Australian Friends of The Hebrew University

YEAR BOOK
2023/24

Australian Friends of The Hebrew University of Jerusalem

Our Passion for Progress

Australian Friends of The Hebrew University

The Hebrew University of Jerusalem

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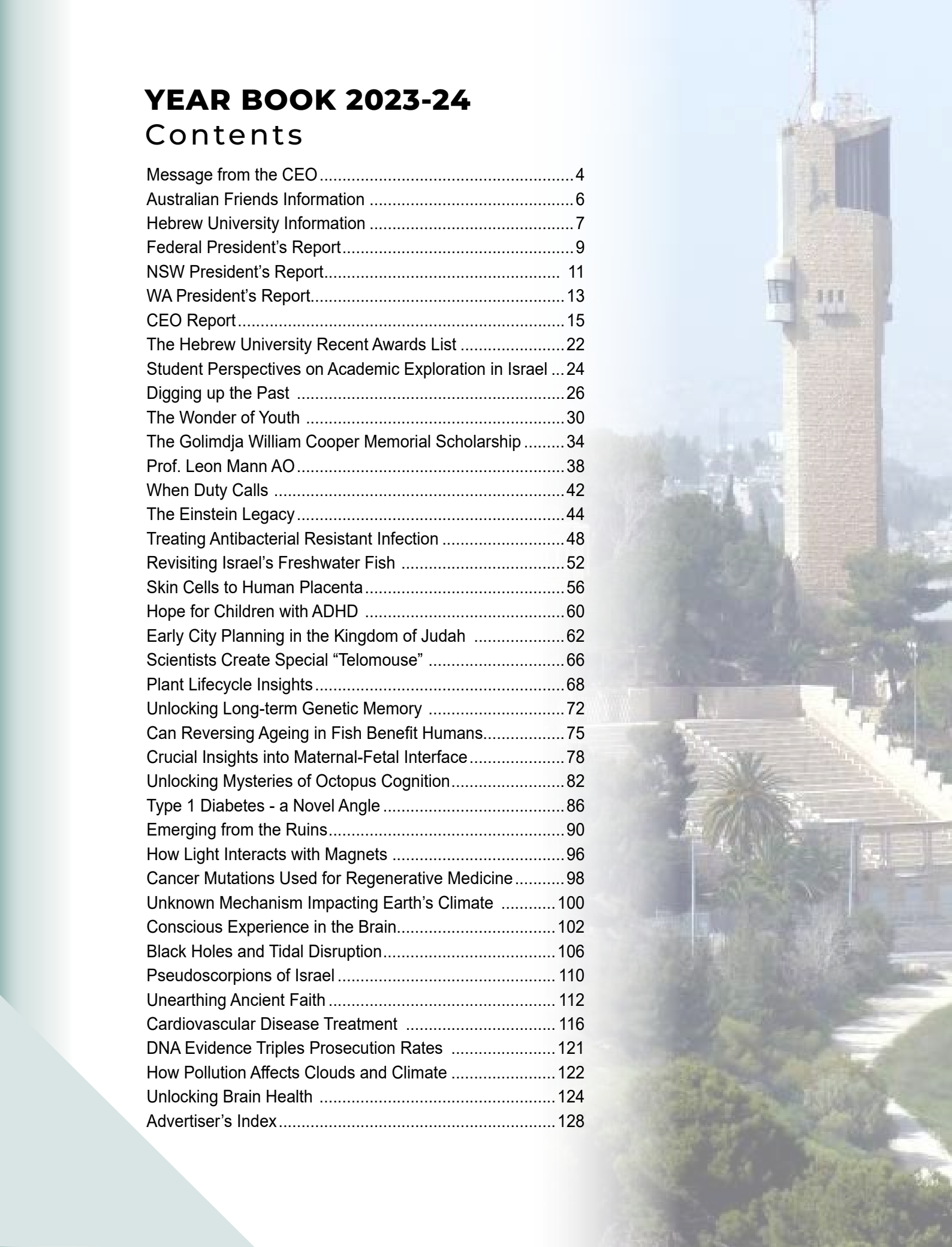
YEAR BOOK 2023-24

Contents



Australian Friends of The Hebrew University

Message from the CEO

Dear Friends

Once again, we are delighted to bring you our Yearbook in both an electronic version and for those that still like to ‘hold a copy in their hands’ we have a limited number of hard copies available from our office.

Following the dastardly events of 7 October 2023, the world has not been the same and certainly, life in Israel has presented many challenges.

We had all hoped that the war would be swift, and the release of the hostages speedily attained but unfortunately this was not to be the case and the aftereffects of this war will be felt for many years to come.

In the spirit of Israel’s amazing resilience and fortitude, our Yearbook features some of the remarkable work and activities that took place both in Israel and here in Australia. Despite the challenges, the Hebrew University continues to be “a shining light unto the nations” and we, as the Australian Friends, are proud to represent Israel’s and indeed one of the world’s premier institutions of higher learning here in Australia.

We were delighted to participate in person at the 2023 Board of Governors meeting in Jerusalem and many of us plan to attend the 2024 meeting that will include a visit to the areas most affected by the surprise attack on 7 October. The Hebrew University has always been solid in its support of Israel and the IDF and is the only Israeli university to offer elite programs and cooperative support and research enabling the IDF to respond to the challenges of war. We all wish that these resources could be applied to peacetime initiatives and our hope is that this wish will be fulfilled in the not-too-distant future.

This Yearbook would not be possible without the loyal and dedicated small team who ensure that the Australian Friends presence is felt throughout Australia in particular our administrator Linda Kugel in Sydney, Yif'at Biran in Melbourne and Talia Raphaely in Perth.

I also wish to thank Shira Halberstadt for the design of our Yearbook and to Philip Joel of Kwik Kopy who always goes the extra mile for us.

We would not be able to produce this Yearbook without the support of our advertisers many of whom have advertised with us for more than 20 years so a very big thank you for your continued support.

Finally, to our members, donors and supporters throughout Australia, we are most appreciative of your friendship and donations to medical research through Hebrew U Health Promotions or for student support for Australian students wishing to study at the Hebrew University through our scholarship fund both of which entities offer Australian donors tax deductibility.

We hope you will enjoy our 2024 Yearbook and that with your support, we will ensure that the Hebrew University continues as Israel's pre-eminent university.

Thank you for your continuing support and friendship.

Wishing you good health

ROBERT SCHNEIDER

Chief Executive Officer

Australian Governors of the Hebrew University of Jerusalem

Mr Michael Dunkel	Governor
Mr Robert Simons OAM	Governor
Mr Sam Lipski AM	Governor
Mr Jerremy Leibler	Governor
Mr Barry Joseph	Governor
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Mr Stuart Silbert OAM	Honorary Governor
Mr Harry Triguboff AO	Honorary Governor

Australian Recipients of Honorary Doctorates of the Hebrew University of Jerusalem

Mr Michael Dunkel	(NSW)
Mrs Agnes Ginges	(NSW)
Mr John Howard AC	(NSW)
Professor Leon Mann AO	(VIC)
Mr Stuart Silbert OAM	(WA)
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Mr Isador Magid AM *	(VIC)
Mr Richard Pratt *	(VIC)

* (Deceased)

Australian Recipients of Honorary Fellowships of the Hebrew University of Jerusalem

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Mr Maurice Cohen OBE *	(VIC)
Mrs Felicia Einhorn *	(NSW)
Mr Stefan Einhorn OAM *	(NSW)
Mr Joseph Frank *	(NSW)
Mr Max Freilich OBE *	(NSW)
Mr Berel Ginges *	(NSW)
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Mr A D Hallam *	(VIC)
Mr Harry Hoffman AM *	(WA)
Dr Jack Hoffman OAM *	(WA)
Mr Alan K Milston OAM *	(NSW)
Professor Louis Waller AO *	(VIC)

Australian Friends of the Hebrew University of Jerusalem

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Vice President:	Mr Philip Moses
Hon. Treasurer	Mr Robert Greenfield
Hon. Secretary	Mr Barry Joseph
NSW State President:	Mr Phillip Joel
WA State President:	Ass. Prof. Peter Winterton AM
Hon. Chairman:	Mr Robert Simons OAM
Chief Executive:	Mr Robert Schneider

National Office
P O Box 876
Bondi Junction NSW 1355
Tel.: (02) 9389 2825
Fax: 02 9387 5584
Email: austfhu@austfhu.org.au
Website: www.austfhu.org.au

The Hebrew University of Jerusalem, Israel's first university, is a multidisciplinary institution of higher learning and research where intellectual pioneering, cutting-edge discovery, and a passion for learning flourish. It is a center of international repute, with ties extending to the worldwide scientific and academic community, where teaching and research drive innovation and provide the broadest of education for its students.

Ranked among the world's leading universities, the Hebrew University is an institution where excellence is emphasized; where advanced, postgraduate study and research are encouraged; and where special programs and conferences attract students and academics from around the world. At its core, the Hebrew University's mission is to develop cutting- edge research, to educate future leaders, and to nurture generations of outstanding scientists and scholars in all fields of learning.

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Rector
Prof. Tamir Sheafer

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Daniel Schlessinger

Chancellor
Prof. Menahem Ben-Sasson

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Prof. Mona Khoury

Vice-Rectors
Prof. Lilach Sagiv, Prof. Avi-Chai Hovav

Comptroller
Zvi Aizenstein

Director, Division for Advancement & External Relations
Ram Semo

6 campuses: three in Jerusalem (Mount Scopus, Edmond J. Safra, and Ein Kerem) and in Rehovot, Beit Dagan, and Eilat

4,242 projects in progress in University departments and some **100** subject - related and interdisciplinary research centers

25,000+ students, including **13,242** undergraduates, **6,435** master's students, **2,193** doctoral candidates, and **2,741** overseas, pre-academic students, postdoctoral fellows, and others

1,034 faculty members

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From the Australian Friends Federal President

Michael Dunkel

(Note this Report relates to the year- end 30 June 2023)

The lifting of all Covid restrictions and the resumption of international travel has allowed us to resume our activities on a more normal basis and to receive visitors from overseas. Consequently, the Committee has been able to resume its bi-monthly physical meetings in the office whilst the Honours Club has also resumed its regular monthly meetings.

The 2023 Board of Governors Meeting was held from June 10 to 13. At the Meeting, Professor Leon Mann from Melbourne received an Honorary Doctorate. Following the Convocation ceremony, there was a Reception in his honour in the Maiersdorf Faculty Club for his family and friends as well as those members of the Australian Friends who were at the Convocation. Overall, the 2023 Board of Governors Meeting was somewhat brief and disappointing. There were some interesting sessions. However, due to the University's decision to reduce the length of the Meeting from 5½ to 3½ days, the formal proceedings were extremely rushed and there was little time to engage with members of other Friends groups.

Following the commitments already made prior to Covid, a small group from Australia was taken on the 2023 Legacy Mission which was held from 4th to 15th May 2023. The Mission was conducted not in conjunction with the British Friends, as originally envisaged, as the British had postponed their Mission until later in the year. Those attending found it interesting and informative and there have been some positive outcomes.

As we were able to hold events again by the end of 2022, in December 2022 we welcomed Professor Asher Cohen, the President of the University, on his first visit to Australia. He was accompanied by Vice-President Professor Oron Shagrir and Professor Yaakov "Koby" Nahmias. They were in Sydney, Melbourne and Perth and spoke at a number of fundraising events as well as at meetings with major donors. It was particularly pleasing that we were able to have Professor Koby Nahmias engaging with young people and students.

This year we have been fortunate in obtaining a sponsor for the The Golimdja William Cooper Memorial Scholarship (GWCMS). The scholarship will cover the cost of a suitably qualified Indigenous Australian (including airfares, program costs, accommodation, a living stipend, medical insurance etc.) for post graduate study at the Hebrew University in one of ▸▸▸

the following programs:

The Global International Development Studies Program, International MSc Program in Agricultural Sciences, The International Master of Public Health Program, or The International MSc Program in Biomedical Sciences in the Faculty of Dental Medicine.

Formal dedication functions for this scholarship will be held in Melbourne and Sydney later this year.

The researchers funded by the Zelman Cowen Academic Initiatives in the Australian universities and in the Hebrew University have now commenced their second year of research and have produced some excellent results. Some of the projects may continue in the future under different funding.

With the prospect of students and academic researchers being able to travel again between Australia and Israel the grants can once more be awarded. This will enable the resumption of these important research and exchange programs of both students and faculty members.

Our efforts to develop further cooperation between the Hebrew University and Australian universities continue to bear fruit. A number of scholarships have been awarded to Australian students at the Australian Catholic University studying archeology, to enable them to participate in digs conducted by the Hebrew University Faculty of Archeology.

We continue to make steady progress towards the re-establishment of the Victorian Division of the Friends with the establishment of a Steering Committee which will form the nucleus for a new committee. Following the reopening of the border of Western Australia and the lifting of restrictions the Western Australian Friends have been able to commence activities again and receive visitors from interstate and overseas. The Australian visit of the President of the Hebrew University, with his colleagues in December 2022 commenced in Perth.

None of our work would be possible without the dedication and commitment of our staff. Particularly, I wish to thank our CEO, Robert Schneider, for his enthusiasm and determination to overcome the challenges of the recent past. His efforts to not only manage day to day issues, but also continue with the goal of increasing awareness of the University and communicating with donors, can only be described as exceptional. I also thank Linda Kugel, our office administrator, and other members of staff for their dedication and hard work and my Executive and Committee for their efforts and support.

From the President NSW Division

Phillip Joel

(Note this Report relates to the year- end 30 June 2023)

I would like to express my gratitude to our dedicated board members for their unwavering support during my second year as NSW President.

This year has been marked by both intriguing challenges and rewarding achievements. I'm delighted that, with the resolution of the Covid-19 situation and the return to a semblance of normalcy, we can now confidently plan and host more events.

In particular, our event in December featuring the esteemed President of the Hebrew University, Professor Asher Cohen, and the accomplished Professor Ya'akov (Koby) Nahmias, Director of the Alexander Grass Centre for Bioengineering at the Hebrew University, was a notable highlight, as mentioned in last year's report. Professor Nahmias is a global leader in ethical drug production and sustainable food technology, and their insights were incredibly informative. The strides made by the Hebrew University and Israel in a short time are remarkable, and we eagerly anticipate further developments.

Our Honors Club continues to thrive, and we welcome additional support to ensure its continued success and its meaningful engagement with the community.

I must commend Mr. Rob Schneider, our CEO, for his tireless efforts in maintaining the impeccable functioning of our institution.

The addition of Linda Kugel and Jayden Adler to our team during the year has been transformative and invaluable to our operations.

As we embark on a new year, we anticipate fresh challenges. With Mr. Schneider's leadership and his new team, I am confident that we are poised for even greater achievements and a future filled with substantial progress.

From the President WA Division

Peter Winterton

(Note this Report relates to the year- end 30 June 2023)

The year that is passing by with great speed has been both joyous and with some loss.

In late November 2022 with the arrival of Professor Asher Cohen, President of the HUJ, accompanied by Professors Nahmias and Shagir, we were honoured to be able to host their visit. A number of functions occurred, including a lunch hosted by the Chancellor and Vice Chancellor of UWA; a lunch hosted by Stuart Silbert; and a community breakfast at my home, which allowed members of the Perth community to hear Prof Nahmias speak on the developments around cultured meat. There was great interest in this lecture. It also allowed for an intimate opportunity to meet the President of HUJ.

Professor Cohen had been keen to personally thank Harry and Sylvia Hoffman for their unfailing support to the HUJ over many years. Sadly, on the day of their arrival Harry was taken to hospital and passed away a few days later. It goes without saying that the Perth Jewish community and the Friends of HUJ will miss his enlightened philanthropy. I have been reviewing Harry and Sylvia's legacy of contribution to HUJ and only one word can describe it; massive over many years.

In early February 2023 Yael Jacobsen tendered her resignation as the publicity officer for the WA Friends. She has made a strong contribution to friend raising and has been responsible for much of the increased awareness in the community for the HUJ. Dr Talia Raphaely, has taken over from Yael and brings with her, effervescence, enthusiasm and grapevine connections. It has been a pleasure to work alongside her for 2023.

We have also been fortunate to have a number of visiting speakers visit this year.

In May 2023 Prof Soreq was our guest. In spite of it being Mother's Day a dedicated audience attended her lecture at the PHC (a first for the WA Friends). Prof Soreq explained how mental insults affect many people at many phases of their life, affecting all parts of the body from the brain via the autonomic nervous system. This physiologic mechanism is dependent on numerous neurotransmitters, however, Professor Soreq focused on Acetylcholine. She is one of the leading experts in Acetylcholine neural transmission. Depletion of Acetylcholine is thought to be a key factor in Alzheimer's disease and other neurodegenerative disorders. The development of medications to inhibit the destruction of Acetylcholine was pioneered at the HUJ and led to the introduction of the so-called Cholinesterase inhibitors to treat early Alzheimer's disease. ▶▶▶

She covered a vast area of knowledge at a breath-taking pace. There was no doubt of WOW amongst the audience at the completion of Prof Soreq's talk. Prof Soreq also acknowledged the immense cost of this research. Her laboratory alone has three scholarship funded postdoctoral fellows. Community-based benefactors have allowed Prof Soreq and others to push the very boundaries of our knowledge of neuroscience.

In August 2023 Ghil'ad Zuckermann, an Israeli-born linguist, Professor of Linguistics and Chair of Endangered Languages at the University of Adelaide addressed a combined meeting of the WA Friends of The Hebrew University and the Western Australian Jewish Historical and Genealogical Society on Sunday evening at Temple David Function Centre.

His address was breathtaking in its breadth of subject content and yet at the same time Prof Zuckermann was able to clarify the importance of language to culture, identity and well-being not only for Jews, but across the world in all cultures and all languages. His special focus was the revival of threatened languages e.g. Yiddish but especially indigenous Australian languages. Prior to European settlement in Australia there were believed to be some 400 Languages which today has been reduced to just twelve. He affirmed that language is important to retain for ethical, cultural and well-being reasons. People identify themselves by their language not the land where they are. He re-enforced this by highlighting that the Hebrew University of Jerusalem was founded in 1917 to **teach in** Hebrew, not as a Jewish University. Prof Zuckermann noted that prior to European settlement the average indigenous person would have spoken at least five indigenous languages, and that disruption of language was used as a tool to disempower indigenous Australians, then further damaged by the misguided ideology of the stolen generation. Clearly an important topic with the Voice to parliament referendum occupying centre stage in 2023.

We wait with keen anticipation the arrival of Niv Gronovich, aged 19 years who is arriving mid-October 2023. He is one of the shining lights at the HUJ, an expert on bacteriophages.

Clearly over the last 10 months we have been fortunate to have had world class speakers and this has been a great bonus to profile and friend raising. We look forward to further visits by HUJ scholars. Fundraising in 2023 has been problematic at best. In Perth there are a number of factors making this especially difficult:

The construction of the new Jewish Hub has taken considerable physical, financial and human resources to achieve. It is going to plan

The current economic climate, political uncertainties, the Ukraine war.

The relevance of "far away HUJ" to the WA community. Other Jewish charities have saturated the space, which makes it harder for HUJ to be seen to be relevant. Scholarships are tangible to the local community.

Peter Winterton as President and the five other committee members; Yael Jacobsen, Lynne Swersky, Ken Bud, Martin Brezger, and Hilary Winterton have made 2023 a year to remember. Their enlightened counsel and the input from Dr Raphaely has made for many a lively meeting and for this I thank them. Hilary Winterton's efforts to ensure that no one goes home hungry does much to enhance meetings.

Robert Schneider, almost single handedly, keeps the front door of the organization open. Robert's attention to detail and governance issues is essential for this organization to run responsibly and instil confidence within our community, allowing members to feel secure in making bequests. He has stepped in when needed to help in The West with transporting visitors, for all these activities

I would like to thank him.

From the Federal CEO

Robert Schneider

(Note this Report relates to the year- end 30 June 2023)

I can't but not note that this AGM is the 76th of the Australian Friends and the 86th of the NSW branch. Subsequently, a Vic Friends branch was established but both later merged into the national Australian Friends body headquartered in Sydney but with representation in Melbourne, Perth and Brisbane.

Our longevity is a community record and credit is due to those who had the foresight to set up an organisation in Australia to support the Hebrew University and to those whose commitment and ongoing support allow us to continue with our mandate of supporting the Hebrew University in Australia.

BOARD & GOVERNANCE

I express my gratitude to Michael Dunkel, our Federal President for his ongoing support, wise counsel and stewardship of the organisation. I am also delighted to report that Michael Dunkel featured prominently in this year's Hebrew University Board of Governors Meeting. He was also re-elected to the Executive Committee of the Hebrew University's Board of Governors. Congratulations Michael.

I am grateful for the support of all board members but in particular wish to thank the Treasurer, Robert Greenfield who has been a tremendous resource not just to the Friends, but also to me personally. Robert's input to the Friends is invaluable!

Vice President Philip Moses is our organisational memory and the man we all turn to for information regarding the past. Thank you Philip.

I am grateful to NSW President Phillip Joel who is from a younger generation and brings much needed insights into a younger demographic that it is vital for us to embrace. Phillip is also a very generous contributor to the Australian Friends not least by undertaking our printing needs often at no cost or if charged for, at rates well below those of other commercial printing outfits.

I am also grateful to WA President Peter Winterton for his ongoing stewardship of our WA committee and for his generous support and hospitality manifested particularly during last year's visit to Perth by our Hebrew University guests.

Barry Joseph, our Honorary Secretary is of great assistance in assessing Australian students applying for financial assistance to study at the Hebrew University and often participates in the interview process. ▶▶▶

The office in Sydney serves as both the Head Office and NSW office of the Australian Friends and provides resources and services nationally.

Committee meetings are held every second month and where necessary, a Federal meeting is convened on the same date as a NSW committee meeting.

WA holds regular committee meetings and where necessary, a meeting is held with our Vic. steering committee via zoom.

STAFF

Our staff complement has undergone many changes especially post covid and following the return to Israel of Moran Pitchon.

I am delighted that we have a most efficient and enthusiastic administrator on board – Linda Kugel. Linda's bubbly personality, dedication and commitment to the Friends even outside of normal working hours is much appreciated.

The role of Student Liaison and Marketing has, in the past been filled by a parttime student and earlier this year, Jayden Adler joined us. In his short time with us, Jayden has increased our social media profile and has been responsible for much of the new promotional material. I might add that Linda also plays an active role in this area and her input here has been invaluable.

Eric Berman who joined us early in 2021 as Accounts Manager brings a professionalism and expertise to this role which can only stand us in good stead particularly now that the ZCAI forms part of our stable.

Our Data Base Manager, Joe Gelbart, a retired engineer with much experience in data processing continues to assist us a day or two per week as needed.

A big change in this last financial year has been the appointment of two dynamic part timers – Yif'at Biran in Melbourne and Talia Raphaely in Perth. The impact of both these ladies has already boosted our presence in these cities and their assistance in organising programs locally for our visitors from Israel is of great benefit.

OFFICE

Our lease runs until December 2025 which provides us with ongoing stability. On the annual anniversary date, the rental increases by the CPI.

DATA-BASE

As mentioned in my previous Annual Report, our ThankQ data base system enables us to manage both personal and financial data on the same system.

In the last financial year, we were able to integrate payments and other information made via our website direct to our data management system.

STUDENT LIAISON & MARKETING

We continue to reach out to Australian students encouraging them to embark on both short term and long term studies at the Hebrew University – no easy undertaking during this time of Covid.

Marketing: We continue to promote study at the Hebrew University, and we were represented at Student Fairs at a number of Australian universities in order to encourage Australian students to consider courses at the Hebrew University.

Much effort was spent on promoting the Hebrew University mainly through social media but also via the MASA program coordinated by the Zionist Federation of Australia. Our social media now runs on a schedule, and news articles are posted regularly in addition to flyers for online courses.

Mishpatim Seminar: The 'Mishpatim Seminar'

took place in person in early 2023 but with fewer numbers than we would have liked. We are actively promoting the 2024 seminar and hope that we will have a decent response.

Financial Assistance: 19 Students were assisted enabling them to participate in the ACU Ancient Israel program and archaeological dig at a cost of $19,000 ie. $1,000/student.

In addition, a further 19 students received scholarships in the financial year ending 30 June 2023 to the value of $32,504.

Statistics for 2022-2023: 58 students assisted or recruited by AUSTFHU participated in programs at HUJI in the last financial year compared to the last year prior to covid (2020-2021) where just 24 Australian students undertook study at HUJI.

Golimdja William Cooper Memorial Scholarship: I am delighted to report that thanks to the generosity of Ilana and Martin Moshal, a fully sponsored scholarship, the Golimdja William Cooper Memorial Scholarship (GWCMS), will be offered for an Indigenous Australian post graduate student to undertake an MSc course at the Hebrew University in 2024.

The Scholarship is named in honour of the late William Cooper, an Australian Aboriginal Leader who believed in the kinship of man and who bravely petitioned the German government in 1938 when he became aware of German atrocities being perpetrated against, among others, the Jewish People. It is for this reason that the Scholarship includes the Yorta Yorta word for "brave" – "Golimdja" as part of the Scholarship title because certainly, William Cooper was not only brave, but he also understood the power of education when he said "Education and opportunity will overcome the problems of the Aborigine (sic.)"

I am immensely grateful to Martin and Ilana for undertaking to finance this Scholarship which is aimed at bringing the expertise of Israel back to Australia to benefit the Indigenous community and Australia as a whole.

HONOURS CLUB

The NSW Honours Club is a great initiative for some of our mainly senior supporters who meet on the last Wednesday of every month to enjoy a presentation by a topical speaker.

These meetings have been held in the Community Lounge at Jewish Care but we believe that our previous venue – the Theatrette at the Waverley Library will become available to us again in early 2024.

Post Covid, it seems that attendances at the Honours Club are way down on what they were prior to Covid but a lot depends on the calibre of the speaker – speakers such as Dr Ron Weiser and Assoc. Prof. Peter Gonski attracted record attendances as did the presentation by the late Jeremy Jones whose untimely passing has caused a void in the community-as well as for us. ▸▸▸

LEGACY MISSION

I am delighted to report that our first Legacy Mission finally got off the ground and this last May, we had a small but quality group visit Israel under my guidance.

All participants met the minimum requirements in terms of a bequest provision with one participant committing a most generous bequest to the Hebrew University.

The intention is to run another Legacy Mission in May 2024 in partnership with the British Friends and advertising for this has already commenced.

PROMOTION & FUNDRAISING

National & NSW: I am pleased to report of the ongoing support of an anonymous donor in Melbourne who has committed in excess of $1million over a few years towards a unique Hebrew University program called Revivim. Revivim is designed to attract Israel's best and brightest students to a career in teaching Jewish Studies in Israel's secular middle and high schools. Revivim's combination of rigorous academic studies, a Special Academic Program, unique teacher training and individual mentorship turns its students into exceptional educators who are equipped to expose their students to Judaism's many aspects in an engaging, challenging and meaningful way. We are most grateful for this donor's commitment and support for this program.

An amount equating to approximately $492,000 was also donated directly by an entity with Australian connections direct to the Hebrew University for specific projects.

Bequests totalling $544,795 were also received in the financial year ending 30 June 2023.

In December 2022, we had the pleasure of hosting the President of the Hebrew University, Professor Asher Cohen, the Vice President in charge of Internationalisation, Professor Oron Shagrir and the keynote speaker at events in Sydney, Melbourne and Perth, Professor Yaakov Nahmias, one of Israel's most prominent bioengineers and Director of the Alexander Grass Centre of Bioengineering at the Hebrew University.

A successful function was held at a delightful venue in Maroubra with 150 bookings made. Unfortunately, some of those who booked came down with covid and were unable to attend.

Successful joint events were held with the Australia Israel Chamber of Commerce NSW (AICC) and with JNF NSW.

Individual meetings with donors: A luncheon hosted by Hebrew University Honorary Governor, Harry Triguboff AO. A dinner hosted by Central Synagogue's Rabbi and Rebbetzin Wolff .

On the professional side, collaboration meetings were held with the Universities of

Sydney, NSW and the Australian Catholic University and a new agreement was signed between the Hebrew University and the University of NSW by the two universities' presidents.

In January 2022, we arranged for a high-profile delegation of non-Jewish academics who visited Israel in a program organised by the Executive Council of Australian Jewry (ECAJ) to visit HUJI. The feedback from this visit was excellent so much so that we are planning for a further ECAJ group to visit in January 2024.

In partnership with AICC NSW and accountants Kelly+Partners, we arranged for an elite group of Sydney high school students to visit HUJI for a specially structured workshop on innovation. Once again, the feedback was very good and we hope this exercise can be repeated with future Kelly+Partners scholarship participants.

Partnerships are a very important avenue for us in order to expand our outreach to the broader community and taking into account our smaller resources.

I have referred to various joint events during our 2022 campaign and also below in the case of Vic. and WA and also in the last section of my report under the header – Israel.

Professor Yossi Garfinkel, an eminent archaeologist at the Hebrew University delivered the Sir Asher Joel Oration at the Sydney Jewish Museum in a partnership between the Australian Friends, the Museum, the Sir Asher and Lady Sybil Foundation and the Australian Catholic University.

Wherever possible, we make use of visiting Hebrew University faculty members for events either under our own banner or in partnership with other organisations..

Victoria: Yifa't Biran, our part-time Victorian Coordinator is a great asset and has already run some events for the Friends in Melbourne. I have no doubt that she will assist greatly in expanding our presence in Victoria.

I would like to acknowledge the amazing assistance and support received in Melbourne from one of our Life Governors, Professor Leon Mann AO and indeed also from his wife, Leah Mann AM. We are delighted that in June 2023, Professor Mann received a well-deserved Honorary Doctorate from the Hebrew University.

I am also grateful for the support from Jeremy Leibler, a senior partner at ABL and President of the Zionist Federation of Australia who was appointed a Governor of the Hebrew University in 2020. I have no doubt that Jeremy will prove to be a most valuable asset to both the Australian Friends and to the Hebrew University itself.

During the visit of Professors Cohen, Shagrir and Nahmias, the following events took place:

A luncheon with the Australia Israel Chamber of Commerce Vic.

A public lecture by Professor Nahmias at the University of Melbourne followed by a dinner hosted by the University in honour of our Hebrew University guests

A Kabbalat Shabbat event at the ARK Synagogue followed by a dinner hosted by ARK Rabbi and Rebbetzin Kaltmann

During the visit, Mr Marc Besen AC was made an Honorary Governor of the Hebrew University.

Western Australia: We have a WA committee based in Perth and chaired by Assoc. Professor Peter Winterton AM.

This committee meets on a regular basis and ▸▸▸

enjoyed the support of a part time PR Officer, Yael Jacobson until March 2023 when Talia Raphaely was appointed to this position. In the short time that Talia has been on board, her energy and positive spirit is already contributing towards a boost in our presence in Perth.

Articles about the Australian Friends and the Hebrew University are featured regularly in the local weekly, The Maccabean.

A number of public events are also held in Perth under the auspices of the local Friends committee.

During the visit of Professors Cohen, Shagrir and Nahmias, the following events took place:

A luncheon generously hosted by longtime member of the Hebrew University Board of Governors, Stuart Silbert OAM

The visit was to have included a meeting with longtime generous donors Harry Hoffman AM and Sylvia Hoffman OAM but Harry took ill during our visit and we were unable to meet him and sadly he passed away a few days later. I salute the memory and generosity of Harry Hoffman AM – a man who I got to know and respect from my time as JNF Australia CEO and I was delighted when still in that role, he shared with me the amazing Leadership Program he had agreed to fund at the Hebrew University. We are all saddened by his loss and heartfelt condolences were extended to his family.

Our WA President, Assoc. Prof. Winterton and his wife Hilary generously hosted a well-attended breakfast lecture by Professor Nahmias. with the Australia Israel Chamber of Commerce Vic.

Queensland: Our Legacy Mission adverts as well as articles about the Australian Friends and the Hebrew University are featured from time-to-time in the local monthly, SHALOM and the support of the SHALOM editor, David Jacobs is much appreciated.

NATIONAL PROMOTION

We have been very selective in our advertising especially since the start of Covid and have chosen to be part of carefully targeted Australian Jewish News editions and supplements nationally (Melbourne and Sydney editions) e.g. Yom Ha'atzmaut, Education, National Calendar.

In the last financial year, we began advertising in the publication distributed to the community free-of-charge, The Jewish Report in both the Sydney and Melbourne editions. Judging from enquiries for last year's Legacy Mission, many of them came from readers of the Jewish Report. Another positive of advertising with them is that they allow advertisers advertorial content.

The Australian Friends Yearbook – in hard copy and electronic versions

E-newsletters, generally coinciding with the main Jewish holidays sharing the latest news from the Hebrew University with our supporters.

Special greetings to mark an important event.

ISRAEL

The 2023 Board of Governors Meeting took place in Jerusalem between the Saturday 10 and Tuesday 13 June.

Unfortunately, the condensed format meant that some of the familiar events including the Friday night dinner never took place.

Highlights of the 2023 Board of Governors included the following –

The awarding of an honorary doctorate to Professor Leon Mann AO.

The reception hosted by the Australian delegation for Australian attendees, HUJI personnel and family and friends of Professor Mann.

The dedication at the Wall of Life in memory of the late Deborah Joselson whose generous bequest will assist the Hebrew University continue its path of excellence as Israel's premier university.

The closing reception which included the laying of the cornerstone of the new Einstein House scheduled to open in 2025 coinciding with the centenary of the opening of the Hebrew University in 1925 although it's establishment was announced in 1918 making it the oldest of Israel's universities.

The 2024 Board of Governors Meeting will, unfortunately be of the same duration as this year's meeting – shorter than in previous years. The dates for the 2024 Board of Governors are Saturday 01 June till Tuesday 04 June.

As referred to previously, we were delighted with the visit of Hebrew University President Professor Asher Cohen, Vice President Professor Oron Shagrir accompanied by our special guest, Professor Ya'akov Nahmias, Director of the Hebrew University's Alexander Grass Centre for Bioengineering

Faculty members of the Hebrew University visiting Australia are always warmly welcomed and were delighted that one of HUJI's most eminent professors, Hermona Soreq visited Melbourne and Perth in June and that she kindly consented to appear at events in both cities in support of our work.

I would also like to thank the staff at the Hebrew University for their ongoing assistance and support in particular those with whom I work with on a regular basis who include Amb. Yossi Gal, Vice President for Advancement & External Relations, Ram Semo, Director of Advancement & External Relations, Faith Segal, Head of the Australian Desk, Brenda Needle-Shimoni, Director of Donor Services, Rivkie Harel, Shoshana Israel, Sarit Petersen, Jane Turner, Naama Oryan and Anat Yaffe.

I am also grateful for the assistance and support of my colleagues of the American Friends, the British Friends and the Canadian Friends who are always willing to share their resources with us in Australia.

Last, but certainly not least, my thanks to our members, donors, and advertisers without whose support, we would not be able to succeed in our role of continued support for the Hebrew University.

The Hebrew University

Recent Awards List

21/07/23 Hebrew University **Professor Adam Lefstein** Appointed as Fellow by the British Academy, Marking Exceptional Contributions to Research

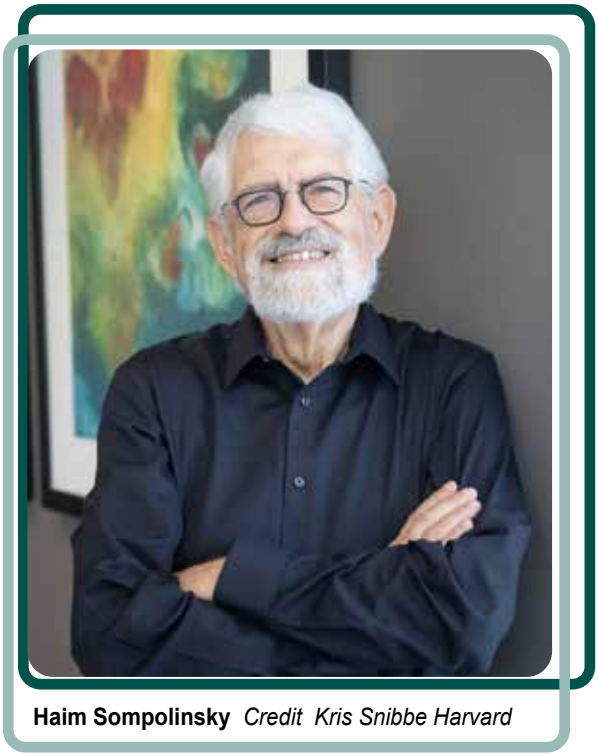
05/09/23 Hebrew University Takes the Lead Among Israeli Universities with the Highest Number of 2023 ERC 'Starting Grant' Recipients. Hebrew University stands out as the top-performing Israeli institution with the highest success rate in grant applications. The following Hebrew University researchers have been selected as recipients of ERC grants: **Professor Guy Katz** of the School of Computer Science and Engineering; **Dr. Shir Atzil** of the Department of Psychology and head of the Neuroscience of Bonding Lab; **Dr. Or (Michael) Hershkovits** of the Einstein Institute of Mathematics; **Dr. Daniel Sharon** of the Institute of Chemistry and the Center for Nanoscience and Nanotechnology; **Dr. Tamar Stein** of the Institute of Chemistry and the Fritz Haber Research Center for Molecular Dynamics; **Dr. Michal Breker-Dekel** of the Department of Plant and Environmental Sciences in the Institute of Life Sciences; **Dr. Gali Umschweif-Nevo** of the School of Pharmacy; **Professor Noam Gidron** of the Department of Political Science and PPE; **Dr. Raunak Basu** of ELSC; and **Dr. Rivka Bekenstein** of the Racah Institute of Physics.

06/09/23 President Herzog hosts Presidential Medal of Honor Award Ceremony it was decided to award the prize to a wide variety of 13 people active in various fields in Israel and in the Diaspora. Among the recipients: eight men, five women, one organization, two leaders from the Diaspora. The ages of the recipients range from 35-102 and they embody the diverse and vibrant Israeli and Jewish mosaic. Amongst them, **Professor Meir Buzaglo** and **Professor Mona Khoury** from the Hebrew University.

Mona Khoury with President Isaac Herzog

23/11/23 The Hebrew University Tops ERC Consolidator Grant Wins for 2023, Garnering NIS 47 million. The recipients of the ERC grants from the Hebrew University include: **Dr. Erez Zohar** from the Rakah Institute of Physics, **Prof. Yair Furstenberg**, who chairs the Department of Talmud and Halacha, **Prof. Oren Ram** from the Institute of Life Sciences, **Dr. Yonatan Anahory** also from the Rakah Institute of Physics, **Prof. Katrina Ligett** from the School of Engineering and Computer Science and overseeing the Center for the Study of Rationality at the Hebrew University, along with **Dr. Nicholas Stone**, also from the Rakah Institute of Physics.

29/02/24 Prestigious 2024 Brain Prize Awarded to Hebrew University's **Prof. Haim Sompolinsky** by Lundbeck Foundation



Haim Sompolinsky *Credit Kris Snibbe Harvard*

20/03/24 Dr. Cochav Elkayam: Dr. Cochav Elkayam-Levy Awarded the Israel Prize for her Work to Raise Awareness of Hamas' Crimes Against Humanity against Israeli Women, Children, Men, and Families

29/03/24 3 Israeli Prize HUJI winners: **Prof. Gershon Ben-Shakhar** for Psychology Research, **Prof. Ya'acov Ritov** for Statistics Research, and **Prof. Hagai Bergman** for Life Sciences Research

11/04/24 Three researchers from the Hebrew University have been awarded prestigious research grants by the European Research Council (ERC): **Professors Maren R. Niehoff, Nathan Linial,** and **David Kazhdan**

12/04/24 Hebrew University extends its heartfelt congratulations to former faculty member of Hebrew University **Professor Avi Wigderson** on being honored with the esteemed Turing Award for his groundbreaking contributions to the field of theoretical computer science.

The Hebrew University
Student Perspectives on Academic Exploration in Israel

Israel, a land full of history and culture, often faces scrutiny and misinformation in global narratives. Despite negative media portrayals, Australian students embarking on academic endeavours at the Hebrew University of Jerusalem (HUJI) discover a nation that defies stereotypes, offering diverse and profound experiences.

Martyn Poyitt, participant in the Tel Lachish Excavation Program 2023, challenges prevailing Western perceptions of Israel as a perpetual conflict zone. “In the Western media, Israel/Jerusalem is often depicted as a warzone but I found a wonderful country and an amazing city full of many different peoples and religions all living in relative harmony,” Martyn observes. His experience echoes that of many who discover a vibrant and harmonious society beyond the headlines.

For **David Gerald Hilder**, pursuing a Masters in Assyriology at HUJI in 2023 opened doors to unparalleled academic opportunities. “(HUJI) is one of the best places in the world to study,” David asserts, emphasising the university’s international standing as a global top 100 university.

Anastazia Pincevic’s archaeological journey in 2023 reveals Israel’s diverse landscape. “I didn’t realise Israel was so diverse in its nature and geography,” Anastazia muses. Her words echo the awe and appreciation felt by many students as they explore Israel’s storied past.

David Godfrey, reflecting on his time at the Rothberg School Ulpan in July 2023, encapsulates the essence of discovery. “Through the knowledge at the HUJI I got to see the layers in Israeli society and Jerusalem,” he shares, highlighting the depth of insight gained during his learning at HUJI.

Credit: Max Lerman

Phoebe Allan’s exploration of Israeli law through the *Mishpatim* program in 2023 exemplifies the university’s commitment to fostering nuanced understanding. “Studying at HU gave me an opportunity to learn more about Israeli law and engage with some more controversial issues which was a really unique and valuable opportunity,” Phoebe reflects. Her experience underscores HUJI’s role as a platform for critical discourse, where students tackle complex issues with intellectual rigour and empathy.

There is a common thread in these experiences—the Hebrew University of Jerusalem as a catalyst for exploration, understanding, and personal growth. Through academic inquiry and cultural immersion, students like these find themselves not only enriched intellectually but also spiritually and emotionally. Their experiences serve as testaments to the transformative power of education and the endless opportunities for discovery that await those who dare to venture into the heart of Israel’s premier university.

Digging up the past leads to new finds and friendships

Gil Davis

In January/Feburary 2023, a joint team excavated at the site of Lachish under the direction of Hebrew University's eminent archaeologist Professor Yossi Garfinkel. Twenty-seven staff and students from Australian Catholic University's (ACU) Archaeology of Ancient Israel program travelled to Israel to work with Yossi and his selected assistants. They were led and organised by Associate Professor Gil Davis and supported by donor funding and generous travel scholarships from The Australian Friends of Hebrew University. The dig was an outstanding success both in terms of its findings and the relationships between the two universities and staff that it helped develop.

Lachish was an ancient Canaanite and Judahite city situated in the transitional zone between the Judean Shephelah and the Philistine Coastal

Students at the site of Lachish

Plain. It occupies a huge Tel (mound) and is best known for its siege and conquest by the Neo-Assyrians under their king Sennacharib in 701 BCE. This is depicted on the Lachish reliefs in the British Museum and celebrated by Lord Byron in his famous poem 'The Destruction of Sennacharib':

The Assyrian came down like the wolf on the fold,
And his cohorts were gleaming in purple and gold.

The cohort from ACU were not so sartorially elegant but they were well disciplined, and they set to their tasks with a will. If they were surprised at finding themselves on a bus before dawn ready to spend a hard day's digging followed by hours washing pottery and then listening to lectures, no one complained (too much).

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- **Excavate at Israel's renowned archeological sites**
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When it rained for a couple of days, the students were treated to a masterclass of incomparable lectures by Yossi on the ancient history and archaeology of Israel. Then it was back to work, taking off wet weather covers and draining trenches.

The focus of the excavations was on a partially uncovered wall or revetement and adjacent domestic buildings that Yossi believed were constructed by King Rehoboam, grandson of David and ruler of the ancient kingdom of Judah around 920 BCE. The excavations confirmed answers to crucial questions about the dating and extent of Judahite rule of this part of ancient Israel and helped substantiate the biblical tradition in 2 Chronicles 11:5–12 of Rehoboam's city building activities.

On weekends, the students toured Israel from south to north soaking up culture and history. They climbed Masada, floated in the Dead Sea, explored Jerusalem, made sense of their excavations at the Israel Museum, ran races in the stadium at Caesarea, marvelled at Megiddo and other ancient sites, visited Capernaum and had a wonderful night out in Haifa.

Israel worked her magic on all leaving an indelible impression. One student reported that at school he had learnt about the Holocaust, but at Yad Vashem he understood it. Although none of them were Jewish, many reflected on the spiritual awareness they felt in the simple communion of Shabbat on Friday nights. Others valued the friendships and knowledge they gained from working with their Israeli supervisors from Hebrew University.

All in all, the dig was an unqualified success, with huge thanks to Hebrew University and its Australian Friends.

Associate Professor Gil Davis
gil.davis@acu.edu.au

Niv Gronovich's visit to Australia

The Wonder of Youth

For many years, the Hebrew University's Youth Division (YUJI) has run a special program for gifted school students enabling them to participate in active research in fully-fledged laboratories at the University. Rob Schneider, Australian Friends CEO was particularly impressed with one such student – Niv Gronovich whom he met at the 2022 Hebrew University Board of Governors meeting and duly invited him to visit Australia. The visit was scheduled for October 2023 and then of course came the horrific attacks by Hamas on 7 October and it was thought highly unlikely that Niv would be allowed to travel, but more about this later.

YUJI offers a variety of academically engaging and challenging activities to ignite curiosity in its young participating students exposing them to current scientific research, tools for critical analysis and creative thinking and encouragement towards higher education especially in the scientific and technological fields.

The Alpha Program is a joint initiative of the Hebrew University together with the Future

Niv Gronovich at work in the lab

The Australian Friends were honoured to host Niv Gronovich, an exceptional young man from the Hebrew University's Alpha Program for talented and gifted students. Niv inspired audiences in both Sydney and Melbourne with details of his fascinating research on bacteriophages, and as a shining example of the future leaders that the Hebrew University cultivates

Scientists Center and the Ministry of Education's Department for Talented and Gifted Students. The Program was established to meet the unique intellectual needs of especially talented students such as Niv by enriching their knowledge base, exposing them to high-level scientific research and providing them with the tools to engage in independent scientific research on an academic level.

Niv conducted his research in the laboratory for phage therapy at the Institute of Biomedical and Oral Research of the Faculty of Dental Medicine. Together with his supervisors and mentors Ortal Yerushalmi and Prof. Ronen Hazan, the head of the lab, Niv worked on researching bacteriophages – viruses that specifically attack bacteria. This research is considered one of the most promising solutions to the crisis stemming from the emergence of antibiotic-resistant infections. Niv's contribution has been beneficial to this research and more than 20 patients have already been treated with this novel solution to the resistance of antibiotics.

After finishing school, Niv was accepted into the ▸▸▸

Niv with Rob Schneider during his visit

TZAMERET program and is studying medicine at the same time as serving in the IDF. Niv was scheduled to begin his Australian tour on 13 October 2023 but as we know, with the outbreak of war on 7 October, this seemed an unlikely prospect. However, his officers in the IDF and supervisors in the Faculty of Medicine felt differently and to our surprise, permission was granted for Niv to visit Australia in the hope that his visit would boost the morale of the Jewish community here, in particular young Jewish Australians.

Niv's visit achieved all these objectives and more. He wowed audiences in Melbourne and Sydney in Synagogues, youth events, schools, and community presentations. But Niv's visit did not just boost and inspire our sprit in Australia – it also boosted and inspired him! Attending Shabbat morning services in Melbourne's

Young adult event in Sydney

Niv talking to young Jewish students at Mt Scopus in Melbourne

Niv addressing the NSW Honours Club

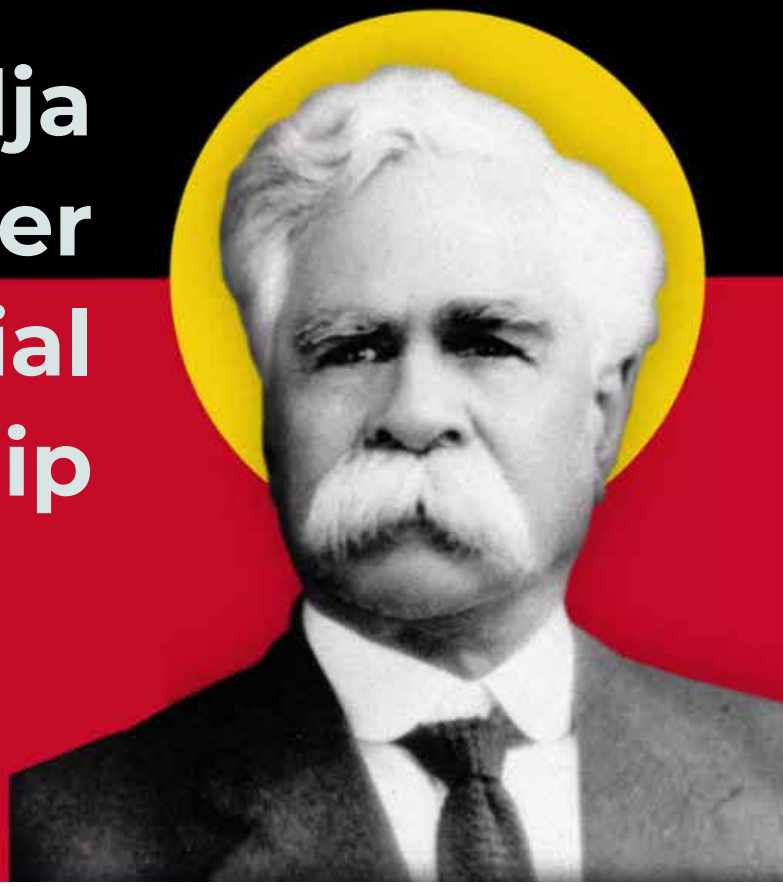
Niv at Emanuel School, Sydney

Caulfield Shul and listening to Cantor Dov Farkas and the Caulfield Shul choir rendering the prayer for the State of Israel and the Israel Defence Force, young Niv was moved beyond words. There and then, he told Rob that his visit to Australia meant that he could return to Israel with a strong message for his IDF colleagues, fellow students, and all Israelis that Australian Jews stand steadfastly with their brothers and sisters in Israel.

Niv's visit indeed provided us with hope and helps reaffirm our belief in the excellence of Israel's young people. Rob Schneider reinforces this saying that "Niv's visit exceeded my expectations. His unassuming, yet confident manner in which he delivered his message gives us faith and reassurance that with universities such as the Hebrew University producing such outstanding young leaders, the future of Israel will be in good hands."

Niv at the Doherty Institute in Melbourne

The Golimdja William Cooper Memorial Scholarship



The Australian Friends of the Hebrew University is delighted to announce that thanks to the generosity of Ilana and Martin Moshal, a fully sponsored scholarship, the Golimdja William Cooper Memorial Scholarship was launched in late 2023. The original aim was to attract Aboriginal post graduate students interested in undertaking an MSc course at the Hebrew University in October 2024 but due to the outbreak of war in Israel in October 2023, it was decided to rather promote the scholarship for the 2025 academic year.

The Scholarship is named in honour of the late William Cooper, an Australian Aboriginal Leader who believed in the kinship of man and who bravely petitioned the German government in 1938 when he became aware of German atrocities being perpetrated against, among others, the Jewish People. It is for this reason that the Scholarship includes the Yorta Yorta word for "brave" – "Golimdja" as part of the Scholarship title because certainly, William Cooper was not only brave, but he also understood the power of education when he said *"Education and opportunity will overcome the problems of the Aborigine (sic.)"*

"The programs being offered as part of the Golimdja William Cooper Memorial Scholarship build further on the Jewish ethos of *Tikkun Olam* which means 'healing the world' and are being offered to a suitably qualified Indigenous Australian student in the hope that Australia, and in particular, indigenous communities, will benefit from Israel's experience and expertise in these areas" says Rob Schneider, CEO of the Australian Friends who conceived the idea of a scholarship at the Hebrew University to honour the memory of William Cooper. Rob is a long-time friend of the Cooper Family and escorted family members, including William Cooper's closest living relative, his grandson Alfred (Uncle Boydie) Turner, on their first visit to Israel in April

2009 when 70 trees were planted, to mark the 70th anniversary of Kristallnacht and William Cooper's brave act.

In welcoming the scholarship named in honour of his late grandfather, Uncle Boydie said "I visited Israel for the first time in 2009 with Rob Schneider. It is pleasing that our long connection has resulted in a Hebrew University scholarship being offered to an Indigenous Australian. My grandfather understood the importance of education and demanded that our people should no longer be denied the opportunity to learn. I am delighted that this scholarship in my grandfather's name will give an Indigenous student the opportunity to bring back knowledge and benefits for our people, and for all Australians".

The Golimdja William Cooper Memorial Scholarship was officially launched at the Jewish Museum of Australia in Melbourne on Sunday 19 November 2023 with the keynote speaker being Dr Lois Peeler AM, 2022 NAIDOC Female Elder of the Year, 2017 Victorian Senior Australian of the Year.

Dr Peeler delivered a most heartwarming tribute to William Cooper including an outline of the struggle by the First People to secure their rights in Australia. She ended her inspiring address with these words "Uncle William Cooper, through his leadership, commitment and determination, has made a difference not only in Aboriginal society in Victoria but which has rippled across the country and indeed across the world. This is a start to Two Way education. A beginning of learning and a beginning of shared understanding."

The Sydney launch took place at the Sydney Jewish Museum on Monday 4 December 2023 with the keynote speaker being Professor Lisa Jackson Pulver AM, Deputy Vice Chancellor Indigenous Strategy and Services at the University of Sydney and herself a former student at the Hebrew University.

Professor Jackson Pulver spoke of William Cooper's commitment to education and how important it was to translate words into actions as William Cooper did ending her address saying, "We all have a role in knowing the story of this ▸▸▸

Group photo - Melbourne launch - L/R Jan Jago, David Jago, Dr Lois Peeler AM, Rob Schneider, Kevin Russel, Greg Moshal, Zelda Rosenbaum AM

Martin Moshal addressing the Sydney launch.

Sydney Keynote Speaker Professor Lisa Jackson Pulver AM, Deputy Vice Chancellor Indigenous Strategy, and Services at the University of Sydney.

Group Photo - Sydney launch - L/R David Ossip, Ilana Moshal, Martin Moshal, Prof. Lisa Jackson Pulver AM, Rob Schneider, Michael Dunkel, Julian Leeser MP, David Jago.

land, we have responsibilities to each other, obligations to pass on the truth of this place, and rights to belong – all of us."

Prior to Professor Jackson Pulver's address, Sydney human rights lawyer, Stewart Levitt read out a poem he had written about William Cooper called "On a Mission."

The Sydney launch was privileged to also be addressed by the Hon. Julian Leeser MP, former Shadow Attorney General and former Shadow Minister for Indigenous Australians. Julian brought together beautifully the example of William Cooper and the promise of the scholarship saying "we are reminded that the focus of Cooper's life was the education, advancement and place of Aboriginal people in our national life. And that is what is so wonderful about this scholarship. It takes that night of courage and repays it by focusing our attention on what William Cooper's life of courage was about: creating opportunity for Indigenous leadership in this land. William Cooper's life was about lifting Indigenous communities through Indigenous opportunity. That's what we are adding to tonight."

Martin Moshal, speaking for himself and his wife Ilana stated that it was an honour for them to be funding a scholarship in the name of William Cooper. He recounted how he had first learned about William Cooper from an exhibit in the Sydney Jewish Museum and that he and Ilana had jumped at the opportunity presented by Rob Schneider to fund a scholarship honouring the brave deeds of William Cooper – a man, who he said "stood up for the plight of the Jews when he, himself did not enjoy rights in his home country."

The last word comes from Michael Dunkel, President of the Australian Friends of the Hebrew University who in thanking Martin and Ilana Moshal for their generosity adds that "Hebrew University scientists and scholars have

Dr Lois Peeler AM delivered the keynote address at the Melbourne launch

Stewart Levitt reading his poem "On a Mission."

Rob Schneider with members of the Cooper Family – L/R Leonie Drummond (great granddaughter), Kevin Russel (great grandson), Alfred (Uncle Boydie) Turner (grandson) Rob Schneider, David Jago (great, great grandson)

played a leading role in Israel's transition from an inhospitable, semi-arid and disease-ridden environment into a highly developed first-world country that today is an international leader in health care, hi-tech, agricultural production, industry and social welfare despite ongoing threats to its security. To be able to share this expertise through this scholarship program can only benefit the Aboriginal community and Australia in general."

For further information about the scholarship visit – https://austfhu.org.au/students/admissions/scholarship-opportunities/the-golimdja-william-cooper-memorial-scholarship-information-sheet/
or call Rob Schneider
02 93892825 or email ceo@austfhu.org.au

Celebrating my love affair with The Hebrew University

Professor Leon Mann AO was deservedly recognised by the Hebrew University of Jerusalem for his long history of support and contribution with the degree of Doctor Philophiae Honoris Causa during a ceremony held at the 2023 annual Board of Governors Meeting. Professor Mann recalls his many wonderful memories and experiences over the course of many decades of collaboration and involvement with the Hebrew University.

Professor Leon Mann AO

Throughout my long career as an academic I have been proud to be a champion and friend of the Hebrew University. While I studied at Yale and taught at Melbourne, I cherish The Hebrew University as my academic family. To me, The Hebrew University stands for the torch of learning on Mt Scopus shining the light of education and knowledge throughout the Jewish and non-Jewish world.

During my 50 years of association with The Hebrew University (HU) I have been fortunate to teach Masters students while a Visiting Professor of Psychology, give seminars to Nursing Department staff and students, conduct collaborative research with gifted HU faculty in Psychology, Education and Nursing, learn from the BioDesign in Medical Innovation

Rob Schneider, Professor Leon Mann AO and International Master of Public Health students.

Professor Leon Mann AO with wife Leah Mann

Professor Leon Mann AO receiving his Honorary Doctorate

program created by HU colleagues in Medicine, Engineering, and Business, and help build a strong faculty and student exchange agreement between The Hebrew University and The University of Melbourne.

I am excited when I attend HU Board of Governors meetings because there is always something new. I have fond memories of BOG events at which President Shimon Peres spoke about the critical ▸▸▸

Asher Cohen, Leon Mann, Tamir Sheafer

Professor Leon Mann AO
pictured with 'Albert Einstein'

The Mann family celebrating in Jerusalem

importance of brain research, President Reuven Rivlin welcomed us to his residence in Talbiya. We attended a lively session of the Knesset. We toured Herodion, Masada, and the Qumran caves where the Dead Sea scrolls were buried. We attended a stunning performance of the opera Carmen in the desert near Masada. Experts from the HU guided us around archaeological excavations in the Old City, walked us through the Western Wall tunnel and into Zedekiah's Cave, and showed us the Jewish, Christian, and Armenian Quarters of the Old City. They guided us on walks around Talbiya and the German Colony and took us to see "Area C" on the West Bank, home to thousands of Palestinians and Jewish settlers.

We enjoyed receptions on the HU Rehovot campus, the Israel Museum, Tower of David Citadel, Jerusalem Zoo, and the Jerusalem Theatre. I recall warm Shabbat Dinners in the King David Hotel where former HU President Menachem Sasson always welcomed us as "my family from all over the world". The 2013 BOG was unforgettable, the year Barbara Streisand was awarded an Honorary Doctorate of The Hebrew University and sang "Avinu Malkeinu".

The 86th Board of Governors meeting in June 2023 was especially meaningful to me and my family. I had been awarded Hebrew University Honorary Fellowship in 2011 and elected Honorary Life Governor in 2012. Now on June 12, 2023, I was to be honoured with the University's highest honour- an Honorary Doctor of Philosophy.

The citation for my Honorary Degree reads: The Senate of the Hebrew University of Jerusalem has resolved to pay tribute to Professor Leon Mann AO honouring his scholarly contributions to the field of psychology through his research in decision making; for translating his findings into curriculum used in IDF officer training and educational programs in Israel; recognizing his life-long commitment to the Jewish people and Israel, including The Hebrew University of Jerusalem, where he established the Phillip Mann Memorial Prize honouring his late brother and the Mann Family Awards for researchers studying brain disease; and with gratitude for his ongoing efforts to strengthen the partnership between the Hebrew University and the University of Melbourne.

I was delighted by the generous hospitality the University extended to my wife Leah, our family, and friends invited to the Honorary Doctorate

luncheon in Bet Maiersdorf and Convocation Ceremonies in Liwerant Mexico Hall and Rothberg Amphitheatre. I was moved by the warm welcome from the Australian Friends of the Hebrew University to the Mann family and Israeli and German friends at the supper following the Doctorate ceremony. Our German friends, descendants of the two families who hid my Uncle Moritz and Aunt Henriette Mandelkern during the Holocaust, were also moved. They came to Jerusalem for my Honorary Doctorate ceremony and to join us at a Tribute event at Yad Vashem for their courageous grandparents recognised as “Righteous Among the Nations”. Our friends from Germany are avid and knowledgeable supporters of Israel. Now they are staunch friends of HU.

There are other wonderful memories of HU BOG June 2023. Standing with President Asher Cohen, Rector Tamir Sheafer, and the other Honorary Doctorates before a happy audience of family, friends, and PhD graduates in Rothberg Auditorium. The Einstein House cornerstone laying ceremony on Givat Ram attended by President Isaac Herzog followed by a sumptuous dinner where Leah and I joined the Australian Friends dinner table. During the dinner I had my photograph taken with Albert Einstein --or possibly his lookalike. We attended the Donor’s lunch at Givat Ram campus with outstanding graduate students from Africa and other countries who have received scholarship support for their HU studies. And of course, the crowning pleasure of being in Jerusalem with my family, friends, colleagues, Asher Cohen, Michael Dunkel, Rob Schneider, Robert Simons, Phillip Moses, Faith Segal, Dani Galai, Koby Nahmias, Charlie Greenbaum, Itzhak Friedman, and Sarit Shimony Kahat.

My fond memories of HU BOG 2023 will last a lifetime.

IN TRIBUTE TO

PAUL KEEN Z”L

A LONGSTANDING FRIEND AND SUPPORTER OF THE HEBREW UNIVERSITY

PAUL COUNTED HIS COMMITMENT TO THE AUSTRALIAN FRIENDS OF THE HEBREW UNIVERSITY AND ISRAEL, AMONG HIS PROUDEST AND MOST MEANINGFUL CONTRIBUTIONS.

IN GRATEFUL RECOGNITION OF THE THE KEEN FAMILY’S CONTINUED SUPPORT

WHEN DUTY CALLS -

The Hebrew University is always there

The Jewish world was shattered on Saturday 7 October when Hamas terrorists entered Israel and slaughtered more than 1400 Israelis, kidnapped 240 innocent people, and wounded many more.

Jews everywhere rose to the occasion raising money, sending much needed supplies and provided moral support in a myriad of ways.

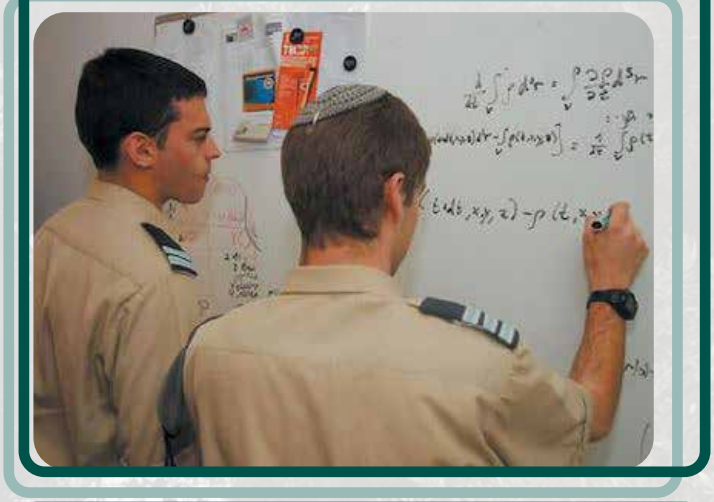
How did the Hebrew University react to the gravest situation faced by Israel since the Yom Kippur War and for the Jewish People, the largest slaughter of Jewish lives in one day since the Holocaust?

The Hebrew University is not only Israel's first and foremost university, but it is also the university that has the most important ties and collaboration with the Israel Defence Force.

It is the home to the elite **TALPIOT** program housed on the Givat Ram campus. Talpiot is a top-notch Israeli Defence Force (IDF) training program for talented recruits who have demonstrated outstanding academic ability in the sciences and leadership potential. Graduates of Talpiot have been involved in major military developments such as the Merkava tank and the Iron Dome to name but a few.

The Hebrew University also runs the **HAVATZALOT** program which trains intelligence officers for key roles in the IDF's Intelligence Directorate. Havatzalot's cadets complete a full three-year bachelor's double major degree at the Hebrew University of Jerusalem. In addition to academic studies, the cadets go through rigorous military and intelligence training, including visits to various IDF units, combat recruit training and officers' course. The Havatzalot Program is regarded as one of the most prestigious

Soldiers in laboratory



Search and Rescue reserve troop of Home Front Command visited the Faculty of Agriculture for a much-needed break

programs in the IDF.

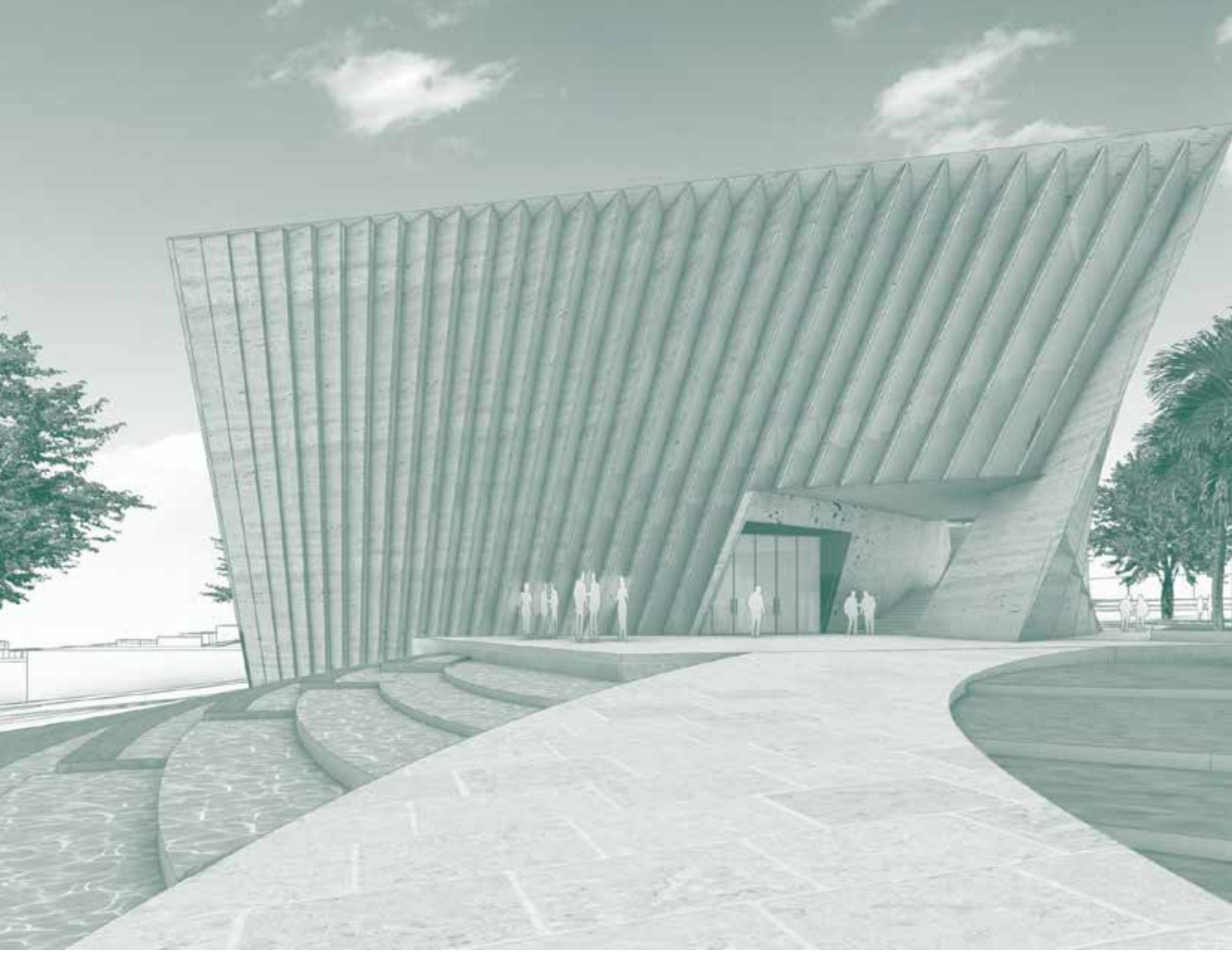
The Institute for Research in Military Medicine (IRMM) is an institute of the Faculty of Medicine of the Hebrew University in partnership with the IDF. The IRMM was established in 2013 for the purpose of developing new treatments and technologies of relevance to operational military medicine and disaster management.

The BINA Elite Dentistry Reserve Track was established some 8 years ago with students of dental medicine committing to serving for five years in the IDF after finishing their dental studies and receiving their degree. Bina cadets go on to serve as Dental Officers in various units in the IDF Dental Corps based upon the IDF's needs.

Furthermore, exclusive to the Hebrew University is the **TZAMERET** program run in partnership with the IDF that allows a student accepted on this program to serve in the IDF whilst studying for a medical degree. Although this entails a longer commitment to the IDF upon graduating, while studying, a Tzameret student is offered opportunities in areas beyond normal medical studies to be prepared to deal with casualties of war as well as disaster relief.

Summing up the role of the Hebrew University in the difficult days that followed 7 October, Hebrew University President, Professor Asher Cohen said "These are challenging days, marked by anxiety and uncertainty. The university is determined to be a beacon of hope and to make an unequivocal promise to our university community that better days lie ahead."

This is the hope and prayer of all of us and since its establishment in 1918, the Hebrew University has certainly lived up to the words of Professor Cohen.



The Einstein Legacy at the Hebrew University

Albert Einstein was one of the founders of the Hebrew University and a strong protagonist for its role as the “University of the Jewish People” saying that “..support of the Hebrew University in Jerusalem and the maintenance of its high standards are of decisive importance.”

So much so that he bequeathed all his writings and intellectual property to the Hebrew University before he died in 1955. The archives now include more than 82,000 items and are an important stop for many visitors to the Hebrew University’s Mt Scopus campus.

In fact, last year, one of the highlights of the Executive Council of Australian Jewry’s Mission to Israel of senior academics was the time spent at the Einstein Archives and many a visitor has been enthralled to be able to be photographed standing at Einstein’s own lectern.

Ground breaking on the new Marie and Jose Mugrabi Einstein House. L-R Asher Cohen, Isaac Herzog, Moshe Leon. *Credit: Max Dinshtein*

L-R Yishai Fraenkel, Jose Mugrabi, Asher Cohen, Marie Mugrabi, Daniel Liebeskind. *Credit: Max Dinshtein*

Thanks to the generosity of Colombian philanthropist and renowned Andy Warhol art collector, Jose Mugrabi, together with funding from the Israeli government, the Hebrew University is building a dedicated Einstein House on its Givat Ram campus as an ode to the German-born theoretical physicist who developed the theory of relativity — a building that will be the new home for the brilliant Nobel Prize winner's archives.

During the 2023 Board of Governors meeting last ▸▸▸

June, President Isaac Herzog, Hebrew University President Asher Cohen, Jerusalem Mayor Moshe Leon and philanthropist Jose Mugrabi laid the cornerstone for Einstein House in the presence of hundreds of local and international dignitaries including its famous architect, Daniel Libeskind.

The distinctively shaped Einstein House, designed by the world-renowned Libeskind as a cube twisted on a vertical axis, will highlight the impact of Einstein's discoveries, his involvement in humanitarian and civil rights issues, and his deep commitment to Hebrew University, Israel and the global Jewish community.

It will include a reconstruction of Einstein's personal library and his office, and exhibits of his original documents, including ones on the theory of relativity and the manuscript that introduced the famous equation $E=mc^2$.

The new Einstein House is hopefully going to be ready in 2025, in time for the centenary of the opening of the Hebrew University in 1925 - although it was established already in 1918 with Einstein delivering lectures there in 1923.

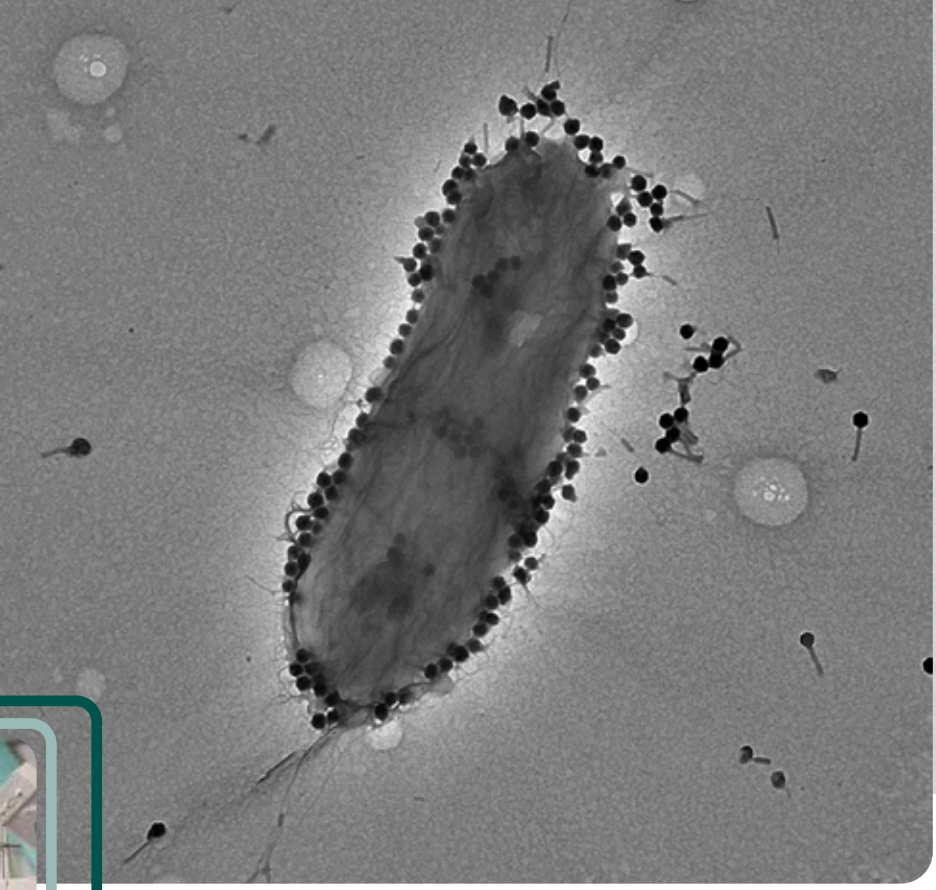
Einstein House, in its new location and grandeur will, no doubt, become one of Jerusalem's most exciting visitor attractions further showcasing the excellence of the Hebrew University and reinforcing Einstein's vision of the Hebrew University as the 'University of the Jewish People."

Anti-bacterial virus successfully treats antibiotic resistant infection

Prof. Ronen Hazan *Credit Nati Shohat Flash90*

A new international study conducted by the Israeli Phage Therapy Center (IPTC) led by Prof. Ran Nir-Paz at Hadassah Hebrew University Medical Center and Prof. Ronen Hazan of the Faculty of Dental Medicine at The Hebrew University of Jerusalem, using phage PASA16 on compassionate basis to treat tough *Pseudomonas aeruginosa* infections, has shown promising results with an 86.6% success rate. This research involving 16 patients with persistent infections represents the largest of its kind and brings encouraging findings. The study's success demonstrates the potential effectiveness of PASA16 phage therapy in tackling challenging *Pseudomonas aeruginosa* infections, paving the way for future clinical trials and encouraging further exploration of phage therapy as an alternative and auxiliary approach against antibiotic-resistant infections.

Phage therapy, the use of specific anti-bacterial viruses against infections, has garnered attention as a critical addition to conventional antibiotics, though clinical trials in this area have been limited. However, recent compassionate phage therapy cases have shown potential, albeit with scarce evidence on treating difficult infections. This study sheds light on the potential role of phages in combination with antibiotics



Visualisationof the PHAGE
Credit Prof. Ronen Hazan

in combating the hard-to-treat pathogen Pseudomonas aeruginosa infections that were unresponsive to conventional treatments.

Prior to treatment, all *Pseudomonas aeruginosa* isolates from patients were tested and treatment was personalised provided to those who were found to be sensitive to the PASA16 phage. During the PASA16 phage treatment, only minor side effects were observed, which were manageable. Remarkably, 13 out of 15 patients with available data achieved a favourable clinical outcome, resulting in an **impressive 86.6% success rate.** This highlights the potential of combining PASA16 phage with antibiotics as a promising approach for patients with previously unsuccessful treatments. The duration of treatment spanned from 8 days to 6 weeks (majority of ~ 2 weeks), with one- to twice-daily regimens, offering a time-efficient option.

In conclusion, this compassionate use case series demonstrates the potential effectiveness of PASA16 phage therapy in tackling tough *Pseudomonas aeruginosa* infections. By outlining potential clinical protocols, this study paves the way for future trials. The success observed encourages further research and exploration of phage therapy as an alternative and complementary approach to combat antibiotic-resistant infections.

Prof. Ran Nir-Paz, co- lead researcher of the study at IPTC of Hadassah Hebrew University Medical Center, expressed excitement about the findings, stating, *"We are elated by the promising results of our study using phage PASA16 to treat tough Pseudomonas aeruginosa infections. This groundbreaking research offers hope for patients with persistent infections and highlights the potential of phage therapy as a valuable alternative to conventional antibiotics in combating antibiotic-resistant pathogens."*

Prof. Ronen Hazan the co-lead researcher of the IPTC, also the head of the Bio-research institute of the Faculty of Dental Medicine at The Hebrew University of Jerusalem stated: *"We are encouraged by the findings! The study's 86.6% success rate offers hope for patients with persistent infections and underscores the potential of phage therapy as an alternative to combat antibiotic-resistant pathogens."*

Pseudomonas aeruginosa is a type of bacteria commonly found in the environment, such as soil, water, and plants, and as part of bacteria residing in humans. It is both a pathogen and opportunistic bacteria, causing infections in individuals with weakened immune systems or underlying health conditions. Known for its potentially complicated and life-threatening infections, *Pseudomonas aeruginosa* poses challenges in healthcare settings.

These infections can range from mild to severe, affecting various body parts, including the lungs, urinary tract, skin, and wounds. It is a common cause of hospital-acquired infections, particularly in immunocompromised patients or those using mechanical ventilation or invasive devices. The bacteria's ability to form protective biofilms hinders treatment, sometimes necessitating the combination of antibiotics and alternative therapies like phage therapy. Strict infection control measures in healthcare facilities are essential to combat its persistence.

The study compiled comprehensive clinical data on 15 out of 16 patients treated with phage PASA16, assessing its efficacy in treating the infections. The phage, provided pro bono by the American phage company "*Adaptive Phage Therapeutics*", was administered through various methods, including intravenous, local application to the infection site, and topical use. The data mainly covered patients with osteoarticular and foreign-device-associated infections.

As the fight against antibiotic resistance continues, this compassionate use case series represents a significant step forward in exploring phage therapy as a potential solution for patients with tough *Pseudomonas aeruginosa* infections.

Phage therapy has re-emerged as a potential solution for antimicrobial-resistant and non-resolving infections, as phages specifically target other microorganisms. While compassionate use cases for phage therapy have been implemented, clinical trials remain limited. This study reports the largest case series of consecutive patients with severe *Pseudomonas aeruginosa* infections who received compassionate use treatment using a single specific phage, PASA16. All 16 patients were treated after demonstrating the susceptibility of their infective agent to both the phage alone and in combination with antibiotics. The study findings demonstrate a favourable outcome in over 80% of treated patients, with minimal side effects. Based on these findings, further compassionate use cases and the development of clinical trial protocols should follow.

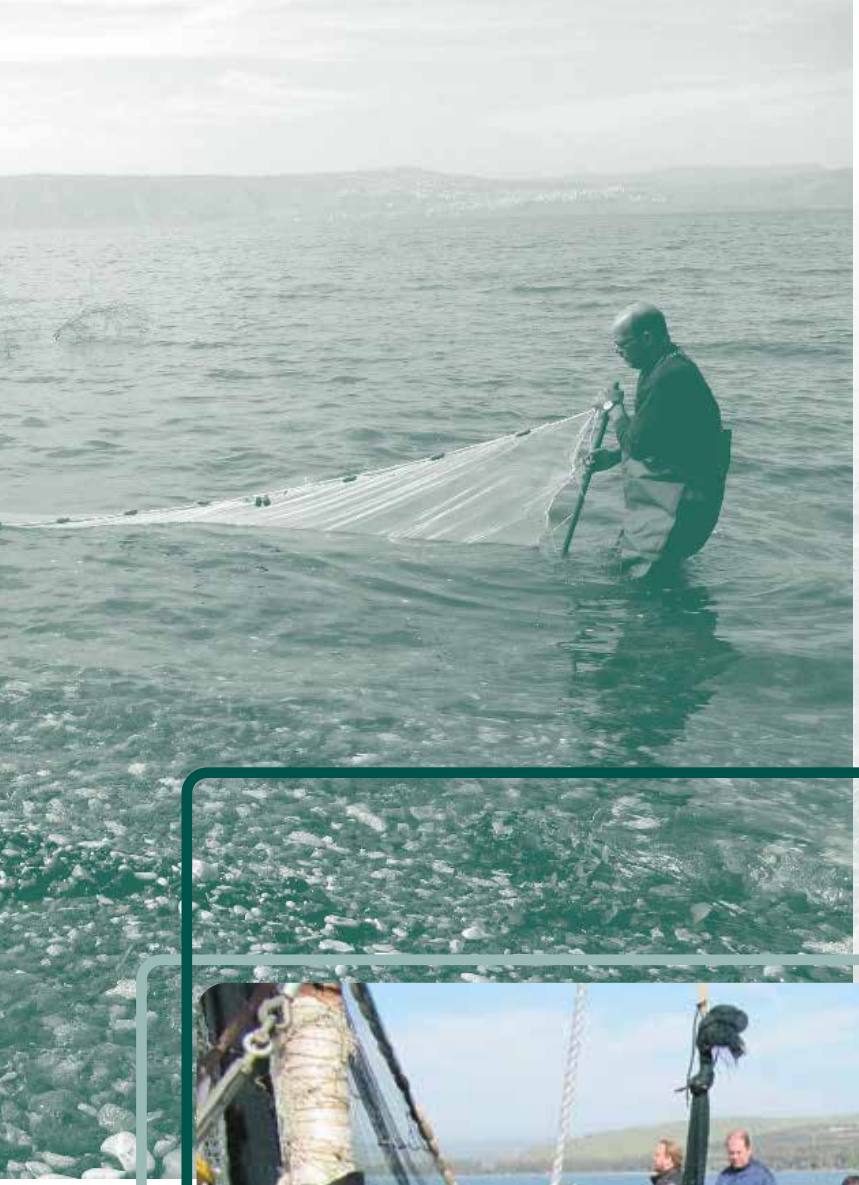
For more information about the study, please refer to the article: "Refractory Pseudomonas aeruginosa infections treated with phage PASA16: A compassionate use case series" published at MED https://doi.org/10.1016/j.medj.2023.07.002

Revisiting Israel's Freshwater Fish Species List through Cutting-Edge DNA Barcoding Technology

A new study led by Dr. Roni Tadmor-Levi in the group of Prof. Lior David and a team of researchers from the **Hebrew University of Jerusalem and Tel Aviv University**, has shed new light on Israel's freshwater fish biodiversity. The study, **initiated by the Israel Nature and Parks Authority,** focused on DNA barcoding, has unveiled intriguing insights into the unique populations and species composition in the region, their genetic distinctiveness, with implications for conservation efforts.

Israel's geographical positioning as a continental bridge has endowed its freshwater fish fauna with a tapestry of species, originating from Africa, Asia, and Europe. Often, these species are endemic or represented by unique populations adapted to live at the peripheries of their distribution ranges. However, freshwater habitats, especially in arid regions, including parts of Israel, have been facing substantial pressures and disturbances, threatening biodiversity.

To address these challenges, a reliable inventory of species and populations can direct what and how to protect Israel's biodiversity. The research team employed DNA barcoding, a cutting-edge technique that complements traditional species identification methods, to create a comprehensive database for Israel's freshwater fish. Over 200 specimens from the scientific collections stored at the Steinhardt Museum of Natural History representing more than 28 species underwent DNA barcoding analysis, yielding 71 distinct barcodes, with an astonishing 37% identified as new. This discovery underscores the unparalleled ▸▸▸



Roni Tadmor on the left, alongside the late Tomer Borovsky on the right, conducting sampling near the Sea of Galilee for the coffee chain.

Credit: James Shapira from the Fisheries Division of the Ministry of Agriculture, Israel

The late Tomer Borovsky (right) with the fishing team from Kibbutz Ein Gav aboard Captain Menachem Lev's boat 'Gil'.

Credit: Roni Tadmor

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uniqueness of fish populations in Israel.

While most species showed alignment between morphological and molecular identifications, the study identified discrepancies in five genera, and lead to significant reconsiderations for 12 different species. Notably, the research suggests the consolidation of species and proposes taxonomic revisions. Among these proposals, *Acanthobrama telavivensis* (Lavnun ha'yarkon) is suggested as a junior synonym for *Acanthobrama lissneri* (Lavnun lisnner), and the potential splitting of *Garra nana* (Yableset) into two distinct species, alongside establishing the presence of Garra jordanica and not Garra rufa (Red garra) in Israel and the near region.

Moreover, the study challenges previously reported classifications of certain species, such as *Pseudophoxinus kervillei* (Lavnunit ha'galil), suggesting discrepancies from neighbouring regions. Similarly, in the case of Oxynoemacheilus (loach) species, combining DNA barcoding with morphology revisited how many and which species are in Israel.

Of significant importance is the revelation regarding *Aphanius mento* (Pearl-spotted killifish), indicating the likelihood of it being a species complex due to genetic and geographic disparities.

This comprehensive barcoding database not only prompts significant reconsiderations of species within the region but also identifies biodiversity 'hotspots,' notably the Sea of Galilee and the Beit She'an valley streams.

The implications of this study extend beyond taxonomy, advocating for a deeper understanding of fish species and their ecological dynamics. This research is poised to fuel further investigations into the region's fish species and their habitats, strengthening efforts towards monitoring and conserving Israel and the region's freshwater fish biodiversity.

According **to Dr. Noam Leader (Director of the Ecology Department) and Dr. Dana Milstein (Aquatic Ecologist) of the Science Division of the Israel Nature and Parks Authority**, the Parks Authority works to preserve the diversity of fish fauna which are characteristic and unique to Israel, including 13 species that are protected species by law. The current study clarifies which species exist in Israel and makes it possible to better assess their distribution, and more importantly to identify those that are at risk. This information has great conservation value since it enables the Parks Authority to promote actions to protect endangered species (for example, the establishment of captive breeding centers), to adjust the management of the aquatic habitats within the boundaries of nature reserves, as well as to emphasise the river rehabilitation activities that the Parks Authority is carrying out. The combination of knowledge and actions is what will ensure better protection of Israel's unique fish community.

The research paper titled "Revisiting the Species List of Freshwater Fish in Israel Based on DNA Barcoding" is available in Ecology and Evolution and can be accessed at https://onlinelibrary.wiley.com/doi/10.1002/ece3.10812.

Skin samples can become human placenta, Israeli researchers find in new breakthrough

This astounding achievement will allow study of possible causes for placental insufficiency, which affects up to 15% of pregnancies and causes one in 100 pregnancies to end in miscarriage.

Prof. Yossi Buganim

A breakthrough achievement of converting skin samples into functional human placenta cells – creating significant implications for understanding pregnancy development, studying pregnancy-related diseases, and advancing cell therapies – has been reached by researchers at the Faculty of Medicine of the Hebrew University of Jerusalem (HU). The study offers improved diagnostic tools and therapeutic interventions for infertility, pregnancy complications and long-term implications for mother and baby.

"The cell-reprogramming research," said Prof. Yossi Buganim "opens new avenues for investigating the causes of infertility, complications during pregnancy and long-term health implications for both mothers and babies." The team said their findings have the potential to "revolutionise" research on placental pathologies and genetic causes and will lead to improved diagnostic tools and therapeutic interventions.

The study has just been published under the title "Pluripotency-independent induction of human trophoblast stem cells from fibroblasts" in the prestigious journal, *Nature Communications*.

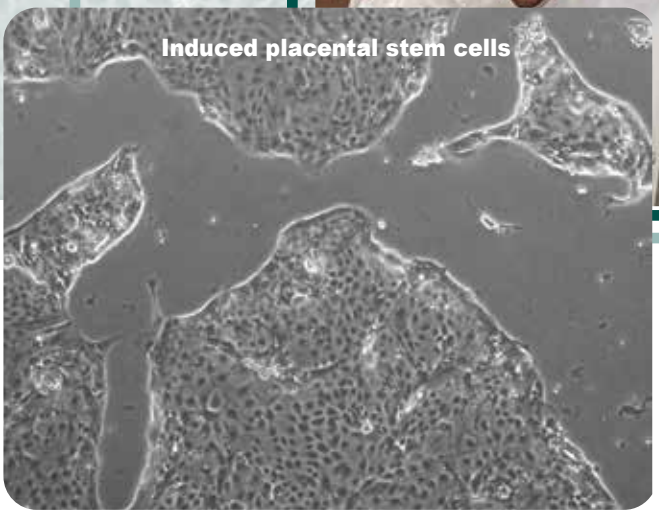
The placenta forms in the uterus during pregnancy, supplying oxygen and nutrients to the growing foetus and removing waste products from its blood. Attached to the wall of the uterus, the foetus's umbilical cord arises from the placenta.

Cell-based therapy: Israeli researchers reach breakthrough by transforming skin cells

Reprogramming cells to assume new identities has been a focus of the lab that uses specialised proteins to modify gene expression. By

Moriyah and Moran

Photos Credit: Moriyah Naama, Buganim Lab



Induced placental stem cells

transforming skin cells into other cell types, the team can study specific diseases and the potential development of cell-based therapies – however, accessing cells from the placenta, which is a critical organ in pregnancy, has long been a challenge because of technical and ethical constraints.

The team overcame these hurdles by deriving early placental cells from skin samples to provide an unlimited supply of cells for studying the function of the placenta. Complicated pregnancies can shed light on the mechanisms behind them by using skin-derived cells with the same genetic makeup that might have contributed to placental dysfunction.

For an extensive period, all attempts to isolate and propagate human trophoblast stem cells (hTSCs) in vitro had failed due to a lack of knowledge of the culture conditions required for the maintenance of these cells. Recently, such culture conditions were identified and for the first time, hTSCs were successfully derived and propagated from blastocysts and first-trimester placentas.

However, this method did not allow the derivation of hTSCs from disease-affected term placentas. “Given that placental disorders are detected only in the late stages of pregnancy, this constraint largely restricted the use of these cells in modelling placental pathologies and identifying risk factors at early stages of implantation.

Alternatively, the ability to convert fibroblasts into other cell types by a defined number of ▸▸▸

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▸▸▸ transcription factors opens an attractive avenue that resolves this limitation, as mesenchymal cells can be isolated relatively easily from post-gestational tissue, such as term placenta, cord blood or skin biopsy following disease-affected pregnancies."

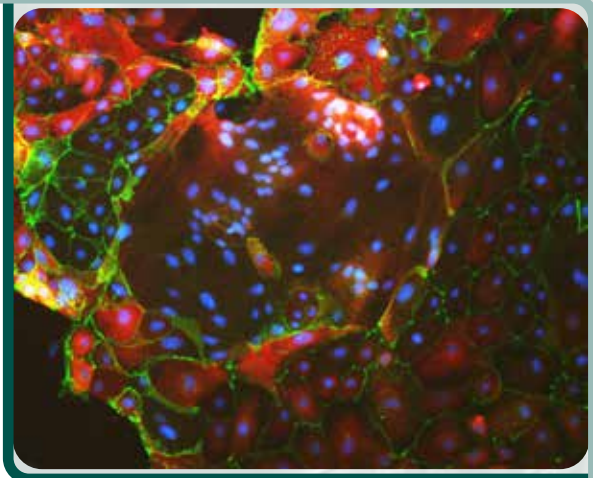
How the research team successfully converted skin cells

To achieve this, the team identified a set of genes that decide the identity of hTSCs, the precursor cells responsible for placental development. By inducing the expression of these genes in skin cells, the researchers successfully converted the skin cells into functional and stable placental stem cells. These induced placental stem cells showed similar properties to those in cells obtained from early pregnancies and had the ability to give rise to different placental cell subtypes.

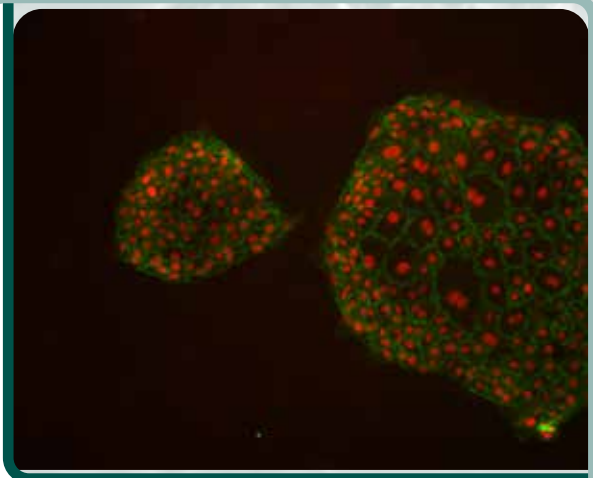
Comprehensive analyses, including multi-omics comparisons (multiple omics provide an integrated perspective to power discovery across multiple levels of biology) validated the superiority of this method over previously published approaches.

The project was led by Dr. Moriyah Naama, an MD/Ph.D. program participant at HU, in collaboration with Moran Rahamim, a doctoral student, and other members of the Buganim lab. The scientists utilised over-the-counter pregnancy tests to speedily evaluate their reprogrammed cells, as these cells produce various pregnancy hormones including human chorionic gonadotropin (hCG).

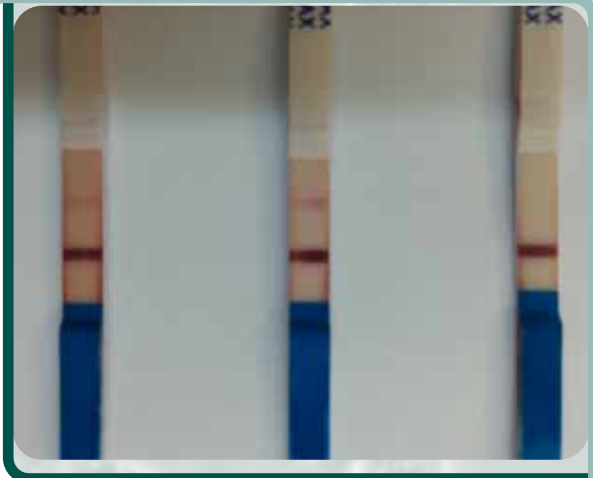
The team received important guidance from Prof. Simcha Yagel's lab at the Hadassah Medical Organisation's obstetrics and gynaecology department and the Stem Cell Research Laboratory at Shaare Zedek Medical Center (SZMC) led by Prof. Rachel Eiges that provided valuable insights and provided critical samples from PGD-embryos.



Placenta multinucleated cells



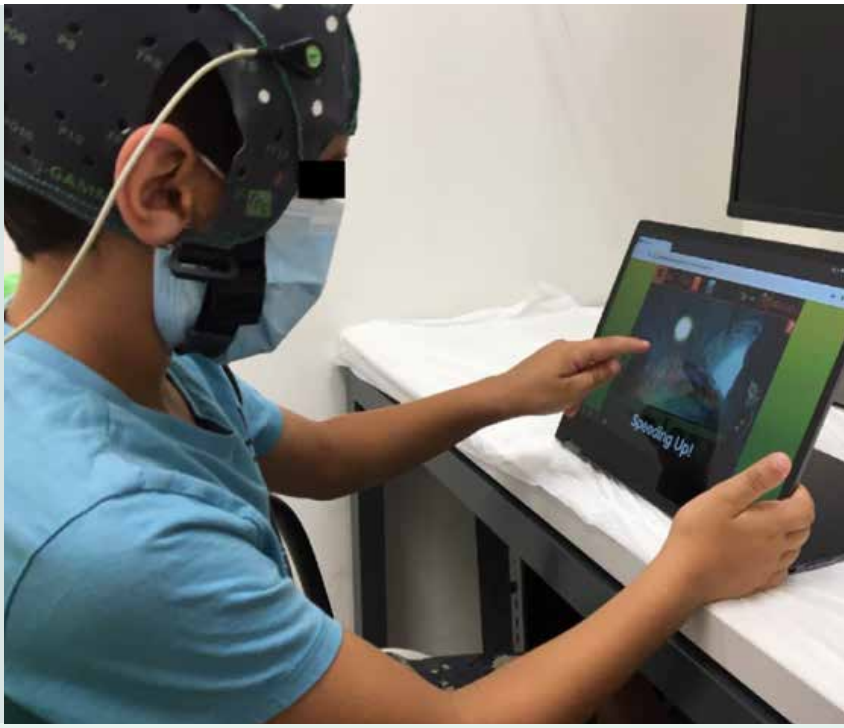
induced placental stem cells-green-membrane-red-protein



Pregnancy test

Hope for children with ADHD

New study finds that non-invasive brain stimulation treatment can ease symptoms



An example of a tES + CT session. Children sat in front of the tablet which delivers the CT, while receiving tES (active or sham) for 20 min each session.

Non-invasive brain stimulation, combined with cognitive training, could significantly improve symptoms of attention deficit hyperactivity disorder (ADHD) in children, according to new research jointly led by the University of Surrey and the Hebrew University of Jerusalem.

In a clinical trial involving 23 unmedicated children (6 to 12 years old) with ADHD, researchers set out to find out whether a novel form of brain stimulation that involves a mild electrical current on the brain through two electrodes, during cognitive training, can improve the symptoms of ADHD.

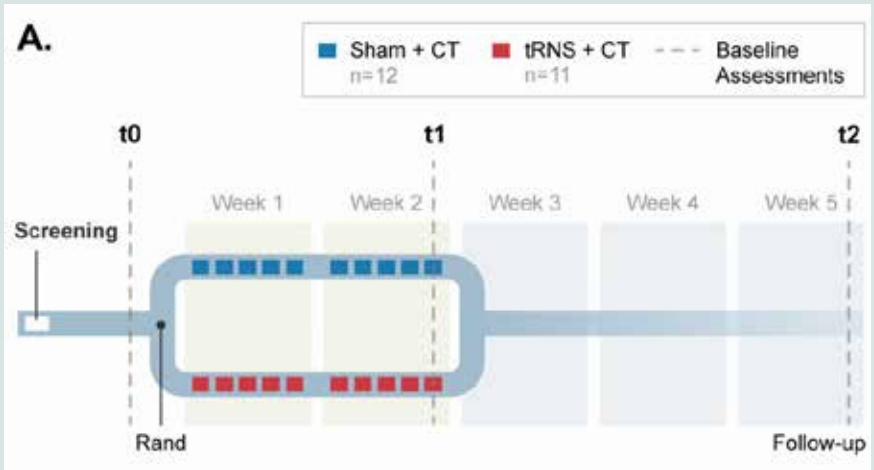
After a two-week program of brain stimulation, the study found that 55% of children showed significant clinical improvements in ADHD symptoms, as reported by their parents. This was compared to 17 percent in the control group who received sham (placebo) brain stimulation, during cognitive training.

The study also found that these improvements were maintained three weeks after the end of the treatment, with 64 percent reporting clinically meaningful responses to the treatments. This is compared to 33 percent in the control group.

Dr Mor Nahum, co-lead of the study and Head of the Computerized Neurotherapy Lab at the Hebrew University where the study took place said that “This is an important first step in offering new therapeutic options for ADHD. Future studies, with larger and more varied samples, should help establish this as a viable therapy for ADHD, and help us understand the underlying mechanisms of the disorder.”

Professor Roi Cohen Kadosh, co-lead of the study, Head of the School of Psychology and Professor of Cognitive Neuroscience at the University of Surrey, said:

“I believe that the scientific community is duty-bound to investigate and develop evermore effective and longer-lasting treatments for ADHD. The findings we demonstrate in our study suggest that a combination of transcranial direct current stimulation (tRNS), which is



Following screening, eligible participants underwent baseline assessments (t0) and were then randomised into one of two groups (tRNS + CT or sham +CT) Participants received 10 daily treatment sessions over 2 weeks (1 and 2). Assessments (dashed lines) were repeated at the end of the week 2 (t1) and again at follow-up t(2).

An example of RS-EEG recording session, in which EEG is recorded from children at rest.

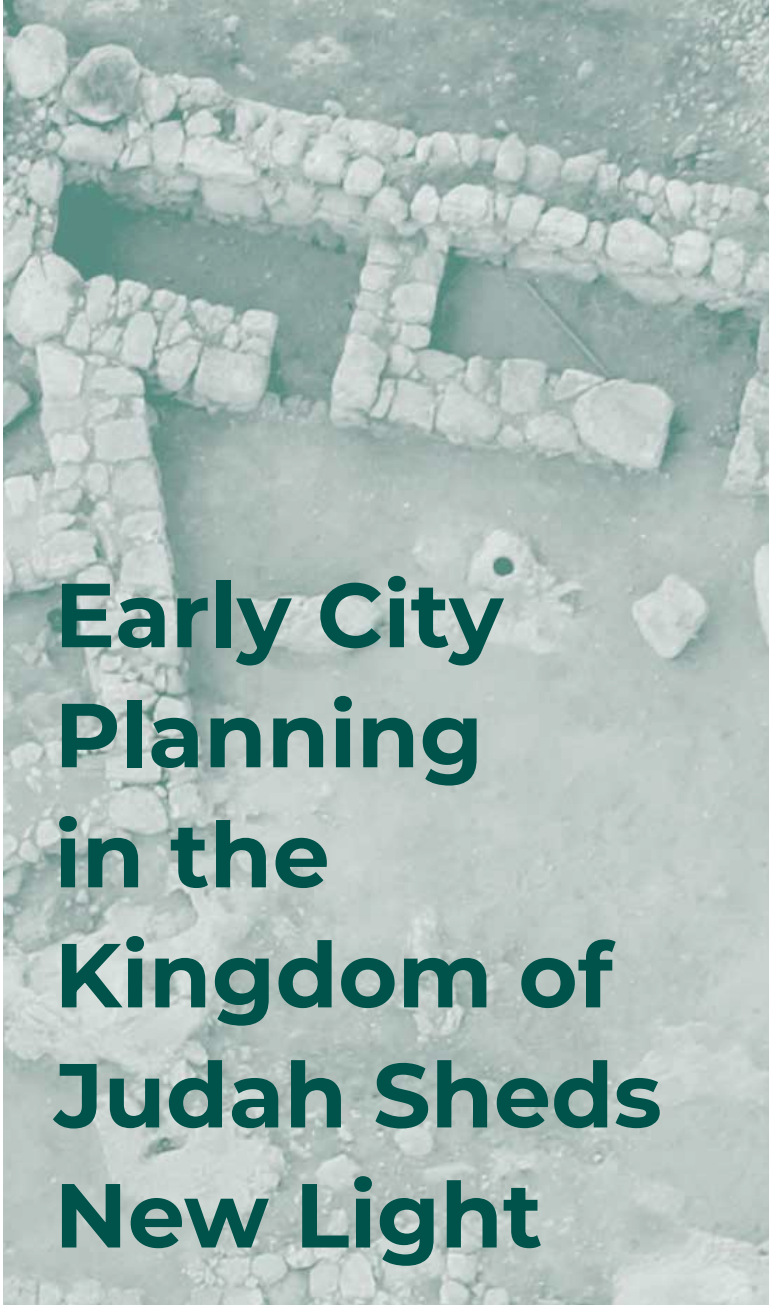
shown to be safe with minimal side effects, has the potential to transform the lives of children and their families. The results from this proof-of-concept study, together with previous results we received using tRNS, increase our confidence that in the future non-invasive brain stimulation may be able to provide an alternative to medication as a treatment pathway for children. However, our important test will be the results from a multi-centre clinical trial with a larger sample that we will start soon. If successful, this approach will be approved as a medical device for ADHD by the United States Food and Drug Administration."

ADHD is a brain condition that affects people's attention, activity, and impulsivity. Around 5.2 percent of children worldwide have the condition, which usually manifests itself with children struggling with focus, memory, and self-control.

Following the treatment, the research team also noticed changes in the children's brain electrical activity patterns that continued even at the 3-week follow-up.

Professor Itai Berger, co-lead of the study, Head of Pediatric Neurology previously at Hadassah, currently at Assuta-Ashdod University Medical Center who recruited the study participants added that: "If the results will be replicated in future larger studies we will be able to offer a novel, promising non-invasive, and safe treatment to large number of children and their families not only in the field of ADHD but in other neuro-developmental disorders."

Ornella Dakwar-Kawar, a post-doctoral researcher at The Hebrew University of Jerusalem said "ADHD is one of the most common neurodevelopmental disorders affecting children across the world. Treating the condition with medication improves a child's attention span and overall mood, however in certain cases there can be side effects including headache and a loss of appetite. There is therefore a pressing need for developing and testing novel, non-pharmacological interventions for ADHD. Results from the current proof-of-concept study provide a preliminary direction towards a novel intervention in paediatric ADHD."



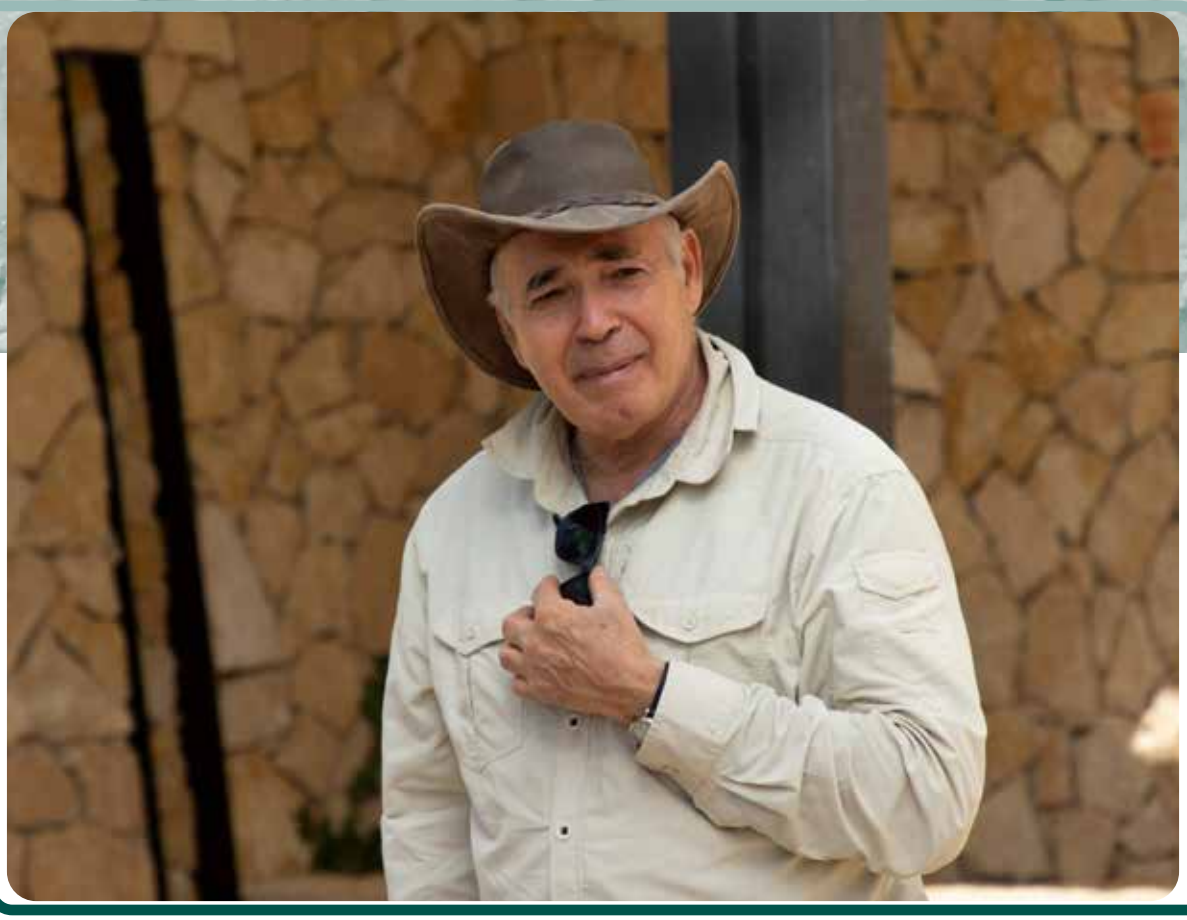
Early City Planning in the Kingdom of Judah Sheds New Light

The Institute of Archaeology at The Hebrew University of Jerusalem recently announced the publication of a new research article titled “Early City Planning in the Kingdom of Judah: Khirbet Qeiyafa, Beth Shemesh 4, Tell en-Naṣbeh, Khirbet ed-Dawwara, and Lachish V” by Prof. Yosef Garfinkel

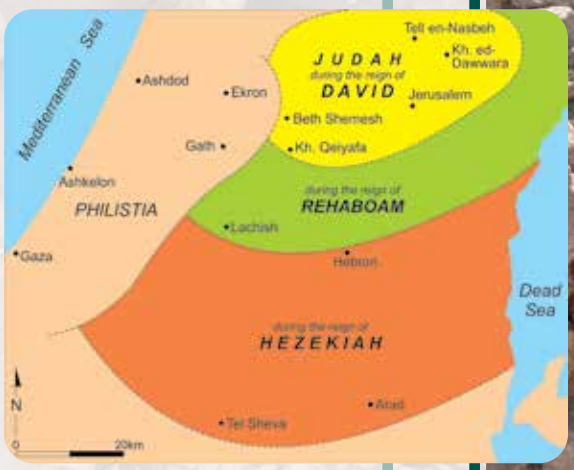
In this comprehensive study, Professor Garfinkel examines the earliest fortified sites in the kingdom of Judah during the 10th century BCE. The research focuses on five key sites: Khirbet Qeiyafa, Beth Shemesh, Tell en-Naṣbeh, Khirbet ed-Dawwara, and Lachish. These sites reveal significant insights into the urbanisation process, urban planning, and borders of the earliest phase of the kingdom of Judah, the days of David and his grandson Rehoboam. The Shephelah (shefela) region, located southwest of Jerusalem, played a crucial role in the kingdom of Judah’s development due to its favourable ecological conditions for agriculture. The research highlights that the Shephelah’s low rolling topography, fertile soil, and ample precipitation made it the breadbasket of the kingdom and a region capable of supporting a large population. The study emphasizes the importance of the kingdom’s expansion into the Shephelah and its agricultural resources as a key stage in its development.

Contrary to previous beliefs that the kingdom’s expansion occurred in the late 9th or 8th century BCE, 200 to 300 hundred years after David, Professor Garfinkel’s research demonstrates that the kingdom had already begun expanding into the hill country and the northern Shephelah as early as the 10th century BCE. The southern Shephelah expansion followed approximately two generations later in the time of Rehoboam.

The research delves into the urbanisation process of the kingdom of Judah, focusing on the fortified settlements at Khirbet Qeiyafa, Beth Shemesh, Lachish, Tell en-Naṣbeh, and Khirbet ed-Dawwara. These sites showcase an urban plan characterised by a casemate city wall with a peripheral belt of structures abutting the wall. Notably, Lachish, Level V, exhibits a similar pattern but without casemates in its city wall. The findings have far-reaching implications for understanding the urban planning and territorial boundaries of the earliest phase of the kingdom of Judah. ▸▸▸



Prof. Yossi Garfinkel



A map presenting the gradual development of the urban area in the KIngdom of Judah
Credit J Rosenberg

A close-up of one of the casements in the city wall of Khirbet Qeiyafa
Credit Prof. Yossi Garfinkel

Three things are common to all these cities: they were fortified with a casemate city wall; they are located on the kingdom border and are located on a main road leading into the kingdom. Khirbet Qeiyafa on the Elah Valley protected the southwest border of the kingdom. Beth Shemesh on the Soreq Valley protected the western border of the kingdom. Tell en-Naṣbeh near Ramallah protected the north and Khirbet ed-Dawwara protected the northeast border. Radiometric dating techniques confirm that the fortified cities of Khirbet Qeiyafa and Beth Shemesh date back to the first quarter of the 10th century BCE., the time of King David.The analysis of the urban planning and the geographical location of the sites clearly indicates that we have a strong kingdom that was able to build well-planned cities on its borders, protecting the main roads leading into its capital Jerusalem.

This research sheds new light on the early city planning of the kingdom of Judah and enriches our knowledge of the urbanisation process and territorial expansion during the 10th century BCE.

Prof. Garfinkel provided an explanation of the research findings, stating, “The discovery of a barrier wall in this area effectively defines the boundaries of the urban core of the Kingdom of David, putting an end to the longstanding historical debate surrounding the existence of the Kingdom and its borders.” He further elaborated, affirming, “This finding provides tangible evidence on the ground, dated to the relevant period, supporting the biblical accounts of King Rehoboam’s expansion and fortification as described in the Book of Chronicles. It is a rare instance where we can present empirical historical and archaeological evidence aligning with biblical narratives from the tenth century B.C.”

Regarding the publication date of the research, Prof. Garfinkel explained, *“The evidence was known before, it is not a matter of new discoveries. What was needed was someone to come along and observe the complete picture that these findings portray. I am glad that I was able to fulfill that role.”*

The excavations that formed the basis of these conclusions were conducted by Saar Ganor from the Israel Antiquities Authority and Prof. Michael Hazel from the Southern Adventist University in the USA.

Scientists Create Special "Telomouse" with Human- Like Telomeres

Researchers introduce the "Telomouse". By making a subtle genetic alteration in standard lab mice, they've made their telomeres, which protect the chromosome ends, more closely resemble those in humans. This discovery promises to reveal new insights into the genetics of aging and may contribute to enhanced longevity and well-being.

Researchers introduce the "Telomouse". By making a subtle genetic alteration in standard lab mice, they've made their telomeres, which protect the chromosome ends, more closely resemble those in humans. Telomeres are critical for maintaining genetic integrity and promoting healthy aging while reducing cancer risk. Standard lab mice have telomeres five times longer than humans, creating challenges in modeling their role in human aging and cancer. The Telomouse model, developed by incorporating a genetic variation from a mouse species with naturally shorter telomeres, provides a valuable resource for in-depth aging and cancer research, highlighting the importance of the RTEL1 protein in determining telomere length. This discovery promises to reveal new insights into the genetics of aging and may contribute to enhanced longevity and well-being.

In an exciting scientific breakthrough, a team of researchers led by Professor Yehuda Tzfati from the Institute of Life Science at the Hebrew University and Professor Klaus Kaestner from the University of Pennsylvania Perelman School of Medicine, has introduced the "Telomouse." This discovery involves changing just one tiny building block in one gene of ordinary lab mice, *Mus musculus*, to make their telomeres (our chromosome caps) look much more like the telomeres in humans.

Telomeres hold a pivotal responsibility in safeguarding our genetic material and ensuring the orderly division of our cells. Maintaining their structural integrity and optimal length holds the potential to diminish the risk of cancer and facilitate a healthier aging process. However, a significant hurdle has emerged: conventional laboratory mice possess telomeres approximately five times longer than those in humans. This disparity has posed a formidable challenge in using mice models for comprehending the implications of telomeres for human aging and cancer.

In the development of the Telomouse model, researchers turned their attention to a distinct mouse species, *M. spretus*, notable for its inherently shorter telomeres. Within the genetic code of these mice, a subtle variation within a pivotal protein known as RTEL1 was identified. By transferring this genetic distinction into typical laboratory mice, they succeeded in producing a lineage of mice with human-length telomeres. These novel Telomice exhibit robust health and reproductive capabilities, making them an exceptional resource for in-depth investigations into the complex realms of aging and cancer.

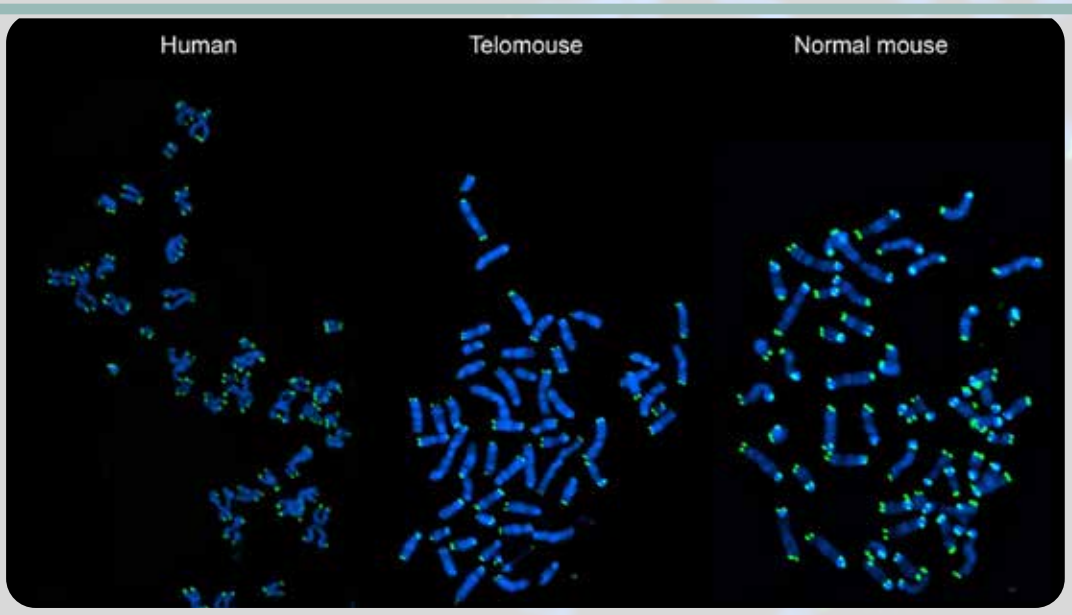
This study illuminates the central role of RTEL1 as the arbiter of telomere length. A nuanced modification to this crucial protein has enabled scientists to fashion a mouse model that closely approximates the human telomere length.

During the research, the researchers also achieved an invaluable breakthrough in our ability to measure the length of each single telomere, and particularly the shortest telomeres in the cell which are the ones to dictate the cellular function and fate. They developed a novel method for measuring the precise length of individual telomeres using a new generation of DNA sequencing called nanopore sequencing. This method, termed 'NanoTelSeq', enables evaluating the 'telomeric health' in samples from blood or other tissues of healthy individuals, as well as patients of cancers and aging diseases, and improve diagnosis, prognosis and treatment of these patients.

Professor Yehuda Tzfati, the principal investigator of this endeavor, posits, "The Telomouse model is promising to enrich our comprehension of the intricate nexus between telomeres, cancer and the aging process. I believe that NanoTelSeq will replace currently used methods, enable acurate evaluation of the telomere state in patients and healthy individuals, and reveal how it affects human health. Such insights will hopefully culminate in innovative strategies for combating cancer and fostering the well-being of aging individuals."

The research paper titled "Telomouse—a mouse model with human- length telomeres generated by a single amino acid change in RTEL1" is now available in Nature Communications and can be read at https://t.ly/BsJlO

Telomouse: Bridging the Telomere Gap in Aging Research



Caption: Telomeres (indicated by the green dots) play a crucial role in safeguarding the chromosome ends (colored in blue). On the right, you can see the notably bright and long telomeres of a normal mouse cell, while the left side showcases comparatively dimmer and shorter human telomeres. At the center, Telomouse telomeres closely resemble human telomeres in brightness and length, highlighting the value of Telomouse as a research model for human aging. *(Credit: Yehuda Tzfati)*

Plant Lifecycle Insights:

Big Data Can Predict Climate Change Impact

A new study published in Nature offers a paradigm shift regarding lifecycles in the plant world and uses big data to predict the future impact of climate change.

The study is based on a new database created by the researchers which combines, for the first time, datasets on distribution and datasets on lifecycles, making it possible to establish the prevalence of different lifecycles around the globe. It uses empirical tools and big data to examine theoretical paradigms about the way in which human disturbance is affecting annual plants and their global distribution. Among other things, it was found that annuals are expected to benefit more with the rise in human population density and due to climate change, which could prove devastating for the ecosystem.

This study examines, for the first time, the lifecycles of plants on a global scale, via the creation of a unique database containing huge quantities of data. The study was led by **Dr. Niv DeMalach** of the Robert H. Smith Faculty of Agriculture, Food and Environment at the Hebrew University of Jerusalem; **Prof. Itay Mayrose** of the George S. Wise Faculty of Life Sciences at Tel Aviv University; and **Dr. Tyler Poppenwimer**, formerly a post-doctoral student at the Hebrew University and Tel Aviv University and now a researcher at the FDA.

Prior to the current study, the use of empirical data to assess the spread of vegetation was restricted to localised studies of regional systems. The new database brings together in one place, for the first time, data about the lifecycles of some 235,000 species (67% of the species known to science), which were collected over the last 80 years from various sources throughout the world, including millions of observations of species across the globe.

For decades, scientists have been interested in the factors influencing the distribution and lifecycles of perennial and annual plant life, and the competition between the two, in an effort to understand the laws of nature and the adaptation of different species to environmental conditions. Various mathematical models have been developed to describe the conditions that affect perennials and annuals. This new study by Dr. DeMalach and Prof. Mayrose, and the international database they have created, marks the first attempt to examine the relationship between those models and the real-world situation.

Plant species can be differentiated into perennials (plants that usually live for longer than a year) and annuals (plants that complete their lifecycle within a single growing season and die after producing seeds). Most species in nature are perennials, as this category includes grasses as well as trees and bushes, and they are very important for the ecosystem as a whole

Annuals serve as the ecological equivalent of laboratory mice due to their petite stature and rapid generational turnover. Scientists employ them to create "microcosms," which are experimental ecological communities. *Credit: Niv DeMalach*

due to their central role in moderating climate changes throughout that system and preventing soil erosion and flooding.

Among agricultural crops the numbers are reversed, with annuals taking up around 70% of agricultural lands and constituting some 80% of the foods consumed by humans. This is because annuals are more efficient at producing seeds, which are a source of carbohydrates and proteins and form the backbone of the human diet.

The researchers found that annuals are common in regions in which summers are marked by particularly high temperatures and low rainfall. This contrasts with the previously accepted view, which did not consider the seasons of the year to be a relevant parameter and instead focused solely on annual averages of temperature and precipitation. For example, the proportion of annuals is higher in California compared with the Chihuahuan desert despite the latter being more arid on average. This is because the summers in California are much drier (almost no summer rain). Additionally, the study found a much lower distribution of annuals throughout the world than was previously thought to be the case. While the accepted estimate in the scientific community was that they form around 12% of all vegetation, the new study findings show a figure less than half that, at no more than 6%.

As part of the study, the researchers created a new and unique global database, which makes it possible to predict the future impact of climate change on the plant world. Among other things, the researchers confirmed the hypothesis that annuals are expected to become more common as the human footprint on the environment becomes larger. In addition, they developed a model suggesting that within three decades, the proportion of annuals will increase in some 70% ▸▸▸

of regions around the globe. This is likely to harm the environment, as (for example) annuals are less efficient than perennials at reducing carbon dioxide in the atmosphere.

Dr. DeMalach, of the Robert H. Smith Faculty of Agriculture, Food and Environment at the Hebrew University of Jerusalem, explained the importance of the findings: "The study both helps explain human history and is relevant for the future of humankind. It helps us understand why agriculture, which is the basis for human civilisation, first appeared in the Middle East. Our region is unusual in its high proportion of annuals, and now we know why—it has the right climate conditions. Food production is based mainly on annual species. This is true today, and it was true thousands of years ago. These conditions facilitated the transition from a hunter-gatherer society to an agricultural society. Regarding the future, our model suggests that the human species has become the most influential factor on the planet, and not only will its impact have consequences for wild plant life, but the changes caused will also affect human life in turn."

Regarding the importance of the factors affecting the spread of annuals, Dr. DeMalach noted: "One of the great challenges facing humanity in the 21st century is providing food for billions of people with minimal damage to the environment. Therefore, extensive efforts are being made to shift from annual crops to perennial crops, which are more environmentally friendly." Dr. DeMalach continued: "The problem today is that perennial crops are still less productive, and there is great debate as to whether they can be made more productive in the future."

The research paper titled "Revising the global biogeography of annual and perennial plants" is now available in Nature for further details https://10.1038/s41586-023-06644-x. https://www.nature.com/articles/s41586-023-06644-x

HENROTH

GROUP

PROPERTY DEVELOPERS and INVESTORS

Sydney, Melbourne and Brisbane

DIRECTORS: JOHN ROTH and STANLEY ROTH

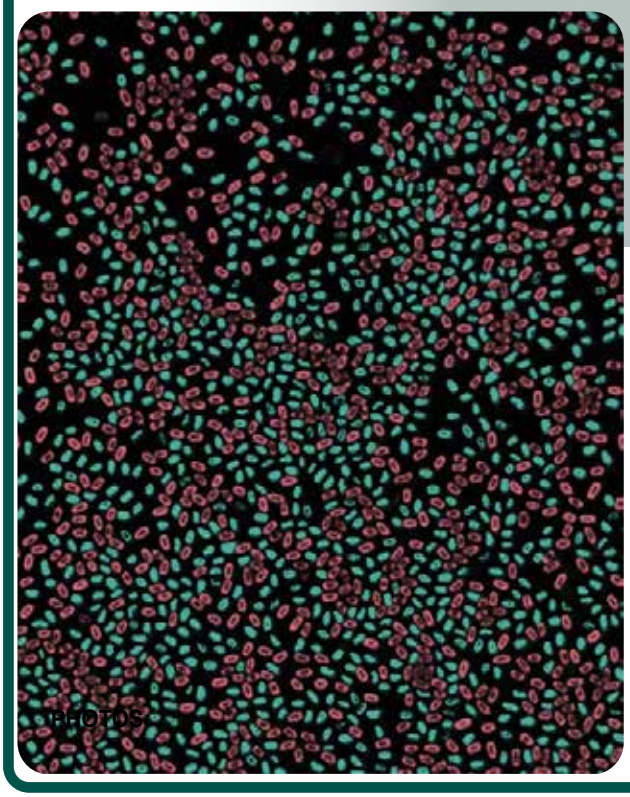
Suite 604, Eastpoint Tower

Level 6, 180 Ocean Street, Edgecliff NSW 2027

Ph: (02) 9302 5333

Unlocking Long-Term Genetic Memory:

Dormant Bacterial Spores Offer Key Insights into Evolutionary Survival Strategies



Spores. *credit Sigal Ben Yehuda*

A recent study spearheaded by **Prof. Sigal Ben Yehuda** and her team at Hebrew University has unveiled a captivating facet of bacterial dormancy. This research illuminates the mechanism through which dormant bacterial spores uphold and activate an enduring transcriptional program upon revival, showcasing an extraordinary genetic memory system. This discovery is pivotal as it unravels the mechanisms governing how these organisms retain vital genetic information during years of dormancy. Understanding this process not only sheds light on bacterial survival in harsh conditions but also holds broader implications. It could offer insights into sustaining long-term transcriptional programs in diverse organisms, potentially impacting fields such as microbiology, biotechnology, and medicine. Such knowledge might pave the way for strategies to control pathogens, enhance biotechnological processes, and deepen our understanding of dormant states across different life forms.

Spores, resilient and protective structures formed by certain microorganisms like bacteria and fungi, serve as a survival mechanism against adverse conditions. Bacterial spores are among the longest-living cellular forms on Earth, with reports evoking their revival following **millions of years of quiescence**. They encapsulate the organism's genetic material and essential components, remaining dormant until conditions become favorable for germination. Comprehending spores is crucial in various fields, offering insights into survival strategies and potential applications in microbiology, agriculture, and biotechnology.

The study, published in Molecular Cell, highlights

the discovery of a central chromosomal domain within dormant spores. This domain hosts core RNA polymerase (RNAP), which remains bound to specific intergenic promoter regions during dormancy. These regions exert control over genes crucial for essential cellular functions, such as the production of rRNAs and tRNAs.

Upon emergence from dormancy, the RNA polymerase inside these spores promptly initiates the copying of vital genetic instructions. It recruits necessary components for transcription, such as sigma factors, swiftly activating essential genes necessary for cellular functions. The study also observed a similar process in disease-causing bacteria that form spores, suggesting a common strategy among various organisms to reinitiate functions after dormancy.

The research also uncovered the pivotal role of spore DNA-compacting proteins in this process. Mutants lacking these proteins displayed scattered RNAP localization, resulting in disorganized gene expression during germination. This underscores the significance of maintaining proper chromosomal structure in preserving the transcriptional program crucial for spore revival.

Prof. Sigal Ben Yehuda remarked, “Our research suggests that the structure of the spore chromosome is designed to uphold a blueprint for gene activity by pausing RNA polymerase, in a standby mode, ready to resume gene expression when conditions favor revival. This mechanism’s relevance might extend beyond bacteria, offering valuable insights into maintaining enduring gene activity plans across various organisms that undergo dormant life stages.”

This research signifies a substantial leap in comprehending the intricate mechanisms behind bacterial dormancy and revival. Its implications span diverse fields, from microbiology to potential applications in biotechnology and medicine.

The research paper titled “Dormant bacterial spores encrypt a long-lasting transcriptional program to be executed during revival” is now available in Molecular Cell and can be accessed at https://www.cell.com/molecular-cell/fulltext/S1097-2765(23)00844-4

Can reversing ageing in fish benefit humans?

Hebrew University researchers genetically manipulate energy regulation in male African killifish, making them live longer and develop resistance to age-related conditions.

Itamar Harel. *Credit: Itamar Harel*

A fish originating from Mozambique and Zimbabwe that lives no more than six months is helping Israeli researchers devise ways to enhance human health, as people live increasingly longer.

By genetically manipulating turquoise killifish, Dr. Itamar Harel and his colleagues at the Hebrew University of Jerusalem's Silberman Institute of Life Science are gaining insights into how to restore metabolic health in vertebrates (organisms with a backbone or spinal column) so they can remain healthier as they age. The HU group published a related study in the peer-reviewed Developmental Cell publication last June.

Harel is hopeful that his tweaking of energy biosynthesis on the cellular level in killifish and ▸▸▸

▸▸▸ other vertebrates in the lab could lead to drug therapies — especially for the benefit of older humans, who tend to suffer from diseases often stemming from the body's diminished ability to properly respond to nutrient availability on the cellular level.

For instance, Type 2 diabetes is common in older people, as they have a harder time controlling their blood glucose levels. When a young person eats, their glucose levels rise, and then come down quite rapidly. Also, when a young person fasts, their blood sugar decreases. But older people tend to have high blood sugar levels even after fasting.

"This inability to get sugar levels down, or reduced plasticity of the metabolism, is a root cause for many age-associated diseases beyond diabetes. It's been linked to many others, including cognitive decline," Harel noted.

Harel utilises killifish for his research because they are vertebrates with an extremely short lifespan. Much work has been done over the past three decades on invertebrates like the worm C. elegans and the Drosophila fruit fly. The findings have been significant. "However," says Harel "if we want to study vertebrate aging, we probably must do so in a model which is a vertebrate. An aging organism is an aging organism and if we find a concept in one animal, it might be conserved across the animal kingdom. This is what was identified so far. But there are key aspects related only to vertebrates, and we wanted to study those," Harel explained.

The problem was that the classical vertebrate models are zebrafish and mice. Mice can live for two to three years, and zebrafish for up to five. Harel needed things to move along more quickly. "This is why we are working with the turquoise killifish, which is a vertebrate that lives for six months. Because of this, we can do a lot of experiments quite rapidly," he said.

Harel focused the research on a critical enzyme called AMPK (AMP-activated protein kinase), which acts as a cell's energy regulator. It senses the energy levels and decides whether it should invest more energy right away for proliferation and growth, or whether it should save energy and just recycle some existing molecules in the meantime.

A two-month-old African turquoise killifish, top, and a 5-month-old killifish, bottom, show aging much like that in humans, including paleness, loss of muscle mass (sarcopenia), and cataracts credit Itamar Harel.

Researchers have found that activating AMPK extends the life of the fruit fly. However, doing the same thing in mice did not extend life, and even led to pathologies.

Harel explained that he and his team posited that the problem was perhaps caused by the fact that AMPK is a complex enzyme made up of multiple proteins, and that each organ of the body has a different version of it.

"We said, okay, maybe that is the reason, maybe it's too complicated to fine-tune this in vivo. So, what we decided to do was go upstream, meaning we did not genetically manipulate AMPK directly. Instead, we mutated one copy of the APRT gene, which encodes for an enzyme that makes AMP from adenine," Harel said.

AMP (adenine monophosphate) is the precursor to ATP (adenosine triphosphate), the body's energy currency. By introducing the mutation, the researchers inhibited the cell's ability to make AMP, with the idea that this would make the cell "think" there was less energy available and that it was fasting, even though there was lots of food around.

By manipulating the components of the energy-producing process, but not the AMPK sensor enzyme itself, the team succeeded in producing killifish that lived longer than usual, while showing signs of resistance to pathologies associated with age.

"These 'old mutants' were resistant to a high-fat diet, which usually results in accumulated lipid droplets in the liver. They had low glucose levels after fasting just like young fish, so their metabolism was completely rejuvenated," Harel said.

The surprise was that this rejuvenation occurred only in the male killifish. Something was going on at the molecular level that resulted in functional differences between the males and the females.

"We are now trying to optimize this process in female killifish. We have also developed a mouse model to investigate this and are looking into whether we can also develop a drug that can do a very similar thing in humans," Harel said.

Further study into these different sex-based outcomes is critical because many age-related illnesses exhibit differently in men and women, and the pharmaceutical industry wants to see new drugs tested on both males and females to measure efficiency and detrimental effects in both sexes.

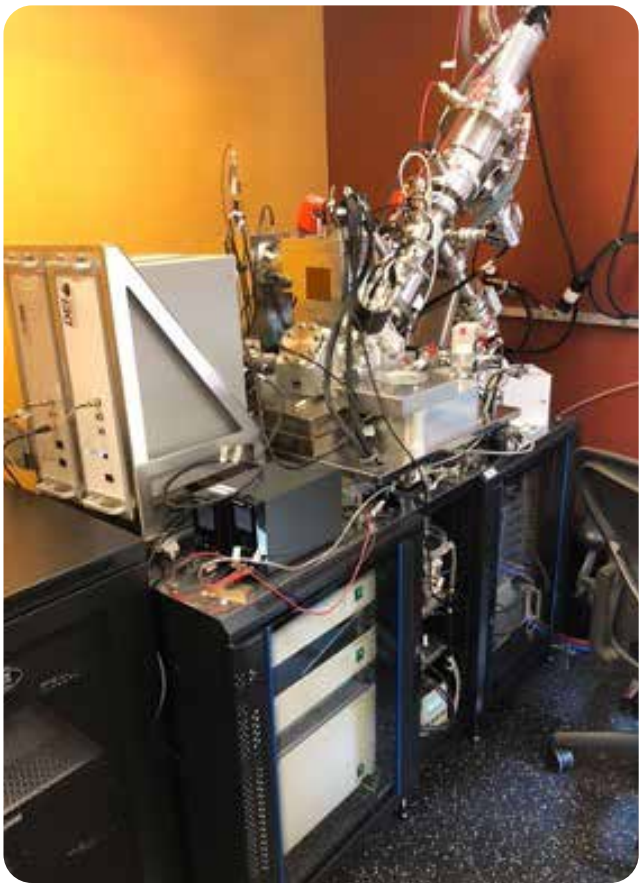
Harel emphasized that his goal for this research on metabolism is not necessarily to significantly extend the human lifespan per se. Rather, its purpose would be to enable people to live with as little disease as possible as they grow older.

"Any medication developed would likely be prescribed for elderly or significantly ill people who cannot use intermittent fasting or exercise to prevent or treat metabolic disease," Harel said. "It wouldn't be widely given. It wouldn't be put in the water like fluoride."

Based on an article by Renee Ghert-Zand originally published in the Times of Israel

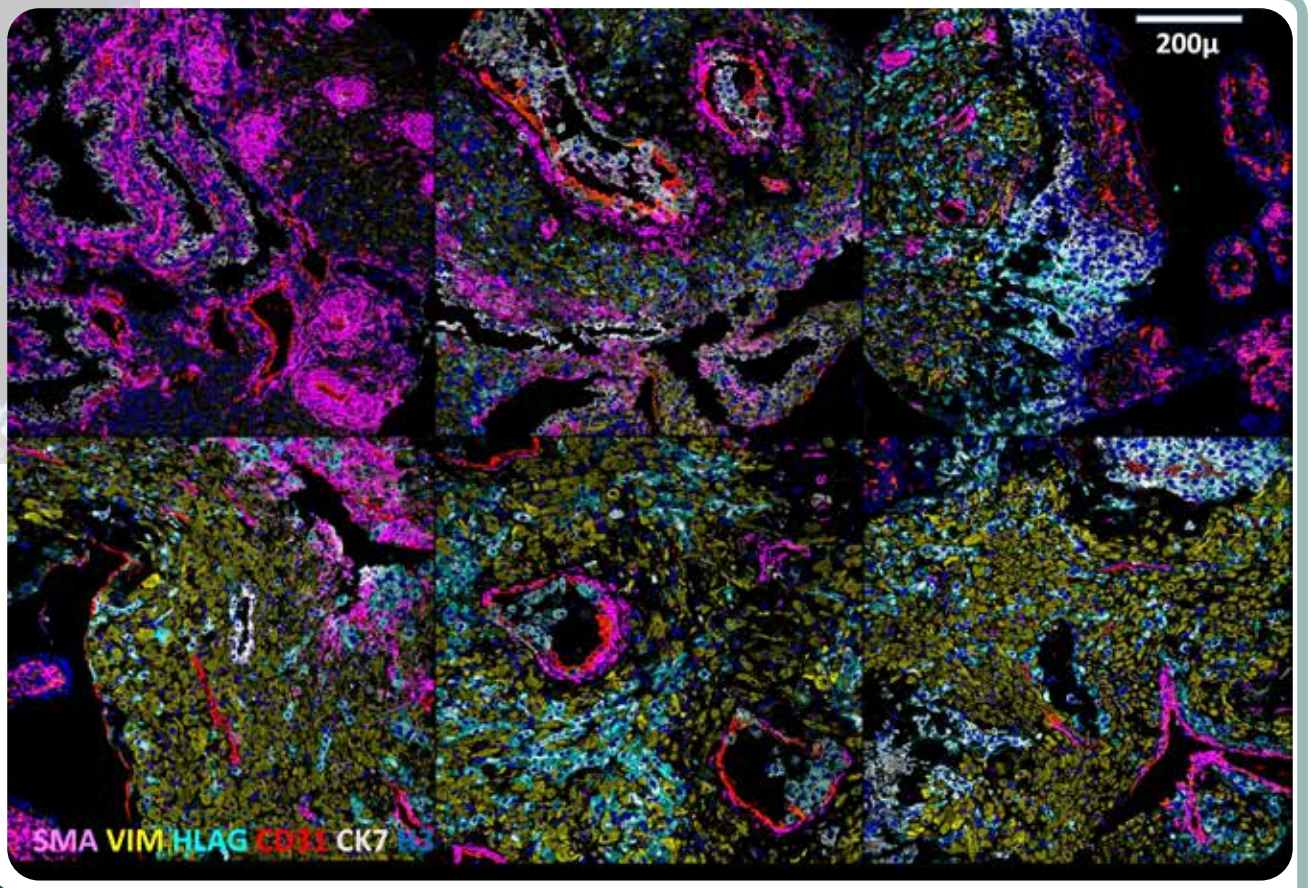
New Study Reveals Crucial Insights into Maternal-Fetal Interface

A recent study published in the scientific journal Nature has revealed a detailed timeline of maternal and fetal dynamics during the first half of human pregnancy. The research, conducted at Stanford University in collaboration with scientists from the **Hebrew University of Jerusalem** helps us understand how foreign fetal cells manage to invade the mother's uterus while escaping maternal immune response, even when many potent immune cells are found in close proximity. In addition, the study focuses on spiral artery remodelling (SAR), the process of transformation of maternal blood vessels during pregnancy which is critical for normal placenta development. The study's findings offer valuable insights into the complex mechanisms underlying pregnancy development and could potentially lead to advancements in placenta-related obstetric complications, such as preeclampsia and preterm birth.



MIBI-TOP instrument at the Angelo Lab in Palo Alto, California.

During normal pregnancy, maternal spiral arteries, which are normally coiled and constricted, dilate extensively to become wide flaccid vessels that can transfer low velocity low pressure blood flow to the placenta (this process, for example, does not occur smoothly in preeclampsia). Using Multiplexed Ion Beam Imaging by time-of-flight (MIBI-TOF) the team examined around 500,000 cells and 588 arteries in the intact decidua (which is the border between the maternal and fetal sides in the placenta) from 66 samples of non-medically indicated pregnancy terminations. MIBI enables the detection of up to 40 markers simultaneously at the single cell level, and captures the spatial data: A whole new level of resolution. This approach allowed them to get a detailed understanding of the changes happening in the tissue at different stages of pregnancy.



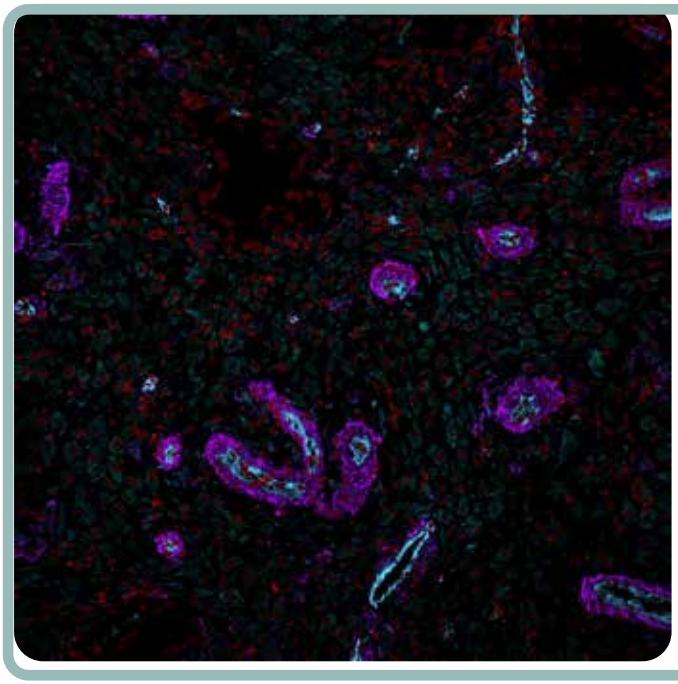
Dynamic MIBI Color Overlays: Exploring Trophoblast Invasion in Early Pregnancy Villi and Maternal Decidua

6 MIBI color overlays at different time points during the first half of the pregnancy. Top right image captures an anchoring placenta villous. During early weeks of pregnancy some villi adhere to maternal decidua, which serves as port of entry to invading trophoblasts. In the top right image, invading trophoblasts (in cyan) can be seen as they leave the anchoring villous (magneta with blue tip) and penetrate maternal decidua (denoted in yellow).
Credit: Stanford University Department of Pathology

"This research represents a major leap forward in our understanding of the maternal-fetal interface. By combining spatial data together with MIBI data, we can characterise all cell populations at the maternal-fetal interface, and capture the proteins they are expressing. We can use these data to unravel the complex interactions between foreign fetal cells and maternal immune cells. We can tackle puzzling questions such as 'Why maternal immune cells are not attacking foreign fetal cells? and 'What drives the dramatic changes we see in the structure of maternal vessels?' " **said lead researcher Dr. Shirley Greenbaum from Hebrew University of Jerusalem.**

Key findings from the study include:

The age of the pregnancy (gestational age) has a big impact on the composition of maternal immune cell populations in the decidua. Starting with an abundance of natural killer (NK) cells, as the pregnancy advances macrophages become more and more dominant. In addition, specific types of cells that promote tolerance (tolerogenic cell subsets) become more abundant and are found in closer proximity to each other. This indicates that the immune environment changes over time to support the developing fetus and prevent harmful reactions.



MIBI Color Overlay: 6-Week Decidua Sample with Magenta Smooth Muscle and Maternal Spiral Arteries

MIBI color overlay of 6 weeks gestation decidua sample. Smooth muscle layer is denoted in magenta demonstrating small and coiled maternal spiral arteries.

16-Week Decidua MIBI Color Overlay: Fetal Cell Invasion in Magenta, Disrupted Smooth Muscle in Blue

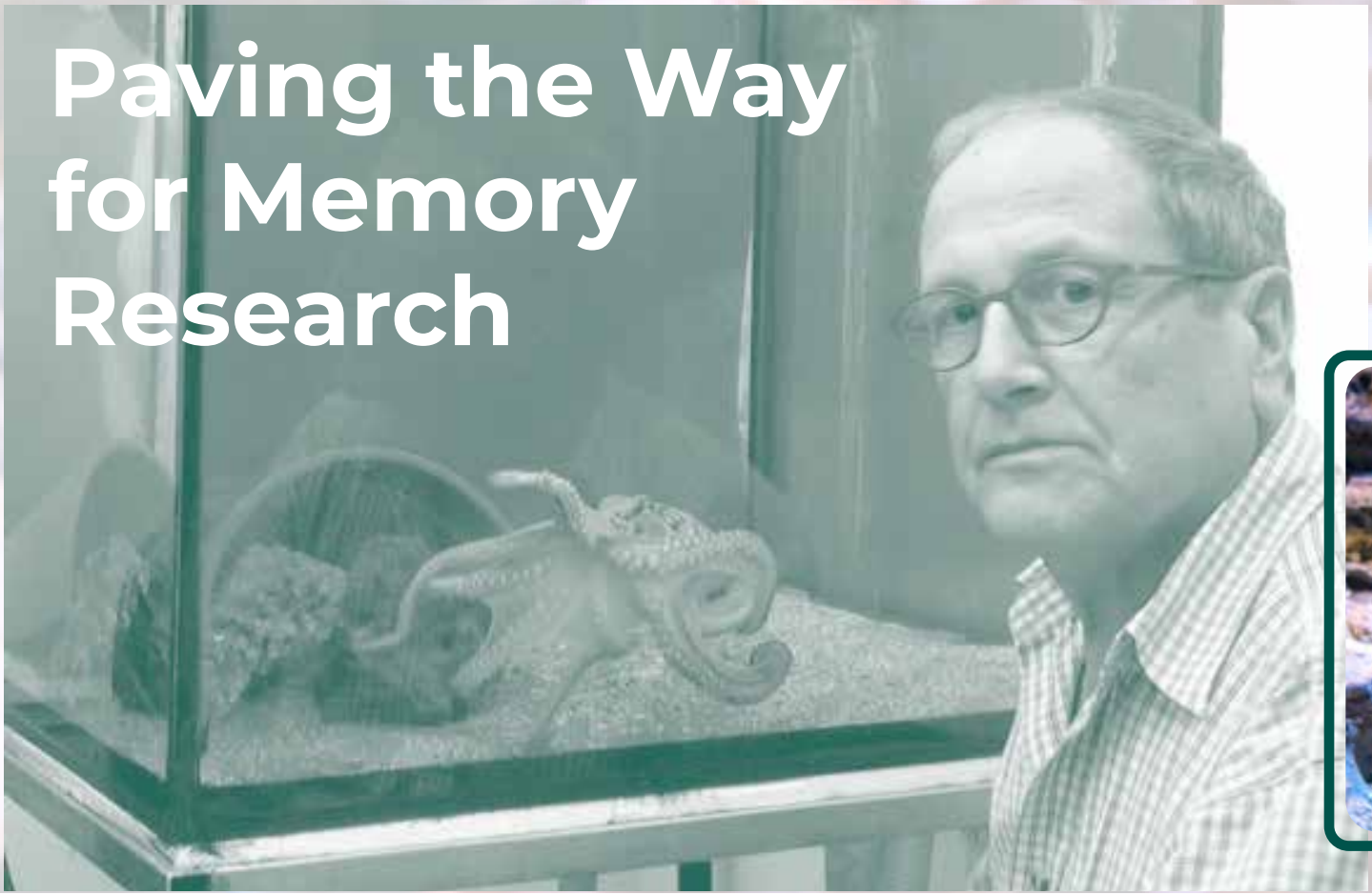
MIBI color overlay of 16 weeks gestation decidua sample. A thin and disrupted smooth muscle layer can be seen in blue, and invading fetal cells are denoted in magenta. Fetal cells can be observed within the artery lumen and surrounding it.

Fetal cells are driving maternal artery remodeling. One of the processes that are the hallmark of normal placental development and healthy pregnancy are spiral arteries remodelling. In contrast, in samples from preeclamptic pregnancies, the arteries often remain constricted and retain their thick muscular layer. Using the single cell data generated by MIBI, the team was able to establish the relationship between the invasion of fetal cells to these arteries, and to the remodeling of invaded vessels. Surprisingly, they found that maternal artery remodeling process was not driven by adjacent maternal immune cells, but rather by the invasion of fetal cells. This implies that, perhaps, it is the fetus that is driving the remodeling of its mother's arteries, and not the mother. Because abnormal remodeling of arteries is a pathological characteristic of preeclampsia, these findings may lead to a better understanding of this disease.

As spiral artery remodeling (SAR) takes place, specific gene pathways play a crucial role. **The study identified 78 such pathways that showed unique patterns of change over time**, some increasing steadily (monotonic) and others changing in two distinct phases (biphasic). They found that as the fetal cells invade the uterus, they activate certain beneficial processes. These include promoting the growth of new blood vessels (pro-angiogenic) and regulating the immune system to prevent any harmful reactions (immunoregulatory). These changes help the fetal cells interact with the maternal blood vessels without triggering an immune response from the mother's immune cells. This coordinated process ensures a healthy pregnancy by allowing the fetus to receive the necessary nutrients and oxygen without facing rejection from the mother's immune system.

The research has **created a unique and detailed map (spatiotemporal atlas) of the interactions between the mother and fetus in the early stages of pregnancy**. This atlas gives us an extraordinary understanding of how these interactions occur. The discoveries made in this study could fill a current knowledge gap regarding normal placenta development. The group is now working on implementing these findings to examine samples from preeclamptic pregnancies. The publication of this study marks a significant milestone in reproductive biology research and offers hope for improved maternal and fetal health outcomes in the future.

Paving the Way for Memory Research



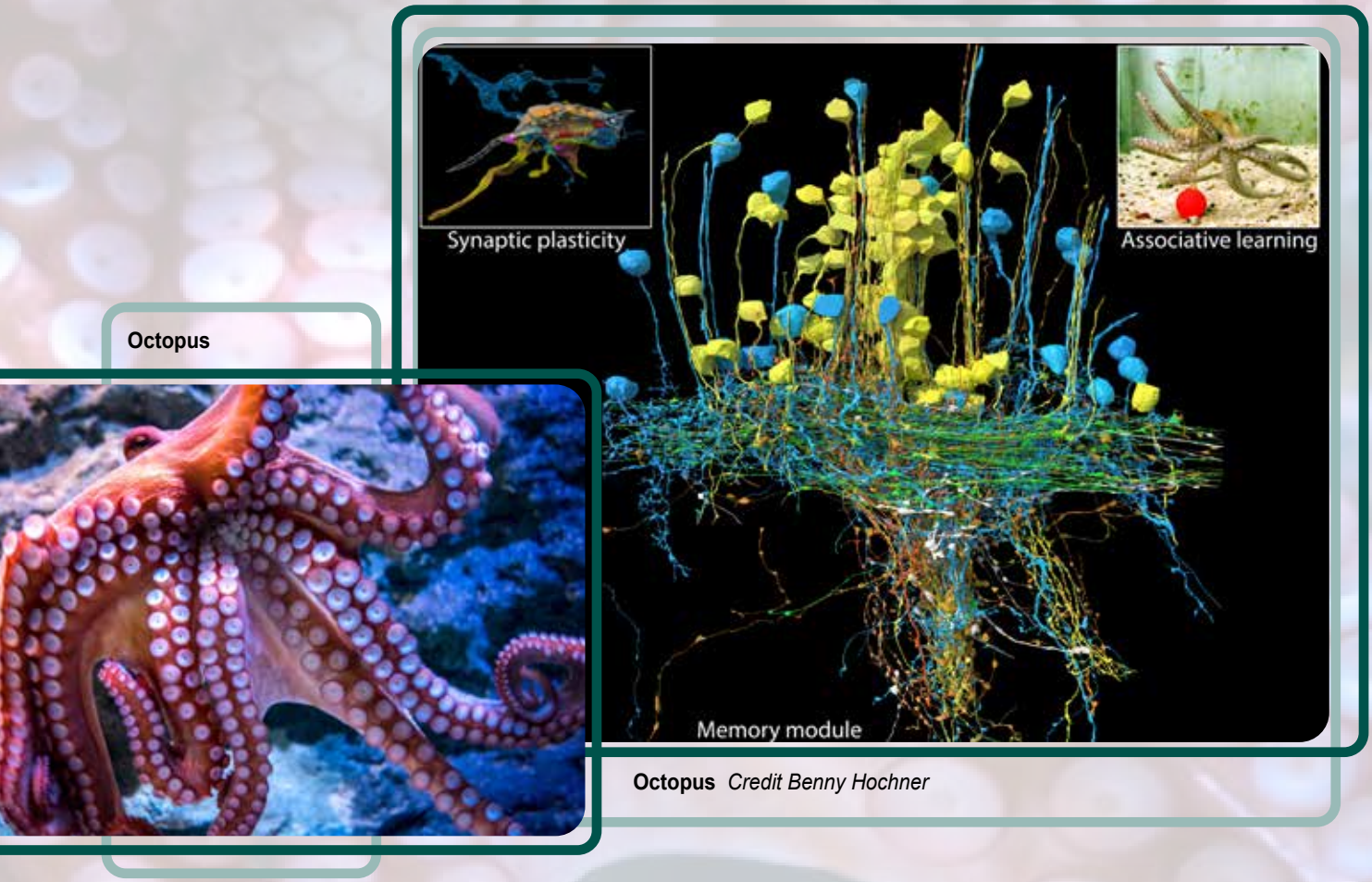
Prof. Benny Hochner and octopus

Prof. Benny Hochner of the Institute of Life Sciences at The Hebrew University and Prof. Jeff Lichtman from Harvard University *have uncovered the neural architecture governing the learning processes of the enigmatic Octopus vulgaris. The research presents a promising model for studying memory networks and could enhance our understanding of cephalopod cognition and memory through the comparison with other animals including humans.*

A recent study by **Prof. Benny Hochner from the Alexander Silberman Institute of Life Sciences at The Hebrew University** and **Prof. Jeff Lichtman from Harvard University** has unveiled the intricate neural architecture governing the enigmatic learning processes of Octopus *vulgaris*. This research introduces a promising model for delving into memory networks, with implications for both cephalopods cognition, considered the most intelligent invertebrates, and broader insights into memory processes, including those in humans.

The octopus, separated from us by 700 million years of evolution, showcases cognitive abilities rivalling higher vertebrates. **Prof. Hochner's team at Hebrew University** focused on the octopus's central nervous system's vertical lobe, crucial for learning and memory. They aimed to compare neural networks and mechanisms across species.

Collaboration with **Prof. Jeff Lichtman's laboratory at Harvard University**, leveraged innovative automated tissue preparation and new machine learning reconstruction algorithms. This cutting-edge technology enabled the cutting



Octopus *Credit Benny Hochner*

and sorting of ultra-thin sections, each a mere 30 millionths of a millimeter thick, constructing a three-dimensional representation of the structural elements comprising the network.

Prof. Hochner remarked, “Our previous studies revealed a fascinating phenomenon of long-term synaptic strengthening (Long-Term Potentiation - LTP) even within the vertical lobe of the octopus. This phenomenon, recognised as a universal synaptic process essential for learning and memory, caught our attention. We meticulously charted the connectivity of the vertical lobe using the precision of an electron microscope, achieving a resolution on the order of about 4 millionths of a millimeter. Together with Prof. Jeff Lichtman’s team at Harvard University, we engineered a robotic system alongside a sophisticated computational algorithm, uniquely capable of organising hundreds of ultra-thin sections (each only 30 millionths of a millimeter thick) into a comprehensive 3D structure. This innovative approach enabled us to trace the connectome – namely the intricate synaptic connections among the neural elements composing the network.”

Under the leadership of postdoctoral researchers **Dr. Flavie Bidel from Hebrew University** and **Dr. Yaron Meirovitch from Harvard University**, a minute tissue volume representing the vertical lobe was meticulously reconstructed to unveil the connectome. Through the application of advanced machine learning algorithms and precise annotation, the researchers charted the wiring of the vertical lobe within octopus brains. This challenged established notions of neural network functionality in the context of learning and ▸▸▸

memory. Unlike typical models, the vertical lobe's network operates in a feedforward configuration, like a one-way street, with information only from the input neurons to output neurons that control octopus behavior.

Central to this simplicity is the organisational structure of approximately 25 million interneurons, divided into two distinct groups: Simple Amacrine Cells (SAMs) and Complex Amacrine Cells (CAMs). The SAMs, numbering around 23 million, specialise in learning visual characteristics through synaptic reinforcement. In contrast, the CAMs, totalling approximately 400,000, play a pivotal role in consolidating activity levels.

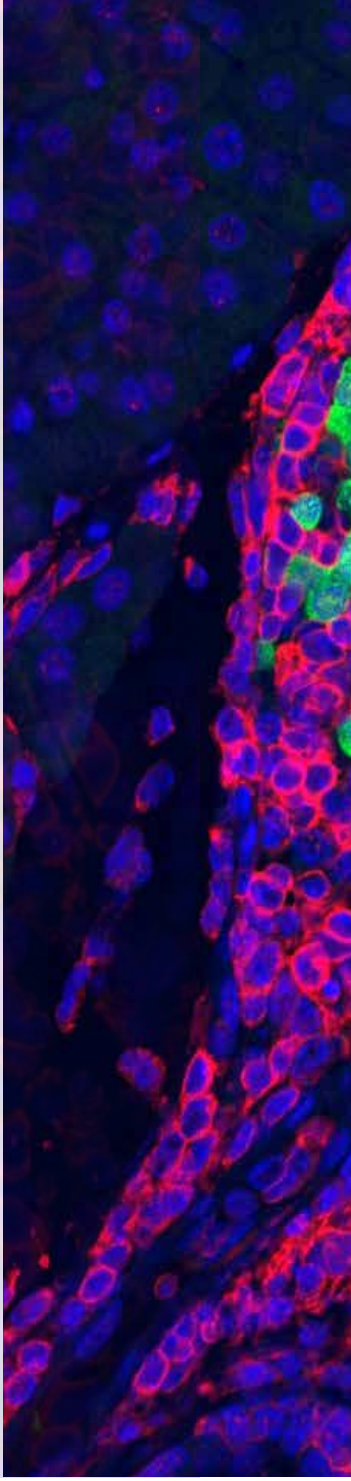
The two types of cells send their axonal branches to connect with bigger cells in the output layer. Simple cells, that transmit "learned" information, make the big cells active, while complex cells make them less active, controlling how the brain works efficiently.

This evolutionary adaptation underscores the octopus's unique cognitive prowess, contributing to our understanding of neural mechanisms important for cognitive functions. The research reveals Octopus *vulgaris* as an invaluable model organism for in-depth exploration of memory acquisition networks and opens doors to further unraveling the intricacies of cephalopod cognitive processes, enriching our understanding of memory across various species.

The study, titled "Connectomics of the Octopus vulgaris Vertical Lobe Provides Insight into Conserved and Novel Principles of a Memory Acquisition Network," has been published in eLife. The full article is available: https://elifesciences.org/articles/84257?utm_source=twitter&utm_medium=social&utm_campaign=organic

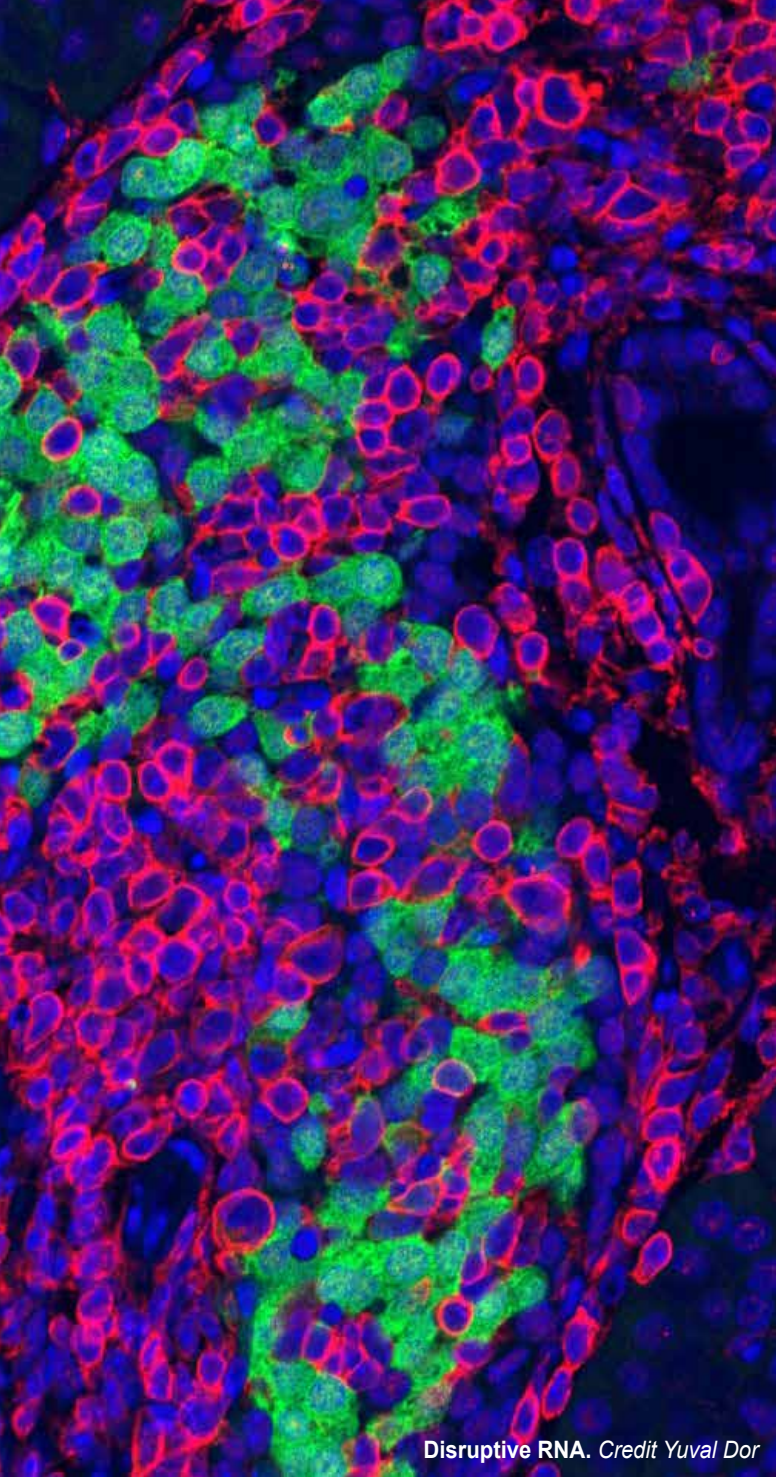
A novel angle on type 1 diabetes:

RNA editing disruption mimics early-stage disease with no involvement of virus



A recent study by researchers at the Hebrew University-Hadassah Medical School, Bar-Ilan University and Vanderbilt University has developed a new paradigm for early stages of type 1 diabetes (T1D), suggesting a new etiology that does not involve viral infection.

T1D is an autoimmune disease, affecting almost 10 million people worldwide, whereby the immune system attacks and destroys insulin-producing beta cells in the pancreas. In the absence of insulin, glucose concentration in blood increases, leading to a host of complications. Patients, typically diagnosed in childhood, require life-long treatment with insulin. A leading model for why T1D develops has been that the disease is initiated by viral infection, which on genetically susceptible individuals is causing autoimmune attack on beta cells. This is supported by extensive information, for example the identification of an anti-viral response in early-stage disease. The implications of this view are vast; for example, it suggests



Disruptive RNA. *Credit Yuval Dor*

the use of anti-viral therapy for preventing T1D. However, despite decades of search, a causal virus has not been found.

The research, led by Prof. Yuval Dor, Dr. Agnes Klochendler and MD/PhD students Ehud Knebel and Shani Peleg introduces a new model for how T1D may develop, explaining the anti-viral response but with no need for viral infection.

The team studied a process called RNA editing, which acts to dismantle endogenous RNA molecules that fold on themselves, forming double-stranded RNA. Since double-stranded RNA is a hallmark of many viruses, such molecules can often be recognised, mistakenly, by the immune system as an indication of an invading virus, and trigger a detrimental immune response. They found that when RNA editing is defective in pancreatic beta cells, the body mounts a massive inflammatory attack, destroying beta cells and eventually leading to diabetes, with features that strikingly resemble T1D. Moreover, they discovered that high levels of blood glucose are boosting the inflammatory attack, suggesting a vicious cycle whereby beta cell destruction leads to diabetes which further drives destructive inflammation. Strikingly, independent work has recently discovered that genetically inherited defects in RNA editing predispose people to multiple auto-inflammatory conditions, including T1D, suggesting relevance to actual human T1D.

Prof. Yuval Dor stated, “Our research presents compelling evidence that disruption of RNA editing within beta cells can trigger an inflammatory response resembling early-stage type 1 diabetes. This offers a new view for how T1D may develop, with implications for prevention and treatment strategies”.

Dr. Agnes Klochendler added, “Identifying a link between natural double stranded RNA in beta cells, inflammation and diabetes opens a new perspective on T1D: a paradigm of “the enemy within”, not necessitating external viral infection as the triggering event for this disease.”

The Institute for Medical Research Israel-Canada (IMRIC) at the Hebrew University Faculty of Medicine is dedicated to pioneering biomedical research.

The study, titled “Disrupted RNA Editing in Beta Cells Mimics Early Stage Type 1 Diabetes,” has been published in **Cell Metabolism** and can be accessed at https://pubmed.ncbi.nlm.nih.gov/38128529/

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Emerging from the Ruins

Intel Ignite Tel Aviv Partners with Hebrew University Startup 'RumaFeed' for Innovative Agricultural Project in Holit

Credit for all photos: Or Eldan/RumaFeed

The Hebrew University recently announced that **RumaFeed** (the origin of the name **RumaFeed** is ruminants feed) - a startup associated with Hebrew University and Yissum (see footnote for information about Yissum), led by Prof. Haim Rabinowitch, has been chosen by Intel Ignite Tel Aviv to partner with Holit on a Proof of Concept (POC). Their project has achieved a remarkable transformation of potato leaves, turning what is currently considered biological waste into a valuable product – animal fodder and silage with excellent digestibility compared to traditional fodder, along with excellent nutritional value.

As the largest employer in Israel, Intel launched the Intel Ignite acceleration program in 2019 under Tzahi Weisfeld and Alon Leibovich. Initially focusing on deep tech startups, the highly successful acceleration program expanded beyond Israel to the USA, continental Europe, and England. The events of October 7th led the program's managers to extend the program by utilising their expertise and abilities to provide innovative technological solutions for supporting the rise from the ruins of the Western Negev. The chosen site for this effort is 'Holit,' a kibbutz in southern Israel's Gaza envelope, historically sustained through agriculture. Following the events of October 7th, where thirteen members of the kibbutz were murdered, substantial damage was done to homes, infrastructure, and production units.

The Intel Ignite judging team, consisting of management, venture capitalists, entrepreneurs, and agriculture innovation experts, had the formidable task of selecting projects with the greatest impact. Their objective was to enhance crop yield and quality, streamline agricultural practices, and push the boundaries of agriculture on both Israeli and global levels.

RumaFeed was selected as one of the five

companies to partner with Intel Ignite Tel-Aviv. Prof. Rabinowitch, leading **RumaFeed**, played a key role in revolutionising the global tomato industry, a world leader in Allium research, and making strides in various ventures. He introduced a groundbreaking method for cultivating dual-purpose potatoes, combining original thinking with modern biological tools, resulting in significant success over the last three years. **RumaFeed** focuses on solutions to increase global food production, prioritising environmental sustainability, and addressing nutritional security challenges. Their innovation involves reevaluating the use of crops, especially those in the Solanaceae (nightshades) family. While significant portions of the biomass of crops such as wheat, corn, and soy are utilised, Prof. Rabinowitch was aware that valuable components of important crops like potatoes and tomatoes are discarded due to the accumulation of toxic substances known as glycoalkaloids in the foliage.

The RumaFeed varieties experimental plot between Orim and Ze'elim, featuring (from right to left) Arnon Rosenbaum - CEO, Haim Rabinovitch - Company Scientist, and Or Eldan - Assistant to the CEO.

A potato plant: unveiling a vibrant green landscape with tubers that were concealed beneath the soil, now brought into view.

Modern biology tools provide a solution by halting glycoalkaloid synthesis even under optimal conditions. Through this innovative approach, the ▸▸▸

project has successfully transformed what was once considered biological waste into a valuable feed. Notably, potato leaves have been found to be more digestible than traditional fodder and feeding experiments have demonstrated normal and even superior development compared to standard hay feed for livestock.

The conventional method of growing potatoes involves vine-killing 10-20 days before harvesting the tubers, primarily achieved through the application of herbicides. Hence, posing environmental hazards and economic challenges. Up to this point, **RumaFeed** varieties farming follows the same cultivation methods as standard practice. However, it offers a unique solution in subsequent steps. Instead of disposing of the haulm by killing and trashing it, **RumaFeed** harvests and transforms the haulm into high-value fodder or silage, requiring no additional investments in resources. This environmentally friendly approach provides a highly nutritious alternative for animal feed, contributes to the income of potato growers, and mitigates environmental damage.

Global estimates suggest that integrating **RumaFeed** varieties could generate 150-200 million tons of high-quality feed, enabling more extensive production of human food and raw materials without compromising critical areas or natural values.

Given the favourable climate, inputs, skills, and human qualities in the settlements of the Western Negev, this region has become Israel's primary potato producer.

RumaFeed has obtained exclusive IP rights for the above from the Hebrew University of Jerusalem/Yissum. **Rumafeed** will now align with Intel Ignite's acceleration program to establish a business venture in Holit, dedicated to cultivating **RumaFeed** varieties. The goal is to leverage advanced technologies, prioritising sustainability and a circular economy to produce high-quality propagation materials for **RumaFeed** varieties. Being recognised as a promising startup by Intel

Capturing the final stages of the growing season at the experimental plot of RumaFeed varieties, nestled between Orim and Ze'elim.

A battalion of RumaFeed potato plants flourishing in regimented raised beds, showcasing the vibrant array of varieties.

Ignite provides a supportive platform, merging the biotechnology expertise from the Hebrew University's now owned by **RumaFeed** with the Company's capabilities. This collaboration, enriched by the unique qualities of Holit's residents and favourable environmental conditions, is poised to significantly contribute to the settlement and neighbouring areas. It holds the promise of advancing agricultural practices, benefiting Israel and the global community by enhancing human food security.

"My journey with **RumaFeed** personnel and board, in partnership with Intel Ignite, embodies a commitment to redefining agricultural practices. The collaboration in Holit signifies more than a mere business venture; it constitutes a mission to convert waste into valuable resources, enhance crop yield, and bolster global food security. Following the tragic events of October 7th, there's a compelling urgency to channel our efforts towards positive and impactful initiatives. With cutting-edge technologies and a steadfast focus on sustainability, we aspire to create a positive impact on the environment and the community. Together, we aim to elevate agricultural practices, not only within Israel but on a global scale, ensuring a future where innovation converges with nutritional security." - Prof. Haim Rabinowitch, Hebrew University, CTO of **RumaFeed**

Yissum, the Technology Transfer Company of the Hebrew University of Jerusalem, stands as the world's third-largest Tech Transfer since its founding in 1964. Serving as the vital link between licensing and global commercialisation, Yissum leverages unparalleled experience to transform cutting-edge research into impactful technology. Aligned with the Hebrew University's commitment to fostering curiosity-driven research, we collaborate with outstanding scientists and industry leaders to provide a robust platform for technology commercialisation, corporate engagement, and economic development. Our dedicated team is focused on supporting leading researchers, developing effective strategies, and creating opportunities for academia's brightest minds to thrive in the marketplace.

To learn more about Yissum visit the official website at https://www.yissum.co.il/

New Insights on How Light Interacts with Magnets for Better Sensors & Memory Technology

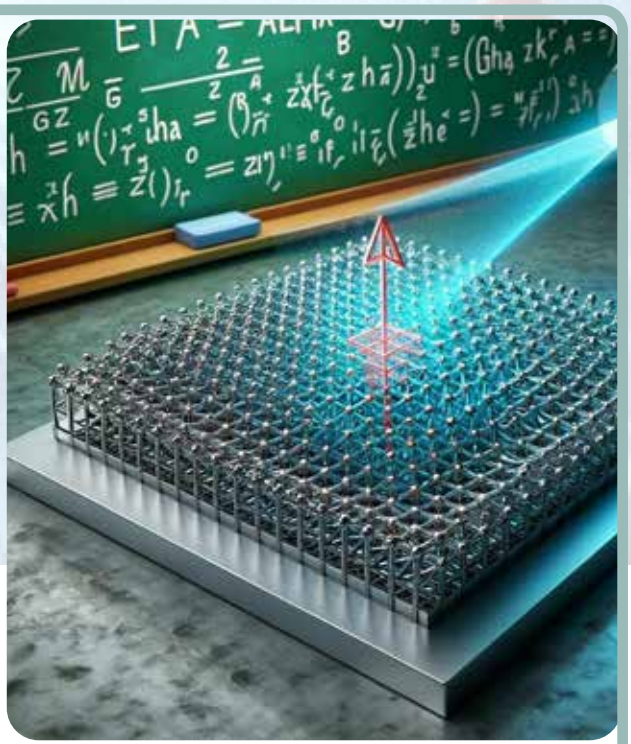
A new study at Hebrew University uncovered a previously unknown connection between light and magnetism. This discovery could lead to super-fast light-controlled memory technology and innovative sensors that detect the magnetic part of light. This breakthrough is expected to revolutionise how we store data and build devices in various industries.

Professor Amir Capua, head of the Spintronics Lab within the Institute of Applied Physics and Electrical Engineering at Hebrew University of Jerusalem, announced a pivotal breakthrough in the realm of light-magnetism interactions. The team's unexpected discovery reveals a mechanism wherein an optical laser beam controls the magnetic state in solids, promising tangible applications in various industries.

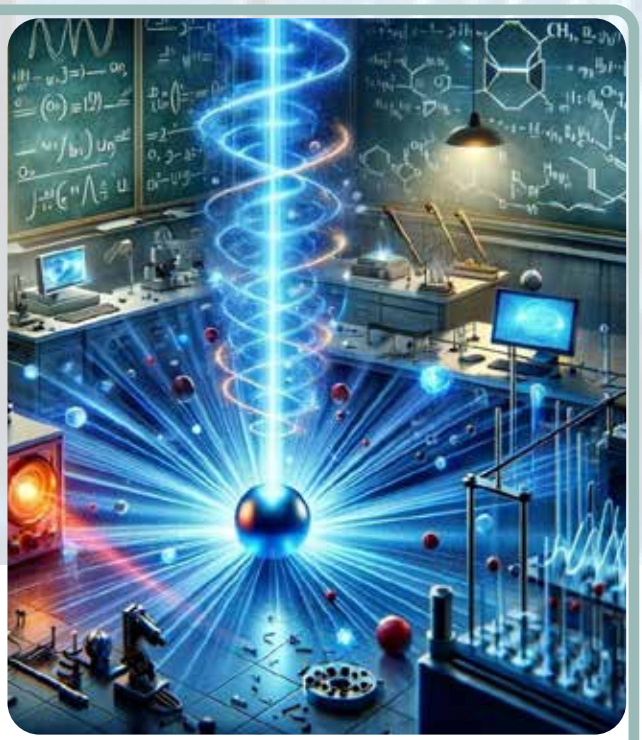
"This breakthrough marks a paradigm shift in our understanding of the interaction between light and magnetic materials," stated Professor Capua. "It paves the way for light-controlled, high-speed memory technology, notably Magneto resistive Random Access Memory (MRAM), and innovative optical sensor development. In fact, this discovery signals a major leap in our understanding of light-magnetism dynamics".

The research challenges conventional thinking by unraveling the overlooked magnetic aspect of light, which typically receives less attention due to the slower response of magnets compared to the rapid behavior of light radiation. Through their investigation, the team unraveled a new understanding: the magnetic component of a rapidly oscillating light wave possesses the capability to control magnets, redefining principle physical relations. Interestingly, an elementary mathematical relation that describes the strength of the interaction was identified and links the amplitude of the magnetic field of light, its frequency, and the energy absorption of the magnetic material.

The discovery is tightly linked to the realm of quantum technologies, and combined principles from two scientific communities that so far had little overlap: "We arrived to this understanding by using principles that are well established within the quantum computing and quantum optics communities but less so in the spintronics and magnetism communities." The interaction between a magnetic material and radiation is well established when the two are in perfect equilibrium. However, the situation where there is both radiation and a magnetic material that are not in equilibrium has so far been described very partially. This non-equilibrium regime is at the core of quantum optics and quantum computing technologies. From our examination of this non-equilibrium regime in magnetic materials, while borrowing principles from quantum physics, we have underpinned the fundamental



Harnessing optical beams for magnetic recording (applications) *Credit: Amir Capua*



Revolutionising light Interaction with magnetic materials *Credit: Amir Capua*

understanding that magnets can even respond to the short time scales of light. Moreover, the interaction turns out to be very significant and efficient. “Our findings can explain a variety of experimental results that have been reported in the last 2-3 decades” explains Capua.

“This discovery has far-reaching implications, particularly in the domain of data recording using light and nano-magnets,” remarked Professor Capua. “It hints at the potential realisation of ultra-fast and energy-efficient optically controlled MRAM, and a seismic shift in information storage and processing across diverse sectors.”

Moreover, in tandem with this discovery, the team introduced a specialised sensor capable of detecting the magnetic part of light. Unlike traditional sensors, this cutting-edge design offers versatility and integration across various applications, potentially revolutionising sensor and circuit designs utilising light in diverse ways.

The research was conducted by Mr. Benjamin Assouline, a Ph.D. candidate in the Spintronics Lab, who played a vital role in this groundbreaking discovery.

Recognising the potential impact of their breakthrough, the team has applied for several related patents.

The research was supported by the Israel Science Foundation, Peter Brojde Center for Innovative Engineering and Computer Science, and the Center for Nanoscience and Nanotechnology of the Hebrew University of Jerusalem

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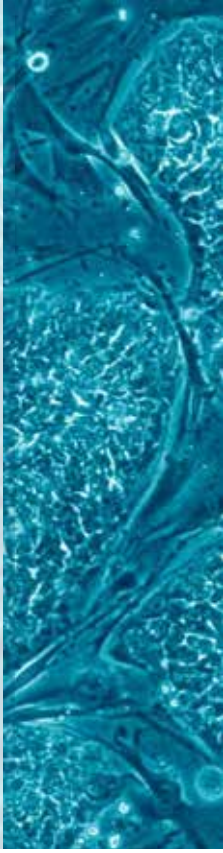
The article titled “Helicity-dependent optical control of the magnetisation state emerging from the Landau-Lifshitz-Gilbert equation” was published in the Physical Review Research and can be accessed at https://journals.aps.org/prresearch/abstract/10.1103/PhysRevResearch.6.013012

Cancer-related mutations appear in stem cell derivatives utilised in regenerative medicine



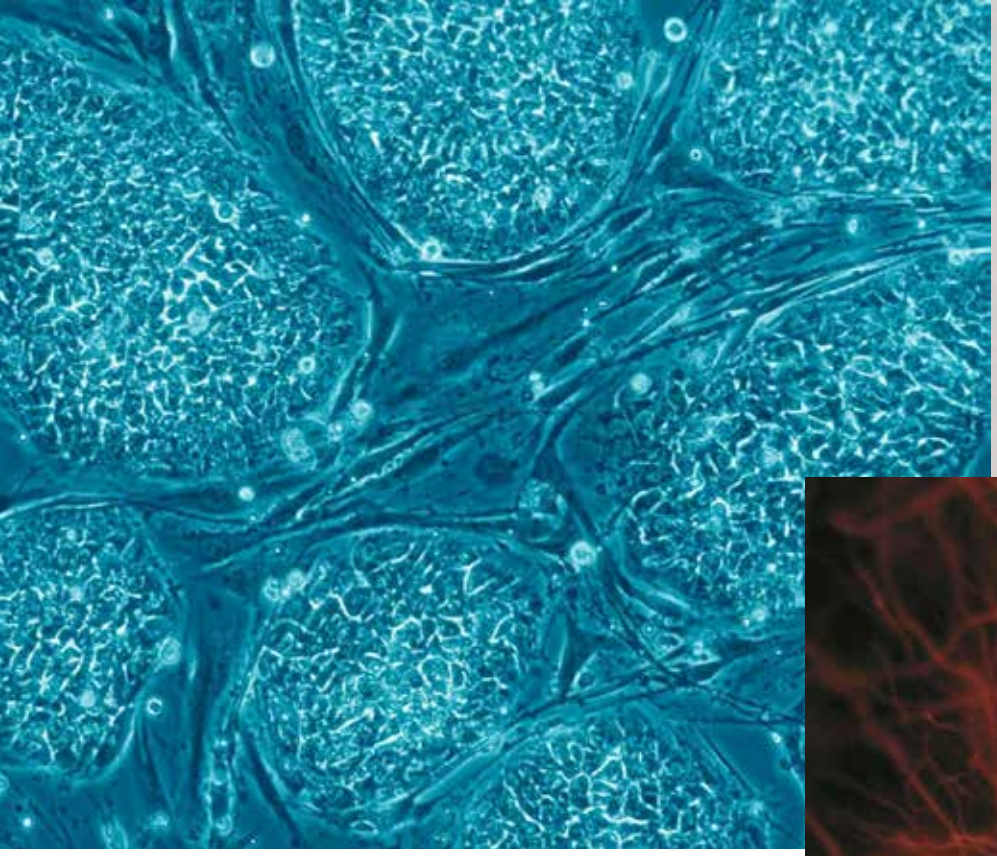
A study by Hebrew University reveals that a significant proportion (over one fifth) of human pluripotent stem cell samples that can be used in regenerative medicine possess cancer-related mutations, with the majority acquired during their propagation in culture. The findings underscore the importance of regular evaluations of cell cultures, as these mutations not only impact the growth advantage in culture but may also influence the cell fate transition during differentiation. The study emphasises the need for increased vigilance in the use of stem cell derivatives in both research and clinical applications to ensure accurate conclusions and safe therapeutic practices.

Human pluripotent stem cells are cells that have two very important traits: a seemingly endless proliferative capability and the amazing ability to give rise to any cell in our body. These characteristics make these cells a great tool for research of early human development as well as disease modeling and drug discovery, and most importantly, as a cell source for regenerative medicine.

Although human pluripotent stem cells can be propagated in culture for long periods of time, it is known that they can also acquire genetic aberrations conferring a selective advantage in the culture conditions. This advantage then allows a single cell with the aberration to take over the population of cells. The laboratory of **Prof. Nissim Benvenisty at the Azrieli Center for Stem Cell and Genetic Research at the Hebrew University** has a been pioneer in identifying cancer-related genes with such mutations and in developing a bioinformatic algorithm to identify them.

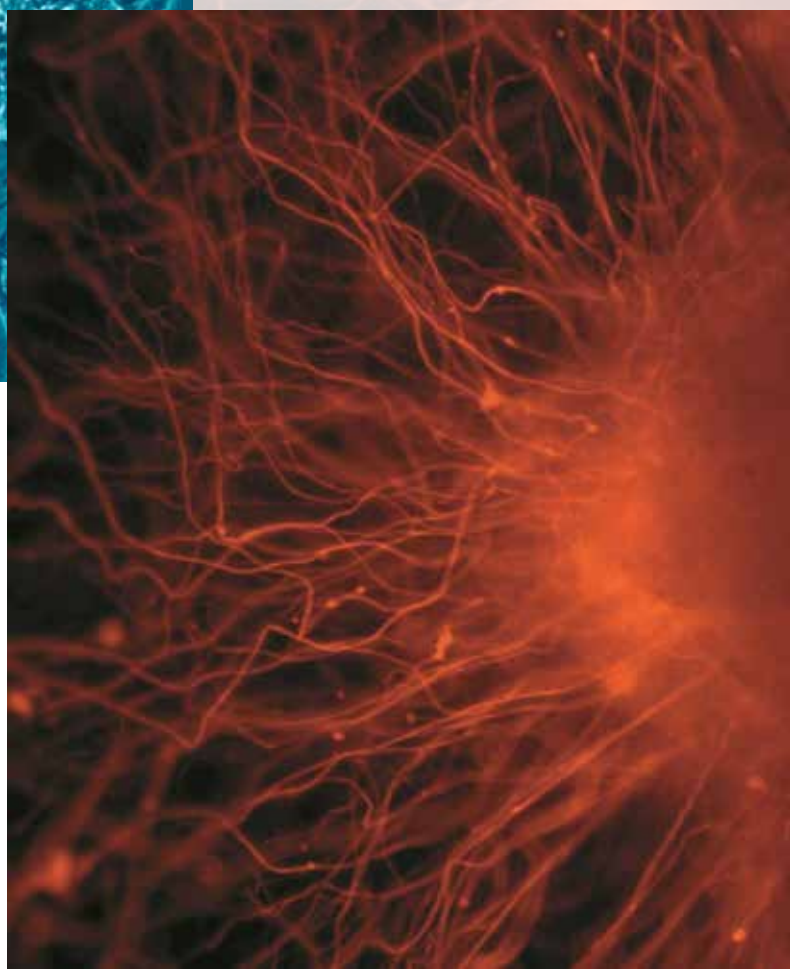
The recent increased popularity of pluripotent stem cell use in differentiation studies and their use in clinical trials, has now led the graduate students **Elyad Lezmi and Jonathan Jung, and Prof. Benvenisty** to try and illuminate the state of mutation abundance in these cells and their differentiated derivatives used in basic and clinical research. Their study has recently been published in the prestigious journal Nature Biotechnology. With their bioinformatic tool, the investigators analysed over 2200 samples from over 140 different human pluripotent stem cell lines, in hopes of unveiling the abundance and severity of these cancer-related mutations acquired in culture.

The researchers show that a staggering 22%



Human pluripotent stem cells
Credit: Nissim Benvenisty

Neurons derived from human pluripotent stem cells
Credit: Nissim Benvenisty



of the samples analysed appeared to have at least one cancer-related mutation, and at least 70% of those were acquired throughout their propagation in culture. Mutations acquired during the differentiation period, although rare, do still occur, and as such require the surveillance of the end product of the differentiation protocol.

The most predominant gene in the analysis was P53, the most known tumour suppressor gene in human cancers. Deeper analysis of the mutations revealed the similarity of mutations acquired in culture in stem cells to those appear in patients‘ tumours. These mutations caused a delay in the exit from pluripotency of the stem cells and in their differentiation into somatic cells. This led the researchers to suggest that these acquired mutations do not only confer an advantage in culture, but also have an effect on the cell fate transition - a crucial point of concern due to the rise of differentiation studies in stem cell research and clinical application.

“The mutations found by us were not known to the investigators that utilised the cells and published their research, and as such could have brought misleading conclusions, especially when phenotypic effects have been shown to exist,” says Jonathan Jung, an author on the paper, “*the need for periodical evaluation of the culture is important for the field to move in the right direction, especially for clinical utilities.”*

The paper is titled “High prevalence of acquired cancer-related mutations in 146 human pluripotent stem cell lines and their differentiated derivatives” and published in Nature Biotechnology - https://www.nature.com/articles/s41587-023-02090-2

Unknown Mechanism Impacting Earth's Climate Revealed in New Study

*In a recent study an **unknown climate mechanism** was discovered, offering insights into Earth's past and present climate. The research focuses on the Cretaceous period when high atmospheric carbon dioxide levels prevailed. By studying how large ocean currents transported warm water, the study highlights their crucial role in shaping temperature gradients. The findings suggest that continental shifts during the Cretaceous disrupted these currents, leading to significant temperature differences between the poles and the tropics. This research not only enhances our understanding of past climate but also underscores the importance of ocean currents in shaping today›s climate systems.*

A research study conducted by **Hebrew University's Ph.D. candidate, Kaushal Gianchandani, under the guidance of Professors Nathan Paldor and Hezi Gildor from the Institute of Earth Sciences at the Hebrew University**, **in collaboration with Prof. Ori Adam and Sagi Maor from the Hebrew University** along with **Dr Alexander Farnsworth and Prof. David Lunt from the University of Bristol, UK,** has unveiled a previously unknown mechanism that significantly influences Earth›s climate. This cutting-edge research, published in Nature Communication, applies a novel analytic model developed by the three Hebrew University researchers two years ago, focusing on wind-driven circulation at the ocean›s surface and highlighting the pivotal role of ocean basin geometry.

This study explores the climate during the Cretaceous period, around 145 to 66 million years ago, when there was a lot of a carbon dioxide (warming gas) in the air. It looks at how big ocean swirls, which move warm water from the tropics to the poles, influenced the temperature difference between these two regions. This temperature difference is crucial for understanding why there were so many different kinds of plants and animals during the Cretaceous period.

In their research, the scientists aimed to uncover the complex relationship between changes in ocean current patterns (gyral circulation) that result from the arrangement of continents on Earth and variations in temperature gradients during the Cretaceous era when dinosaurs roamed the Earth. To do this, they conducted a thorough analysis using computer models that simulate ancient climates. Their findings revealed that the movement of Earth's continents during the Cretaceous period caused a slowdown in the large swirling ocean currents responsible for carrying warm water from the equator to the poles. This slowdown disrupted the way the ocean regulated its surface temperatures, resulting in a significant increase in temperature differences between the poles and the tropics during that time. These findings align with geological evidence from the Cretaceous era, providing a more comprehensive understanding of past climate dynamics.

Key takeaways:

Discovery of a Previously Unknown Mechanism: The study has unveiled a previously unknown mechanism that significantly influenced

Professor Nathan Paldor, Institute of Earth Sciences at the Hebrew University

Professor Hezi Gildor, Institute of Earth Sciences at the Hebrew University . Credit-Bruno Charbit

Prof Ori Adam.
Credit Bruno Charbit

Earth's climate during the Cretaceous period. This mechanism is related to changes in the distribution of the continents which affects ocean current patterns and their impact on temperature gradients.

Implications for Contemporary Climate: While the study primarily focuses on the Cretaceous period, it has implications for our understanding of contemporary climate systems. It highlights the importance of ocean gyres (circulation patterns) in shaping climate dynamics, both in the past and today. It underscores the complexity of Earth's climate and the strong effect that processes other than CO2 concentration might have on it.

Focus on Cretaceous Period: The research primarily focuses on the climate during the Cretaceous period, which occurred approximately 145 to 66 million years ago. This period is of interest because it was characterised by high levels of carbon dioxide in the atmosphere, which is a greenhouse gas that can influence global temperatures.

Role of Ocean Swirls (Gyral Circulation): The study investigates the role of large ocean swirls, known as gyral circulation, in transporting warm water from the tropics to the poles. Understanding how these currents influenced temperature differences between the poles and the tropics is crucial for comprehending the biodiversity and climate of the Cretaceous period.

Impact of Continental Movement: The research findings suggest that the movement of Earth's continents during the Cretaceous period disrupted the large ocean currents responsible for transporting warm water. This disruption led to significant increases in temperature differences between the poles and the tropics during that time.

Validation with Geological Evidence: The study's findings align with geological evidence from the Cretaceous era, providing further support for the proposed mechanisms and enhancing our understanding of past climate dynamics.

In summary, this research helps us gain insights into the complex relationship between ocean circulation patterns, equator-to-pole temperature differences, and past climate conditions. While it primarily contributes to our understanding of Earth's ancient climate, it also underscores the significance of oceanic processes in shaping contemporary climate systems. This knowledge can potentially aid in modelling and predicting the impacts of climate change in the modern era, as ocean circulation patterns continue to play a crucial role in regulating global climate.

The study, titled "Effects of paleogeographic changes and CO2 variability on northern mid-latitudinal temperature gradients in the Cretaceous" has been published in Nature Communications and can be found at https://www.nature.com/articles/s41467-023-40905-7

Study sheds light on where conscious experience resides in the brain

Researchers from Hebrew University of Jerusalem and UC Berkeley recorded electrical activity in the brains of epilepsy patients while showing them various images in an attempt to find out where persistent images are stored in the brain and how we consciously access those images.

Researchers from the Hebrew University of Jerusalem and the University of California, Berkeley, have made progress in understanding the puzzling affliction known as unilateral neglect, where stroke victims lose conscious awareness of half of what their eyes perceive. The scientists have identified a region in the brain where sustained visual images are retained for a few seconds. By recording brain activity from electrodes placed on patients' brains, they discovered that visual areas of the brain retain information about a perceived object at a low level of activity for an extended period, suggesting a neural basis for stable perception. The prefrontal and parietal cortexes become active when something new is perceived, while the occipitotemporal area of the visual cortex maintains a sustained but low level of activity. These findings provide insights into the difference between perceiving something and being consciously aware of perceiving it, which could have implications for coma patients and the development of treatments for consciousness disorders.

More than a quarter of all stroke victims develop a bizarre disorder — they lose conscious awareness of half of all that their eyes perceive.

After a stroke in the brain's right half, for example, a person might eat only what's on the right side of the plate because they're unaware of the other half. The person may see only the right half of a photo and ignore a person on their left side.

Surprisingly, though, such stroke victims can emotionally react to the entire photo or scene. Their brains seem to be taking it all in, but these people are consciously aware of only half the world.

This puzzling affliction, called unilateral neglect, highlights a longstanding question in brain science: What's the difference between perceiving something and being aware or conscious of perceiving it? You may not consciously note that you passed a shoe store while scrolling through your Instagram feed, yet you started searching online for shoe sales. Your

Image credit: Hadar Vishne, Royal College of Art

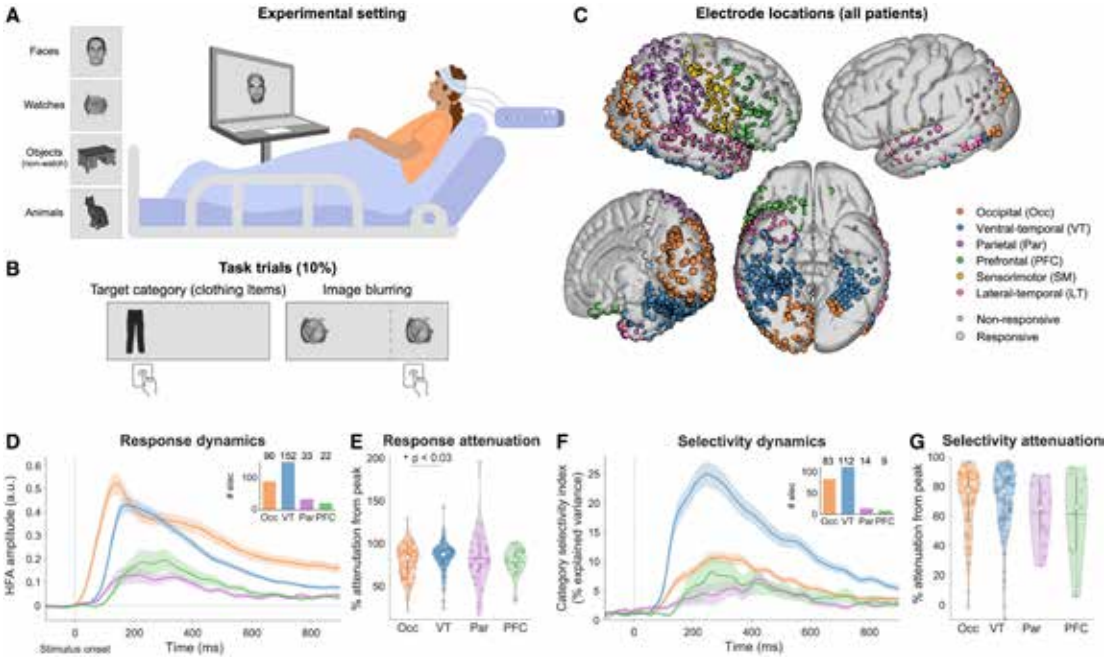
brain records things that you don't consciously take note of.

Neuroscientists from the Hebrew University of Jerusalem and the University of California, Berkeley, now report that they may have found the region of the brain where these sustained visual images are retained during the few seconds we perceive them. Their findings were recently published in the journal *Cell Reports*.

"Consciousness, and in particular, visual experience, is the most fundamental thing that everyone feels from the moment they open their eyes when they wake up in the morning to the moment they go to sleep," said Hebrew University graduate student Gal Vishne, lead author of the paper. "Our study is about your everyday experience."

While the findings do not yet explain how we can be unaware of what we perceive, studies like these could have practical applications in the future, perhaps allowing doctors to tell from a coma patient's brain activity whether the person is still aware of the outside world and potentially able to improve. Understanding consciousness may also help doctors develop treatments for disorders of consciousness.

"The inspiration for my whole scientific career comes from patients with stroke who suffer from unilateral neglect, where they just ignore half of the world," said senior author Leon Deouell, a Hebrew University professor of psychology and member of the Edmond and Lily Safra Center for brain research. "That actually triggered my whole interest in the question of conscious awareness. How is it that you can have the information, but still not acknowledge it as something that you're subjectively experiencing, not act upon it, not move your eyes to it, not grab it? What is required for something not only to be sensed by the brain, but for you to have a subjective experience? Understanding that would eventually help us understand what is missing in the cognitive system and in the brains of patients who have this kind of a syndrome." ▸▸▸



▸▸▸ "We are adding a piece to the puzzle of consciousness — how things remain in your mind's eye for you to act on," added Robert Knight, also a senior author and a UC Berkeley professor of psychology and member of the Helen Wills Neuroscience Institute.

The brain has a transient and a sustained response Deouell noted that for some six decades, electrical studies of the human brain have almost solely concentrated on the initial surge of activity after something is perceived. But this spike dies out after about 300 or 400 milliseconds, while we often look at and are consciously aware of things for seconds or longer.

"That leaves a whole lot of time which is not explained in neural terms," he said. In search of longer-lasting activity, the neuroscientists obtained consent to run tests on 10 people whose skulls were being opened so that electrodes could be placed on the brain surface to track neural activity associated with epileptic seizures. The researchers recorded brain activity from the electrodes as they showed different images to the patients on a computer screen for different lengths of time, up to 1.5 seconds. The patients were asked to press a button when they saw an occasional item of clothing to ensure that they truly were paying attention.

Most methods used to record neural activity in humans, such as functional MRI (fMRI) or electroencephalography (EEG), only allow researchers to make detailed inferences about where brain activity is happening or when, but not both. By employing electrodes implanted inside the skull, the Hebrew University/UC Berkeley researchers were able to bridge this gap.

After analysing the data using machine learning, the team found that, contrary to earlier studies that saw only a brief burst of activity in the brain when something new was perceived, the visual areas of the brain actually retained information about the percept at a low level of activity for much longer. The sustained pattern of neural activity was similar to the pattern of the initial activity and changed when a person viewed a different image.

"This stable representation suggests a neural basis for stable perception over time, despite the changing level of activity," Deouell said.

Unlike some earlier studies, they found that the prefrontal and parietal cortexes in the front of the brain become active only when something new is

perceived, with information disappearing entirely within half a second (500 milliseconds), even for a much longer stimulus.

The occipitotemporal area of the visual cortex in the back of the brain also becomes very active briefly — for about 300 milliseconds — and then drops to a sustained but low level, about 10% to 20% of the initial spike. But the pattern of activity does not go away; it actually lasts unaltered about as long as a person views an image.

"The frontal cortex is involved in the detection of something new," Deouell explained. "But you also see an ongoing representation in the higher-level sensory regions."

The sequence of events in the brain could be interpreted in various ways. Knight and Vishne lean toward the idea that conscious awareness comes when the prefrontal cortex accesses the sustained activity in the visual cortex. Deouell suspects that consciousness arises from connections among many areas of the brain, the prefrontal cortex being just one of them.

The team's findings have been confirmed by a group that calls itself the Cogitate Consortium. Though the consortium's results are still awaiting peer review, they were described in a June event in New York City that was billed as a face-off between two "leading" theories of consciousness. Both the *Cell Reports* results and the unpublished results could fit either theory of consciousness.

"That adversarial collaboration involves two theories out of something like 22 current theories of consciousness," Deouell cautioned. "Many theories usually means that we don't understand."

Nevertheless, the two studies and other ongoing studies that are part of the adversarial collaboration initiated by the Templeton Foundation could lead to a true, testable theory of consciousness.

"Regarding the predictions of the two theories which we were able to test, both are correct. But looking at the broader picture, none of the theories in their current form work, even though we find each to have some grain of truth, at the moment," Vishne said. "With so much still unknown about the neural basis of consciousness, we believe that more data should be collected before a new phoenix can rise out of the ashes of the previous theories. "

Future studies planned by Deouell and Knight will explore the electrical activity associated with consciousness in other regions of the brain, such as the areas that deal with memory and emotions.

Edden Gerber is also a co-author of the paper. The study was supported by the U.S.-Israel Binational Science Foundation (2013070) and the National Institute of Neurological Disorders and Stroke of the National Institutes of Health (R01 NS021135).

Origin of Intense Light in Supermassive Black Holes and Tidal Disruption Events Revealed

A new study at the Hebrew University reveals a significant breakthrough in understanding about Tidal Disruption Events (TDEs) involving supermassive black holes. For the first time ever, the new simulations accurately replicate the entire sequence of a TDE from stellar disruption to the peak luminosity of the resulting flare. This study has unveiled a previously unknown type of shockwave within TDEs, settling a longstanding debate about the energy source of the brightest phases in these events. It confirms that shock dissipation powers the brightest weeks of a TDE flare, opening doors for future studies to utilise TDE observations as a means of measuring essential properties of black holes and potentially testing Einstein's predictions in extreme gravitational environments.

The mysteries of supermassive black holes have long captivated astronomers, offering a glimpse into the deepest corners of our universe. Now, a new study led by **Dr. Elad Steinberg and Dr. Nicholas C. Stone at the Racah Institute of Physics** at The Hebrew University, sheds new light on these enigmatic cosmic entities.

Supermassive black holes, ranging from millions to billions of times the mass of our Sun, have remained elusive despite their pivotal role in shaping galaxies. Their extreme gravitational pull warps spacetime, creating an environment that defies conventional understanding and presents a challenge for observational astronomers.

Enter Tidal Disruption Events (TDEs) - a dramatic phenomenon that occurs when ill-fated stars venture too close to a black hole's event horizon and are then torn apart into thin streams of plasma. As this plasma returns towards the black hole, a series of shockwaves heat it up, leading to an extraordinary display of luminosity—a flare that surpasses the collective brightness of an entire galaxy for weeks or even months.

Black Hole Devouring a Star

Description: A star in the midst of being disrupted by a supermassive black hole. As the star wanders past the super massive black hole, the tidal field of the black hole rips apart the star. Half of the star is flung away to infinity and the other half falls back to the black hole. The picture shows the result of the simulation carried out by Steinberg and Stone, showing the density of the infalling half (green-blue color) as well as the heat that is generated by the shocks (white-red).

Credit: Elad Steinberg

The study conducted by Steinberg and Stone represents a significant leap forward in understanding these cosmic events. For the first time, their simulations have recreated a realistic TDE, capturing the complete sequence from the initial star disruption to the peak of the ensuing luminous flare, all made possible by pioneering radiation-hydrodynamics simulation software developed by Steinberg at The Hebrew University.

This research has uncovered a previously unexplored type of shockwave within TDEs, revealing that these events dissipate their energy at a faster rate than previously understood. By clarifying this aspect, the study resolves a long-standing theoretical debate, confirming that the brightest phases of a TDE flare are powered by shock dissipation—a revelation that sets the stage for comprehensive exploration by observational astronomers.

These findings pave the way for translating TDE observations into precise measurements of crucial black hole properties, including mass and spin. Moreover, these cosmic occurrences could serve as a litmus test for validating Einstein's predictions in extreme gravitational environments.

Steinberg and Stone's study not only unravels the intricate dynamics of TDEs but also opens a new chapter in our quest to comprehend the fundamental workings of supermassive black holes. Their simulations mark a crucial step towards harnessing these celestial events as invaluable tools for deciphering the cosmic mysteries lurking at the heart of galaxies.

The research paper titled "Stream-Disk Shocks as the Origins of Peak Light in Tidal Disruption Events" is now available in Nature and can be accessed at 10.1038/s41586-023-06875-y.

Pseudoscorpions of Israel

Two New Family Records Discovered

A recent study has unveiled two previously undiscovered families of Pseudoscorpions in Israel. Positioned at the convergence of three continents, Israel's distinct biodiversity has undergone systematic revision, resulting in an updated checklist featuring 61 pseudoscorpion species across 28 genera and 14 families. This pioneering research includes the introduction of the first illustrated identification key, based on morphological characters, accompanied by distribution maps. Notably, the study highlights the discovery of two new family records in Israel—Syarinidae and Cheiridiidae—both with a cosmopolitan distribution, including in the Mediterranean region. The findings significantly enhance our comprehension of regional biodiversity, offering crucial resources for forthcoming ecological, taxonomical and conservation endeavours. Furthermore, several undescribed species identified in this paper will be comprehensively described in separate publications, further advancing the field of

Olpium pallipes balcanicum (Olpidae).
Credit: by S. Aharon

Hysterochelifer sp. (Cheliferidae).
Credit: by S. Aharon

Lasiochernes turcicus (Chernetidae).
Credit: by J. A. Ballesteros

pseudoscorpion taxonomy.

The research, conducted by Dr. Sharon Warburg, Dr. Efrat Gavish-Regev from the National Natural History Collections of the Hebrew University of Jerusalem and team, provides a crucial update to the understanding of the pseudoscorpion species in Israel.

Situated at the crossroads of three continents, Israel boasts a distinctive fauna, influenced by both Palearctic and Afrotropical zoogeographic origins. Over the past sixty years, systematic revisions and the discovery of new species have rendered the existing key to pseudoscorpions in Israel outdated. This newly released checklist offers a contemporary perspective on the pseudoscorpion species in the region, complete with distribution maps and a groundbreaking illustrated identification key based on morphological characters.

Before this study, the pseudoscorpion fauna of Israel was believed to consist of twelve families, 26 genera, and 52 species, including several “subspecies”. However, the current research expands this catalogue to include 61 pseudoscorpion species belonging to 28 genera and fourteen families. Most of these species exhibit Palearctic and Mediterranean distributions, with only a few displaying Afrotropical origin.

An exciting revelation from this study is the discovery of two families previously unreported in Israel: Syarinidae and Cheiridiidae. Both families are cosmopolitan and have representatives in the Mediterranean region. The researchers note that the putative new species discovered during this study are presented at the genus level and will be further described in subsequent publications.

The significance of this research extends beyond the academic realm, offering valuable insights into the biodiversity of the region and providing a foundation for future studies in ecology taxonomy and conservation. The annotated checklist and key, with their meticulous documentation and visual aids, are expected to become essential resources for researchers, students, conservation organisations, and enthusiasts interested in pseudoscorpion taxonomy.

The research paper titled “Pseudoscorpions of Israel: Annotated Checklist and Key, with New Records of Two Families” is now available in Taxonomy at https://www.mdpi.com/2673-6500/3/4/27

Unearthing Ancient Faith:

Byzantine Greek Inscription Paraphrasing Psalms 86 Found in Hyrcania

Archaeologists from a Hebrew University of Jerusalem excavation project at the remote site of Hyrcania in the Judean Desert, unearthed a rare Byzantine Greek inscription paraphrasing a verse from the Book of Psalms

child-sized gold ring

Oren Gutfeld (L) and Yusuf Abu-Amaria

A Koine Greek inscription paraphrasing Psalms 86 was discovered by Hebrew University archaeologists at the site of Hyrcania Fortress in the Judean Desert. Adorned with a cross, the Byzantine-era inscription was likely made by a knowledgeable monk and holds significance as a well-known prayer in the Masoretic text and Christian liturgy. Analysis of the script's style suggests a dating no later than the first half of the 6th century CE, the height of the Byzantine era, with minor grammatical errors revealing the scribe's mother tongue to be Semitic.

Built upon an imposing, artificially leveled hilltop situated approximately 17 km southeast of Jerusalem and 8 km southwest of Qumran and the Dead Sea, this was one of a series of desert-fortresses first established by the Hasmonean dynasty in the late 2nd or early 1st century BCE—named in honor of John Hyrcanus—and later rebuilt and enlarged by Herod the Great. The most famous, and luxurious, of these strongholds are Masada and Herodium. Shortly after the death of the latter in 4 BCE, Hyrcania lost its importance and was abandoned. It would then lie desolate for nearly half a millennium, until the establishment of a small Christian monastery among its ruins in 492 CE by the monk Holy Sabbas, an expression of the monastic movement that took shape in the Judean Desert with the rise of the Byzantine period. Dubbed *Kastellion*, or "Little Castle" in Greek, the monastery remained active past the Islamic conquest of Byzantine Palestine around 635 CE but was apparently abandoned by the early 9th century. The site is known also by its Arabic moniker, *Khirbet el-Mird*, or "Ruins of the Fortress." Attempts were made in the 1930s to revive the monastery, but harassment by local Bedouin cut short the venture.

Although a few isolated investigations of the site had been sporadically undertaken in the past, no methodological, academic archaeological excavation had ever been conducted—until now. Complex access and logistics have long played a role. However, recently a team led by Hebrew University's **Dr. Oren Gutfeld and Michal Haber**, with the support of **Carson-Newman University** (Jefferson City, Tennessee) and **American Veterans Archaeological Recovery**, spent four weeks at the site, uncovering key evidence of the site's remarkable history. ▸▸▸

During this initial "pilot" season, efforts were primarily focused on two key areas. In the southeastern corner of the summit, a segment of the prominent upper fortification line was uncovered, a vital component of the Second Temple-period fortress dating back to approximately the late 2nd or 1st century BCE. This discovery prompted **Dr. Oren Gutfeld** to make the following observation: "There are certain architectural elements within these fortifications that strongly recall those of Herodium, all part of Herod's extraordinary vision. It's quite possible that the construction was even overseen by the same engineers and planners. It's not by chance that we call Hyrcania 'Herodium's little sister.'"

In the northeast, the team peeled away a deep collapsed layer of building stones to unearth an elongated hall lined with piers, part of the lower level of an expansive compound constructed of finely drafted stones. Its original date of construction has yet to be determined, though it likely comprised part of the monastery.

Over the course of excavation, a sizeable building stone was discovered lying on the plastered floor of the hall, bearing lines of text painted in red, with a simple cross at its peak. Haber and Gutfeld immediately recognised the inscription as written in Koine Greek—the language of the New Testament—but called on their colleague, expert epigraphist **Dr. Avner Ecker of Bar-Ilan University,** to decipher it.

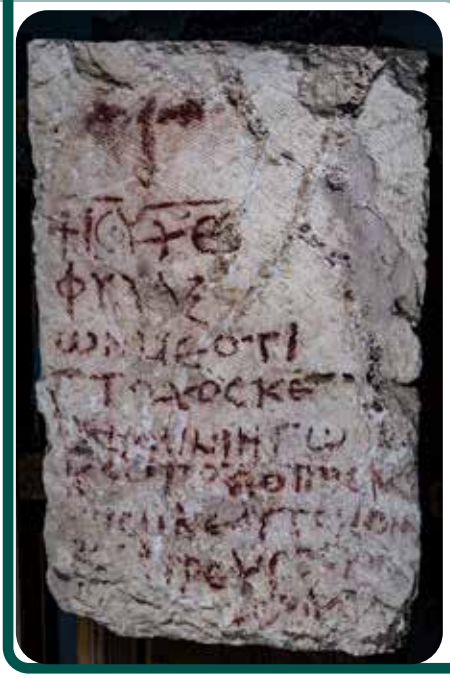
Dr. Ecker was able to identify the readable text as a paraphrase of Psalms 86: 1–2, known as "a prayer of David." While the original lines are "Hear me, Lord, and answer me, for I am poor and needy. Guard my life, for I am faithful to you," the Hyrcania version reads:

† Ἰ(η)σοῦ Χ(ριστ)ἐφύλαξ<ο>ν με ὅτι
[π]τ<ω>χὸς (καὶ)
[π]έν[ης] <εἰ>μὶ <ἐ>γώ
† Jesus Christ, guard me, for I am poor and needy.

Michal Haber

Dr. Ecker explains, "This psalm holds a special place in the Masoretic text as a designated prayer and is notably one of the most frequently recited psalms in Christian liturgy. Thus, the monk drew a graffito of a cross onto the wall, accompanied by a prayer with which he was very familiar." Judging by the epigraphic style, he assigns the inscription a date within the first half of the 6th century CE. Ecker also points out the presence of a few grammatical errors typical of Byzantine Palestine, which can be attributed to individuals whose native language was a Semitic one. He suggests, "These minor errors indicate that the priest was not a native Greek speaker, but likely someone from the region who was raised speaking a Semitic language."

A few days following this initial discovery, an additional inscription was found in close proximity. It was also inscribed on a building stone from a collapsed wall and is currently undergoing analysis. **Michal Haber** emphasises the profound significance of these findings, stating, "Few items hold such importance in the historical and archaeological record as do inscriptions—and it must be stressed that these are virtually the first examples from the site to have originated in an orderly, documented



Inscription of Book of Psalms

context. We are familiar with the papyrus fragments that came to light in the early 1950s, but they are all of shaky, unreliable provenance. These recent discoveries are truly exceptional."

In addition, a child-sized gold ring, a little over 1 cm in diameter and adorned with a turquoise stone, was found on site. What adds to the special nature of the discovery is the miniature inscription incised in Arabic Kufic script on the stone. **Dr. Nitzan Amitai-Preiss, an expert in Early Arabic epigraphy at The Hebrew University,** was able to decipher the inscription as "مَاشَ ءَاللّٰهُ" (Mashallah), which translates to "God has willed it." She dates the script style to the time of the Umayyad caliphate, which reigned during the 7th and 8th centuries CE. Dr. Amitai-Preiss also observed a unique feature in the inscription: two of the three words were mirror images, strongly suggesting that the ring may have originally served as a seal.

The origin of the turquoise stone itself adds another layer of historical intrigue. It was likely sourced in the newly conquered territory of the Sassanid Empire (modern-day Iran), part of the expanding Umayyad caliphate. The exact path this remarkable artifact took to reach Hyrcania remains a mystery, as is the identity of whoever wore it.

The team is eagerly anticipating the next excavation season, slated for early 2024, which will see the collaborative effort with Carson-Newman University and American Veterans Archaeological Recovery continue.

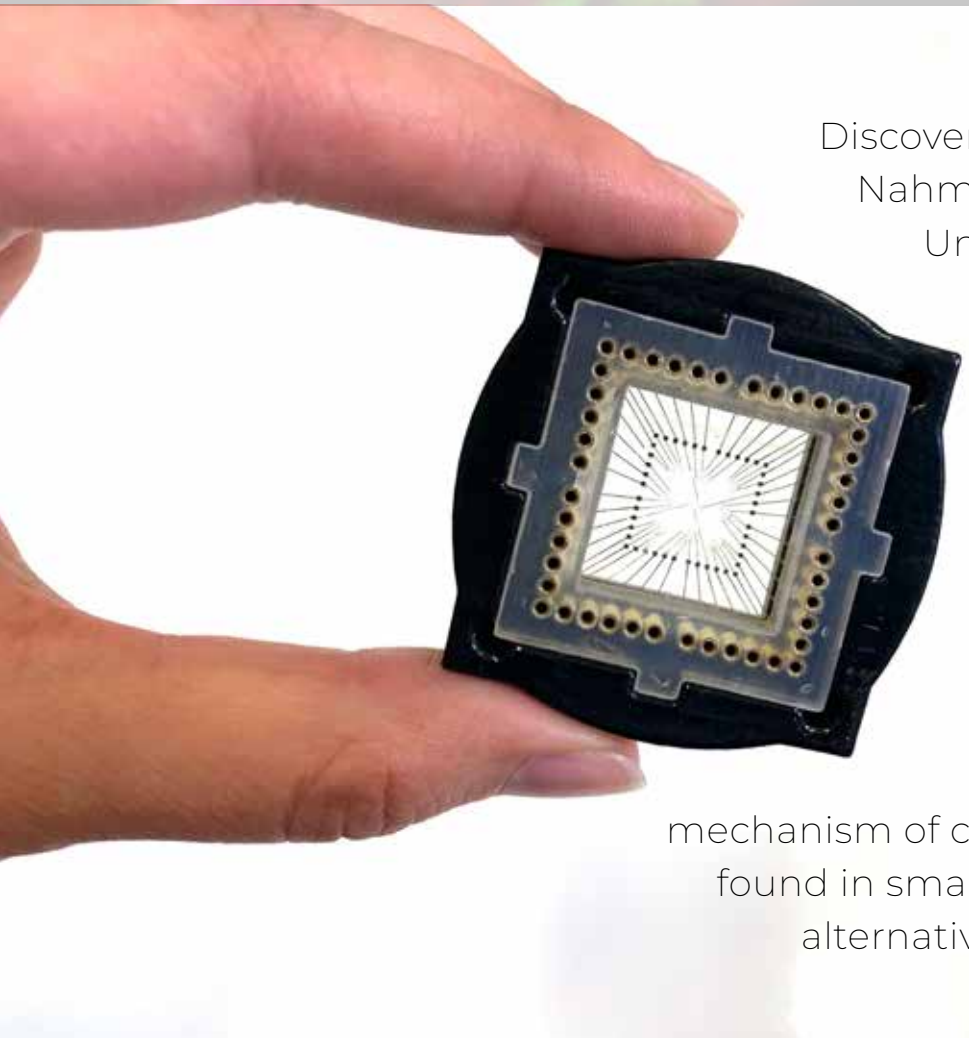
Staff Officer for Archaeology – Civil Administration of Judea and Samaria **Benny Har-Even** said: "The Civil Administration will continue its tireless efforts to preserve and develop the archaeological sites throughout Judea and Samaria. We are delighted to work in cooperation with leading Israeli academic institutions and all parties involved in the archaeology of the Land of Israel to reveal the ancient and rich past of the area."

Dr. Stephen Humphreys, the founder and CEO of AVAR, commented, "Our organisation serves to provide military veterans with challenging fieldwork opportunities, then giving them the support tools and training they need to excel. At Hyrcania we saw the entire project team bond over the physical challenges and excitement of excavating this exceptional site. The training our veterans received at the site from the Hebrew University team will also make them more employable and better prepared to continue engaging with the field."

Alongside their excitement, **Haber and Gutfeld** remain acutely aware of the complexities of safeguarding such a site. They emphasise the support they have received from the Staff Office of Archaeology of the Civil Administration in combating the ongoing phenomenon of antiquities looting. They conclude: "We are aware that our excavations will draw the attention of looters. The problem persists; it was here before us and will likely continue after us, underscoring the need for academic excavation—particularly in such a sensitive site as Hyrcania, though this is just one example. We are simply trying to stay a few steps ahead.

Game-changing potential for drug testing

Tiny Heart Model



Discovery led by Prof. Yaakov Nahmias from the Hebrew University marks a new era in cardiovascular research, multi-chambered, self-paced miniature heart model, holding the key to saving lives and enhancing patient outcomes.
Sensors reveal a new mechanism of cardiac arrythmia not found in small animals, promising alternatives to animal testing.

In a remarkable breakthrough, a collaborative team of researchers, led by **Professor Yaakov Nahmias from The Hebrew University of Jerusalem, Technion-Israel Institute of Technology, and Tissue Dynamics Ltd.**, has unveiled a miniature human heart model that could potentially transform drug testing and cardiovascular research. This study, published in **Nature Biomedical Engineering,** introduces a self-paced **multi-chambered human heart model, no larger than a grain of rice**, which promises to revolutionise the way we study the heart and its functions.

Cardiovascular diseases remain the leading cause of global mortality, underscoring the critical importance of this pioneering work. Professor Nahmias and his team embarked on an intricate endeavour to create an accurate replica of the human heart using human induced

and cardiovascular disease treatments

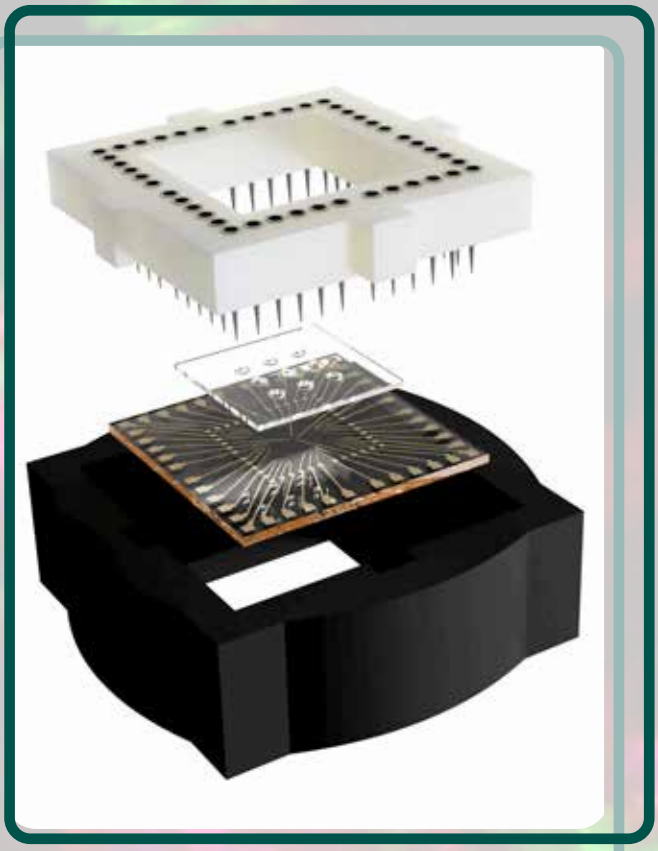
Carries Massive Implications

Credit for pictures: Tissue Dynamics

pluripotent stem cells (hiPSCs). The resulting model comprises multiple chambers, pacemaker clusters, epicardial membrane and endocardial lining, all meticulously designed to mimic the structure and functions of the human heart.

One of the most significant features of this heart model is its ability to provide real-time measurements of essential parameters such as oxygen consumption, extracellular field potential, and cardiac contraction. This capability enabled the scientists to gain unprecedented insights into heart function and diseases, making it a game-changer in the field of cardiovascular research.

The heart model, **approximately the size of half a grain of rice**, represents a remarkable feat in cardiac research and holds immense potential for precision drug testing. Already, the research team has made groundbreaking discoveries that ▸▸▸



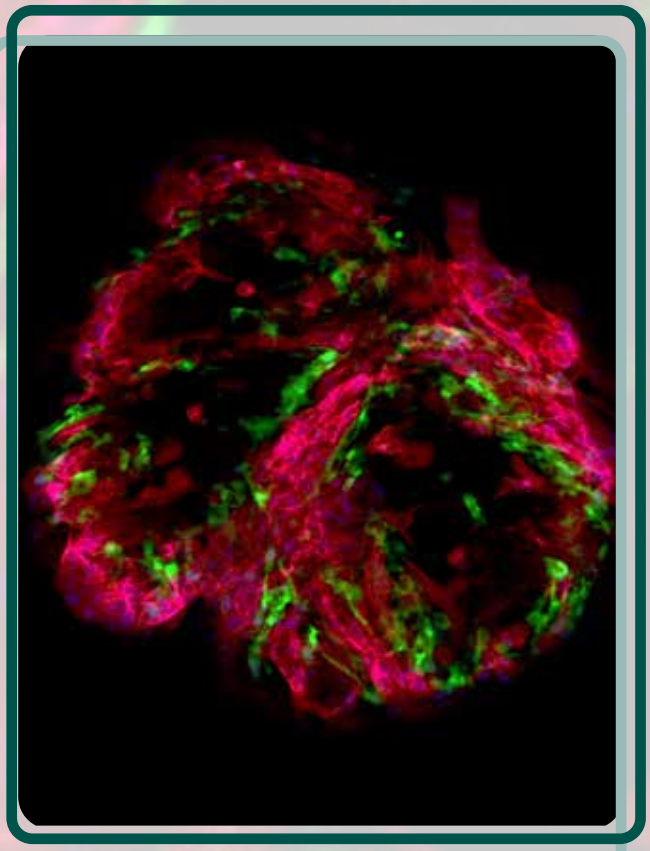
Heart Microchip

Yaakov Nahmias. *Credit: Hebrew University*

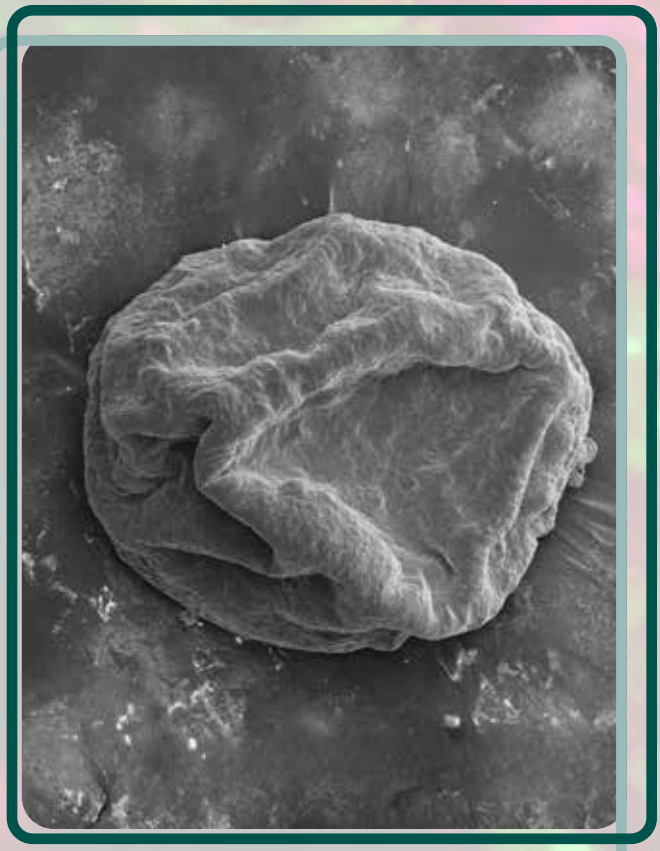
were previously unattainable using conventional methods. Notably, **the heart model unveiled a new form of cardiac arrhythmia**, distinct from those observed in traditional animal models, thereby offering new avenues for studying human physiology.

The implications of this discovery extend to the pharmaceutical industry, as it allows researchers to gain invaluable insights into the precise effects of pharmaceutical compounds on the human heart. The heart model's response to the chemotherapeutic drug mitoxantrone, commonly used to treat leukemia and multiple sclerosis, was carefully tested. Through these experiments, the researchers pinpointed how mitoxantrone induces arrhythmia by disrupting the heart's electro-mitochondrial coupling. Encouragingly, the team also discovered a potential solution by administering metformin, which showed promise in mitigating the drug's adverse effects.

Professor Nahmias, Director of the Grass Center for Bioengineering at The Hebrew University of Jerusalem and a fellow of the Royal Society of Medicine and AIMBE, emphasised the significance of their work. "The integration of our complex human heart model with sensors, allowed us to monitor critical physiological parameters in real-time, revealing intricate mitochondrial dynamics driving cardiac rhythms. It is a new chapter in human physiology", said Nahmias. Partnering with Tissue Dynamics, the scientists developed a **robotic system that can screen 20,000 tiny human hearts in parallel for drug discovery applications.** The potential applications of this micro-physiological system are vast, promising to



Fluorescent Heart



Electron Microscopy Heart

enhance our understanding of heart physiology and accelerate the discovery of safer and more effective pharmaceutical interventions, leading to a healthier future for all.

By offering unparalleled accuracy and insights into cardiovascular diseases, this advanced human heart model has the potential to revolutionise drug testing methodologies. With this tiny heart model, researchers are poised to make significant strides in developing safer and more effective medications for patients worldwide, potentially saving lives and improving patient outcomes.

Moreover, the miniature heart model also presents an ethical advantage, as it **offers a viable alternative to animal testing**. This breakthrough discovery could mark a turning point in the pharmaceutical industry, reducing reliance on animal models and minimising potential harm to animals in the pursuit of medical advancements.

In conclusion, the tiny heart model developed by Professor Nahmias and his team represents a monumental achievement with far-reaching implications for medical research. This miniature yet sophisticated human heart model has the potential to reshape drug testing practices, advance our understanding of cardiovascular diseases, and ultimately contribute to a healthier and more sustainable future.

The article 'Electro-metabolic coupling in multi-chambered vascularised human cardiac organoids', was published in Nature Biomedical Engineering https://www.nature.com/articles/s41551-023-01071-9

DNA Evidence Triples Prosecution Rates in Criminal Cases

A recent study conducted by the Hebrew University of Jerusalem sheds light on the impact of DNA profiles on prosecutorial decisions in the criminal justice system.

In the pursuit of justice, law enforcement agencies heavily rely on forensic evidence, with DNA testing constituting the cornerstone of modern investigations. While the scientific and technological advancements in DNA testing have been extensively studied, there is scant evidence regarding how the availability of DNA evidence influences prosecutors' decisions to move cases forward.

To address this knowledge gap, the research team created a unique database by combining data from the Forensics Division of the Israel Police, which documented the presence or absence of DNA profiles in criminal cases (n = 9862), with data on each case's subsequent indictment decision from 2008 to 2019.

This extensive dataset's analysis yielded significant insights into the impact of DNA evidence on criminal prosecutions. The researchers discovered that roughly 15% of all criminal cases presented to the prosecutor's office were ultimately prosecuted. In stark contrast, the criminal justice system advanced approximately 55% of cases with DNA profiles. This effect demonstrates the significant influence DNA evidence has on the decisions of prosecutors.

The findings highlight the significance of using a scientific approach to prosecute offenders, recognising the value DNA evidence brings to the criminal justice system. However, the researchers caution against the indiscriminate use of DNA evidence and emphasise the necessity of prudence. DNA evidence is a potent tool, but it is not infallible; therefore, its use in the legal system must be carefully considered. The study encourages a balanced approach that harnesses the benefits of DNA evidence while acknowledging its limitations.

This research contributes to the ongoing dialogue surrounding the role of forensic evidence in criminal investigations, specifically highlighting the impact of DNA profiles on prosecution decisions in Israel. The findings have implications for law enforcement agencies, legal professionals, and policymakers involved in the pursuit of justice.

The study, titled " The role of DNA in criminal indictments in Israel" was published in the Journal of Forensic Sciences - https://onlinelibrary.wiley.com/doi/pdf/10.1111/1556-4029.15327

How Pollution Affects Clouds and Climate

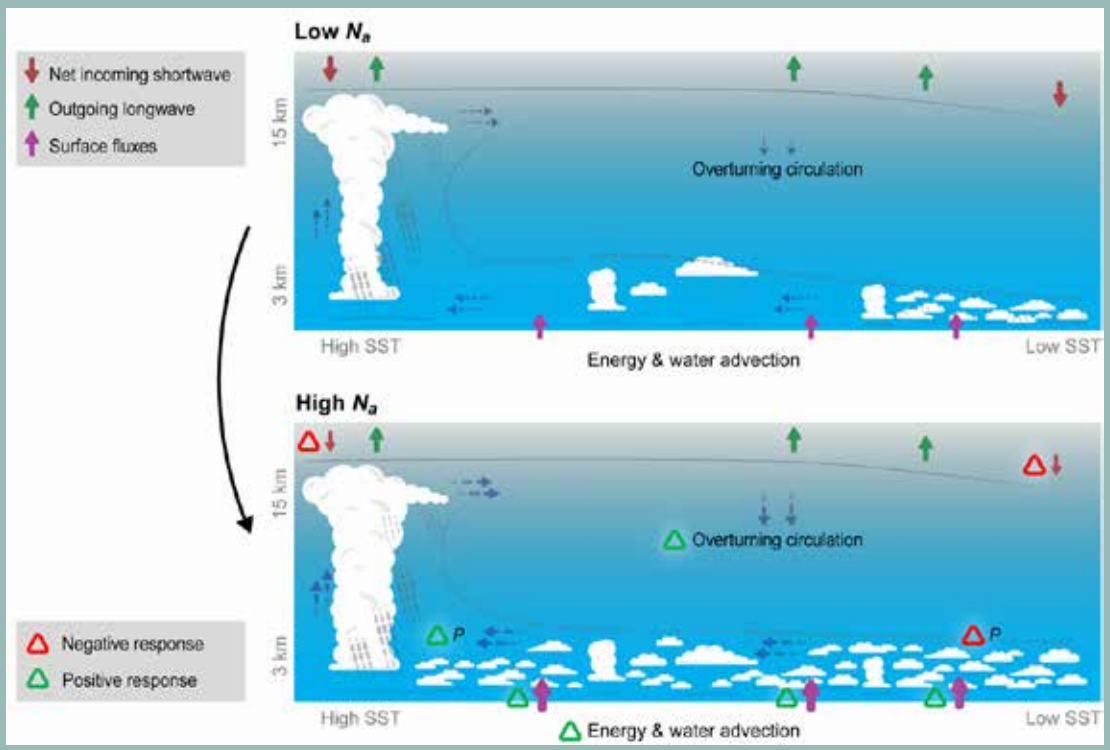
Dr. Guy Dagan *Credit: Bruno Charbit*

A recent study reveals the profound impact of pollution on cloud behaviour. This newfound understanding illuminates the intricate ways in which pollution alters our climate. Such research marks a significant stride in comprehending the influence of pollution on our weather and broader climate dynamics. Emphasizing the need to factor in both localized cloud formations and overarching climate patterns, it underscores the criticality of considering all scales in studying the effects of pollution on our climate.

[Jerusalem, Israel] – The interplay between human-induced aerosols and cloud dynamics stands as a pivotal factor in unravelling the intricacies of our climate system. Despite its significance, reconciling the vast scale disparities between cloud formations, spanning approximately 1 to 10 kilometres, and the broader atmospheric circulation and climate patterns extending over 1,000 kilometres has posed a significant challenge.

Taking on this task, Dr. Guy Dagan and his research team at the Hebrew University of Jerusalem, together with researchers from Princeton University, embarked on a new study. Their focus was on understanding how minuscule pollution particles, known as aerosols, interact with clouds in the sky—an interaction that profoundly shapes our climate. However, a fundamental hurdle lay in the mismatched scales: clouds, small in scale, juxtaposed against expansive climate patterns, akin to fitting puzzle pieces from different sets.

The innovative approach employed by Dr. Dagan's team involved sophisticated computer simulations



Cloud–circulation coupling under clean and polluted conditions.

A schematic representation of the coupling between clouds and circulation in the tropics under clean conditions (top) and the response of this coupled system to an increase in air pollution concentration (bottom). It demonstrates that under polluted conditions the circulation becomes stronger, which intensifies the cloudiness that acts to cool the planet.
Credit: Guy Dagan

capable of examining the minute details of the sky while capturing the broader essence of the entire climate system. Through a meticulously crafted series of simulations, the team dissected mechanism involving changes in the large-scale circulation due to air pollution. Their comparative analysis revealed a compelling revelation: the presence of aerosols triggers changes in large-scale circulation, which in turn substantial enhances the effective radiative forcing i.e., the effect of human activity on the climate system.

One key finding was that more aerosols stop rain in some areas. This makes moisture move to places where big clouds form. These big clouds then release more heat into the air and cause stronger winds.

Dr. Guy Dagan explains, "Our study helps us understand better how aerosols and clouds affect the climate. The changes caused by aerosols come from complex shifts in big weather patterns, showing us an important part of how these interactions affect the climate."

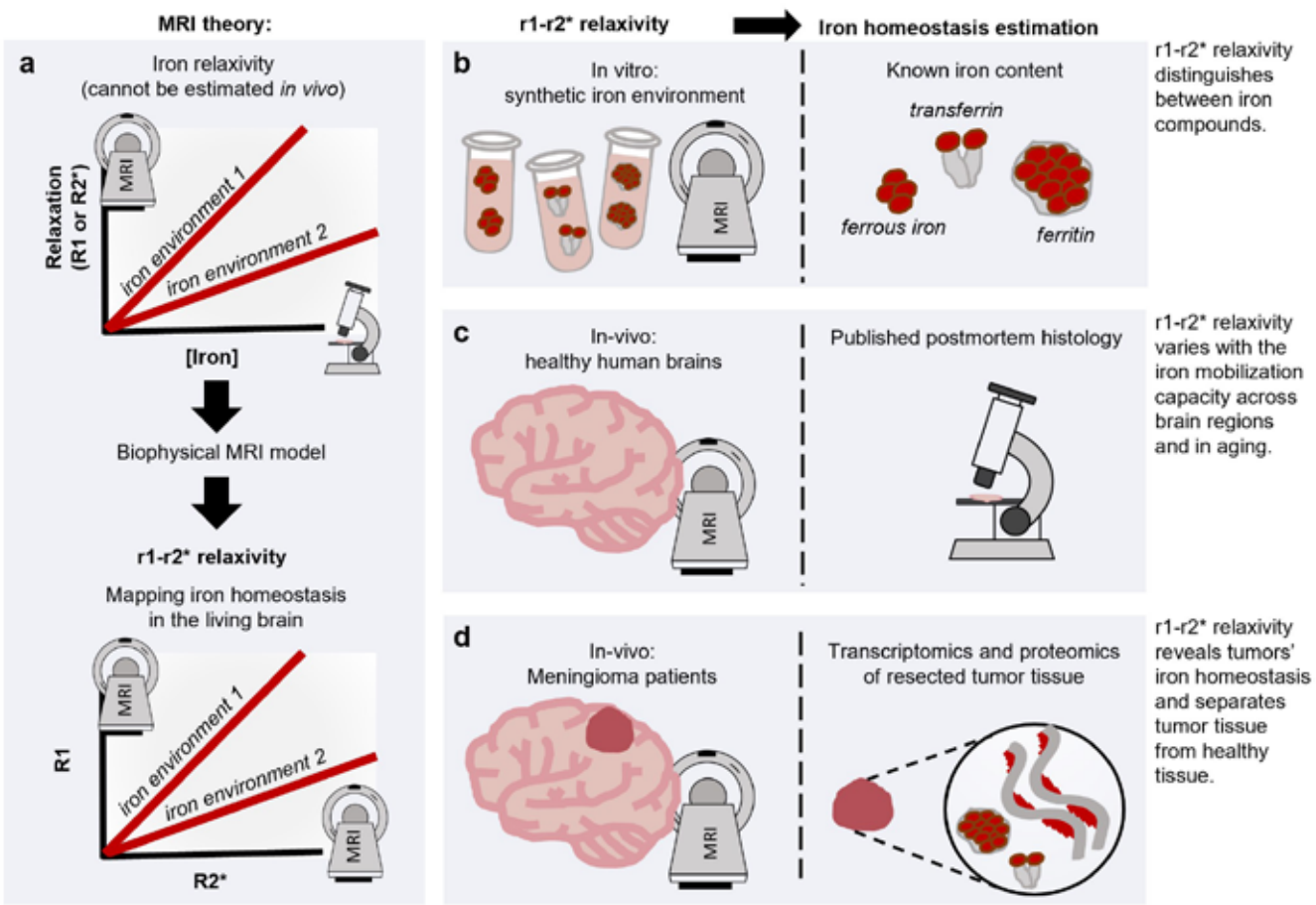
The research paper titled "Radiative forcing from aerosol–cloud interactions enhanced by large-scale circulation adjustments" was published in Nature Geoscience and can be read at https://rdcu.be/drzoC.

Unlocking Brain Health:

A Non-Invasive Look at Iron Balance

Researchers at the Hebrew University of Jerusalem, Tel Aviv Sourasky Medical Center and Shaare Zedek Medical Center, have developed a ***new MRI technology that non-invasively assesses iron levels in the human brain,*** *shedding light on its critical role in brain function, aging, and diseases like cancer and neurodegenerative disorders. This innovative approach, based on quantitative MRI, distinguishes between healthy and pathological brain tissue without contrast agents and provides insights into iron-related disorders, offering a significant advancement in neuroscience and healthcare.*

A research team led by Shir Filo and Prof. Aviv



Mezer of Hebrew University of Jerusalem and Dr. Tal Shahar currently, Director of the Neurosurgical Oncology Unit at the Neurosurgery Department, *Tel Aviv Sourasky Medical Center*, has unveiled groundbreaking magnetic resonance imaging (MRI) technology that promises to revolutionise our understanding of iron homeostasis in the human brain. Their research, demonstrates the ability to non-invasively assess different molecular iron environments within the brain, shedding light on its vital role in normal brain function, aging, neurodegenerative diseases, and cancer.

Traditional MRI scans provide qualitative images that necessitate subjective interpretation by medical professionals. In contrast, quantitative MRI seeks to replicate the precision of assessing body temperature accurately when ill, moving beyond qualitative observations like "too hot" or "too cold." Achieving this involves intricate physical models that amalgamate multiple MRI scans to extract a diverse array of measurements. These MRI measurements are then leveraged to uncover valuable biological insights, akin to a blood test's ability to reveal our blood's composition, encompassing proteins, fats, and potential irregularities. One critical aspect of brain function is maintaining the balance, or homeostasis, of iron, crucial for overall health. Imbalances in brain iron levels have implications for various conditions, including neurodegenerative diseases and cancer. Until recently, the non-invasive assessment of the molecular iron environment within the living human brain posed a significant challenge.

The research team from **Hebrew University of Jerusalem, Tel Aviv Sourasky Medical Center and Shaare Zedek Medical Center** introduces a novel MRI approach based on the quantitative MRI, which can sensitively detect changes in brain iron homeostasis. In their in vitro experiments, this MRI technology revealed distinct paramagnetic properties of key iron compounds, including ferritin, transferrin, and ferrous iron. The real breakthrough came with **in vivo** MRI scans of patients with brain tumours, operated at the **Neurosurgery Department at Shaare Zedek Medical Center** where the technology was also validated against **ex vivo** iron compound quantification of the resected tumours. These ex-vivo transcriptomics and proteomics analyses were done in the lab of **Dr. Naomi Habib in the Hebrew University** and the lab of **Molecular Neuro-oncology at Shaare Zedek Medical Center**, directed at the time of the study by **Dr. Tal Shahar**.

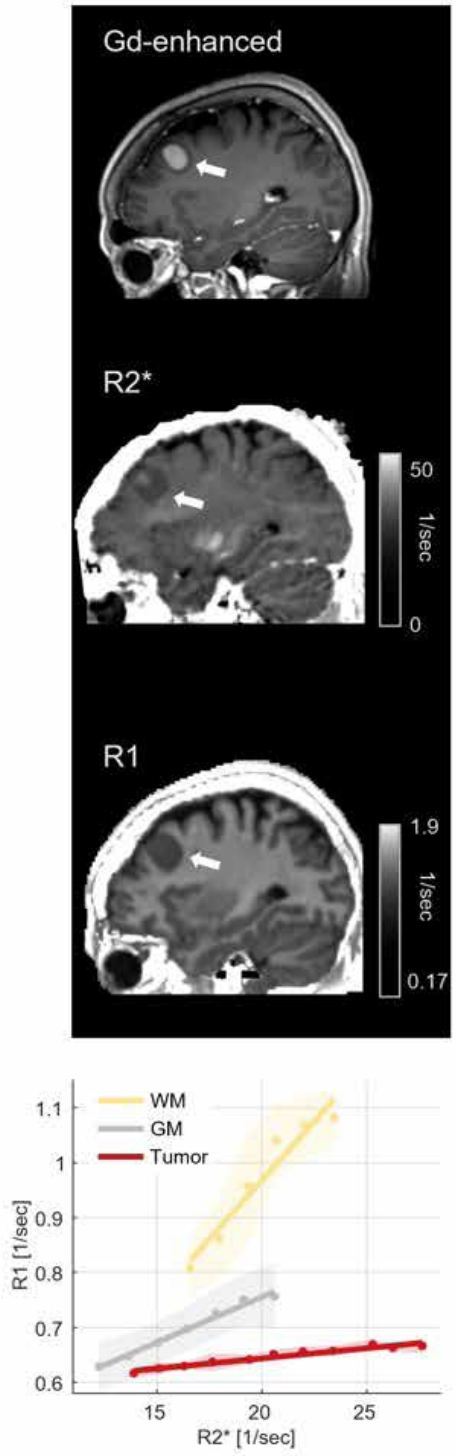
This innovative MRI approach demonstrates sensitivity to changes in iron mobilisation capacity across different brain regions and during brain aging. It offers insights into changes in iron homeostasis and iron-related gene expression in pathological tissues. Most notably, ▸▸▸

it can differentiate between tumour tissue and non-pathological tissue without the need for toxic contrast agents injection.

Shir Filo, explained, “Our technology opens up new possibilities for understanding the role of iron in cancer, normal aging, and neurodegenerative diseases. It enables non-invasive research and diagnosis of iron homeostasis in the living human brain, offering a potential game-changer for healthcare and neuroscience."

Prof. Aviv Mezer emphasised, “The strength of our team lies in its diverse composition, comprising experts from various disciplines and specialties. **Dr. Tal Shahar** was leading the medical aspect of the study involving meningioma patients and the proteomic studies. **Dr. Rona Shahrabani** was instrumental in conducting experiments with iron proteins, while **Dr. Nevo Margalit, Chair of the Neurosurgery Department at** Shaarei Zedek Medical Center made a substantial contribution through his involvement in a significant portion of the surgeries and recruitment of patients. Additionally, **Dr. Eli Ben David**, a radiologist at Shaarei Zedek Medical Center, played an indispensable role in enabling the MRI scans and **Dr. Naomi Habib** brought the valuable knowledge in gene expression. Their collective and truly interdisciplinary expertise and unwavering dedication significantly enhanced the success of this pioneering study.”

In summary, the Hebrew University of Jerusalem’s MRI quantification, represents a groundbreaking advance in our ability to assess iron homeostasis in the human brain. It shows promising ability to distinguish between pathological and healthy brain tissue without the use of toxic contrast agents and offers insights into molecular iron states inaccessible to conventional MRI techniques. The technology’s sensitivity to in vitro, in vivo, and ex vivo iron environments validates its potential to enhance our understanding of iron-related disorders and opens new avenues for research and diagnosis in the living human brain.



The study, titled “Non-invasive assessment of normal and impaired iron homeostasis in the brain,” has been published in Nature Communications. DOI for the paper is 10.1038/s41467-023-40999-z

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Index Page

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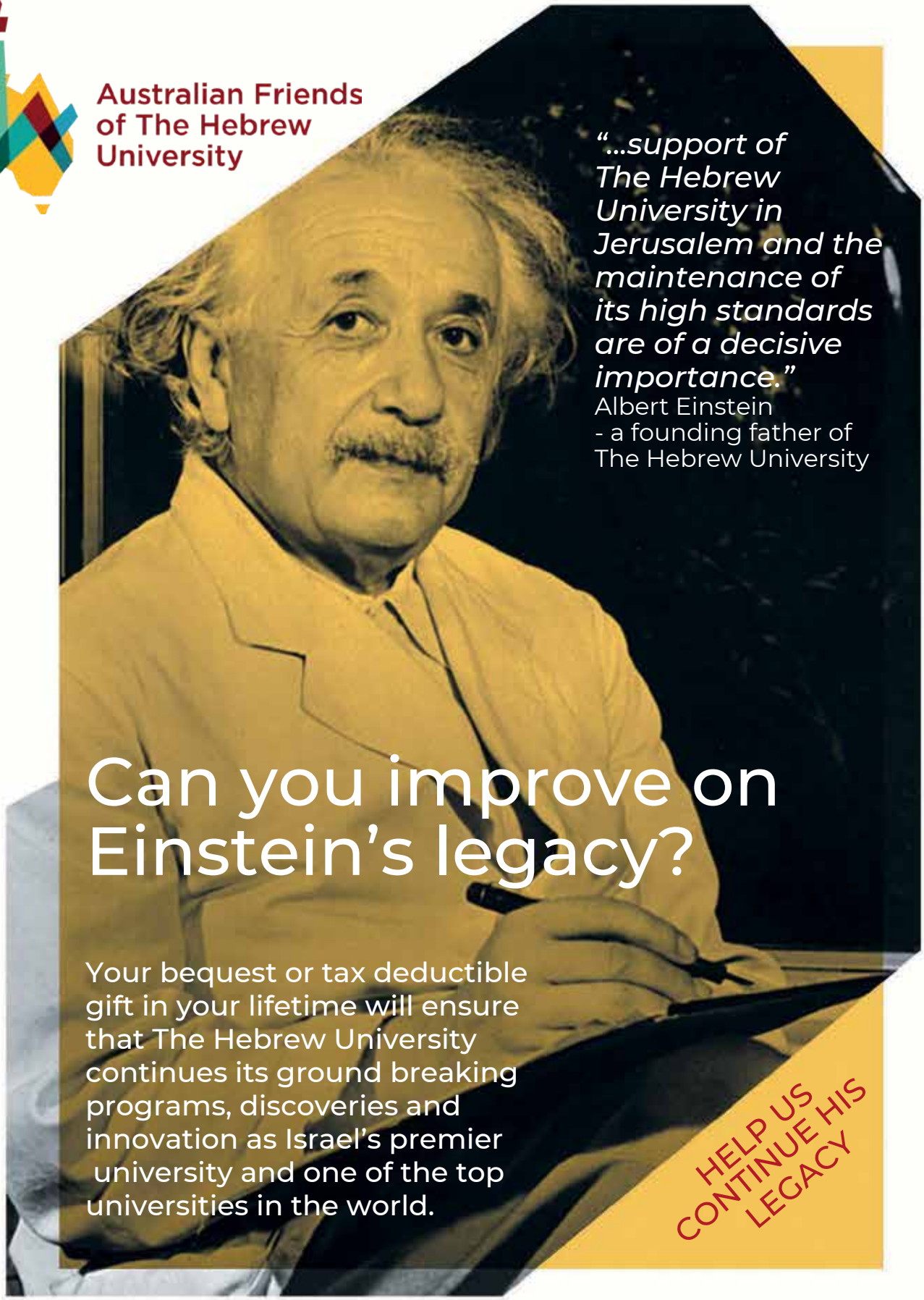

"...support of The Hebrew University in Jerusalem and the maintenance of its high standards are of a decisive importance."
Albert Einstein
- a founding father of The Hebrew University

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Friends Associations of The Hebrew University of Jerusalem

ARGENTINA
T +54 11 4374 7045
info@huji.org.ar
www.huji.org.ar

AUSTRALIA
T +61 2 9389 2825
austfhu@austfhu.org.au
www.austfhu.org.au

AUSTRIA
T +43 1 795 3031
Marcel.landesmann@gutmann.at

BELGIUM
Brussels T +32 2 343 5546
contact@uhjerusalem.be
www.befhu.org

BRAZIL
T +55 11 972 426 695
amigosbrasiluhj@gmail.com

CANADA
T +1 416 485 8000
Toll Free 1-888-HEBREWU
info@cfhu.org
www.cfhu.org

CHILE
T +56 2 955 5067
simar.univhebrea.chile@gmail.com

EUROPE
T +972 2 588 0455
europeanoffice@uhjerusalem.org
www.efhu.org

FRANCE
T +33 1 4250 4323
cbelais@uhjerusalem.org
www.ffhu.org

GERMANY
T +49 30 30 839 122
info@fhuj.org
www.gfhu.org

ISRAEL
T +972 2 588 2840
diklaa@savion.huji.ac.il
http://alumni.huji.ac.il/
http://shocharim.huji.ac.il/

ITALY
Milan Office
T +39 02 7602 3369
aug.it@tiscalinet.it
Rome Office/ BrainForum Italia
info@brainforum.it
http://www.braincircleitalia.it

JAPAN
T +81 75 461 4603
tsujita@h2.hum.huji.ac.il

LUXEMBOURG
T +352 2 402 545
alainm@pt.lu

MEXICO
T +52 55 9150 2995/6
info@amauhj.org.mx
www.amauhj.org.mx

THE NETHERLANDS
T +31 6 5434 6641
info@nvhu.nl
www.nvhu.nl

PANAMA
ibtesh@rejovot.com

PERU
amigos.uhj.pe@gmail.com

PORTUGAL
T +351 937 272 206
madalena.barata@me.com
europeanoffice@uhjerusalem.org

SOUTH AFRICA
T +27 82 551 2126
safhu@beyachad.co.za
www.safhu.co.za

SWEDEN
Stockholm T +46 70 89 49 481
petergoldmanoffice@gmail.com

SWITZERLAND
Zurich
T +41 79 623 10 48
hujschweiz@gmail.com
www.chdfhu.org
Geneva
T +41 22 732 25 67
lsainsaulieu@uhjerusalem.org
www.chfhu.org/

UNITED KINGDOM & IRELAND
T +44 20 8349 5757
friends@bfhu.org
www.bfhu.org

UNITED STATES
T +1 212 607 8500
Toll Free 1 800 567 AFHU
info@afhu.org
www.afhu.org

URUGUAY
T + 598 2 712 3523
amigos.huji.uy@gmail.com