ENGINEERING A BETTER WORLD

Magazine of the Sami Shamoon Academic College of Engineering | Issue 43 | Shevat 5778 | February 2018

SCE
SHAMOON COLLEGE OF ENGINEERING

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What's in this issue?

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Congratulations to the research grant winners

Five of the College researchers have recently won research grants, which will significantly help them promote their researches

SCE congratulates its researchers who have won research grants – by themselves or together with partners from academic institutions in Israel or around the world:

Dr. Meirav Topol from the Mathematics Department has won, together with a partner from China, a research grant on behalf of Israel-China program NSFC-ISF (National Science Foundation of China - Israel Science Foundation). The research will focus on the classification of algebraic surfaces and curves, which in itself is an interesting and challenging field. It is done by means of calculating additional basic and invariant groups of the curves. On an individual basis, the classification of straight lines is mostly done by finding Zaritsky pairs. Work with straight arrangements is very extensive and can yield interesting work that would spread over the years. The invariants divide the surfaces and curves into different classes within the module space, and this way make it possible to fill in the missing picture.

Prof. Leonid Oster from the Physics Department, together with his partners from other research institutions, has won a research grant on behalf of PAZI Fund of the Israel Atomic Energy Commission. The research that won the grant aims to bring to a final stage the development of a method based on double measurement of thermally and optically stimulated luminescence. The method is designed to achieve almost complete separation between high ionizing density radiation (more dangerous to biological tissues) and radiation with low ionization density. This method has significant potential in the field of ionizing radiation measurements (e.g., radiation fields in space and in the air, radiation fields produced by a nuclear reactor, many categories of oncology/clinical applications, particle accelerator applications, and many others).

Dr. Karim Abu Affash from the Software Engineering Department, together with his partners from other research institutions, has won a research grant on behalf of the United States-Israel Binational Science Foundation (BSF).

The study discusses a collection of geometrical optimization problems with network applications, such as wireless networks, transport networks, cloud calculations, and any other model that uses the term "network." One of the most important problems in geometric networks is the efficient construction of the network under certain constraints. The project's general goal is to study the mathematical properties of the proposed problems in order to provide the most effective algorithms (precise or approximate) for their solution.

Dr. Peter Beker from the Electrical and Electronics Department has won a research grant on behalf of the Ministry of National Infrastructures, Energy and Water Resources. The research focuses on constructing transparent solar cells using the evaporation technology, with the main goal of developing a new method of growing sun cells based on polymer electrodes in a vacuum. This different technology will allow the development of new polymer structures, with high thermal stability and efficiency. The effect of developing new transparent polymers can be tremendous, and the technology can be the key to making an extensive use of solar energy around the world.

Dr. Rami Eid from the Civil Engineering Department, together with his partner from another research institution, has won a research grant on behalf of the Ministry of Construction and Housing. The research deals with quantifying the mechanical-structural properties of reinforced concrete walls, for the purpose of assessing their seismic resistance. The aim of the proposed research is to examine the mechanical properties of reinforced concrete walls, in order to allow an assessment of their effect on the behavior of existing structures. The research will be based on taking samples of reinforced concrete walls in existing structures and/or preparing laboratory samples. The experiments will include an experimental array that would simulate the effect of horizontal loading on the behavior and tolerance of reinforced concrete walls. In this array, which is based on a "diagonal press experiment," some of the samples will also employ a constant axial force along with the periodic force, so that the experiments would represent seismic activity.

Learning chemistry out of interest and curiosity: Nobel Prize winner, Prof. Dan Shechtman, speaks to SCE students

Prof. Dan Shechtman, who is active in the Nobel Association that encourages young people to learn sciences out of interest and motivation to work in the field, has told the students and faculty members about his path, the difficulties he had to face, and the breakthroughs he had along the way

SCE students and faculty members enjoyed, at the beginning of January 2018, a unique lecture given by Chemistry Nobel Prize winner, Prof. Dan Shechtman from the Technion's Science and Material Engineering Faculty, who visited the College. Prof. Shechtman told them about his personal life, his crystals research and his passion for engineering and chemistry.

Prof. Shechtman, a father of four and grandfather of twelve, won the prestigious Nobel Prize in 2011 for discovering a new crystalline structure in quasiperiodic crystals. His visit to the College was part of Nobel Association's activity for educational excellence, which encourages young people to learn science out of interest, curiosity and motivation to work their way into the 21st century industrial world.

"As a boy, I used to love Jules Verne's story which had an engineer as the main character. As I grew up, I went to learn mechanical engineering, and from there I went on to graduate school," said Prof. Shechtman. "I was first exposed to the microscope as a student, and since then I couldn't stay away from it. After I finished my Ph.D., the Technion received its first electronic microscope. For days on end I sat in complete darkness and developed my expertise to such a level that I was able to teach the electronic microscope to doctoral students. And that's what I did for years. The same technical expertise led me to an inexhaustible skill, and later on, I believe, to receiving the Nobel Prize."

After telling the students about his path in the field, Prof. Shechtman went on to tell them about his crystal research and about winning the Chemistry Nobel Prize: "Throughout my years of research, there were people who encouraged me and there were others who strongly opposed my findings or my methods. In fact, they tried to prove that I wasn't going 'by the book'. One of the great chemists, a Nobel Prize winner himself, vigorously objected to my findings and to my article and opposed them for the next decade and practically until he died. Nevertheless, I stood behind my research and kept going. When my article was published, after a lot of hardships, I started receiving inquiries from many researchers, who wanted to continue exploring my discovery."

Prof. Shechtman also spoke about the importance of science to our lives. In his view, those who are interested in science should start working in the field at a young age, and for that reason he currently promotes, among other things, the establishment of university research laboratories in kindergartens across the country.

From the President's desk

President of SCE – Professor Jehuda Hadad

The first semester is over, and now we send our warm success wishes to all SCE students who are in the midst of the exams season.

We have recently been ranked by Forbes Magazine at top ranking among all engineering faculties in Israel. The survey results grant us satisfaction, and at the same time oblige us to pursue our continued growth and the development of academic and social excellence. We believe that the work we all do in the various engineering fields will help us achieve a better world.

In recent years we have grown to be the largest engineering higher education institution in Israel. The College researchers have been winning research grants and prestigious awards; we have opened new research centers, and international academic conventions have taken place in the College, attracting the best researchers from Israel and from around the world. All these are intended to grant you, our students, a considerable initial advantage in finding your way in the industry and academia worlds.

For the coming semester I wish you all to continue innovating, developing and growing to new heights with us.

For the hundreds of new students who join us for the spring semester, I wish a successful and fast integration into SCE learning and student life.

Yours sincerely,
Prof. Yehuda Hadad

Newly started at Ashdod Campus: colloquium meetings for faculty members and advanced stage students

In the series of meeting, researchers and industrialists are invited to talk about topics which are close to their hearts

Dr. Meirav Topol, Dr. Elad Shufan and Ms. Elinor Taicher

This year we started holding colloquium meetings at Ashdod Campus once in four weeks, where researchers and industrialists can talk about topics which are close to their hearts.

The series of meetings was opened with a lecture given by Prof. Uzi Vishne from Bar-Ilan University, about the relationship between the drum shape and the frequency range of the sound waves reaching the ear (spectrum). Is it possible to know the shape of the drum from the full spectrum? This question has been asked before, and was given a negative answer: examples had been found of two drums with different shapes, which produced the same spectrum. But these examples all shared an "equal measure" feature. By using abstract mathematical ideas, such as folding groups, Prof. Vishne showed that in dimensions that were higher than 2, it was possible to find examples of drums with different measures that would produce the same spectrum.

The lecture given by Prof. Yossi Rosenwaks, the Dean of the Engineering Faculty in Tel-Aviv University, was addressed to a larger audience, and dealt with a topic close to the hearts of all faculty members: the training of an engineer in the 21st century. Prof. Rosenwaks spoke about his vision of how engineers should be trained, emphasizing the importance of multidisciplinary knowledge as a characteristic of today's engineering world and the possibility to combine humanities as part of the engineer's training program. Some of the things he spoke of are already implemented at SCE, like the important connection between academia and industry, and project-oriented learning.

Dr. Uri Godes, an Israeli researcher who has lived in Australia in recent years, spoke about analyzing data which were gathered from Geographic Information Systems (GIS). The diverse information which can be drawn from these systems may have implications on the study of urban community behaviors and the possibilities of improving these behaviors. For example, analyzing travel habits and road accidents may promote the treatment of traffic congestion and improve road safety. The information can also contribute to creating healthier communities, for example by analyzing data related to bicycle riding habits. Dr. Godes' visit to the College has opened new prospects for Israeli-Australian collaboration.

The first semester's last meeting was devoted to a lecture given by Dr. Itay Leviathan, on the subject of drawing conclusions from failures in the engineering of buildings and bridges in Israel.

The colloquium includes faculty members as well as 4th year and M.Sc. students. We believe that the lecture series will contribute to broadening their horizons, deepening the College research and strengthening the ties between academia and industry.

SCE Safety Convention: "an annual 31% increase in the number of electric bicycle riding victims"

Dozens of students, faculty members, lecturers and transportation experts participated in the "Electric bicycle safe use" convention which took place at Ashdod Campus

In recent years there has been an increase in the number of electric bicycle users in Israel and around the world. Youths and adults use them in order to get to work, to school etc. Together with the large increase of electric bicycle use, the number of road accidents has increased as well.

The Civil Engineering Department at Ashdod Campus, headed by Dr. Wafa Elias, has been conducting a profound research these days, about electric bicycle safety. The conference, initiated by Dr. Elias, hosted road safety experts and a representative of the Israeli Police, Superintendent Dr. Mali Sher from the Traffic Department, who came to discuss the problems and find educational transportation solutions for proper and safe riding.

The convention was opened by SCE President, Prof. Yehuda Hadad, who said: "Our College, besides its being a body that builds and researches products and infrastructures, is an education agent. When we develop an engineering product, we think of society as well. Our goal is to find a solution to an existing social problem, with reference to the educational issue. The same way society has undergone an educational change regarding the use of car safety belts, we should bring about the same change in the culture of electric bicycle use."

Dr. Elias spoke of the research she was conducting, in which she interviewed many young people about riding electric bicycles, and referred to the dangers: "We are witnessing an increase in the number of road accidents. One of the main questions is if the physical space allows the use of bicycles. Furthermore, many young people are not aware of the riding rules and most of them are afraid to ride on the road, alongside other vehicles."

Dr. Victoria Gitelman, from the Transportation Research Institute at the Technion, presented data about electric bicycle use and the traffic violations committed by the riders: "There are currently hundreds of thousands of electric bicycles in Israel. With the rising number of riders, there are also rising numbers of those who are injured and hospitalized. Our research-results indicate that the riders often tend to switch from road to sidewalk, enter intersections illegally and dangerously, and even cross the road at pedestrian crossing points against the law."

Dr. Elias' research, which was presented at the convention, indicated that 31% of the riders crossed intersections in red light. 11% of the riders observed were under the age of 16, which means they were riding illegally. 92% of them were not wearing helmets, although the law requires them to wear helmets until the age of 18. 13% had a passenger riding behind them, against the law.

Yiftach Gordoni from the National Authority for Road Safety summarized the event: "Electric bicycles are a good thing, green, cheap and efficient, but public space doesn't make room for them. There are practically no bicycle paths, so they are forced to ride on the road, where they are in a terrible danger and that's why they go to the sidewalk and endanger the pedestrians. Since this is a shared problem, we believe that we have a shared responsibility to solve it."

"The visit has contributed to promoting the College's international strategy and to expanding its collaborations abroad"

Tal Gavish, Head of the Student Administration Department, and Maggie Goverman, the International Programs Coordinator, went for a week-long training course at the University of Cantabria in Spain, as part of Erasmus+ program

Erasmus + is a European Union program that supports the promotion of young people's education and training. The program, designed to improve the higher education systems in the participating countries, is based on international academic collaboration and promotes internationality, innovation and excellence. SCE began its activity in Erasmus + several years ago, and is working in two main tracks: mobility and capacity building.

The mobility track allows the exchange of students and faculty members, and offers them an opportunity to study or teach at a higher education institution in a foreign country. Among other things, the College has a mobility agreement for faculty members and students with the University of Cantabria in Spain, in the field of chemical engineering. As part of the agreement, three students of the Chemical Engineering Department went to Spain for the summer semester and completed their final project there, while a doctoral student from Cantabria came to our College and worked under the instruction of Prof. Adi Wolfson. Likewise, Prof. Wolfson visited the University of Cantabria and hosted a researcher, as part of faculty members' exchange.

The mobility track also allows the administrative staff to participate in the program, for a week-long training course. Tal Gavish, Head of the Student Administration Department, and Maggie Goverman, the International Programs Coordinator at the College, went for an eight-day long stay in Spain, of which five working days were dedicated to training at the University of Cantabria.

The university is located in Santander, a beautiful port-town in the north of Spain. It has about 12,000 students, who attend the faculties of medicine, economics and business administration, law, humanities, exact sciences, and of course – engineering.

Tal and Maggie met with representatives of various departments and units, including the Occupational Directing Center, the Advanced Teaching Technologies Center, the library, the Chemical Engineering Department, etc. Maggie says, "We focused mainly on the topics related to internationality and academic administration. The visit has contributed to promoting the College's international strategy and to expanding its collaborations abroad, to strengthening the bond between the University and the College, and to opening new horizons for enriching the students as individuals and the College system as a whole."

The University of Cantabria's International Office yearly handles about 400 visiting students and 400 students who are visiting foreign countries, most of them through Erasmus+ program, and activates other mobility programs with South-American countries, the U.S., Canada and Australia. This is a very impressive scope. The University activates a designated student association for the students who join the international programs, which, among other things, organizes trips and tours for them to Madrid and to the north of Spain for affordable prices. Staying at the University of Cantabria is undoubtedly an exceptional experience for the visiting students. Tal: "We managed to create relationships that would allow us to talk and learn at a long distance. We presented the College and its achievements and realized that in terms of computerized work processes, smart classrooms, student administration software and monitoring and control processes, we are very progressive. Our ability to carry out student exchanges, research collaborations and international experiences will advance us to be the students' first choice, allow them to have an exceptional experience, and develop academic excellence."

Learning software engineering through the hackathon competitions

New in the curriculum: second year students took part in the hackathon as part of the Software Engineering Basics course. ■ "The hackathon is the most significant demonstration of integrating knowledge and the ability to learn as you work," says Dr. Hadas Chassidim from the Software Engineering Department

The Software Engineering Department at Beer-Sheva Campus conducts hackathon competitions for its second year students, as part of the Software Engineering Basics course curriculum. The hackathon is an event in which the competitors are asked to develop a technological solution in a limited time period.

The students were asked to build an application in one of the following fields: photography processing for the purpose of identifying a fruit or a vegetable of some kind; a trivia game about cyber; a competitive game for two users; a game kit resembling Checkers or Ladders and Ropes, etc. After they chose their project, they were asked to characterize it and define its requirements.

In the second hackathon the students were required to write the code for the application they had chosen, and conduct tests against failures, and in the third and last hackathon they were asked to check their friends' applications and try to fail their codes in any way they could.

"The idea is to allow them to experience group decision making and thus assimilate a professional world work environment."

The entire hackathon lasted more than eight consecutive hours, in which the students were obliged to finish their assignments and submit their final products.

Shmuel Moha, one of the hackathon participants, says, "We chose to build a photograph-identifying application. We wanted to experience the MATLAB language, which is being developed in the industry and can implement various algorithms. It was a difficult, complicated assignment, which allowed us to learn in-depth a language that's important to the labor market and to the industry."

"I believe that the hackathon is the most significant demonstration of integrating knowledge and the ability to learn as you work," says Dr. Hadas Chassidim, a lecturer in the course. "The students are experiencing active learning and use academic and professional sources like websites, blogs etc. We promote team working as much as we can, while using cooperation methods like pair programming or mob programming. The idea is to allow them to experience group decision making and thus assimilate a professional world work environment. The students develop their ability to learn new environments and conduct development processes, as well as their soft skills, such as communication, decision making, planning and carrying out projects."

What do the road signs mean?

At the Vienna Convention expert meeting, held at the U.N. building in Geneva, Dr. Tamar Ben Bassat from the Industrial Engineering and Management Department at Ashdod Campus presented the results of an international research she was heading, which examined how understandable road signs were to the average driver

Imagine yourselves going out on a trip to the Black Forest in Germany. You rent a car at the airport and start driving towards the Black Forest. On your way, you run into this road sign:

What does it mean? What will you do when you run into it over and over again, driving between Germany's picturesque towns? You will most probably ignore it, since you do not understand what it means. Except, if you arrive at the intersection where this road sign is posted and fail to slow down and give the right of way to a crossing vehicle – you may get a ticket at the best case scenario, or cause a car accident at the worst. The meaning of the sign is: "The end of your right of way". In other words, you must slow down at any intersection and give the right of way to crossing vehicles.

Road signs are one of the most common ways to control traffic and to deliver instructions and information to the road users. For the road signs to deliver the accurate information to the drivers, they must be clear – to local and to foreign drivers alike.

In 1968, the Vienna Convention on Road Signs and Signals was established in order to ensure the uniformity of road signs used in European countries. The Convention includes transportation experts from various European countries which are U.N. members. Most European countries, and Israel, respect the uniformity dictated by the Convention and use identical road signs. However, every country has its unique road signs as well. Unfortunately, some of the road signs selected by the Convention are unclear (like the ones presented here), because they are not ergonomically designed to suit the drivers' perceptions and associations.

Dr. Tamar Ben Bassat at the Vienna Convention expert meeting in Geneva

Studies that examine the understanding of road signs by drivers have been conducted around the world for many years. One of the most comprehensive studies has been conducted for the last two years by an international team of researchers from five countries – Poland, Finland, Canada, South-Africa and Israel – led by Dr. Tamar Ben Bassat from the Industrial Engineering and Management Department at Ashdod Campus. In the course of the research, which was partly funded by the College, the researchers examined the understandability of conventional road signs and that of their ergonomically designed alternatives.

Last November, Dr. Ben Bassat was invited to a Vienna Convention expert meeting, which was held at the U.N. building in Geneva. In the meeting she presented the results of the international research of understanding road signs, which proved that with the right design one could improve the understandability of some of the road signs used by European countries, and allow any driver – local or foreign – to understand their meaning. Below are presented some of the road signs that are currently used throughout Europe (the conventional signs on the left), opposite an ergonomically designed alternative for each one of them (on the right), and the rate of the participating drivers (an average of the five countries) who understood each one of the road signs. As you can see, the ergonomic design evidently improved the road signs' understandability – although they were new and unfamiliar to the drivers.

The conventional signs are presented on the left, opposite the ergonomically designed alternatives on the right, and the improvement in the drivers' ability to understand them is specified below.

Later this year the Convention is due to reconvene and discuss changes in the European Road Sign Table, based on the results of this research.

Stop sign in front of you

Conventional Sign	Alternative Sign
	
38%	96%

A toll road ahead of you

	
8%	86%

The conventional signs are presented on the left, opposite the ergonomically designed alternatives on the right, and the improvement in the drivers' ability to understand them is specified below.

"Bdikaton": academia, industry and test management tool developers join forces

A unique software testing marathon allowed the students of the Software Engineering Department at Ashdod Campus to experience an advanced test tool, used in many companies, and detect many bugs in the system

Through a joint initiative of SCE Ashdod College, Wisewed Company, which develops a wise system to run a wedding budget, and Testuff Company, a manufacturer of software test management tools, a unique testing marathon, called "Bdikaton", was held in January 2018. Students from the College served as software testers for Wisewed's new system, which was chosen to be the marathon project's case study, using Testuff's test management tools.

Wisewed: get married wisely

SCE has been holding software quality and testing courses for years, integrating them into the curriculum from the first day of school. A great emphasis is placed on the fact that implementing the software quality is an integral part of the software development process, and an essential component to the success of the project. The Software Engineering Department even opened a software quality and testing specialization track, to qualify the learners to implement advanced topics in the field.

As part of the software and software testing studies, the lecturers and the practitioners use the Testuff test management system for exercises and for running software testing projects. The students enjoy using a test management tool which is used by many companies, and experience a genuine process, as much as possible, of writing a code and testing it. Testuff's cooperation allows the lecturers and the practitioners to easily and conveniently keep track of the students' work and provide them with immediate, on-line feedbacks.

Since the Wisewed system was in its initial version, the student-testers had the chance to detect quite a few bugs. In a joint process, accompanied by the company's representatives, they managed to "get

into the character" of the system's target audience, and this way they detected the most particularly important and interesting bugs.

A testing project of this kind is a beneficial move for all its participants: it helps the developing company with the improvement of users' experience, with the technical aspects and with fixing malfunctions in various system characteristics. It allows the students to practice and get to know a testing process of a "real" software system, which is about to open to its target audience, and all this is done by using advanced test management tools.

About 60 students convened in the campus to carry out the marathon, divided into 12 different testing groups. Each group worked separately on using the system, running the tests and reporting the malfunctions. By the end of the testing day about 250 bugs were found and many user experience comments were registered, 90% of which were found relevant, according to Wisewed's CEO, Netanel Baruch. "SCE deserves a great credit," Baruch added, "and particularly Danny Almog and Meital Solomon, for the initiative, the accompaniment and the training of the students. They led the students into innovative, creative thinking, and the students, in spite of the early stage they are in their studies, have achieved amazing results and great accomplishments, both in finding the bugs and in reporting them. I feel that we have received a new, interesting perspective, which will allow us to make better decisions later on. "

Learning and touring: **Civil Engineering students toured the Cebus Rimon plant**

Dr. Dagan Bakun Mazor, Head of the Civil Engineering Department at Beer-Sheva Campus, said: "exposing the students to industry completes their theoretical knowledge and practically trains them to become the young generation of engineers"

Fourth year students of the Civil Engineering Department at Beer-Sheva Campus, went on a tour at the Cebus Rimon plant in the city, as part of their Primed Concrete course. The plant manufactures concrete elements, which are primed by steel cables in order to enhance their strength.

The students walked along the production line and enjoyed in-depth explanations about the plant's activity: execution and casting of primed ceiling panels, processes of improvement and priming of the panels, unique production lines for special projects and preservation methods of elements manufactured in the plant. Among other things, they were shown parts of an arch-like structure, which are manufactured at the plant and designated to serve as the side walls of the railway red line tunnels, which are constructed these days at Tel Aviv metropolitan area.

The students were hosted by the plant's engineer, Hadas Barel, who had graduated from the department at SCE, and by her team. By the way, the close relationship between the College and the plant goes further: one of the students in the tour was Hadas' brother, Ram, who gained a family reunion "by the way".

Dr. Dagan Bakun Mazor, Head of the Civil Engineering Department at Beer-Sheva Campus, said: "exposing the students to industry completes their theoretical knowledge and practically trains them to become the young generation of engineers."

Origami for engineers

It turns out that Origami, the Japanese paper folding art, is not just a children's game. As part of a second year course at the Mechanical Engineering Department, Introduction to Design 1, an "Origami for engineers" presentation was held at Ashdod Campus.

During the course, the students learned surface folding methods and realized how various mechanisms worked, while trying to expand their creative tool box and development skills. Among the great works exhibited were: a folding chair, a car park, a piston, a satellite, a wheel, a folding umbrella, etc. Judging by their looks – the course has greatly achieved its purpose.

An edible bridge

Build a bridge, build a bridge, build a… spaghetti bridge: third year students at the Civil Engineering Department competed in building a spaghetti bridge that would withstand maximal loads

In a unique competition between third year students of the Civil Engineering Department at Beer-Sheva Campus, which was held as part of the course Structure Statics 2, the participants were required to plan and build a spaghetti bridge that would withstand maximal loads.

The creative students were allowed to use only spaghetti and glue for building a bridge that would connect between two surfaces, 1 meter (40 inches) apart from one another. There were also rigid weight and height limitations: up to 0.5 kg (1.1 pounds) and 0.5 meter (20 inches) respectively.

All the works were highly invested and impressive, and at the end of the close competition, the winners were announced: the first place was won by Lee Dorfman and Ron Shariki, with a bridge that withstood the load of 19 kg (42 pounds); the second place was won by Ala Fayed and Ali Sindiani, with a bridge that withstood the load of 17 kg (37 pounds).

Closing a circle: an SCE graduate is running the construction works for expanding the College

Shlomi Hazan, a Civil Engineering Department graduate, is currently in charge of planning and constructing the new building at Beer-Sheva Campus

SCE is constructing these day an additional building on Beer-Sheva Campus, as part of a plan to expand the College and build additional offices and classrooms.

The construction work is carried out by Assaf Roy Engineering Company – a planning and construction engineering company from Beer-Sheva. The person in charge of the project is Shlomi Hazan, a graduate of SCE Civil Engineering Department.

"When our office won the tender for constructing the new building, it was obvious that I – as a graduate of the College and a head of team at the office – would be in charge of the project. The company saw this nomination as a sort of closure," says Shlomi Hazan.

Shlomi began his engineering career in mechanical engineering: "I started out as a practical mechanical engineer, and when I decided to go to college I chose to study civil engineering. It seemed particularly interesting and challenging. The way I see it, putting up a building – from the planning on paper stage to the construction itself – is one of the greatest, most fascinating challenges," he says.

"Our office is in charge of the design of the new college building," explains Hazan. "Before planning a building, we make primary schemes for the structure, to meet the requirements of withstanding the static and dynamic loads. All this is done in coordination with the architects and experts of the various fields – electricity, plumbing, land etc. If everything works according to plan, we'll finish constructing the new building within the next few months."

Shlomi himself, as well Assaf - the CEO

of Assaf Roy Engineering Company – currently serve as external teachers at the College, instructing and accompanying civil engineering students throughout their final projects. "The combination of working with the students alongside the construction work is a challenging combination of two worlds – the academic and the work worlds. This combination allows me to study my profession in-depth from all aspects – the theoretical as well as the practical," he emphasizes.

For the first time in Israel: an engineering training track in underground construction and tunneling

The track which will be opened at the College is designed to meet the growing demand for engineers in this field

The underground construction and tunneling field has been rapidly developing in Israel in recent years. In order to meet the demand for engineers in this area, SCE is opening a designated training track in underground construction and tunneling, as part of the civil engineering B.Sc. curriculum.

The track will qualify the students to carry out and manage tunneling projects – starting with a geological investigation and land/rock characterization, through feasibility tests, selection of construction method, tunnel analysis and monitoring, tunneling work safety, assessment of environmental risks and construction planning methods to project risk management.

The track is intended for third year students who are interested in specializing and integrating into this field. It is also suitable for professionals who wish to specialize in the field at the Foreign Studies Center.

The program will be headed by faculty members from academia and industry. On the academic side it will be led by Dr. Vladimir Frid and Dr. Itai Elkayam from the Civil Engineering Department; on the industrial side it will be led by leading engineers in this field.

"Green campus" at the College: let's build a better world

A "green campus" group, which was established at SCE a year ago, is expanding its activity and inviting all college members to join in and work together for the environment and for mankind

A new group, called "green campus", was established at the College a year ago, in conjunction with the Students' Association and the Dean of Students. The group was founded in order to lead change in the environmental perception – for the sake of the environment and the people inhabiting it – and raise environmental issues on the agenda for all college members: students, staff and visitors.

In the passing year we worked hard to promote various projects and took part in events like the "Opening of the year happening" and "Scientists' Night". Now our efforts and thoughts are beginning to materialize, and in the next semester we shall inaugurate recycling centers throughout the College and plant a community organic garden, which will be planned and set up by the students. Another important aspect of environment quality is the health of the people inhabiting it, and we shall work in that area as well and encourage College members to exercise.

Being part of an academic institution, we encourage the College to work on the promotion of research in green and sustainable engineering and to hold elective courses in the overlapping fields of ecology and engineering.

Looking at the future, we would like to expand the group and add to it as many students as possible, so that we can all think together how to promote our activity and increase people's awareness of environmental issues.

We look forward to hearing your opinions, and of course, we'll be happy if you take part in our various projects. Please contact us at: Green@ac.sce.ac.il

Let's build a better world together!

On your way to Vegas you learn entrepreneurship

A student delegation has set out for the first time to the University of Nevada in Las Vegas, as part of an entrepreneurship course at the College, in order to learn and obtain further entrepreneurship tools

An SCE student delegation has recently returned from UNLV – the University of Nevada, Las Vegas, U.S.A. The delegation, which included students from four departments: chemical engineering, civil engineering, mechanical engineering and electrical and electronics engineering, was sent on behalf of the College's Entrepreneurship Center and with the funding of a Jewish donor from France.

The visit to UNLV was intended to enrich the students with entrepreneurship knowledge and lead to an inter-departmental cooperation. Each one of the students joined a researcher and a group of local students, and worked with them on a project they were leading. Lessons about personal entrepreneurship were held once a week.

"In upcoming meetings, during the entrepreneurship lessons, we'll think of creative ideas and methods of engineering performance, and use the knowledge and the tools we have acquired to choose an idea for an entrepreneurship startup," says

Marina Mintz, a fourth year student of the Chemical Engineering Department, who took part in the expedition.

Prof. Yehuda Hadad, SCE President, referred to the unique project by saying, "Our collaboration with the University of Nevada is part of our comprehensive tendency to participate in international programs and have research collaborations with leading academic engineering institutions. Since the field of entrepreneurship is characterized by a great deal of dynamics, we attach great importance to creating bonds in this field. These collaborations offer our students opportunities to learn from the best universities in the world, be exposed to various approaches and develop professional relationships for the future."

Helping to reduce "brain drain" from Israel

Every year the Contact Center for Israeli Researchers of the National Academy of Sciences holds a convention that includes a meeting and an employment fair. The fair is intended for Israeli researchers who are staying abroad and use the winter holiday to return to Israel and look for a job in the academia or in the industry. The direct encounter with representatives of academia and industry offers these researchers employment opportunities and helps to bring them back to Israel and thus reduce the "brain drain" phenomenon, which has been common in recent years.

The last fair was held in December 27, 2017. This year, too, Prof. Saad Tapuchi, Head of the Graduate School, represented the College in the fair. Several researchers were already absorbed into the College academic staff in the past, thanks to SCE's participation in the fair.

The Beer-Sheva startup that arouses the curiosity of water desalination companies around the world

From a chemical engineering B.Sc. degree, through a joint patent in their M.Sc. studies, up to the "exit" and sale to an American company - Kati Matzkin and Shai Bedlov, who met when they were students at SCE, speak of their water desalination joint patent

Kati Matzkin and Shai Bedlov graduated from the SCE Chemical Engineering Department in 2011, and then they both went on to study at the Environmental Engineering Graduate School at Ben-Gurion University. In recent years they have been working together on a new development, which may turn out to be revolutionary, in the field of sea-water desalination.

In the course of his M.Sc. studies at Ben-Gurion University, Shai worked on a thesis about creating membranes in a new technology of inkjet printing. His research was directly linked to Kati's, whose thesis was about changing membrane surface using the same technology. They decide to collaborate in that area, under the instruction of Prof. Yoram Oren and Dr. Christopher Arnusch from Ben-Gurion University. The patent was eventually registered under their names and the University's name.

"Water desalination is a relatively expensive process, which is usually done using the reverse osmosis method," explain Kati and Shai. "In this process, one uses a complex membrane, which is essentially a polymer membrane that is permeable to water but not to larger molecules and ions. Over time, this membrane undergoes a chemical and

biological infection that significantly shortens its lifespan and efficiency."

Kati and Shai developed a chemical process in which they create a membrane and modify it using the innovative technology. In this process, the membrane will be more resilient and have improved performances in separation and water flow, and this way it will greatly reduce the maintenance costs and increase the efficiency of the process. The patent aroused the curiosity of water desalination companies in Israel and around the world, and the development was recently purchased by Aqua Membranes, the American giant company.

Having accumulated experience in a variety of chemical engineering fields, Kati currently works at Vishay Intertechnology, Inc. and is engaged in coating electronic components that conduct metals such as nickel, tin, copper and gold. "What I do today is not directly connected to the areas I studied deeply as a student," she says, "but somehow it turned out that the Introduction to Electrochemistry course that I took in my first year at college, gave me the background and the basis to what I'm doing today. In general, I was very pleased with studying at SCE, mostly because of the high level of teaching and the lecturers' personal attention. If I had to do it all over again, I would take exactly the same path as I did."

"Studying at SCE has given me a wonderful background for the topics I am dealing with today," says Shai. "They were strict with us about many things, and I feel that I came to graduate school with a richer background than most of my classmates. There were things that we knew much better than the university graduates."

Today, Shai works in a research and development team of a global company whose main expertise is the purification of mineral and coal mine waste. During his M.Sc. studies he published two articles in international journals and won two awards for his research.

SCE hosts the Youth Biotechnology Conference

High-school students from Ashdod, Ashkelon an Beer-Sheva competed at the "Bio-7: Breakthrough Technology" Conference, by giving concise presentations of biotechnology topics

The "Bio-7: Breakthrough Technology" Conference, organized by the Chemical Engineering Department and the Technological Center, Beer-Sheva, was held at the College with the participation of high-school students from the southern region.

A representative from each school was asked to deliver a very brief lecture on a technology subject, in a time period that would not exceed 180 seconds.

The purpose of the conference was to expose biotechnology high-school students to the broad practical uses of biotechnology in industry, science and high-tech.

Between these brief lectures, biotechnology experts lectured about technology uses in everyday life, regarding issues like finger prints, DNA and cancer cells. Among the lecturers were Dr. Yoram Shotland and Dr. Nir Trabelsi from the College, and Dr. Hefzi Zohar of molecular biochemistry, who is also Beer-Sheva's acting mayor.

The students' lectures were judged by Dr. Yoram Shotland, Dr. Hefzi Zohar, Judith Daskalo – Biotechnology Supervisor at the Science and Technology Administration – and the students themselves – who were asked to rank each lecture using Kahoot application, based on criteria such as: punctuality, relevance to biotechnology, innovation in the field, connection to research etc.

At the end of the event, the three lectures that got the highest scores - from the judges and the audience – were announced. Comprehensive School A from Ashkelon won the first place; Comprehensive School F from Beer-Sheva won the second, and Yeshivat Zvia from Ashkelon won the third.

Dr. Ariela Burg, Head of the Chemical Engineering Department at the College, said: "The purpose of the conference was to expose biotechnology high-school students to the broad practical uses of biotechnology in industry, science and high-tech. We initiated the conference because we wanted to arouse the students' curiosity towards such an important field that affects our lives and is being investigated in academic institutions in Israel and around the world. The students had a good time; they showed a great deal of interest in the lectures about biotechnology uses for police work, research, medicine etc. and of course they learned a lot."

About 300 "High School Seniors in Blue and White" visited the College

The youths, 12th grade students from France, arrived at SCE as part of a project that encourages 12th grade students to continue their higher education in Israel

About 300 12th grade students from France visited the College on Hanukkah as part of the "High School Seniors in Blue and White" project. The students toured the departments and research laboratories, absorbed the "student atmosphere" and met with French students, graduates of the "Massa" (journey) program.

"High School Seniors in Blue and White" is the broadest project of the Jewish Agency, in conjunction with The Israeli Experience, of bringing Jewish youth from France for educational tours in Israel. The high school students come to Israel for a week-long tour, in which they are exposed to the learning possibilities open to them once they pass their matriculation exams. In the passing year the Agency placed the emphasis on the Start-Up Nation topic, and subsequently there is a growing interest in SCE.

Dr. Avshalom Danoch, Assistant to the President and Head of the Academic Administration, says: "We are proud to host such a large group of youths from France, who chose to come to us because they are interested in exploring the possibility of studying engineering in Israel. This is the largest group we have had so far, and we consider its coming here a sign of its high confidence in SCE as a science and technology leader."

"Help Prof. Proton discover the code and save the world from ruin"

An "escape room" at the Chemical Engineering Department's laboratories at SCE is only one the exceptional components intended to bring high school students to the world of chemistry

"For many years there has been an argument going on between Prof. Proton from the Software Engineering Department and Prof. Electron from the Chemical Engineering Department at SCE. Which one of the fields is more important? Which one of them would save humanity from an existential threat?

"This argument has led Prof. Proton to unlawfully enter the Chemical Engineering Department's laboratories in order to sabotage the equipment. Before leaving his room, he constructed a computer program that would activate a nuclear bomb, which will be launched automatically after 60 minutes, unless he cancels the order before this crucial moment. Unfortunately for Prof. Proton, the laboratory door was locked as he entered, and he remained helpless inside the laboratory, facing the hourglass that threatens the world. If he does not manage to get out of the laboratory within 60 minutes, the computer software will activate the nuclear bomb. In order to open the laboratory door, he has to enter a numeric code that is encrypted in the laboratory. Help Prof. Proton discover the code and get out of the laboratory in time!"

These unusual words opened the visit of 10th and 12th grade students from Eilat to the Chemical Engineering Department's laboratories at SCE, and the special escape room installed in them. The purpose of the visit, which took place at the end of December 2017, was to introduce them to the world of chemistry and chemical engineering, and to arouse their interest.

The students listened to Dr. Oshra Saphier's fascinating lecture, which was titled "Going to the market – nature's health basket", and learned concepts like oxidation processes, antioxidants, Polyphenols and how they are connected to the food we eat. Next they participated in a Kahoot quiz and after that they shut themselves in the escape room, until they managed to crack the encrypted code. As part of the cracking code challenge they learned about atomic structure and concepts like acids and bases, and also examined solutions using the spectrophotometer device.

The department's academic staff and the laboratory's staff put a lot of efforts into planning the visit. The students had a great time, and we are sure they will be back!

A wonderful journey of the Beer-Sheva Campus bowling team to the cup; in futsal we are close to another league rise

SCE's sports teams have scored success in the bowling and futsal leagues for workplaces

The Beer-Sheva Campus bowling team. Enjoying themselves on their way to success

The surprise of the bowling league for workplaces continues to star at the cup enterprise: after qualifying at the end of one game season from League D to league A and finding its way into the top playoffs at the end of the regular season, the Beer-Sheva Campus bowling team has qualified for the cup final.

All 12 league teams took part of the cup enterprise. At the end of one round of games, four teams, including the Beer-Sheva Campus team, qualified for the semi-final and final game evening, which took place at the bowling alley of Big Center in town.

In the semi-final round, the team got enough scores to qualify from second place to the final game. According to the bowling game method, the results are cumulative. Thus, the SCE team reached the final with a lag of 38 points, which had to be closed in one game, in which four players played and only the best three results were counted.

The final game rose to high levels and the college team won it, but disappointingly, the gap was only 30 points, not enough to overcome the Bezeq retirees, who were crowned as the cup's winners.

According to the team's captain, Yaarit Katzav, "winning second place in the cup is a surprising and exciting achievement – a clear outcome of the determination and solidarity of our team members, who worked hard to win the College some acknowledgement and respect." Referring to the future, she said: "We aim to achieve further significant success later on in the league, while enjoying our way to achieving them."

The Ashdod Campus bowling team also enjoys its activity this season, for the second year, as part of the workplaces' league.

The Ashdod Campus bowling team. An equal among equals

The Beer-Sheva Campus futsal team. Leading the league

The group comprises six faculty members, with no previous bowling experience, which does not prevent it from competing as an equal and now gaining the fifth place at the league, in which experienced players, some of them with over a decade's seniority, take part.

The Ashdod Campus team players say that what motivates them to develop their game and improve their results is the consolidating atmosphere that exists between them. They also say that seriousness and perseverance are the keys to success.

The achievements of the futsal team

From bowing to futsal: the Beer-Sheva Campus team, which qualified for League D after one year of activity, continues to succeed in these levels as well. At the cup games it reached the semi-final, where it was defeated 1:0 after a relentless battle with Earth A, but in the league – the bread and butter of every sports team – it squints at another run-up.

As of mid-season, the SCE futsal team leads the close league up by one point from the two teams that follow it, Earth A and the Teachers' Organization, with seven wins, one draw and one loss.

The College Sports Coordinator, who is also captain of the futsal team, Manny Reuven, says: "The league is tough and challenging this year, but we show a lot of character and determination. Plus the combination of juniors and seniors proves itself again and again at each game."

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