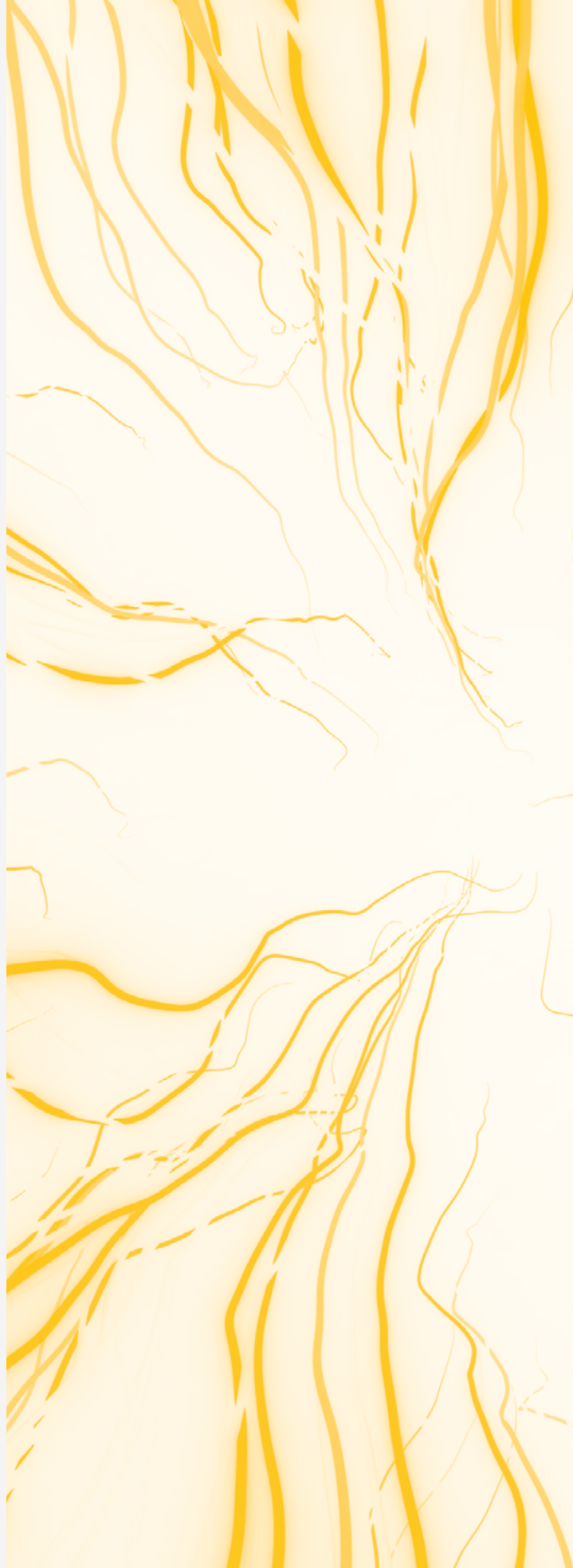


Brain  
Matters:

**ELSC**  
**Newsletter**  
**September**  
**2022**





Dear ELSC friends and community,

We are delighted to bring you a brief overview of what has been happening at ELSC. We have been leading a wide range of activities, some of which are highlighted here.

There have been many innovations and breakthroughs made by our researchers, and we will focus on a few of them.

We hope that this summary will give you a glimpse into the vibrancy of ELSC research and the commitment of our wider ELSC family.

We want to take this opportunity to thank you for your enduring friendship, which helps provide us with the energy and determination to constantly move towards the extraordinary goals we share.

We hope you will stay in touch and perhaps even visit us here at ELSC. Wishing you a healthy and peaceful year.

*Prof. Israel (Eli) Nelken - ELSC Director*

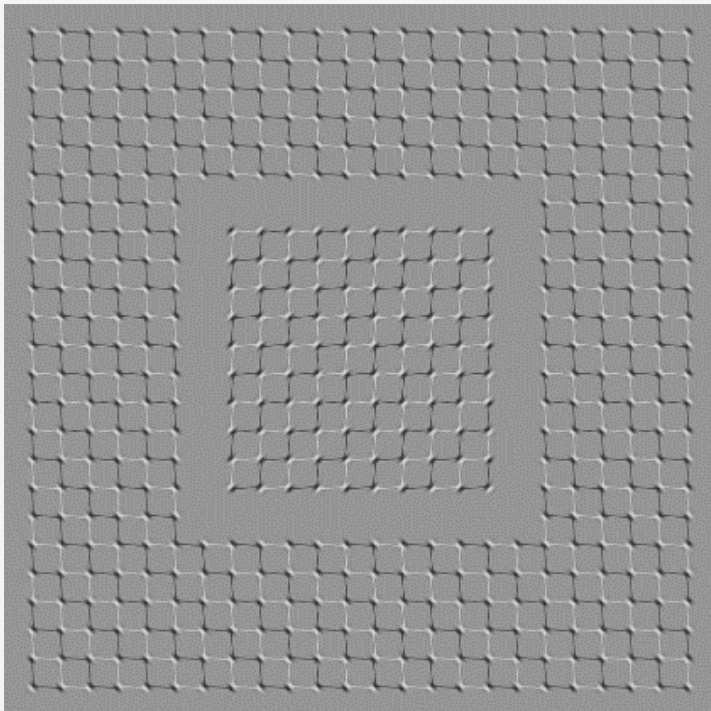
*Orit Ozana - Executive Director*

# Scientific Breakthroughs at ELSC

Publications: ELSC researchers publish groundbreaking articles in the world's leading scientific journals

## ELSC researchers identify for the first time how the brain controls tiny involuntary eye movements

A new article by **Prof. Yoram Burak, Prof. Mati Joshua** and colleagues in the prestigious journal Nature Communications reveals that the source of small eye movements is in brain activity, not in the eye muscles. The research suggests a close connection between these movements and how neural networks in the brain store short-term memories.

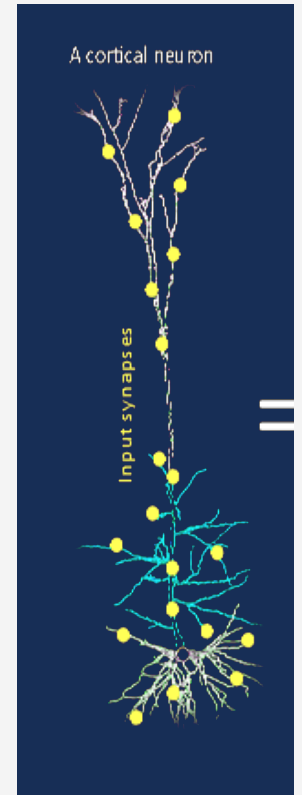


Credit: Akiyoshi Kitaoka, Ritsumeikan University

## The computational power of neurons is being revealed

Neurons were discovered in the 1880s by Ramón y Cajal who called them the butterflies of the soul. They are the basis of our creativity, memories and emotions. When neurons malfunction, neurological and neuropsychiatric diseases emerge. But how do they work?

Providing a surprising answer to this question came from the research by **David Beniaguev**, a Ph.D. student in the labs of **Prof. Idan Segev** and **Prof. Mickey London**. The research was published in the prestigious journal Neuron and demonstrates that single neurons in the mammalian cortex are computationally equivalent to an artificial neuronal network that is ~7 layers deep with each layer having up to 256 perceptrons. This means that a great deal of computation is going on in individual neurons. This could help explain the amazing capability of the brain to perform all the sensory, motor and creative tasks that it does.



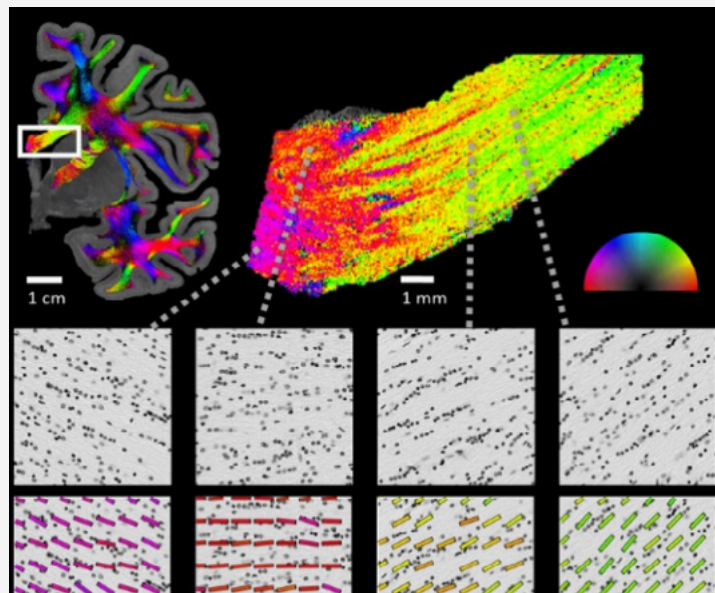
**This study will help research into new drugs and also in the development of brain-inspired artificial intelligence.**

## Special brain scans may diagnose early Parkinson's

ELSC researchers, led by **Prof. Aviv Mezer**, realized that the cellular changes in Parkinson's could possibly be revealed by adapting a technique known as quantitative MRI.

The research by Mezer and his doctoral students was published in Science Advances and written about in 700 media outlets around the world!

This breakthrough is a step towards early diagnosis of Parkinson's disease and will aid drug development. The research was done at the ENU (ELSC Neuroimaging Center), part of the Helmsley Brain Imaging Center.



## An expedition to the barriers of the brain

ELSC researcher **Dr. Naomi Habib** and colleagues build the first map of cells in a barrier region of the brain, the choroid plexus (shown below in pink), across different positions and ages. Her work on mapping this barrier region is a significant advance in revealing poorly understood mechanisms governing the function of this region, its diversity and how it is involved in regulation of the brain.

**The new findings are a major step toward the understanding of the role of the plexus in regulation of brain development, infectious diseases such as COVID19, and brain aging and related diseases, such as Alzheimer's disease.**





# ELSC members' achievements

## ELSC congratulates:

### **Prof. Hermona Soreq for winning the 2022 EMET Prize**

The EMET Prize is an annual prize given for excellence in academic and professional achievements that make a significant and far-reaching contribution to society. The prizes, in total amount one million dollars, are sponsored by the A.M.N. Foundation for the Advancement of Science, Art and Culture in Israel, under the auspices of and in cooperation with the Prime Minister of Israel.

### **Prof. Haim Sompolinsky on winning the 2022 Gruber Neuroscience Prize and for his election as Fellow of the Israel Physical Society**

The Gruber International Prize Program honors individuals in the fields of cosmology, genetics, and neuroscience. The honorees' groundbreaking work provides new models that inspire and enable fundamental shifts in knowledge and culture. Each prize includes a gold medal and a cash prize of \$500,000.

Prof. Sompolinsky has also been elected as an IPS Fellow in virtue of his significant contribution to science. In recent years the IPS has honored members who have made unique contributions to science by electing them as Fellows.

### **Dr. Naomi Habib for winning the 2021 Krill Prize**

The Krill Prize is awarded to ten recipients annually. Award winners are untenured lecturers or senior lecturers at Israeli universities and who come from the fields of the exact sciences, life sciences, medicine, agriculture and engineering.

### **Prof. Yoram Burak for winning the ERC Synergy Grant together with Nobelist Prof. Edvard Moser**

The €10 million ERC Synergy Grant, awarded annually, is given to a group of two to four researchers working together and bringing different skills and resources to tackle ambitious research problems.

### **Prof. Merav Ahissar and Dr. Yoav Adam for winning advanced and starting ERC Grants, respectively**

The ERC Advanced Grants back outstanding researchers throughout Europe. Their pioneering work has the potential to make a difference in people's everyday lives and deliver solutions to some of our most urgent challenges.

The ERC Starting Grant supports early-career scientists who show potential to be research leaders in their field.

### **Prof. Israel (Eli) Nelken for winning the Alexander von Humboldt research award**

Prof. Nelken is one of the leading auditory neuroscientists in the world. He has developed a variety of experimental methodologies for a better understanding of signaling in neurons and circuits and for analysis of dysfunctional neurons in mouse models of Alzheimer's disease.



# ELSC new recruits: the next generation

We welcome to ELSC: Dr. Jonatan Kadmon, Dr. Aya Ben-Yakov and Dr. Raunak Basu.  
Our researchers will inaugurate new state-of-the-art laboratories in the Goodman Building.



## Theoretical

### **Dr. Jonathan Kadmon: computational scientist**

Dr. Kadmon arrived from Stanford University where he did his postdoc research. He studies how biological behavior is affected by dynamic connectivity. Jonathan's research focuses on the interface of machine learning and neuroscience. Recent technological developments in the two fields allow for exciting research for understanding how biological behavior emerges from circuit dynamics and connectivity.

"ELSC is a world leader in promoting interdisciplinary research, and I look forward to creating diverse partnerships," Jonathan said. "I hope my lab will be a hub for researchers and students across ELSC looking to include machine-learning-based or theoretical models in their work."



## Cognitive

### **Dr. Aya Ben-Yakov: cognitive scientist**

Dr. Ben-Yakov joined ELSC following postdoc research at Cambridge University. She studies the function of the hippocampus and its contribution to creating a lasting memory experience.

Aya is interested in using neuroimaging in humans to reveal how continuous experience is transformed into discrete memories. In her lab, she plans to use fMRI data to explore fundamental properties of hippocampal function and their contribution to ongoing experiences.



## Theoretical



## Biological

### **Dr. Raunak Basu: neuroscientist**

Dr. Basu will be joining us in the fall from the Max Planck Institute for Brain Research, Frankfurt (Germany), where he did his postdoctoral research. He studies spatial behavior patterns and associated neural activity in the brain. He combines computational and experimental methods in his research.

We are looking forward to welcoming him here at ELSC!

A blue-tinted photograph of a group of people, possibly at an art installation or gallery. The text "Brain & Art" is overlaid in the center. The image shows several individuals, some wearing hats and jackets, looking towards the camera or slightly away. The background is slightly blurred, suggesting an indoor setting with other people and structures.

**Brain & Art**

# The Martine De Souza-Dassault Brain Art Gallery Exhibitions 20-22' take a peek!

The ELSC gallery is a home to special interactions between neuroscientists and artists. Here are our most recent exhibitions:

*"STOP! Wandering"*  
**Max Epstein and Olga Goltser**  
with Prof. Israel (Eli) Nelken  
March - August 2021



The idea for this exhibition came out of discussions between the artists and researchers, on the way the brain processes encounters with unfamiliar objects - how it must find ways to categorize and describe them.

The sculptures challenge us: they integrate the familiar but are presented in constructions that ultimately defy classification.

*"Working Memory"*  
**Alon Kedem with Prof. Leon Deouell**  
November 2021 - March 2022



Kedem used the gallery as a work space "laboratory" - where he painted his short-term memory, which changed every day. The development of the painting represented the development of our short-term memory.

*"Sundowning"*  
**Dan Orimian with Dr. Naomi Habib**  
June - October 2022



The blurring of the photographic images and the breaking down of reality into its primary and raw components through stain, shape and material, are used by Dan Orimian as tools to express the unfathomable gap between observing his mother's present figure and the empty and inaccessible space that opened within her as she succumbed to Alzheimer's disease. "Our journey with Dan started by talking about the microscopic level of cells in the brain and their loss and dysfunction in the diseased brain and ended in a discussion of the loss of the individual in front of our eyes due to the disease. Dan's work helped us reconnect to the core of our motivation to study this devastating disease."



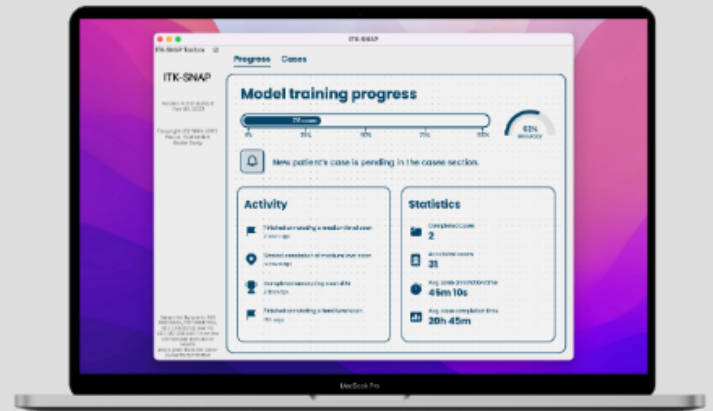
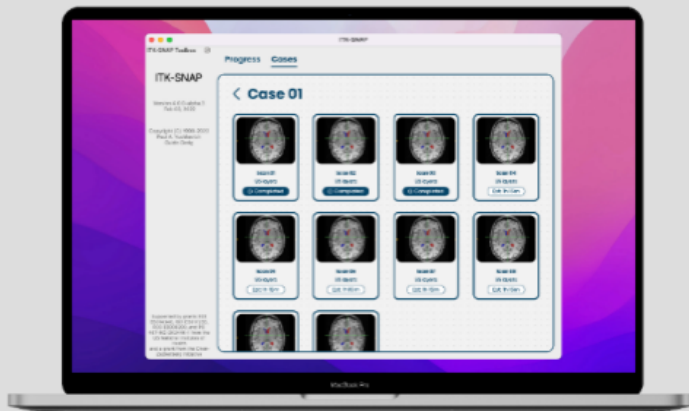
# Working together ELSC & Bezalel Academy of Art and Design

Bezalel Academy of Art and Design is the leading academy of art, design and architecture in Israel. It invited students and graduates to participate in a new collaboration with ELSC for its master's degree program in industrial design.

For this project, three ELSC laboratories were chosen: those of Dr. Aya Ben-Yakov, Prof. Ami Citri, and Prof. Leo Joskowicz.

Each laboratory works with Bezalel designers coming from different disciplines. The aim is to create a project of mutual interest that is based both on the research field of the lab and the tools it uses. This can stimulate new questions and ways of proceeding with research.

**Sue Peleg and Daniel Glazman**, at Bezalel, worked with **Leo Joskowicz's lab**, which focuses on computer-aided surgery and medical image processing. They examined the communication between researchers and doctors in the development of computerized technology. They developed a tool (app) that makes it easier for researchers and doctors to understand each other.



# ELSC sculpture garden

The Goodman Building, the home of ELSC, was designed to create an advanced and comfortable work place – but it is much more than that, as we seek to make this building and its environment a space where residents, guests and visitors can experience and be inspired by the diversity of human creativity.

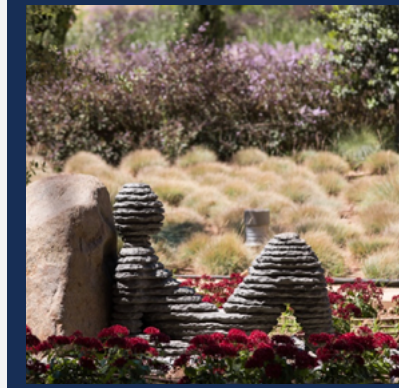
A sculpture garden lies among the paths and stairs leading to the building. The sculptures are chosen jointly by the HUJI curator and ELSC director.

So far, three sculptures have been donated to the garden and they portray the essence of the human body in different and distinctive ways.

The first sculpture that inaugurated the garden was Boaz Vaadia's sculpture "Ahiam 2nd".

Menashe Kadishman's sculpture "Segments II" was then placed in the garden. It is located at the top of the stairs in a commanding position.

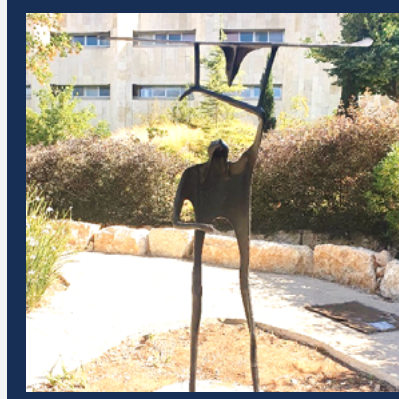
And recently we received Yosef Schlein's sculpture "Man with a Bird". This abstract work expresses a tension between the earthbound man and the soaring bird.



"Ahiam 2nd" by Boaz Vaadia



"Segments II" by Menashe Kadishman



"Man with a Bird" by Yosef Schlein

# Poet in Residence

Lecture series from our Poet in Residence, in memory of Prof. Naftali "Tali" Tishby.

As part of our wish to expand the borders of scientific investigation and to bring together the language of science and the language of art, ELSC hosted the author and poet Yonatan Berg for a period of six months. During his stay, he opened a two-way channel. On the one hand, he offered those at ELSC and the general public an opportunity to expand their horizons by experiencing the world of poetry and literature; and on the other, he visited the laboratories, talked to researchers, watched their scientific work, and reflected on these encounters within a literary context.

Yonatan conducted a fascinating series of open lectures on various subjects, including Time, Nature, Memory. Some of the content related directly to scientific work. In these lectures, he described how these themes are treated in the field of poetry, introducing us to some of the world's finest poets and revealing the processes involved in the creation of their poetry.

These series were dedicated to Prof. Naftali Tishby, a most brilliant computational scientist. Tali's love of poetry was revealed at the opening of the "Poetry weekend in Cabri," where he spoke openly about his final days, and his passion for revealing emotions by expressing himself through poetry.

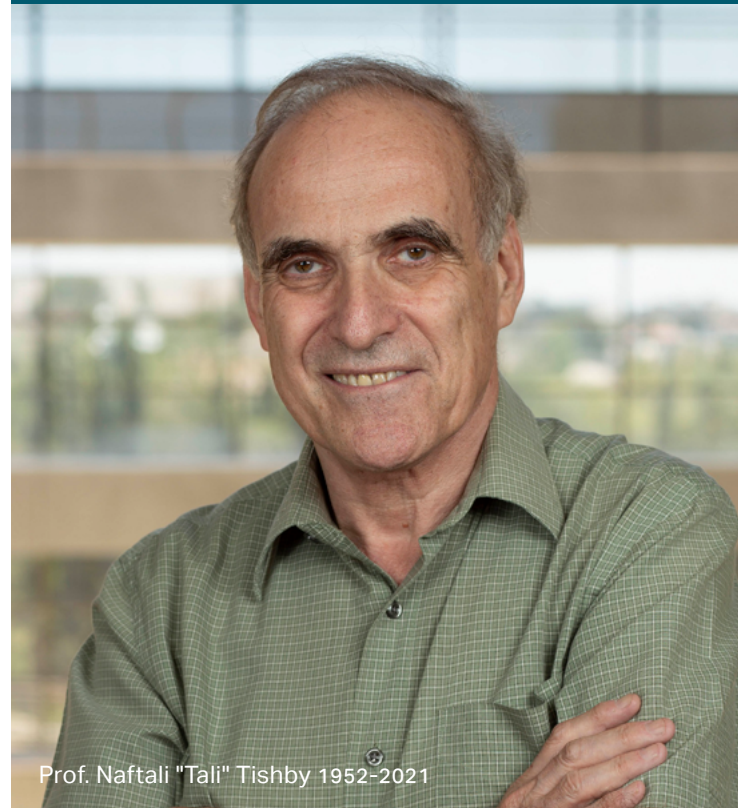
The Edmond and Lily Safra Center for Brain Sciences Presents

## "Poet in Residence"

A series of meetings with poet and writer Yonatan Berg  
in memory of Prof. Naftali (Tali) Tishby



Thursdays, 24/03/2022 - 07/07/2022, 12:00 - 13:00,  
Class 2004 (ground floor), The Suzanne and Charles Goodman Brain  
Sciences Building, at the Edmond J. Safra Campus in Jerusalem



Prof. Naftali "Tali" Tishby 1952-2021

# Concerts

ELSC in cooperation with the Jerusalem Academy of Music and Dance (JAMD) offered a series of events in the summer semester, called Concert+. These events, organized by Prof. Israel (Eli) Nelken from ELSC and Prof. Eitan Globerson from JAMD, looked at the connection between music and brain science. The events included live performances of music, lectures, and demonstrations with active audience participation.

The first event in the series - **Brain, Rhythm, MUSIC** - tested the concept of rhythm and its expression in dance, in music and in the brain.

The second event, **Multisense**, tested the connection between music and other arts – painting, cinema, and song.

Mind the Melody: a series of concerts in the Isaac and Luba Becker Auditorium in the Goodman Building was organized by the rector's office of the Hebrew U. The concerts hosted leading Israeli musicians and included classical music, Andalusian music, and jazz. The concerts are open to the general public.



# ELSC in the Press



**The researcher whose findings may change the treatment of Alzheimer's and depression**

**Prof. Inbal Goshen** was chosen by Globes magazine as one of Israel's 50 most influential women in 2022, on the occasion of International Women's Day.



**Why do motorcycles sound like an alarm?**

**Prof. Israel (Eli) Nelken** was a scientific adviser on Kan's (the Israeli Broadcasting Corporation) web series "Curious". In the episode about the sound of motorcycles, he explained the effect on our brains.



**A surprising new use for a 140-year-old method of brain research**

A new approach to mapping nerve brain fibers was developed by **Prof. Aviv Mezer and Dr. Roey Schurr** was published in the journal Science. The research team used a technique that has been around for almost 140 years, but has never been used to study connectivity in the brain.



**What is the connection between cats, our brains and the ability of a computer to learn?**

A study led by **Prof. Idan Segev** found that one neuron in the brain functions like an entire network of neurons and performs more complex calculations than was formerly believed. This discovery may help further our understanding of how the brain manages to perform more complex operations than artificial networks. It also is an important step towards developing more sophisticated learning networks.

# ELSC seminar series

ELSC's prestigious doctoral program provides its students with a high-level and diverse curriculum. This includes an innovative course, known as the Seminar Series, which brings together all ELSC students each week for a lecture given by a leading researcher from the various fields of neuroscience. The speakers come from institutions in Israel and leading brain research centers abroad.

These important lectures are not only attended by students and researchers from the center, but attract attendees from other faculties throughout the Hebrew University.

Following these lectures a special forum has been established by ELSC Prof. Inbal Goshen to help support female doctoral students. This initiative enables female academics, who have given a lecture at the Seminar Series, to share the difficulties they have experienced as women in science with a new generation of female researchers.

This allows for open discussion of possible ways to resolve the challenges they face.

[Click to watch the seminar recordings](#) →



# ELSC Brain Circle

London Gala, May 2022

**Mrs. Muriel Salem**, the President of the Brain Circle UK, organized a gala in London last spring to raise funds for ELSC students. The event, to which 100 guests were invited, took place at the Royal Academy of Arts, London. It was hosted by two outstanding researchers in brain science: Prof. Catherine Dulac (Harvard University) and Prof. Adi Mizrahi (ELSC, Hebrew University).

The participants enjoyed a private viewing of Whistler's *Woman in White*. And following dinner, there was a fascinating discussion between the scientists about the frontiers of brain research. This occasion was just one of the events initiated by Muriel Salem, whose efforts on behalf of ELSC are so appreciated.

We are also grateful to all the guests for their generosity and friendship.

In June, Muriel Salem was awarded an Honorary Fellowship of The Hebrew University, in recognition of her enduring contribution to brain science research.

Friends of the Brain Circle are an essential part of the ELSC story

## Movie



# ELSC & SWC Collaboration

A collaboration between ELSC and the prestigious Sainsbury Wellcome Centre (SWC) at UCL, London was initiated by Jean-Francois de Clermont-Tonnerre and Marie-Laure de Clermont-Tonnerre - members of the Brain Circle UK (BCUK).

Their donation was designated for a collaborative scientific research program whereby the two institutions will work at the intersection of theory and experiment, specifically targeting a deeper understanding of how the brain gives rise to behavior. For two years, professors and postdocs from four labs at UCL and ELSC will work together to bring new understanding in their respective fields of research, for example in AI, autism, fear, and decision making.

## Keeping the community informed

ELSC always seeks opportunities to ensure that the wider community is well-informed about developments in its research. As part of this initiative, the Clermont-Tonnerre family opened their home for a special BCUK event to update members on the SWC-ELSC research. At this event Dr. Haran Shani Narkiss, a postdoc sponsored by the SWC-ELSC program, shared insights into his research with an invited audience. The project he works on is part of the collaboration between lab of Prof. Idan Segev (ELSC) and that of Prof. Tiago Branco (SWC).

Haran explained how he is using theoretical tools developed at the Segev lab to study empirical data collected at the Branco lab, which is a world leader on research into defensive behavior. During this research program, Haran will work in both Jerusalem and London.

## Wall of Life

The Hebrew U Board of Governors (BOG) dedicated an inscription on the Wall of Life to Jean-François de Clermont-Tonnerre for his donation and contribution to brain science.

## Movie





# EMOTIONS

A unique series of lectures and events showcasing the research of over 50 world-renowned women scientists who have contributed to our understanding of human emotions. Held in nine different cities, from October 2021 through to autumn 2022, this extraordinary project was the brainchild of Viviana Kasam, President of BrainCircle Italia, who recognized that women scientists, despite their excellence, are often underrepresented at neuroscience conferences.

Organized by the BrainCircle of Italy, together with ELSC and EBRI (the European Brain Research Institute, Italy), and supported by many generous donors, the series is dedicated to the memory of Italian Nobel Prize winner Rita Levi-Montalcini, who has been an inspiration to generations of women scientists and had supported the founding of the BrainCircle Italia ten years ago.

The first EMOTIONS conference was held in Jerusalem at ELSC in October 2021 and received generous support from: the Lilah Foundation, Matanel Foundation, Asper Foundation, and Sagol International Network.

Other cities hosting EMOTIONS events: Genoa, Rome, and Milan, Italy; Lugano and Geneva, Switzerland; Lisbon, Portugal; Delphi, Greece; and London, UK.

## Movie



# Board-Of-Governors (BOG) meeting in Jerusalem

After a long hiatus due to the Covid-19 pandemic, the Hebrew U Board of Governors (BOG) held a five-day conference in Jerusalem in June 2022. It was a wonderful opportunity for the ELSC community to meet and celebrate with its friends and donors.

**Prof. Joshua R. Sanes**, Head of ELSC International Steering Committee, was awarded an honorary doctorate at the Hebrew University. Before the ceremony we enjoyed a special reception for Josh and a lecture that he gave to the ELSC community. To learn more about Prof. Sanes research, [click here](#).

**Roberto Burstin**, donated funds both for the establishment of the lab of a new tenure-track female scientist as well as for generous scholarships for ELSC students. On his visit to ELSC he was joined by Julie Castoriano Bugnone, the Brain Circle International Coordinator. They met ELSC students, visited our Expertise Centers including the ELSC Virus Core Facility, as well as various experimental and computational labs!

As part of BOG 2022, Roberto Burstin was inscribed on the Wall of Benefactors at the Hebrew University.

## Movie

**Jean-François de Clermont-Tonnerre**, BCUK member, who donated to the SWC-ELSC collaboration. His visit enabled us to update him on the progress of this joint venture. He was also able to meet with [Prof. Hagai Bergman](#) and hear about his important research on serotonin.

**The Salem Family: Muriel, Freddy and their family** visited us at ELSC, and were updated about our latest research, other activities, and the art at the center. On a beautiful Jerusalem evening, accompanied by the sound of Israeli and Arabic music, we celebrated together: the Salem family and friends, Julie Castoriano Bugnone, the ELSC academic staff and the artist Michal Rovner.

# ELSC home of innovation and hope

With the gradual return to normality around the world, ELSC is also back to hosting a wide variety of visitors and events:

**The Israeli Government** celebrated Jerusalem Day at ELSC, which was chosen because it represents the remarkable achievements of Israeli technological and scientific innovation. It was attended by (then) Prime Minister Naftali Bennett, and Moshe Lion, the Mayor of Jerusalem.

We were honored to host representatives of the Edmond J. Safra Foundation, the founders of ELSC.

During a two-day visit, we had the pleasure and the opportunity to update the Edmond J. Safra Philanthropic Foundation about ELSC - academic achievements, activities and vision, our scientists, the excellent Ph.D. teaching program, the Labs, Expertise center, our students, postdoctoral fellowships and more. ELSC is grateful for our strategic partners and founders- The Edmond J. Safra Philanthropic Foundation.

The outstanding design and 'green' credentials of the Goodman Building drew a larger number of visitors, including: The Israeli Green Building Council; students of architecture; and hi-tech companies.

**The Council for Higher Education** chose ELSC for its conference for the senior management of Israeli academic institutions in Israel.

**Brainstorm Israel** is a brain science community led by ELSC students together with other representatives from all Israeli academic institutions. Several of their meetings were held at ELSC, including events to establish connections between the neurotech industry and the scientific community.



The Israeli Government at a festive meeting at ELSC on Jerusalem Day, 29.5.22

### 'How to tell a (scientific) story?'

At the end of June, we held an event led by ELSC Prof. Yosef Grodzinsky. The conference sought to enable the scientific community to learn from the best Israeli writers and editors how to perfect scientific storytelling. Authors participating in the conference included: Meir Shalev, Eshkol Nevo, Noa Yedlin, and Hila Blum. We were also joined by special guest: Robert (Bob) Prior, Executive Editor, MIT Press.



## How to Tell a (Scientific) Story





YOU ARE WELCOME TO FOLLOW US ON OUR  
WEBSITE AND SOCIAL MEDIA PLATFORMS



[elsc.huji.ac.il](http://elsc.huji.ac.il)