

2026

FALLING WALLS LAB

GIF-ScienceAbroad

Which are the next walls to fall?



PRESENTER ORDER

1**Tomer Gafni**

Columbia University - New York

2**Noga Larry**

Carnegie Mellon University - Pittsburgh

3**Tamar Berger**

The Rockefeller University - New York

4**Hagar Setty**

Cologne Excellence Cluster for Cellular Stress Responses in Aging-Associated Diseases (CECAD) - Cologne

5**Omer Sharon**

University of California, Berkeley - Berkeley

6**Meital Tamar Eliyahu**

Pathogenix Ltd - Be'er Sheva

7**Nitzan Shauloff**

Ben-Gurion University of the Negev - Be'er Sheva

8**Mohammad Khaled Atrash**

Bar-Ilan University - Ramat Gan

9**Lenny Aharon**

Columbia University - New York

10**Adi Avram Shperling**

University of Toronto - Toronto

11**Omer Eldadi**

Reichman University - Herzliya

12**Mayis Eissa**

Goethe University Frankfurt - Frankfurt am Main

13**Tomer Sheinfeld**

The Hebrew University of Jerusalem - Jerusalem

14**Sara Gutkin**

Technical University of Munich - Munich

15**Nir Asch**

Rambam Medical Center and The Hebrew University of Jerusalem - Haifa and Jerusalem

16**Oron David Kotler**

Columbia University - New York

17**Itay Itzhak**

Technion Israel Institute of Technology - Haifa

18**Uri Bertocchi**

Tel Aviv University - Tel Aviv

19**Fatima-Ezzahra Ait Mohand**

The Hebrew University of Jerusalem - Jerusalem

20**Hila Doron**

Tel Aviv University - Tel Aviv

1

Tomer Gafni

Columbia University in the City of New York - New York

Breaking the Wall of Reactive Healthcare

PROBLEM

Preventive healthcare systems are often reactive, relying on static rules despite evolving patient behavior and risk. In large-scale programs, many patients disengage before support arrives. The key challenge is dynamically allocating limited medical resources under uncertainty.

THE PROJECT

Many large-scale healthcare systems remain reactive and struggle to adapt to continuously changing patient behavior. My project develops AI-driven learning methods that allocate limited resources more effectively and help deliver timely interventions at scale.

WHICH ARE THE NEXT WALLS TO FALL?

2

Noga Larry

Carnegie Mellon University - Pittsburgh

Breaking the wall of brain's internal conversations

PROBLEM

For us to see, move, and think multiple brain regions must work together. Even when individual areas and their physical connections are well understood, we know little about how they coordinate. It remains unclear whether the brain can flexibly orchestrate and modify how communication unfolds.

THE PROJECT

We built a BCI task that lets the monkey see feedback about how two brain areas are interacting. Using this setup, we test whether the monkey can change the way these areas communicate by learning to adjust its brain activity.

WHICH ARE THE NEXT WALLS TO FALL?

3

Tamar Berger

The Rockefeller University - New York

Breaking the Wall of Precancer

PROBLEM

Most cancers are detected after visible disease develops, when treatment is harder and outcomes are poorer. Yet early genomic changes accumulate silently before cancer appears. Current screening misses these stages, requiring noninvasive methods to detect high-risk tissue early for prevention.

THE PROJECT

Noninvasive oral brush biopsies with genomic profiling detect early molecular changes preceding head and neck cancer. Using Fanconi anemia as a model, we identified precancerous alterations in normal oral tissue, enabling earlier detection and prevention-focused monitoring of high-risk patients.

WHICH ARE THE NEXT WALLS TO FALL?

4

Hagar Setty

Cologne Excellence Cluster for Cellular Stress Responses in Aging-Associated Diseases (CECAD) - Cologne

Breaking the wall of reproductive averages

PROBLEM

Research often focuses on average reproductive outcomes across populations. However, this approach can overlook important differences between individuals, including rare cases of reproductive failure, making it difficult to explain why some individuals consistently lose more embryos than others.

THE PROJECT

My project investigates why some individuals naturally lose more embryos than others, even in the absence of obvious disease. By studying reproduction at the level of the individual in *C. elegans*, I aim to uncover novel biological mechanisms that influence embryo survival and reproductive success.

WHICH ARE THE NEXT WALLS TO FALL?

5

Omer Sharon

University of California, Berkeley - Berkeley

Breaking the Wall of Whole-Night Sleep Imaging

PROBLEM

Traditional fMRI is "anti-sleep" due to extreme noise (>100 dBA) and rigid head helmets, making natural overnight sleep impossible, especially for patients and older adults. Consequently, we cannot non-invasively image deep-brain structures during restorative sleep in these populations.

THE PROJECT

We developed a neuroimaging platform that allows for the first-ever undisturbed, whole-night fMRI scans of natural sleep across diverse clinical populations. By capturing deep-brain dynamics overnight, this technology opens a non-invasive window for the early detection of human diseases.

WHICH ARE THE NEXT WALLS TO FALL?

6

Meital Tamar Eliyahu

Pathogenix Ltd - Be'er Sheva

Breaking the Wall Between Fast and Sensitive Diagnostics

PROBLEM

Millions of patients rely on rapid diagnostic tests that deliver results within minutes but often lack the sensitivity of laboratory-based methods. This diagnostic gap can lead to missed infections, delayed treatment, unnecessary antibiotic use, and increased healthcare costs worldwide.

THE PROJECT

Pathogenix is developing a next-generation electrochemical diagnostic platform that bridges the gap between rapid testing and laboratory sensitivity. Our technology aims to enable earlier and more reliable detection of infectious diseases at the point of care.

WHICH ARE THE NEXT WALLS TO FALL?

7

Nitzan Shauloff

Ben-Gurion University of the Negev - Be'er Sheva

Breaking the Wall of Microbial Sensing

PROBLEM

Current bacterial detection methods are slow, labor intensive, and often require culturing or labeling steps. This delays contamination identification in food, environmental, and clinical settings, increasing safety risks and operational costs.

THE PROJECT

Our project combines carbon nanomaterials and capacitive sensing to create an electronic nose capable of distinguishing bacterial species through their emitted VOC fingerprints. The platform enables rapid, real-time monitoring for food safety and diagnostic applications.

WHICH ARE THE NEXT WALLS TO FALL?

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Mohammad Khaled Atrash

Bar-Ilan University - Ramat Gan

Breaking the wall of human cell adaptation to extreme stress

PROBLEM

Cells face many challenges, such as heat, infection, and medical treatments. During high fever, cells must rapidly adapt to survive. We still do not understand how they quickly switch to “sport mode.” Understanding this process will reveal the limits of human adaptation to extreme conditions.

THE PROJECT

Cells rapidly adapt to heat and chemotherapy by reprogramming RNA production and transport to survive stress. My work identifies the factors behind this response and may help develop therapies that limit cancer cell adaptation.

WHICH ARE THE NEXT WALLS TO FALL?

9

Lenny Aharon

Columbia University in the City of New York - New York

Lightning Pose 3D: uncertainty-aware multi-view pose estimation

PROBLEM

Multi-view pose estimation is essential for quantifying animal behavior in scientific research, yet current methods need much labeled data, give poor uncertainty estimates, lack a unified end-to-end approach, and provide no usable application for the wider research community.

THE PROJECT

We present a unified end-to-end pipeline for multi-view animal pose estimation: a pretrained vision transformer processes all camera views jointly, trained with uncertainty-aware distillation and simulated occlusion. A nonlinear Ensemble Kalman Smoother then corrects overconfident predictions.

WHICH ARE THE NEXT WALLS TO FALL?

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Adi Avram Shperling

University of Toronto - Toronto

Using the amazing yeast to decipher genetic background effects

PROBLEM

The human genome is a mess. It's huge, redundant, and it's in humans. These issues have bothered geneticists for decades, and impose challenges when trying to understand how genes function and interact with each other, and how the genetic background affects these.

THE PROJECT

I'm breaking the walls of human genetic background research. Using the amazing yeast system, combining molecular biology, hard-core genetics and advanced computational force we aim to better understand the genetic background effect that is just too complex to decipher in human models.

WHICH ARE THE NEXT WALLS TO FALL?

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Omer Eldadi

Reichman University - Herzliya

Breaking the Wall Between Team Cognition and Cosmic Discovery

PROBLEM

Only three interstellar objects have ever been observed. Each vanishes within weeks, carrying irreplaceable data from other star systems. Past rushed team decisions cost critical telescope time. With the Rubin Observatory making detection routine, astronomy urgently needs team cognition science.

THE PROJECT

Scientific discovery is the ultimate high-stakes team performance — yet no one has ever studied it as such. Embedded at Harvard's Center for Astrophysics, I will be the first to study how astronomical teams think together when interstellar objects appear, vanish, and challenge what we know.

WHICH ARE THE NEXT WALLS TO FALL?

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Mayis Eissa

Goethe University Frankfurt - Frankfurt am Main

Re-thinking Safety in Refugee Childhoods

PROBLEM

Refugee children are often protected through adult-defined systems that overlook how children themselves experience safety. As a result, interventions may fail to address children's everyday emotional, relational, and social experiences of safety and "safe space."

THE PROJECT

This project explores how refugee children aged 6–10 in Germany experience and create safety in their everyday lives. By centring children's own perspectives, the study aims to develop a child-derived framework of safety that can inform more responsive educational and psychosocial support practices.

WHICH ARE THE NEXT WALLS TO FALL?

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Tomer Sheinfeld

The Hebrew University of Jerusalem - Jerusalem

Breaking the wall between a single dose and addiction

PROBLEM

A single dose of an addictive drug, and a lasting addiction are separated by a cascade of synaptic and cellular changes we barely understand. How the acute drug response is converted into durable rewiring of brain communication remains one of addiction's central unanswered questions.

THE PROJECT

Acutely, cocaine drives a transient dopamine signal that selectively silences contextual input from the insula to the striatum. With repetition, this transient silencing consolidates into lasting reductions in insular drive and rewiring of the insula–striatum pathway.

WHICH ARE THE NEXT WALLS TO FALL?

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Sara Gutkin

Technical University of Munich - Munich

Mining for therapeutic targets using tailored photoswitches

PROBLEM

The rise of antibiotic resistance and the lack of effective strategies to target previously undruggable bacterial proteins, limiting the discovery of new drugs with novel modes of action.

THE PROJECT

During my postdoctoral research, I successfully designed and synthesized a covalent photoswitch capable of tunable labeling of the bacterial proteome. This approach enables light-controlled modulation of both protein localization and binding mode, offering precise spatiotemporal control over target.

WHICH ARE THE NEXT WALLS TO FALL?

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Nir Asch

Rambam Medical Center and The Hebrew University of Jerusalem - Haifa and Jerusalem

Breaking the wall of schizophrenia's untreated symptoms.

PROBLEM

Schizophrenia is a debilitating disorder affecting ~1% of the population. Because it disrupts synaptic integration across the entire brain, it is difficult to treat; even with today's best care, negative and cognitive symptoms limit learning, work, independence, relationships, and recovery.

THE PROJECT

We showed in non-human primates that schizophrenia-like synaptic disruption impairs cognitive flexibility and exploration, and that basal-ganglia stimulation can restore adaptive learning. We are now translating this into a treatment strategy targeting this brain-wide bottleneck.

WHICH ARE THE NEXT WALLS TO FALL?

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Oron David Kotler

Columbia University - New York

Astrocytes as Integrators in the Attentive Mouse.

PROBLEM

Neurological treatments largely focus on neurotransmitter control. However, how overlapping signals like acetylcholine (ACh) and norepinephrine (NE) integrate to dictate cognitive states remains unknown, creating a global therapeutic bottleneck for ADHD, Alzheimer's, and schizophrenia.

THE PROJECT

This project investigates how mPFC astrocytes integrate overlapping ACh and NE to control neurological states of attention. By combining photometry, 2-photon imaging, and AI modeling, we hope to establish astrocytes as localized therapeutic targets for cognitive disorders.

WHICH ARE THE NEXT WALLS TO FALL?

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Itay Itzhak

Technion Israel Institute of Technology - Haifa

Breaking the Wall of Blind AI Evaluation

PROBLEM

Large language models are increasingly used as assistants, advisors, and agents. Yet, we still evaluate them mostly with static benchmarks. These benchmarks are useful, but often miss failures that appear in real use: biased reasoning, confident mistakes, and unsafe decisions.

THE PROJECT

I develop evaluation methods that reveal hidden failures in language models before deployment. The project tests how models reason, decide, and fail in realistic settings, beyond what standard benchmark scores can show.

WHICH ARE THE NEXT WALLS TO FALL?

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Uri Bertocchi

Tel Aviv University - Tel Aviv

From Psychedelic Revolution to Epigenetically Targeted Psychiatry

PROBLEM

Depression and PTSD affect hundreds of millions worldwide. Many patients never reach remission with current treatments. Psychedelics show real promise but face serious barriers: legal restrictions, psychological risks, and unsuitability for patients prone to psychosis.

THE PROJECT

A single psilocybin dose can relieve depression for months, yet nobody knows how the brain holds onto that effect. We map the molecular switches that get reprogrammed in the brain after treatment, with the goal of reproducing that effect through targeted therapies that don't require psychedelics.

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Fatima-Ezzahra Ait Mohand

The Hebrew University of Jerusalem - Jerusalem

Breaking the Wall of Radiation Resistance in Glioblastoma

PROBLEM

Glioblastoma is the deadliest brain tumor. Radiation, the standard treatment, paradoxically amplifies cancer cells' communication, driving resistance. Moreover, the blood-brain barrier blocks most drugs from reaching the tumor, leaving patients with no effective therapeutic options.

THE PROJECT

Radiation, the backbone of glioblastoma treatment, paradoxically fuels tumor resistance by amplifying signals between cancer cells. We identified this mechanism and developed an intranasal nanoparticle therapy to block it.

WHICH ARE THE NEXT WALLS TO FALL?

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Hila Doron

Tel Aviv University - Tel Aviv

Breaking the wall of tumor cell microinjections

PROBLEM

How to personalize tumor biology studies in vivo at a single cell resolution?

THE PROJECT

In this future high-risk high-gain project, I plan to inject tumor cells into *C. elegans* nematodes to create a robust worm-tumor model.

WHICH ARE THE NEXT WALLS TO FALL?

Jury

Prof. Rivka Carmi Chair, ScienceAbroad; President Emerita, Ben-Gurion University of the Negev

Prof. Aaron Ciechanover Faculty of Medicine, Technion – Israel Institute of Technology; Nobel Laureate in Chemistry

Prof. Nili Cohen Buchmann Faculty of Law, Tel Aviv University; former President, Israel Academy of Sciences and Humanities

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