriguing, interesting, and accompanied by great excitement. I wish our students success in realizing the goal, while enjoying the experience and gaining knowledge."

Over the past five years, the Satellites and Space" track has grown from only 5 students the first year to about 60 students, and a variety of other courses were added to the curriculum. At SCE, emphasis is placed on cooperation with the companies in the aerospace industries, to enable students to accumulate work experience within a real business environment, potentially opening doors for their future employment.



Dedication of a nano-satellite laboratory

# “An opportunity to encourage curiosity, innovation, and the joy of creation”

The SCE Hackathon - held in cooperation with Intel, in memory of the late Reserves Major, Amir Naim, a student in the Department of Chemical Engineering on the Be'er-Sheva Campus, who was killed on October 7th, while serving as a member of the Security Alert Team of Kibbutz Erez - was dedicated to Amir and his unique legacy, and raised suggestions for eco-friendly solutions for the treatment sewage byproducts.



The Hackathon in memory of the late Reserves Major, Amir Naim, was held at SCE, in cooperation with Intel. Amir had studied in the Department of Chemical Engineering on the Be'er-Sheva Campus and, last year, had begun to work as a student at Intel. He was also a member of the Security Alert Team of Kibbutz

Erez, but he lost his life on October 7th, defending the local residents, whom he loved so much.

His college classmates and work colleagues describe him as pleasant and notable for having many skills, for his curiosity and tendency to innovate. The theme of the Hackathon was dedicated

to Amir's legacy and was chosen by his peers at Intel - an essential challenge for environmental protection during production processes. The Hackathon's participants were asked to find a creative, cheap, and viable solution for treatment of the solid salt, yielded as a byproduct of sewage treatment processes at the Intel plant in Kiryat Gat - by means of cleaning it and finding applications for its use.

At the opening event of this Hackathon, in which tens of students from the Department of Chemical Engineering (sophomores, juniors, and seniors) participated, a short film was shown about Amir and the challenge was presented. The various competing groups received their designated workspaces and were given 24 hours to work on the challenge. They were assisted by mentors from Intel and by members of the academic staff of SCE's Chemical Engineering Dept.

On the second day of the Hackathon, 8 teams presented their solutions for the first round of judging. Four of them

continued to the final round, and their members were granted monetary prizes amounting to the sum of 26,000 NIS. The members of the team that took first place were: Salah Abu-Dayyeh, Paz Guetta, Shira Dayan, Hila Peretz, Daniella Sverdllov, Mor Kadosh, Lior Bnuya, Meital Colette, Liz Danilik, and Nur Kadri.

Prof. Ariela Burg, Head of the Department of Chemical Engineering said that at SCE, “Amir's image will accompany us forever.” She added that “in light of Amir's inspirational image - who always strove to know more - we will educate thousands of students in the years to come. This Hackathon provides us with an opportunity to encourage our students to enjoy creating and innovation, based on the knowledge acquired at the College, just as Amir did. I would like to thank Intel for their collaboration and Amir's family for the privilege of sharing his extraordinary story and legacy with the students.”

אמיר מנצור נעים ז"ל  
תמיד ראשון.  
Always First.  
Amir Manzhor Naim RIP 7/10/2023  
גיבור שלנו



# “Truth or Dare”

## About Honesty and Manipulation in Visual Communication

The Third Conference of the SCE Visual Communication Department brought together designers, artists, and researchers to deal with questions regarding honesty versus fakery, intimacy as opposed to exposure, and making the truth accessible within a virtual reality.

‘Truth’, ‘honesty’, and ‘manipulation’ in the various arenas of visual culture - these are the concepts dealt with by the 3<sup>rd</sup> Conference of the Visual Communication Department, held at SCE. This conference was intended to introduce designers, artists, and researchers, and to enrich the design arena in Be'er-Sheva and the southern region.

The main talk was given by Tal Cantor, creator of the animated film “Letter to a Pig,” that won an “Ophir Award” and is nominated for an “Oscar Award” in the “Best animated short film” category. Additional speakers at this conference were the artist, Ofri Cnaani; illustrator and animator, Rotem Codish; newspaper illustrator,

Gil Gibli; Haaretz newspaper journalist, Omer BenJakob; and other well-known artists and researchers.

Until recently, during the ‘postmodern’ period, the widespread theoretical conception was that the truth is relative and dependent upon one’s perspective. In the current era, following ‘postmodernism’, the ability to understand and differentiate between ‘truth’ and ‘lies’ has been completely undermined. “Indeed, out of this very subversion a renewed aspiration is growing around us - to provide proof of the truth, to make it accessible, to expose it amid oceans of virtual reality,” said Nino Benashvili, Head of the SCE Visual Communication Department, who had organized this conference, along with Dr. Noga Bernstein and Roei Regev. “Changes in the conception of ‘the truth’ are occurring today, first and foremost, in the visual arena, providing a plethora of practical and theoretical challenges for those who deal in design, art, and visual research.”



According to Ms. Benashvili, artificial intelligence challenges conceptions regarding the connections between creativity, authenticity, and humanity, while the ongoing war situation we are experiencing over the past year has obliged us to ask questions about the connection between ‘the truth’ and ‘morality’. Within that context, this conference also discussed the question - How can we create honesty and intimacy by visual means in an era that contains fakery, on one hand, and hyper-exposure, on the other.



## A Meeting of Bugs and Code: An AI System Based on Machine Learning for the Identification and Tracking of Small, Fast-Moving Objects

Groundbreaking cooperation between AI researchers at SCE and researchers from HUJI's Faculty of Agriculture aids in the development of smart systems that track wasps and flies

A gathering instigated by SCE to encourage familiarity and cooperation between researchers from the College with those from the Hebrew University yielded the unique cooperative research project of Dr. Hadassa Daltrophe and Dr. Tamar Shrut from SCE's Department of Software Engineering in Ashdod, along with Prof. Sharoni Shafir and Dr. Yael Heifetz from the Department of Entomology in HUJI's Faculty of Agriculture in Rehovot.

The initial collaboration was born between the SCE researchers and Prof. Shafir's laboratory, specializing in honeybees. To understand the spatial perception of these bees, and their changing flight patterns, two very important aspects are research on pollination and ecological oversight of Nature; however, tracking small fast-moving objects is a difficult challenge. A joint research team, including B.Sc. and M.Sc. students from both institutions, modelled and trained an AI system, based on machine learning, to identify and track bees.

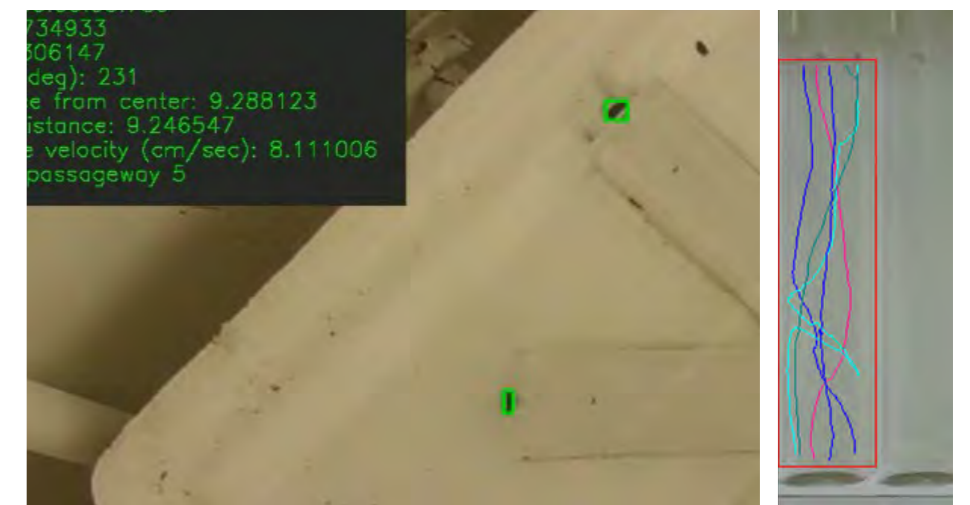
The development of this machine-learning system required a catalogued database with which to prepare the models. To cope with this challenge, the team assimilated an automatic system that analyses and labels the videoclips. This marked database served as the basis for two distinct solutions for the tracking of bees - the tracking of individual bees in closed

mazes by means of a neural network, and the identification and the tracking of bees in flight in open spaces by means of a neurons and algorithms.

The success of this cooperative project led to further cooperation with the laboratory of Dr. Yael Heifetz, who specializes in the research of flies. An additional, AI-based, tracking system was built and adopted, which provides the research infrastructure for studying Drosophila fruit flies and examining the connection between aging and reproduction from the aspect of resource allocation. Even for the establishment of this system, a designated model was adopted, which identifies Drosophila and tracks the movements of several individuals flies in vials - the main challenge being to isolate the route of an individual fly within an environment in which other flies are also in motion.

The two research teams are coping with many challenges in various environments, but in both cases - the systems cope, among other things, with the challenge of tracking small creatures, whose movement patterns are quick and varied. It is important to clarify that, despite the fact that these systems were applied to the concrete research of bees and flies, they are relevant to the research of insects, in general, and also to the development of general solutions for tracking tiny bodies that move quickly.

This joint research project yielded several systems that serve as innovative research tools for continued biological research, and they have contributed significantly to the field of smart systems. The results have already been published in a few leading journals and at scientific conferences.



# SCE's IDF Reservists

They were recruited into the IDF Reserves by means of “Emergency Order #8” (*tsav shemoneh*) and later returned to their studies. SCE students talk about the challenges of fighting in the Gaza Strip and also about the heartwarming welcome they received from the College upon their return.

“There’s no Reservist who doesn’t appreciate someone waiting for him, though Zoom recordings are not enough.”

**Gad Hasson, a sophomore in the Software Engineering Department at the Ashdod Campus,** said that, on the first day of the Gaza War, “Swords of Iron,” an emergency call-up was activated, and two weeks later, he was in uniform, reporting for duty in response to the needs of the wounded soldiers and their families. Hasson, who had previously served in the Reserves as a Logistics Department Head of a Regional IDF Medical Services Center - the ‘mother’ unit of 14 “Ram 2” units situated in hospitals Israel’s Central Region, recounts:

“In the beginning, the war was chaos; it was hard to draw a line between where things stand and the [military] units in the field. Thanks to my knowledge of the systems and the connections I’d amassed, and after

we communicated with the appointed Command, we were able to recruit the necessary equipment and to meet all the needs. As a logistics officer, I encountered many complex cases of families in distress, whose children had been wounded in battle. I received hundreds of telephone calls each day from people who only wanted to contribute and help. Thanks to the people of Israel, who opened their hearts and pockets, we succeeded in recruiting heaters, clothing, underwear, socks - everything that was necessary. This really warmed my heart.”

When Hasson was called-up to tend to the wounded and their families, who sat beside the patients in the hospitals, they needed all manner of help. He began to receive messages from friends about the upcoming start of the academic school year. “My friends from other educational institutions returned to their studies in November or December, while at SCE, they decided to wait for the



Reservists. I don’t think there was a Reservist who didn’t appreciate the fact that SCE was ‘burning’ [losing] and entire semester, waiting for him, rather than choosing the default case of shifting to taped Zoom sessions. I’d never have succeeded in making up so much material.”

Hasson also said that each time he turned to his department [at SCE], he was given support and immediate replies. “Lior, Svetlana, and Sharon gave me their full attention, which I needed; they explained my options and were open to hear my suggestions. They contacted me more than once from the College to ask about my welfare. That’s not to be taken for granted.”

According to Hasson, who was released from Reserve duty on the very first day of the belated SCE academic year, he felt guilty about returning to a “semblance of normal routine.” He stated that “as a Logistics Officer, he’d commanded young soldiers, cared for the wounded and their families, who’d all placed great faith in him. Although I maintained contact with them - but that’s not the same thing. However, there’s no doubt that I also felt relief. I was ‘thirsty’ for routine, and could hardly wait to get back to the Campus. When I returned, I felt a drop in tension that I really needed.”

“When I returned, my head wasn’t entirely in my studies, but I felt enveloped by a wonderful ambience.”

**Reservist Captain, Tal Berko, an SCE junior in the Software Engineering Department on the Be’er-Sheva Campus,** is the IDF Operations Office of a battalion in the “Efrayim” Spatial Division. “I was awakened on 7 October by the sound of the air-raid sirens, and I understood that something irregular was happening, something more than just another round [missile attacks]. I grabbed my



pistol and prepared myself physically and mentally for the anticipated IDF order to report immediately for Reserve duty. Two hours later, I got a phone call from an IDF Operations Staff Officer from my battalion, and by 17:00, we were already in the Judea-Samaria sector, in the vicinity of Qalqilya. Our operations consisted mainly of making arrests, preventing attacks, and foiling terrorist attempts. We made tens of arrests each night, while explosive devices were thrown at us; we coped with endless, life-threatening gunfire, but we had a sense of personal responsibility that gave us strength. You can go out on an operation, rest your head for an hour, and then get up when called back into action. It was very intense. We were disconnected; we didn’t look right and left, which helped us maintain our operational tension. The battalion did an amazing job of foiling attacks, providing medical responses, and a sense of security. We hardly slept, but we felt supported and boosted by the nation.”

Although Berko is somewhat conflicted about returning to his studies, he

openly states his feelings. “It was a strange sensation. My head wasn’t entirely in my studies. I attended the lectures but didn’t understand the material. My thoughts wandered to my Battalion, that I’d left in Judea and Samaria. It was my personal battle, between me and myself, to try to focus and restore some sort of routine.” Berko blesses the decision of the SCE Administration to postpone the opening of the academic year, and he doesn’t withhold his praises for Mazal, the Departmental Coordinator, whom he calls “an angel.” Berko says, “There aren’t enough words to describe the personal, close, supportive treatment I received from her. She received us [soldiers back from warfare] affably, sat with us one by one, nudged us to submit requests for loans, and helped me set up a course roster that suited to my needs and constraints. The ambience here is truly wonderful. I have personal reinforcements, special consideration on works that must be submitted; I’m closely accompanied, and most importantly - I sense genuine concern.”

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**"I decided that I'm returning to my studies, or I'll be damned, and I'm doing all I can not to fall behind."**

**Israel Clari (28), married and the father of a two-and-a-half-year-old daughter, is an SCE junior in the Department of Industrial Engineering and Management.** He lives on Kibbutz Saad in the Gaza Envelope. On October 7,

Clari was called-up for IDF Reserve duty and served for 167 consecutive days in the northern region. "I serve as a fighter in the "Nahal" Reconnaissance Patrol. Throughout my service in the Reserves, we worked days and nights, kept watch, always on the look-out, utilizing special means meant to identify the enemy and destroy him, in conjunction with the armored and air forces."

While Clari was giving his all, reporting for duty to protect the State, his wife and daughter were evacuated from their home in Kibbutz Saad to a hotel on the Dead Sea. "At first, there was a great sense of uncertainty. We didn't know how long we'd be away from our home. About a month ago, we had taken this step in coordination with the Homeland Command. Meanwhile, 80% of the kibbutz community decided that they want to go back home. We like the quiet and are determined to restore our lives as they had been, to the extent that we can." Despite the hardship of returning to his studies as a regular student, Clari decided that he would

not succumb to the difficulty. "I decided that I'm returning to my studies, or I'll be damned, and I'm doing all I can not to fall behind. I'll be one of those people who take themselves in hand and don't give up easily. I'd sit into the wee hours of the night watching the video recordings of the lectures and exercises, learning and trying to close the gaps."

Clari admits that, at first, he felt lost, but the wonderful people in the Dept. of Industrial Engineering and Management spurred him on to make every effort, to narrow the gap as quickly as possible. "My first day back at SCE, I felt like an alien from outer space. I was under pressure, and I understood that I had to become my own spokesman, so others would understand what I was going through, and with which challenges I was dealing. If I hadn't known that SCE was there for me, I wouldn't have been motivated or felt secure enough to return to Reserve duty in June. The readiness to assist us and private lessons with lecturers guiding us - these made all the difference."



**"I trusted that SCE would assist the Reservists"**

**Nave Naggar, a junior in the Department of Mechanical Engineering on the Ashdod Campus,** served in the IDF Reserves for over 150 days as a fighter in Brigade 646, Battalion 466 of the Paratroopers. Naggar, who was supposed to get married on October 10, 2023, found himself donning his IDF uniform on the day following the Hamas surprise attack. "On October 8, we were called-up to report for active duty. As far as I was concerned, there was nothing to question, no wavering about postponing the wedding. I told my parents and my fiancée that I was summoned to report; this was part of

my role as a fighter in the Reserves.

During my stay in Khan Yunis, in the central camps, in Zeitoun in the city of Gaza, and in Judea and Samaria, we conducted more than a few military operations, some of which were reported in the news. During one of those military actions, we exposed the route of a Hamas tunnel in Zeitoun. We found the shaft, which caused the Hamas's battalion commander and company commanders to come out of hiding, which was how they were taken out from the air." Naggar speaks openly about his coping with a vortex of emotions, although he didn't have a shadow of a doubt that he was in the right place. "Naturally, my fiancée worried about me, but she gave me great support and boosted my morale. She understood, like everyone, that this was the hour when we were required to defend our homes."

When SCE opened their academic studies, Naggar and his battalion buddies were about to enter Khan Yunis. "My head wasn't in my studies. I knew I was giving my all to the warfare, and I trusted that

SCE would assist the Reservists, and offer us an organized course [of study] with special allowances." He admits that it's very hard to overcome the gaps he's amassed, but doesn't hold back his praises, saying that the College did its best to enable the Reservists the best possible starting point. "I'm very pleased with the course [of study]; SCE was among the last of the [educational] institutions to initiate the start of the academic year. My department is in constant contact with me and is interested to know whether I need any additional reinforcements. I appreciate this very much."

When Naggar was in the Gaza Strip, he knew he was fighting so that the residents of Israel might be able to return to some semblance of a routine, but he admits that once he was released from his Reserve duty, he found himself suffering from a complex dissonance. "Until a few days ago, I was in Khan Yunis, and now I'm sitting at home or studying at SCE. It's not simple to make that separation, but I'm coping and making an effort to return to the Campus and to fit in."



**"It makes me happy and warms my heart to know that good also exists"**

**An SCE senior female student (who wishes to remain anonymous), studying in the Data Systems track of the Department of Industrial Engineering and Management on**

**the Be'er-Sheva Campus,** is a Major in the IDF Teleprocessing Branch, and has been a 'career soldier' for 14 years. As part of her military service, she received a full student scholarship that ended last Summer, such that she is taking her senior year of studies in tandem with her military service.

With the Hamas incursion on October 7, 2023, she found herself leaving her home in Sderot, which was being attacked by terrorists, and heading for her military base. Although she was pregnant, she served for several months, until mere days before her delivery. Today, in parallel to her maternity leave, she's also incorporating days of IDF operational activity.

"The State of Israel has experienced a cruel and despicable incident that caused the outbreak of war," she said, "a penetrating war that is claiming many casualties. It will take a long time for rehabilitation and to return to routine life. Like me, there is no shortage of students, Reservists and members of the Security Forces, who volunteer and contribute a great deal to the State, who act with devotion, as part of the nation-state's effort, in this war for survival and the defence of the State's character."

"Getting my degree is an important goal and very significant for me, and throughout my years of study, I was diligent, so I might excel and reach high achievements. Being a student at

a time like this is a significant challenge. Sometimes, it seems almost impossible to meet the deadlines, to accomplish all the required tasks, and to complete [learning] all the material."

She also recounted that her main trepidation had been not completing the year, and then having to postpone the rest of her studies. "I feared that the [proposed] course [of study] wouldn't be valid for me, because I belong to the Security Forces, not the Reserves. I breathed a sigh of relief when SCE decided to amend the course [of study]. The return of some sort of routine was complex in my case. We'd all experienced a traumatic event from which it's hard to detach ourselves, to

make a sharp transition and give our studies 'a push'."

Due to the difficulty and complexity, she says that there is a large ray of light in the image of the staff of the Department of Industrial Engineering and Management, headed by Prof. Yossi Haddad. "From the first moment, this staff, even before the academic year was officially opened, turned to us personally, expressing interest in the students' wellbeing, placing emphasis on the focal populations, worried and worrying about our welfare. We're altogether privileged to have such a staff, and particularly the Departmental Office - for their personal and attentive treatment, with the door always open

for whatever problems arise within the context of the war and in general."

She wishes to thank them for their support and assistance, "Within the darkness we're experiencing, it makes me happy and warms my heart to know that good also exists. I feel that we were blessed with a professional staff that makes demands and does not give up, but, simultaneously, displays a close, personal relationship. Lena, the lecturer, is available to answer questions 24/7, and provides a sense of security and support, not to be taken for granted. I'm thankful, from the bottom of my heart, for the [excellent] treatment, attention, and readiness to assist. Were it not for your help, I'd be in another place entirely."

# Researchers assist tourists: Improving the ability of Instagram photos for trip planning

Dr. Aviad Elyashar, Dept. of  
Computer Sciences

Article: "Automated photo filtering  
for tourism domain using deep and  
active learning: The case of Israeli  
and worldwide cities on Instagram."

Journal: Information Technology  
& Tourism (Q1) 2024.

Media platforms, such as Instagram, have a significant impact on the decisions made by tourists regarding their trips, by providing valuable insights, recommendations, authentic data, and points-of-interest. Nevertheless, the photos that are attached via location-based hashtags, even those relating to tourist attractions, do not always actually reflect the destination, sometimes even posing a challenge or creating difficulties for potential visitors, who are seeking precise information.

To assist tourists in finding relevant tourist information on specific destinations via Instagram, Dr. Aviad Elyashar, from the SCE Dept. of Computer Sciences, together

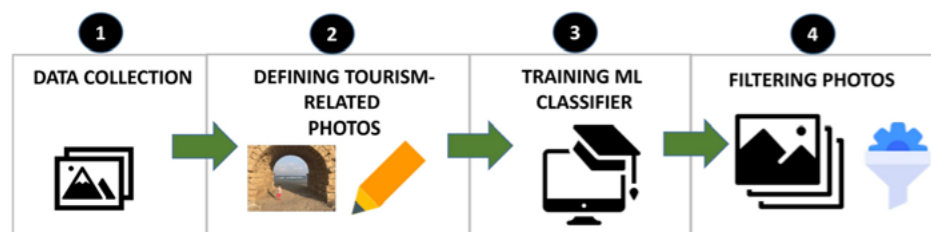
with Dr. Avigail Paradise-Vit, from the Yezreel Valley College (JVC), suggest VISTA (visual identification of significant tourist attractions). The proposed system uses both 'deep learning' and 'active learning' techniques to automatically classify the photos into two categories - 1) photos associated with tourism and 2) those not relevant to tourism.

For the sake of training a classifier based on machine learning, we collected data that includes photos from the 10 most popular cities in Israel, according to Instagram. The proposed classifier achieved precision rates of 96.5% and a weighted F1 (independently per category) of 96.4%. Moreover, the researchers examined this classifier's ability to go beyond the local data, to make generalizations about photos from around the world, by testing it on a set of global data - resulting in precision rates of 95.8% and a weighted F1 of 95.9%. VISTA's effectiveness was presented by means of a comparison between the tourism-related photos and the irrelevant ones, in terms of the proportion of the photos, the involvement of the users, and comparison of the objects. The researchers found that most of the famous Instagram photos relate to cities that are not relevant to tourists, and that the photos related to tourism

received more 'likes' than the irrelevant ones. Similarly, a small congruence was found between objects in both photo categories. Based on these findings, the researchers concluded that VISTA can assist tourists coping with the problem of locating relevant photos, from amid the large volume accessible on Instagram.

This article was accepted in July 2024 by the periodical: Information Technology & Tourism, with a Q1 rating.

Link to the article: <https://link.springer.com/article/10.1007/s40558-024-00295-y>.



Examples of the three types of photos relating to tourism

## Innovation in Science and Engineering at SCE

Faculty members and students gathered on the Be'er-Sheva Campus for SCE's Annual Researchers' Conference. At the conference, brief, 15-minute lectures were given by the 16 leading, trailblazing researchers in SCE's Faculty. Leading this conference was Prof. Victor Kagalovsky, Dean of the Engineering Faculty and Head of SCE's Research and Development

Gravity waves, machine learning, and earthquakes were only a few of the subjects highlighted at SCE's Annual Researchers' Conference. Prof. Victor Kagalovsky, who invited everyone, "...to learn about the trailblazing research being conducted at SCE, to find the field that arouses your curiosity and join it."

Authority. In attendance were also Prof. Jehuda Haddad, Rector and Founder of SCE and Prof. Semyon Levitsky, SCE's President.

During the first session, studies on a variety of subjects were presented: recruiting machine-learning algorithms for the medical diagnosis of illnesses; gravity waves; the ability of amphetamines (catalytic substances) to protect agricultural crops; improvement of human communication in people on the autistic spectrum by means of a visual interface; improvement of the accessibility transportation services for the elderly, and more.

The second session included research studies on: the cooling of electrical appliances with cyclic service (like mobile phones); the influence of changes in the sea level of the Dead Sea on the recurrence of earthquakes; the strength and structure of the UHPC concrete plates used to build advanced infrastructures; and others. During the third session, the presentations were of: an analytical model of civilian disobedience; a study dealing with combinatorics; and a graphic display about problems in the field of Industrial Engineering and Management.

Prof. Kagalovsky said: "This year's

Researchers' Conference demonstrated an impressive variety of groundbreaking scientific and engineering studies being conducted in tens of SCE's laboratories. Some of this research answers basic scientific questions that spark the imagination, while many others have practical applications that can improve how machinery is built, better protect agricultural crops, more accurately diagnose patients, etc. Now, I invite our students, and those who are not yet SCE students, to learn about the trailblazing research being conducted at SCE, to find the field that arouses your curiosity and join it."



# Releasing the power of swarms of drones

How do strategies, inspired by Nature, revolutionize military defense?

**Dr. Chen Giladi, Department of Mechanical Engineering, Ashdod Campus**

Across the globe, new military concepts are developing, and the use of unmanned aerial vehicles (UAVs) or small unmanned drones are becoming more and more common. This article presents how drone swarms, as inspired by Nature, are capable of changing defensive military strategies, especially when coping with incursions by hostile drones; it also deals with the advantages they offer for the improvement of airspace security.

Imagine a pack of wolves hunting and communicating by means of body language and sounds,

when surrounding their prey. In a similar manner, a swarm of drones, using sophisticated algorithms to communicate and coordinate their actions in real time, can ensure the maximization of the likelihood of neutralizing the threat. These are especially highly-adaptive methods of action that are important in the modern battle field. By mimicking the behaviors of natural predators, the great potential of swarms of drones for improving firing strategies and redefining reaction times, is revealed - which are so very essential - considering the attack we experienced on 7 October, 2023.

A lone drone can only focus on a single target each time, which limits its

effectivity in complex scenarios having multiple threats. However, a swarm of drones can divide the missions between them, thus ensuring that several targets will be dealt with simultaneously. This division of labor guarantees that no threat will be left without a response. Each drone can focus on a specific aspect of the firing process, whether it is closing-in on the target, or tracking the movements of a hostile drone, or performing the neutralization maneuver.

### The use of algorithms based on artificial intelligence (AI)

Each individual drone in a swarm is equipped with advanced sensors, capable of locating targets and following them. Such drones use

various algorithms based on artificial intelligence (AI), enabling them to make decisions in real time, and to share that data amid the swarm, as do the wolves in a pack, communicating one with the other while hunting. The AI system processes massive quantities of data and enables the drones to analyze their surroundings, to identify potential threats, and to react accordingly. These abilities make drone swarms fast and their rapid reactions outstanding, when they can adjust their tactics while in motion, as the new information becomes available.

During the development processes, physical simulations were used extensively, since they can produce reliable images of the dynamic behavior of the swarms. The use of such simulations, before drone deployment and use in the real world, is done to sharpen the drones' cooperative algorithms and to ensure that they will be able to cope with every hostile force. These simulations serve as tools for the performance of rehearsals and tactical adjustments, so that military strategists will be able to adjust their strategies before the real-world application. In the simulated surroundings, the drone swarms are tested against a variety of scenarios - from simple surveillance missions to complex defensive maneuvers against threats of multiple UAVs infiltrating the defense area. This pedantic examination process helps to ensure that, once they are deployed, the drone swarms will perform in a smooth and efficient manner.

### The efficiency and thriftiness of autonomous drones

In areas, such as the Gaza Strip and the Lebanese border, where

incursions of hostile drones pose significant, worrisome threats - the deployment of drone swarms can provide an effective means for firing on them and neutralizing the threats. By means of cooperative work, and inspired by the wolf pack, such autonomous drones can improve the security of sensitive aerial spaces. For example, during an incursion, a drone swarm can mobilize rapidly, while its individual units spread out and create a defensive envelope. The moment a hostile drone appears, the swarm can move to shoot, surround the target and neutralize it, before it becomes a significant threat. This coordinated reaction ensures that all the threats are handled rapidly and effectively.

A combination of drone swarms within a military defense system offers clear advantages. It improves the ability to secure the aerial space and prevents unauthorized drone activity, while reducing risks to human life and physical property. As this technology continues to advance, it has the potential to create a revolution in the way we approach military operations, markedly improving our national security.

Drone swarms are not only effective, but also thrifty; by using AI and autonomous technologies, these systems reduce the need for human intervention, decrease the operational costs, and diminish risks to the personnel. Moreover, thanks to the low costs of drones, it is possible to deploy them in large quantities and to supply broad cover and systemic redundancy.

### Technology and biology intersect

During B.Sc. studies in Mechanical Engineering, when focusing on

autonomous systems, we stress the importance of the skills required by students to cope with tomorrow's challenges. By means of courses on Advanced Control Architecture, Algorithms, and Machine Learning, we prepare the next generation of mechanical engineers to innovate and contribute to technologies that can significantly alter military strategies and improve national security.

The education of future engineers involves not only the inculcation of technical skills, but also the fostering of deep understanding of the ethical considerations and potential ramifications on your work. By preparing the students to think critically about the applications of these technologies, we hope that they will know how to develop solutions that are both effective and responsible.

The use of drone swarms in military defense marks significant progress in the field, inspired by the efficiency and amazing suitability found in Nature. The future of UAVs for military defense is an exciting story, and we expect that over the next few years there will be more Nature-based strategies that shape the modern landscape of warfare.

By imitating the strategies of good, natural hunters, drone swarms offer a peek into the future military defense, in which technology and biology intersect to create new solutions to complex challenges.



# Industrialized construction for enhanced safety at construction sites

**Dr. Ethan Chetrit, a lecturer in the Dept. of Civil Engineering, presents the disruption experienced by the construction industry with the outbreak of the “Gaza War,” the heavy costs being paid by the construction industry, and the solutions. A successful construction technique, already in use in advanced countries, can greatly reduce the number of work accidents, lessen dependence on unskilled workers, and increase productivity in the construction industry.**

With the momentum in construction in our area, it is important to remember that safety regulations are written in blood! Unfortunately, this saying proves itself true each year. One might think that the State of Israel, accustomed to catastrophes and casualties, has become indifferent to the heavy costs paid at construction sites - where the tally of the victims (killed and physically/mentally disabled) rises annually, due to the repetitive cycle of negligence, amateurism, and disregard.

News captions announce each incident in turn, experts present their claims and

recycled, trite pretexts, thus paving the way for the next catastrophe. The lack of trained, professional manpower, the absence of sufficient institutions for professional training, the sparsity of supervision provided by the regulatory authority, insufficient significant sanctions, old and defective equipment - the list above only presents some of the causes that sustain the high annual rate of building site victims - workers who only want to provide for their families and return home safe.

The crucial questions are: Is there

something within our power that we can do to change this bleak reality? If so, what is it? The claims, the factors, and the costs are all known; nonetheless, sufficient steps are still not being taken to eradicate these tragic incidents from the construction industry.

The “Black Sabbath” and the events of October 2023 threw a new reality of life in the construction industry smack in our faces. The industry was almost entirely shut down and about 100,000 workers from the Gaza Strip, Judaea, and Samaria vanished in an instant - with no forecast of

when they might return. Many employees of the construction sites, planning offices, and supervisory units were gone - some having been called or recalled to active military duty or to secure Israel's borders; others refrained from coming to work - either because it was prohibited or out of fear of being caught without sufficient bomb shelters on site.

The impact of the economic blow taken by the industry on October 7th, 2023, keeps getting stronger and its influence on the entire Israeli economy will no doubt last for at least the next two years. The indicated solutions, based on the importation of tens of thousands of construction workers from distant countries, would, at best, serve as “first aid” and, certainly, not as a real, in-depth, solution to the existing problem.

The regulatory authority would be required to focus on the adoption of technological solutions that would ensure: timely responses regarding safety matters; a satisfactory performance rate; the prevention of construction defects; and especially, the reduction (or even cancellation) of Israel's dependence on cheap, foreign manpower - whose absence might, once again, bring the entire industry to a standstill. One potential solution might be the marked expansion of industrialized construction.

The suitability of modular industrialized construction - prefabricated, prefinished, volumetric construction (PPVC) - for the local Israeli market has recently been studied in several academic institutions in Israel. Over the past three decades, this technique has been very successfully implemented in many industrialized and advanced countries, and it suggests an efficient solution for very speedy and high-quality construction, involving very small work accident rates - both during the production process of the building

components and during the process of their on-site installation.

### What are the advantages?

Comparative studies between the modular PPVC and conventional construction (requiring on-site concrete casting) indicate that there are significant advantages to the PPVC for all the parameters of construction quality, speed, and safety, as well as reducing the dependence on cheap, general manpower, and requiring only a minimal team of skilled workers.

Much has been said and written about the advantages of the process of ‘industrialized construction’ versus the in-situ ‘production of construction components’. PPVC production has permanent, highly-skilled and experienced work teams. For safety's sake, the work is done on the production floor and not at any height (except during the component's installation, which is faster than that of conventional in-situ construction). The PPVC construction management team is ‘lean’; the amount of building waste byproducts is reduced, and there is much less traffic on the PPVC sites (fewer concrete pumps and mixers, etc.). All this creates a proven recipe that can improve the safety and hygiene in the world of construction.

### How can this actually be done?

The PPVC construction system is performed in parallel - on construction sites and in production plants. The production lines in the plants that produce the building components are like those found in the automotive industry. Designated teams of workers wait at workstations positioned along the production line, and the structural components move from station to station, but only after being inspected and approved by an independent team of quality inspectors, who oversee the

8-12 production workstations.

Once each module has been completed, a general, final quality inspection is made, certifying the shipping of that industrialized unit to the construction site for rapid installation. Its installation consists of: work on the building construction, exterior facade, dry and wet finishing, the installation of electromechanical systems and, sometimes, even certain permanent components of furniture (kitchens, closets, showers, etc.) - in other words, after the infrastructural tasks, founding, and bracing the building. This system may even be improved by industrializing the elevator shafts, the stairwells, and the safe rooms, that may be rapidly installed by a skilled installation team, trained specifically for on-site installation and finishing tasks.

As such, it is possible to say that, by recognizing the construction needs of the State of Israel - the quantity of buildings likely to more than double over the coming 20 years - it is prudent to put an end to: our troubling dependence on workers (some of whom are hostile); the shortage of skilled construction professionals; the absence of sufficient institutions that training construction workers; and the bleak, unsafe reality on construction sites - all of which require immediate responses with proven solutions. The actual adoption and extensive use of the modular PPVC system for public construction (e.g., student dormitories, old-age homes, hotels, offices, etc.) will lead to a significant reduction in work accidents and greater productivity in construction. It is important that we not allow mental blocks or administrative obstacles to prevent Israeli citizens, in general, and especially construction workers, from enjoying the advantages of PPVC.

## From a War Zone to Summer Courses in Germany



SCE Master's students in Green Engineering returned from international, academic courses, held at the University of Lübeck in Germany. We got Anton Vernitsky to talk to us about his experience, in general, and about the sharp transition from IDF Reserve duty in the Gaza Strip to studies abroad.

This year, six SCE Master's students in Green Engineering had participated in Summer courses at the Technische Hochschule in the German city of Lübeck. Other Israeli students, from the Holon Institute of Technology (HIT) were also in attendance, as well as an Iranian student, some students from South Korea, Saudi Arabia, Egypt, and Poland.

After a day of 'orienteering' by way of a challenging navigational race, during which they would become familiar with the campus and the academic faculty, all the participants were given a guided tour of Lübeck and learned about the city's rich history. Later, they participated in a workshop on their various cultures, telling them more about the participants from different countries and cultures.

These courses included: "Environmental Systems and Simulations;" "Sustainability and Artificial Intelligence (AI);" and "Storerooms in Supply Chains." They were also given a tour of the international "Dräger" medical and safety equipment company, the main branch of which is located in Lübeck. During this tour, the students visited an exhibition of Dräger's products, spoke with Dräger

representatives, and participated in a practical-learning workshop for the creation of a solution to a need presented by Dräger.

Among those who had represented SCE - Anna Grouzmark, Irit Miriam Green, Hila Solomon, Ron Peretz, Hannah Reichman, and Anton Vernitsky - we got hold of the latter, who apparently made the sharpest transition of them all. Anton was drafted to serve in the IDF Reserves, Regiment 5 on October 7 and had already served for four-and-a-half months in the Gaza Strip and other regions. He was meant to return to active duty in the Gaza Strip for another two months, so this trip to Germany became part of the respite he needed.

Anton recounted, "Returning from Reserve duty to a normal routine isn't simple. Even when you're released, you're still connected to the news and your Whatsapp groups that are always turned on. Personally, the courses in Germany enabled me to disconnect a bit from the Israeli reality - to rest in a foreign country, meet people from across the globe, to learn, to see new places, and to get away from the news a bit. It did me good!"

Daniel was among Anton's new friends;

Daniel's family had left Iran for Germany a few years earlier and he was now a student of Biomedical Engineering. Anton said that "we [he and Daniel] spent a lot of time together during the Summer and, among other things, we talked about the global situation and, specifically, about the [Gaza] War. Daniel told me that living in Iran was very hard and that the [Iranian] Government oppresses its citizens. Against that background, his family had chosen to emigrate."

Anton continued describing that during their free time, they'd all go out to wander the streets of Lübeck and sit in restaurants, bars, and on the North Sea beach, where a festival was held during their stay. "We'd go out dancing and spend time with people we'd just met, and it was a very enjoyable experience, very socially bonding. I recommend that every student take such Summer courses, if the opportunity arises. It contributes to academic and personal development and, of course, it's an enriching experience, that can also pave the way to future professional opportunities. Speaking for myself, I'm certain that these memories and experiences will stay with me all my life."

## SCE students presented their research at the Annual Conference at the Center for Smart Transportation Research

Four students from SCE's Dept. of Industrial Engineering & Management were the only freshmen at the conference and SCE's only presenters there.

SCE sent a respectable delegation to the Annual Conference at the Center for Smart Transportation Research, held at the Ben-Gurion University of the Negev - two teams of students from SCE's Dept. of Industrial Engineering & Management on the Be'er-Sheva Campus, mentored by Dr. Svetlana Daichman, presented their research projects.

The subject of the research presented by students Emely Ben-Sadon and Yarin Huri - "Traffic accidents among elderly drivers." Their goal was to gain a deep understanding of the causes and risks, so they might lead to the improvement of traffic safety for that segment of the population. Their examinations revealed important findings, among which was the fact that, during the Winter months, when the level of precipitation is at its highest and there are more frequent extreme weather conditions, there is a notable increase in the number of traffic accidents, in general, and a greater tendency for serious accidents to occur among young drivers, than among elderly drivers. It was also found, in general, that 'pedestrian-

vehicle crashes' and 'side collisions' were the most common types of Winter traffic accidents, in general; while 'pedestrian-vehicle crashes' showed the highest rate (38.55%) of all the Winter traffic accidents among elderly drivers.

Neta Turgeman and Daniel Isaac Cohen focused on the subject: "The statistical correlation between ADHD and traffic accidents in Israel." This study examined two main questions - Does ADHD increase the risk of involvement in traffic accidents? Does medicinal treatment of ADHD reduce that risk? These two students did a comprehensive literature survey and also distributed questionnaires to 300 research subjects. The analysis of the data showed a positive correlation between a diagnosis of ADHD and involvement in traffic accidents. Nevertheless, it became clear that most of the accidents involving drivers suffering from ADHD were relatively mild. Moreover, it was found taking drugs for the treatment of ADHD significantly reduce the risk of involvement in serious traffic accidents among diagnosed drivers. These research

results stress the importance of the diagnosis and appropriate treatment of ADHD.

In the words of Dr. Daichman, "Academic research enables our students to broaden their knowledge in their field of studies, to develop critical thinking skills, and to become familiar with the accepted methodologies in the field. This process strengthens the students' theoretical understanding and prepares them for coping with professional challenges in the future. Their participation in these conferences is their special opportunity to present their works before researchers and experts, to get professional feedback, and to connect with a community of colleagues. These gatherings can lead to cooperative research, to the opening of doors, to employment opportunities, and to widening the students' professional networks."

Note that our four students were the only freshmen and also the only representatives of colleges making presentations at this conference. Well done! May you continue to succeed!



# “A Symbol for Looking Forward”

On both SCE campuses, 887 graduates participated in the ceremonies granting them B.Sc. and M.Sc. degrees. “This evening symbolizes the decision...to stand firm and continue grooming our future generation - one that is meritorious, determined, able to lead, and bring about change,” said Prof. Semyon Levitsky, SCE President.

887 bachelor’s and master’s graduates in Engineering marched this year in the traditional parade of graduates, held during the massive and emotionally charged ceremonies bestowing degrees in Be’er-Sheva and Ashdod. “This evening symbolizes the decision to look forward... to continue...grooming our future generation... able to lead and bring about change,” said Prof. Semyon Levitsky, SCE President.

These ceremonies were held in the presence of Prof. Jehuda Haddad, Rector and Founder of SCE; Prof. Semyon Levitsky, SCE President; Attorney Meir Sahar, Head of the Executive Committee; Prof. Eli Abramov, Representative of the Executive Committee in Ashdod; Be’er-Sheva’s Mayor, Ruvik Danilovich; and Ashdod’s Mayor, Dr. Yechiel Lasri.

In Prof. Haddad’s opening words, he spoke of remembering the ten students and graduates of SCE, who had fallen on October 7 and in the Gaza War, “Swords of Iron.” He also said, “We are all praying for the safe return home of our IDF soldiers and, especially, the quick release of all our hostages.” Then, he turned to address the new graduates saying, “Today, you are joining the community of engineers, who are required to cope with complex technological, scientific, and social challenges. You are ready to go out in the real world and to make a positive

impact. You must believe in your power to affect change and continue to aspire to excellence and innovation in all you do!”

About 15% of all the engineers in the State of Israel are SCE graduates, from the Be’er-Sheva and Ashdod campuses. According to the Israel Bureau of Statistics for the months of February-April, Israel still lacks over 8,700 engineers - an increase of 1% from the data for January-March. SCE graduates are closing those gaps, especially during this complex time of war, when they can integrate into advanced technology industries operating in Israel, in general, and particularly in the southern region, thus helping to develop and create progress in the Negev and southern region.

At the graduation ceremony on the Ashdod Campus, Orna Pesach, Manager of the Scholarships Program, “IMPACT,” of the “American Friends of the IDF” was awarded an honorary degree for her work on behalf of Israel’s society and students. The ceremony held on the Be’er-Sheva Campus was honored by the presence of a special participant - Ravit, mother of Itay Berdichesky, who was murdered in Kfar Aza; she came to receive his Electrical & Electronics Engineering diploma in his stead. She recounted her feelings, “It’s very painful to know that Itay did not get to pick the fruits of his labors. He worked very hard, combining fatherhood with his

studies. He got great support from [his wife] Hadar, who freed up his time and was happy for him. They left wonderful children behind, who are currently being raised by her sister.”

This was only one of the harsh stories from the massacre perpetrated on the residents of Kfar Aza. The couple, Itay and Hadar Berdichesky had hidden their 11-month-old twins in their safe room, when the terrorists broke into their home. They had struggled against the terrorists but were murdered. The twins were alone for almost 14 hours, until they were rescued by Israeli security forces. At the conclusion of the ceremony, the staff of the Electrical & Electronics Engineering Department and Itay’s classmates held a memorial for him.

Prof. Levitsky also addressed the events of October 7th, saying, “This academic year was unlike all the others. These days stand in the shadow of the events of the “Black Sabbath,” as we continue to cope with the situation of ongoing warfare, hard losses, physical and spiritual, over 250 hostages, hundreds of thousands of displaced persons, and the complex challenges of rehabilitation and recovery. Amid this hardship, this evening serves as an important and vital symbol of rehabilitation and healing for us all.”



# Concrete construction: Can natural stone aggregate be replaced by recycled concrete aggregate?

Replacing natural stone aggregate (gravel) with recycled aggregate may solve the two-pronged problem of environmental pollution and the waste of precious land - whether caused by quarries or by concrete waste landfills. Research done by Agnesa Osher Nir, an SCE Master's student in Green Engineering, is the first important step towards finding a local solution in Israel.

The massive momentum of construction in Israel, especially in urban renewal, has raised two important problems in the field of Green Engineering in Israel. Here, the most common build material is concrete, a synthetic stone consisting of cement, water, sand, and aggregates. These aggregates are what is termed 'gravel'-consisting of natural stone shards with sizes up to 2-2.5 cm. As such, the momentum of construction requires extensive excavation in quarries that cause environmental pollution, including air pollution. At the same time, building demolition projects within cities produce large quantities of concrete waste that must be buried - another process

that also pollutes the environment, as well as wasting valuable land. In her attempt to find solutions for both these problems, Agnessa Osher Nir, an SCE Master's student in Green Engineering, conducted research, under the supervision of Dr. Orit Leibovich.

The concept: To replace the natural aggregate (NA) with recycled concrete aggregate (RCA), prepared from crushed pieces of concrete retrieved from demolished buildings. Since the quality of the concrete used for construction in Israel since the mid-20th century (the period of accelerated construction), had been lower than that of the current global 21st century

standard (weaker, lower quality) - the initial results of international research on concrete were not useful. It was necessary to conduct new research on the use of local concrete.

Agnesa's research provides the first, groundbreaking examination of the modified gravel on the global behavior of that element. Her work focused on its flexure and examined its behavior under 'service limit state', representing the daily use of this concrete aggregate, especially in construction. She also tested its 'ultimate limit state' under extreme conditions (e.g., a strong earthquake) - how it behaves as part of a construction and alone, to determine its point-of-failure.

The experiments were conducted on 2.5-meter-long beams at the National Building Research Institute (Illus. 1). These beams were loaded to the point-of-failure, which enabled the testing of their behaviors under two conditions. Both experiments were conducted using displacement control. To study the distribution of the strains the within the steel and within the compressed concrete, gauges were placed throughout the length of each beam. To assess the degree of displacement, displacement gauges were positioned (marked LVDT and POT in Illus. 2). Developing fractures were marked by the researchers during the experiment. Four beams were studied in this initial research - two for each type of aggregate, and all four until they failed.

This study found that the type of aggregate does affect the concrete's flexure behavior, especially in its early, pre-fracture stage, which affects the daily use in its 'service limit state'. It was determined that beams consisting of RCA concrete developed earlier and more extensive fracturing, accompanied by greater displacement, compared to NA concrete beams. In an 'ultimate limit state', it was found that the enhanced development of curvature is accompanied by the crushing of the concrete.

This research proves that there is a potential, future solution for the replacement of concrete aggregate; however, there is still need of more research and examination of additional aspects of its global and local behaviors, so that we will be able to provide the correct instructions, regarding the proportion of aggregate that may be safely replaced, and/or make suitable adjustments in the planning guidelines.

## Medical High-Tech - A Course before All Others

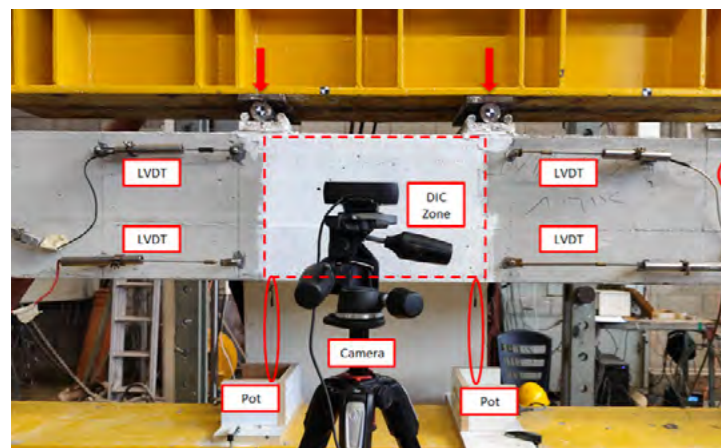
A new and unique course, dealing with the creation of biomedical programming, has been developed for the SCE Software Engineering Department and is being taught in Israel. Shay Ginsbourg, a Biomedical Engineer, the developer and lecturer of this course, talks about the vital and sought after integration of Software Engineering with Biomedical Technology.

A new, ground-breaking course for Bachelor's students - "Introduction to Biomedical Software" - is opening for SCE's Software Engineering Department on the Be'er-Sheva Campus. This is a pioneer course that equips the students with essential skills for the integration of Software Engineering with Biomedical Technology. Despite the great demands among biomedical High-Tech companies for fresh software engineers, a course such as this has not yet been offered at other educational institutions.

This course combines frontal lectures with intensive guided laboratory sessions meant to familiarize the basic terms and concepts, regulations and specific risks in biomedical software development. It closes the gap between the principles of software development and the special demands of the biomedical field, offering knowledge and insights from both areas, thus preparing the students to cope with the challenges of biomedical software development.

The subject-matter will include: software development in high-risk industries; blood-bank management; medical simulations; electronic health records (EHRs); AI-guided medicine; and how to cope with the regulatory requirements of the leading international bodies, such as the FDA.

This course expresses the commitment of SCE's Software Engineering Department to innovation and the grooming of the next generation of software engineers in many fields.



Ill. 2. The setup for the examination and the measuring equipment



Ill. 1. The experimental setup

# SCE Remembers Its Fallen



During the memorial ceremony held in 2024, on “The Memorial Day for Fallen Soldiers of the Wars of Israel and Victims of Actions of Terrorism, SCE dedicated “The Garden of the Fallen” to commemorate those thanks to whom we will bloom and grow again.

“The fallen are the deep roots thanks to whom the State of Israel was built, and their memory is a beacon on our obligation to continue to defend her.”  
Over the years, and even more so this past year, SCE has lost students and graduates, who gave their lives in defense of their homes and Homeland. During the Memorial Day ceremony for the fallen soldiers of the wars of Israel and victims of actions of terrorism, in the presence of bereaved families, the “Garden of the Fallen” was dedicated, commemorating the memories of those thanks to whom we will bloom and grow again - as a state and as a nation.

In parallel, the College displayed a moving and powerful exhibit entitled: “Without Words,” created by students of the Department for Visual Communication, in the wake of the incidents of October 7. Blatant among the placards in the exhibit were: a wounded and bandaged star-of-David; an orange balloon with the number 1 on it, marking the first birthday of the baby taken hostage, Kfir Bibas; a placard showing an hourglass filled with blood running out, a time runs out; and a map of the Land of Israel positioned next to the words to the Israeli national anthem, ha-Tikvah [The hope] in childrens’ handwriting.

Wreaths of flowers were placed in the memorial corner and the bereaved families spoke about their loved ones. Among them were Refael and Sara Malka, the parents of the late Karine Malka, who had been a student in the Dept. of Industrial Engineering and Management - killed by a terrorist bomb on a bus in Be'er-Sheva; Diana Yakimov, an SCE student, whose deceased brother, Dennis Yakimov, a graduate of the Dept. of Software Engineering, was killed in combat in the southern part of the Gaza Strip in March 2024; and Aviel Atiya, brother of the late Liav Atiya, who had been a junior studying Construction Engineering, but



fell in battle in the southern part of the Gaza Strip in December 2023. The Rector and Founder of SCE, Prof. Jehuda Haddad, said at the ceremony, “This year, ten of our SCE graduates and students were added to our bereaved family; in their honor and for their memory, we have dedicated this ‘Garden of the Fallen’. This year’s Memorial Day is a direct continuation of October 7 - a day when citizens, women, men, children, and soldiers were murdered and tortured without mercy. We have seen unbelievable wickedness, but in response to that wickedness, we witnessed acts

of heroism by our soldiers. Victory will indeed arrive, as it is written in Psalms [18:38]: “I pursued my enemies and overtook them. I did not turn back till I destroyed them.” The fallen are the deep roots thanks to whom the State of Israel was built, and their memory is a beacon on our obligation to continue to defend her. May their memory be a blessing.”





SCE

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