FALLING WALLS LAB WROCLAW

Saturday, 13. September 2025

Oratorium Marianum, University Main Building

Ambasada
Republiki Federalnej Niemiec
Warszawa

Uniwersytet Wrocławski

FALLING WALLS LAB WROCLAW

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CONTENT

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CONCEPT

The Falling Walls Foundation founded the Falling Walls Lab in 2011 in order to

... **connect** aspiring innovators

... **discover** and develop talents

... **support** interdisciplinary dialogue and international cooperation

... **develop** new ways of scientific communication

... **build up** new and strong networks

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TIMELINE

Saturday, 13. September 2025
Wroclaw, University Main Building, plac Uniwersytecki 1, Oratorium Marianum

12:45 – 13:00	**Arrival and registration of participants**
13:00 – 13:10	**Jury and participant briefing**
13:10	Opening Address: Vice-Rector UWr, dr hab. Arkadiusz Lewicki, prof. UWr
13:15	Welcome address: Vice Consul of Germany in Wroclaw, Mr. Torsten Göhler
13:20	Introductory remarks: prof. David Blaschke
13:30 – 14:20	**Scholar Presentations (1-8 in person)**
14:20 – 14:40	**Networking break I**
14:40 – 15:30	**Scholar Presentations (9-16 in person)**
15:30 – 16:00	**Networking break II / Evaluation session (Jury)**
16:00 – 16:15	Award ceremony / Group picture / Farewell

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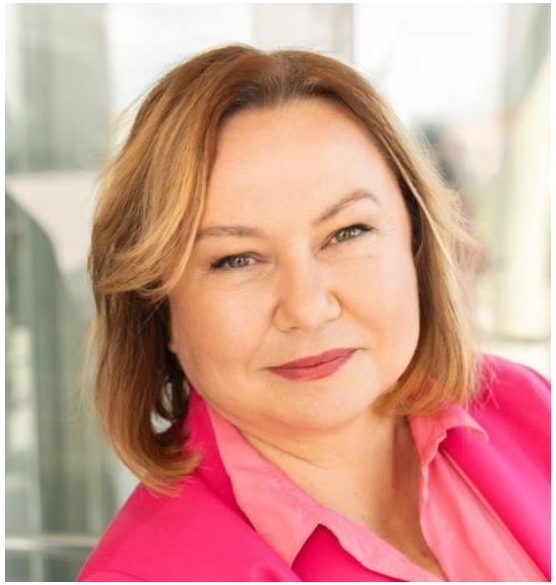
THE JURY



Dr hab. Malgorzata Korzeniowska, prof. UPWr
Head of the Department of Functional Food Products Development
Head of the Doctoral School Board
Wrocław University of Environmental and Life Sciences

Prof. Kamil Staniec
Vice-Rector for Education
Wrocław University of Science and Technology

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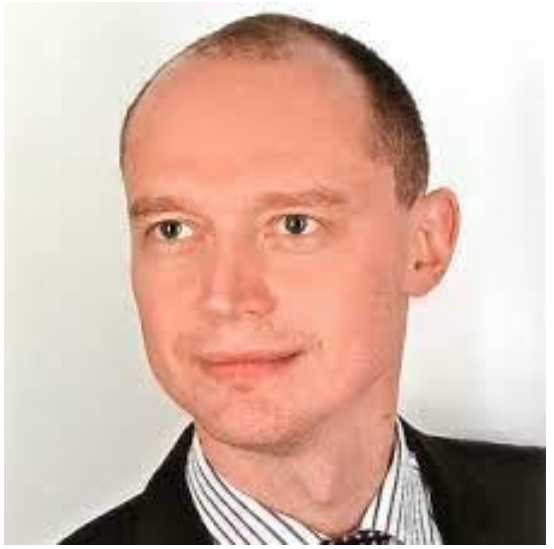
THE JURY

Torsten Göhler

Vice Consul
German General Consulate in Wrocław

Tomasz Janos

Head of the Municipal Office for University Relations
Wroclaw Academic Centre



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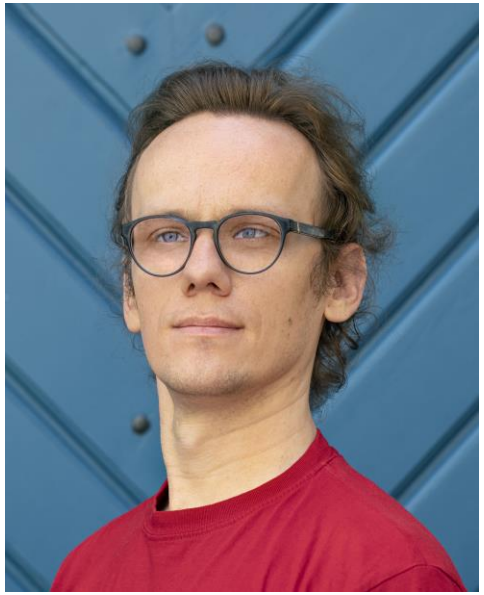
THE JURY

Narine Gevorgyan
Falling Walls Lab Organizer
A Alikhanyan National Science Lab, Yerevan

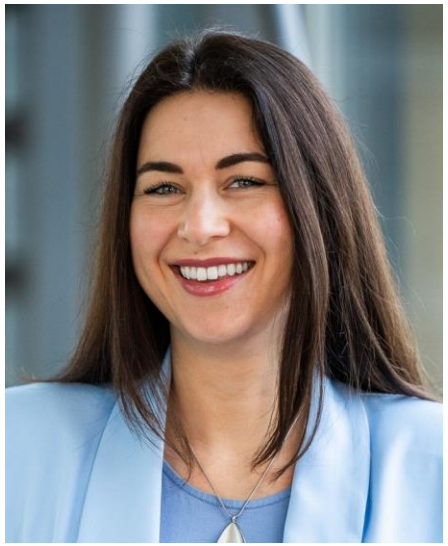


Dr Jakub Jankowski
Winner Falling Walls Lab Wrocław 2017
Climate Risk Analyst
University of Wrocław & HSBC

THE JURY

Dr. Peggy Jungke

Molecular Biologist, Strategic Alliance Manager, Tech Transfer
Helmholtz-Zentrum Dresden-Rossendorf



Dr hab. Krzysztof Graczyk, prof. UWr

Vice Dean at Faculty of Physics and Astronomy
University of Wroclaw

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PARTICIPANTS

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Bano, Kalsoom (Pakistan)
Politechnicka Wrocławska, Poland

Title: Breaking the Wall of Electric Power Forecast

Problem: Solar PV power is clean but unpredictable, with output changing rapidly due to weather fluctuations. Current forecasting methods struggle to capture complex, local patterns, causing grid instability, higher costs, and limiting large-scale renewable energy integration.

Solution: Using advanced deep learning models, I develop high-resolution, real-time forecasts that capture complex weather–power relationships. This improves accuracy, reduces grid instability, lowers costs, and enables greater reliance on solar PV as a stable, sustainable energy source.

Summary: I develop deep learning models to accurately forecast solar PV output by capturing complex, rapidly changing weather patterns. This work enhances grid stability, reduces costs, and accelerates the integration of solar energy into sustainable power systems.

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Benes, Viktor (Czechia)
CTU (Prague), Faculty of Transportation Sciences, Czechia

Title: Breaking the Wall of Urban Climate Blindness

Problem: Current approaches to urban emissions overlook the interconnected impact of weather, traffic flow, and the built environment. Without a systemic understanding of their interaction, cities cannot effectively manage air quality or design resilient transport systems.

Solution: I propose an explainable systematic framework combining meteorological, traffic, and urban morphology data to model and predict emissions. This modular system defines the minimal data inputs required for cities to adapt it for planning, policy and crisis management.

Summary: This project develops a transferable, emission prediction model that accounts for local weather, traffic dynamics, and urban form. It enables cities to better understand pollution peaks and proactively design cleaner, more adaptive mobility strategies.

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Bezpałko, Jan (Poland)
Wrocław Medical University/Oncosort, Poland

Title: Breaking the Wall of Bureaucracy in Healthcare

Problem: Complex and constantly changing reimbursement criteria prevent timely access to expensive, life-saving therapies, overburdening physicians with paperwork and risking patient health.

Solution: An AI-driven platform that automates clinical and reimbursement criteria analysis, enabling doctors to safely and efficiently qualify patients for high-cost therapies within national drug programs.

Summary: Oncosort uses trusted AI to eliminate administrative delays in oncology drug programs. By automating eligibility checks, it empowers physicians to focus on treatment, ensuring faster, fairer access to life-saving care.

website: https://oncosort.pl

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Brzoza, Bartosz (Poland)
CASUS/HZDR, Germany

Title: Breaking the Wall of Electronic Structure

Problem: In order to access material properties in-silico we need to compute the electronic structure of a given material. Density Functional Theory (DFT) gives us access access to electronic structure, but up to a limited scale. To simulate device-scale systems a more scalable approach is needed.

Solution: I present "Mandala" - an ML framework to train E(3)-Equivariant Graph Neural Networks for the task of predicting DFT matrices in localized atom basis. The framework facilitates a wide hyperparameter search through a diverse set of E(3)-EGNN variants creating them from modular building blocks.

Summary: Mandala is an ML framework for prediction of DFT matrices in E(3)-equivariant way. Instead of relying on intuition to select a favorable NN architecture, it allows for exploration of a wide variety of E(3)-GNN variants interchangeable building blocks.

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Dr. Císař Brown Lucy (United Kingdom)
Czech Academy of Science, Czechia

Title: Breaking the Wall of Historic Gender Violence

Problem: A fundamental assumption in the longterm history of European society has been the gradual decline in interpersonal violence and the monopolisation of said violence by the state (resulting in state formation). Both of factors are true but for only half the population (men) so what happened to women?

Solution: Medieval women were non-violent which should have given them advantage in rise of pacified court society/power. Pacified patriarchal structures therefore required the reimagining of women as violent to undermine their advantage. The concept of the witch was created in the absence of real violence.

Summary: By examining medieval/early modern conduct books and crime statistics, I identified a clear difference in actual gendered violence. Using early modern print culture, I traced the rise and suppression of the 'violent women' through the concept of witches which was used to regulate women's behaviour.

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Dr. Frantová, Nicole (Czechia)
Mendel University in Brno, Czechia

Title: Breaking the Wall of Lab-Field Separation

Problem: I challenge the tradition of lab-only plant research by focusing on real-time field data and holistic observations, using lab tests only as support. My field-based approach breaks barriers and helps develop crops truly resilient to real-world stresses.

Solution: I break the silo thinking in plant science by merging field reality, plant physiology, and molecular data into one living story. This holistic, system-wide view empowers breeders to create crops that thrive in the real world, not just survive in a lab.

Summary: I break the barrier between lab and field by uniting real-time field data, physiology, and molecular signals into one holistic plant story. This approach empowers breeders to develop truly resilient crops ready for real-world challenges.

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Gonin, Maël (France)
Deutsches Zentrum für Astrophysik, Germany

Title: Breaking the Wall of Dark Matter

Problem: Dark Matter represents one of cosmology's greatest mysteries. This invisible substance acts as gravitational glue holding galaxies together and accounts for a large fraction of the Universe's energy. Multiple lines of evidence confirm its existence, yet it remains completely unobserved.

Solution: While physicists long favored particle Dark Matter theories involving new massive particles, Primordial Black Holes offer a different solution: Dark Matter could be ancient black holes formed during the Universe's birth, bridging astronomical observations with Big Bang theory.

Summary: My project develops new computational tools to explore how Primordial Black Holes elegantly connect Dark Matter mysteries with the origin of heavy elements like gold. I aim to provide critical evidence as this promising theory approaches experimental validation.

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Hossain, Md Foysul (Bangladesh)
University of South Bohemia, Czechia

Title: Breaking the Wall of Who's Farming Who?

Problem: Pond animals face lysine shortages due to seasonal shifts, zooplankton overtake phytoplankton, triggering phytoplankton to halt lysine production. This disrupts food webs and growth, worsened by poorly timed feeding that ignores nutrient dynamics, leading to eutrophication.

Solution: Precision Pond Feeds match fish amino acid needs with seasonal pond food web dynamics, reducing nutrient waste and eutrophication. This eco-strategy boosts fish growth, lowers carbon footprints, and aligns with the EU Green Deal and UN SDGs for sustainable aquaculture.

Summary: Phytoplankton regulate lysine availability, effectively "farming" higher trophic levels by causing seasonal nutrient bottlenecks in ponds. Our Precision Pond Feeds offers targeted supplementation to match natural amino acid shifts, boosting fish growth and reducing eutrophication.

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Dr. Jureczko, Marcelina (Poland)
Silesian University of Technology, Poland

Title: Breaking the Wall of Cure and Contamination

Problem: Rising cancer rates have increased anticancer drug use. Although lifesaving, these drugs pose environmental risks as they aren't fully removed by wastewater treatment and contaminate surface, groundwater, and drinking water, exposing aquatic life and humans to harmful effects.

Solution: I am among global pioneers using white-rot fungi to remove anticancer drugs from the environment. These fungi effectively eliminate drugs through degradation and sorption. I achieved the highest/fastest removal efficiency internationally and confirmed that degradation also leads to detoxification.

Summary: Life-saving anticancer drugs have become water pollutants, threatening aquatic life and human health. I am among the pioneers using white-rot fungi to remove these toxic compounds from wastewater, achieving record-breaking efficiency and proven detoxification.

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Mahadura, Ashini Dias (Sri Lanka)
Masaryk University, Czechia

Title: Breaking the Wall of Plant Sex Mysteries

Problem: Why do some plants split into males and females, while others combine them? Earlier studies masked true global patterns of sexual dimorphism. We explore whether these systems are shaped by specific environments and how females persist alongside bisexuals using thistles (Cirsium) as a model.

Solution: We hypothesize that sexually dimorphic plant systems follow global patterns linked to breeding systems, climate, and life history traits. Using thistles (Cirsium), we examine whether the female advantage over bisexuals relates to vegetative, reproductive traits, and seed predator pressure.

Summary: We revealed strictly contrasting global patterns: gynodioecy peaks in temperate zones, dioecy in tropics and islands. Using thistles, we showed females outperform bisexuals in seed success and predator resistance, revealing latitudinal and evolutionary dynamics in plant sex dimorphism.

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Maráková, Ester (Slovakia)
Mendel University in Brno, Faculty of AgriSciences, Czechia

Title: Breaking the Wall of Cancer Treatment

Problem: Pro-apoptotic therapeutic proteins are an unmapped territory in cancer treatment. Unfortunately, their application deals with immunogenicity, short half-life, poor cellular uptake and overall instability.

Solution: Bioinspired lipid nanoparticles that mimic the mitochondrial membrane are opening the frontier for more effective cancer treatment by delivering cell-killing proteins directly into tumours.

Summary: This project focuses on the development of a novel cancer treatment strategy by synthesising mitochondria-mimicking nanoparticles, which are capable of delivering cell-killing proteins into cancer cells. By releasing them inside cancer cells, we can shrink or destroy the tumour.

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Marhama Sirajudheen, Ziyaurrahman (India)
Masaryk University, Czechia

Title: Breaking the Wall of Bone Health Maintenance

Problem: Bone stem cells rely on a supportive niche to maintain healthy skeletons—but we don't know what this niche is made of. Without this knowledge, we can't fully understand or treat many bone diseases caused by a failing niche.

Solution: In zebrafish, we found a new type of cells around bones that acts like a mini-liver, clearing toxic metabolites to protect bone stem cells. When this system fails, it mimics human bone disease—making these cells a promising new niche component for therapeutic target.

Summary: In live zebrafish we will do the targeted killing of these cells and observe what is happening to bone development and maintenance. This will help us to understand how important these cells are for maintaining bone health.

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Nowak, Wiktor (Poland)
Wrocław Medical University, Poland

Title: Breaking the Wall of Genetic Silence

Problem: Lack of understanding of how sensory stimuli—especially music—molecularly influence gene activation in healthy individuals and in patients with Alzheimer's, cancer, or ASD, hindering the development of personalized music-based therapies.

Solution: Use genomic analysis to study how music alters gene expression, identifying patterns linked to health or disease. Apply findings to design personalized music-based interventions that enhance well-being and support treatment.

Summary: We investigate how music impacts gene activity in healthy people and those with diseases such as Alzheimer's, cancer, or ASD. By applying genomic analysis, we seek to create tailored music-based therapies to improve health and aid in treatment.

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Dr. Rashid, Ambreen (India)
Wrocław University of Science and Technology, Poland

Title: Breaking the Wall of the Chiral Pool

Problem: Cinchona alkaloid catalysts are structurally rigid, limiting steric and electronic tuning. This restricts the development of versatile, highly selective organocatalysts and ligands for asymmetric synthesis, pharmaceuticals, and their unexplored biological applications.

Solution: The solution is to replace Cinchona alkaloids with synthetic analogues that can be easily and highly divergently tuned. This approach will create a synthetic “Cinchona-like” pool, providing versatile catalysts for a wide range of chemical reactions and potential biological applications.

Summary: Development of synthetic analogue of Cinchona alkaloids and their subsequent derivatization that retain catalytic efficiency but allow structural modification to diverge into new areas, which were previously unreachable from the chiral pool.

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Trávníčková, Hana (Czechia)
Technical University of Liberec, Czechia

Title: Breaking the Wall of Unfocused Learning

Problem: Young professionals face an overload of irrelevant learning content that wastes time and fails to support real career growth.

Solution: GrowZ.one offers AI-powered, personalised microlearning that helps people focus on what matters most in their job and career.

Summary: GrowZ.one breaks the wall of unfocused learning by providing targeted, modular content tailored to each user's needs. It empowers Gen Z and companies to upskill effectively, with AI ensuring relevance, clarity, and impact.

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Wójcik, Adrian (Poland)
Uniwersytet Wrocławski, Poland

Title: Breaking the Wall of the Neutron Star Mass Gap

Problem: There is an upper limit to the mass of neutron stars, which plays a crucial role in our understanding of astrophysical phenomena such as neutron star mergers and supernova explosions. The exact value remains unknown, but a limit proposed by Rhoades and Ruffini suggests a maximum of 3.2 solar masses.

Solution: I've revisited this theoretical limit and found that it strongly depends on the onset density of a new phase of matter inside neutron stars. By incorporating modern insights into phase transitions, I've learnt that the onset of the mass gap can occur at much higher densities than previously assumed.

Summary: The lower limit of the mass gap between neutron stars and black holes may reach values as high as 4 solar masses. The merger of two typical neutron stars does not necessarily lead to the formation of a black hole — it can instead result in a stable neutron star.

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WHICH ARE THE NEXT WALLS TO FALL?

IN COOPERATION WITH

Ambasada Republiki Federalnej Niemiec Warszawa

Wrocław University of Science and Technology

Silesian University of Technology

Research University Excellence Initiative

Wrocław University of Economics

WCA Wrocław Academic Hub

Uniwersytet Wrocławski

Wrocław Medical University

Wrocław University of Environmental and Life Sciences

THANK YOU TO OUR PARTNERS AND SUPPORTERS

Network Partners

Federal Foreign Office

DAAD Deutscher Akademischer Austauschdienst German Academic Exchange Service

DFG Deutsche Forschungsgemeinschaft

SPRINGER NATURE

CONTACT

Prof. David Blaschke
Institute of Theoretical Physics
University of Wroclaw
david.blaschke (at) uwr.edu.pl
www.ift.uni.wroc.pl/~blaschke

FEEDBACK

What is your overall impression of the Falling Walls Lab Wroclaw?

What are your concrete suggestions for improvement?

What was most challenging?

email: david.blaschke (at) uwr.edu.pl

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