15 YEARS EuroTech Universities Alliance

EUROTECH RISING STARS 2026

Recognising early-career researchers and research-driven innovators

About EuroTech Universities Alliance

The EuroTech Universities Alliance is a strategic partnership of six leading universities of science and technology: the Technical University of Denmark (DTU), École polytechnique fédérale de Lausanne (EPFL), Institut Polytechnique de Paris (IP Paris), Technion - Israel Institute of Technology, Eindhoven University of Technology (TU/e) and the Technical University of Munich (TUM).

Founded in 2011, the Alliance combines complementary strengths in infrastructure, research, innovation, and education, to address societal challenges and strengthen Europe's competitiveness, sustainability and resilience. Through its Strategy 2030, EuroTech is advancing deeper cooperation, contributing scientific expertise to European policymaking and connecting research and innovation ecosystems to achieve greater collective impact.

www.eurotech-universities.eu

DTU

EPFL

INSTITUT POLYTECHNIQUE DE PARIS

TECHNION Israel Institute of Technology

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY

Technical University of Munich

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Forward

What does it take to turn a bold idea into a discovery, a technology or a solution that makes a difference? It starts with people curious enough to ask new questions, challenge conventional thinking and explore what others have yet to imagine.

The **EuroTech Rising Stars Award 2026** celebrates this spirit of curiosity and ambition, recognising exceptional early-career talent from the six universities of the EuroTech Universities Alliance. Building on previous editions under a new name, the award continues to spotlight researchers whose work holds the promise of lasting scientific, technological and societal impact.

As the jury, we have been impressed by both the breadth and the exceptional quality of this year's nominations. The nominees and finalists represent two complementary paths from research to impact. **Rising Research Stars** honours those advancing scientific knowledge and opening new avenues for discovery, while **Rising Innovation Stars** recognises researchers transforming their findings into future technologies, practical applications and new ventures.

From quantum technologies and artificial intelligence to clean energy, medical imaging and healthcare, their work spans some of the most exciting frontiers of science and technology. Some push the boundaries of fundamental knowledge, while others turn scientific discoveries into solutions to real-world challenges. Together, they show how the desire to explore and research excellence can open new possibilities and make a tangible difference to society.

Their achievements also send a powerful message for Europe: our future scientific and technological leadership depends on the talent we nurture today. Supporting the next generation of researchers and innovators, connecting expertise across disciplines and borders, and giving novel concepts the freedom and resources to flourish are essential to pushing the frontiers of knowledge and turning scientific excellence into lasting impact.

We warmly congratulate all nominees and finalists on their achievements and invite you to explore their inspiring work, the ideas driving it and the new possibilities it opens up.

THE EUROTECH RISING STARS AWARD JURY



GERHARD KRAMER

Executive Vice-President for Research & Innovation, TUM



SILVIA LENAERTS

Rector Magnificus, TU/e



NOAM ADIR

Executive Vice-President for Research, Technion



CHRISTINE NELLEMANN

Provost, DTU



ANNALISA BUFFA

Associate Vice-President for Research, EPFL



JAMAL ATIF

Vice-President for Research & Innovation, IP Paris

RESEARCH

Research





YOSTA DE STIGTER

ENGINEERING GLOW-IN-THE-DARK SENSOR PROTEINS TO GET DIAGNOSTICS OUT OF THE LAB





OMER CAN KARAMAN

SHAPING LIGHT AT THE NANOSCALE: FROM RECONFIGURABLE DEVICES TO QUANTUM SOURCES



ANDRÉS FELIPE CASTRO MÉNDEZ

UNDERSTANDING AND CONTROLLING THE INTERFACES THAT POWER SOLAR CELLS



Photo credits: TU/e and Angeline Swinkels Fotografie

1 WINNER

YOSTA DE STIGTER

PhD Candidate

ENGINEERING GLOW-IN-THE-DARK SENSOR PROTEINS TO GET DIAGNOSTICS OUT OF THE LAB

THEME:
Biotechnology & Health Technologies

FOCUS:
De novo protein design; Point-of-care diagnostics; Bioluminescence; Infectious diseases

LAB WEBSITE:
https://merkxlab.nl/

Many medical tests still depend on central laboratories, specialised equipment and trained staff. That can delay diagnosis or make testing difficult in remote and resource-limited settings. Yosta de Stigter is developing light-producing sensor proteins that detect disease-related molecules, with the aim of bringing reliable diagnostics closer to the patient.

Her research combines protein engineering, artificial intelligence and microfluidics. The sensors are designed to change their light signal when they bind to a specific target, allowing tests to be read with simple equipment and potentially a smartphone camera. Yosta has developed platforms that detect DNA linked to infectious diseases and measure small molecules such as therapeutic drugs. Microfluidic cartridges help turn these sensors into compact tests that can be used outside specialised laboratories.

The work has resulted in publications in Angewandte Chemie and ACS Sensors, contributions to AI-driven protein-design research published in Science, and two patent applications. Yosta also received a Biotech Booster grant and the Royal Netherlands Chemical Society's Spotlight Prize for science communication. Prototype tests have progressed to clinical validation with Dutch hospitals and field testing in Uganda.

Alongside her PhD at TU/e, she is helping translate the technology through Spotlight Dx. Her longer-term goal is to use AI to design sensor proteins for specific diagnostic needs, enabling faster and more accessible testing.

EPFL

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Photo credits: Omer Can Karaman

OMER CAN KARAMAN

PhD Candidate, Doctoral Assistant, Photonics Doctoral Programme

SHAPING LIGHT AT THE NANOSCALE: FROM RECONFIGURABLE DEVICES TO QUANTUM SOURCES

THEME:
Semiconductors, Photonics & Quantum Technologies

FOCUS:
Nanophotonics; Nonlinear optics; Quantum photonics; Reconfigurable metasurfaces; Thermo-optical control; Ultrafast light–matter interactions

UNIVERSITY PROFILE:
https://people.epfl.ch/omer.karaman

Heat is often seen as an obstacle in photonics, limiting the speed and stability of optical devices. Omer Can Karaman explores how designed nanostructures can turn it into a tool for controlling light. His research brings together nanophotonics, nonlinear optics and quantum-light generation, opening possibilities for compact, tunable devices for sensing, communications and quantum technologies.

At EPFL's Laboratory of Nanoscience for Energy Technologies, Can combines nanofabrication, optical experiments and modelling to develop silicon metasurfaces: surfaces patterned with structures smaller than the wavelength of light. His experiments demonstrate large, reversible changes in transmission, with optical transitions faster than the thermal response predicted by modelling. This shows how designed resonances can turn gradual temperature changes into rapid optical signals.

In quantum photonics, his collaborative research demonstrates photon-pair generation in amorphous-silicon films and metasurfaces. It reveals how heating shifts optical resonances and changes the efficiency of this nonlinear process. These findings provide a foundation for tunable sources of quantum light using a material compatible with established semiconductor fabrication methods.

His research also explores ultrafast electron dynamics in gold, revealing how crystal structure and interfaces shape the flow of absorbed optical energy. Across these studies, Can connects fundamental light–matter interactions with new ways to control and generate light. Supported by experimental demonstrations and peer-reviewed publications, his work lays the groundwork for compact, reconfigurable photonic devices and quantum-light sources, with potential to strengthen Europe's capabilities in photonics, semiconductors and quantum technologies.

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Photo credits: Andrés Felipe Castro Méndez

ANDRÉS FELIPE CASTRO MÉNDEZ

Postdoctoral Researcher

UNDERSTANDING AND CONTROLLING THE INTERFACES THAT POWER SOLAR CELLS

THEME:
Energy Systems

FOCUS:
Energy materials; Solar cells; Interface engineering; Metal-halide perovskites

RESEARCHER PROFILE:
https://scholar.google.com/citations?user=wJMUQHEAAAAJ&hl=en

Next-generation solar cells promise high efficiency and potentially lower-cost manufacturing, but their performance depends on microscopic interfaces between different materials. Andrés Felipe Castro Méndez studies these often-hidden boundaries to understand how they influence efficiency, stability and the long-term reliability of photovoltaic devices.

His research focuses on metal-halide perovskites, a promising class of light-absorbing materials. Combining materials synthesis with advanced optical and electrical measurements and device engineering, Andrés investigates how interface chemistry and structure affect energy transfer, electrical losses and degradation. His work has shown that carefully designed interfaces can guide crystal growth, stabilise otherwise unstable material structures and improve vacuum-deposited solar cells. He has also examined how interfaces influence ion movement, revealing routes towards better operational stability.

Andrés has extended these insights to large-area and multijunction photovoltaics, which combine different absorbers to capture more of the solar spectrum. His research has produced more than 25 peer-reviewed publications and contributed to three patent applications. His distinctions include a Fulbright Doctoral Scholarship and the Novelis Scholar Fellowship.

Now a postdoctoral researcher at TUM, he is developing design principles that can help translate materials advances into scalable solar technologies. By addressing barriers to durability and manufacturing, his work could accelerate next-generation photovoltaics and strengthen Europe's clean-energy capabilities.



Photo credits: Dr. med. Alexander Biederstädt

DR. MED. ALEXANDER BIEDERSTÄDT

Physician-scientist & Emmy Noether Research Group Leader

REPROGRAMMING IMMUNE CELLS FOR OFF-THE-SHELF CANCER IMMUNOTHERAPY

THEME:
Biotechnology & Health Technologies

FOCUS:
CAR-engineered immune cells; Genome-wide CRISPR screening; Precision gene editing; Cancer immunotherapy; Allogeneic cell therapy

RESEARCH GROUP WEBSITE:
https://med3.mri.tum.de/de/forschung/biederstaedt-junior-group

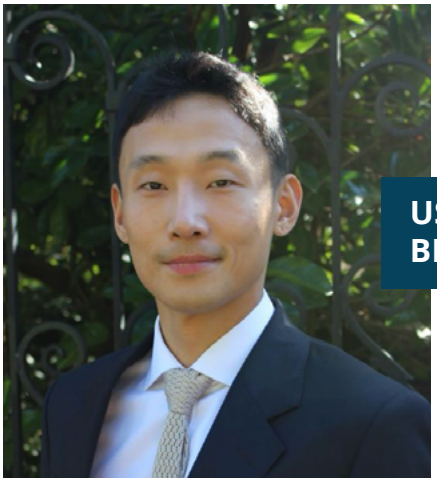
Dr. med. Alexander Biederstädt is a physician-scientist developing engineered immune cells to treat cancers that resist current therapies. His research aims to help these cells sustain their cancer-killing activity and withstand the suppressive conditions created by tumors.

At MD Anderson Cancer Center, he led the development of the first genome-wide CRISPR screening platform for primary human natural killer (NK) cells. By systematically switching off individual genes, the team identified genetic changes that enhanced the ability of NK cells, including CAR-engineered NK cells, to attack cancer in laboratory and animal models. Published in Cancer Cell in 2025 (DOI: 10.1016/j.ccell.2025.07.021), the work established a systematic approach to discovering modifications that could improve future cell therapies.

Now leading an Emmy Noether Research Group at the Technical University of Munich, Dr. Biederstädt combines genetic screening, precision gene editing, and synthetic biology to develop the next generation of immune cell therapies. His team works with invariant natural killer T cells, and gamma delta T cells, targeting difficult-to-treat blood cancers and solid tumors.

The group evaluates new cell therapy candidates in preclinical models, with the goal of advancing the most promising approaches into early-phase clinical trials. The longer-term aim is to develop donor-derived off-the-shelf cell therapies that can be prepared in advance, potentially making advanced cancer treatment available to more patients.

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SOOYONG CHAE

from the École Polytechnique, member of IP Paris

PhD Candidate, Laboratory of Physics of Interfaces and Thin Films (LPICM)

USING THE POLARISATION OF LIGHT TO HELP REVEAL BRAIN TISSUE STRUCTURE DURING SURGERY

During brain-tumour surgery, surgeons must remove diseased tissue while protecting pathways controlling movement, speech and other essential functions. Sooyong Chae is developing an optical method that could give surgeons an additional, label-free view of tissue structure during operations.

His research, supervised by Dr Tatiana Novikova, uses wide-field Mueller polarimetric imaging, which measures how tissue changes light polarisation to reveal structure not visible in ordinary images. As co-lead of the AOPOLAR project with Dr Théotim Lucas, Chae develops physics-based and machine-learning algorithms to distinguish tumour from healthy tissue, reconstruct images from incomplete measurements and map nerve-fibre orientation in white matter. These advances have enabled real-time tracking of white-matter fibres.

In two years of doctoral research, he has co-authored four journal articles (three as a first author), a book chapter, eight first-author conference contributions and three patent applications. Journals include IEEE Transactions on Medical Imaging, Biomedical Optics Express (Editor's Pick) and the Journal of Microscopy (cover article). His awards include best student paper and poster awards, a Young Researcher Award from the Fondation pour la Recherche Médicale, the i-PhD innovation competition and Falling Walls Lab Paris, where he was selected to represent France.

Next steps include validation on tissue closer to clinical practice and developing compact, surgery-ready equipment. If validated, AOPOLAR could help surgeons see tumour boundaries and critical fibre pathways more clearly while preserving vital brain function.

THEME:
Biotechnology & Health Technologies

FOCUS:
Mueller polarimetry; Biomedical optics; Biomedical imaging; Machine learning; Brain tumour surgery; Neuro-surgical guidance; Label-free tissue characterization

LAB WEBSITE:
https://aopolarimetry.com/

Photo credits: Sooyong Chae

TECHNION Israel Institute of Technology



DR. AVIOR ELMUALEM

Assistant Professor

PERTURBING QUANTUM MATTER: REVEALING AND CONTROLLING EMERGENT STATES AT THE ATOMIC SCALE

Quantum materials can display properties that have no simple counterpart in conventional materials, including unusual forms of superconductivity and magnetism. Understanding where these behaviours come from is a fundamental scientific challenge. Dr. Avior Elmualem studies how electrons behave inside such materials and how their collective behaviour creates these emerging states.

Using advanced microscopy, he examines electronic properties at the atomic scale, focusing on what happens around individual defects, edges and interfaces. These local variations can reveal information that is hidden in measurements averaged across an entire material. His research has provided evidence supporting an unconventional form of superconductivity in kagome metals, whose distinctive atomic geometry can give rise to unusual electronic behaviour.

Avior has also studied how atomic arrangement and magnetic order affect electrons in other quantum materials. By comparing detailed observations with competing theoretical explanations, this work helps narrow down the mechanisms responsible for their properties.

After completing his doctorate at the Technion and postdoctoral research at the University of Illinois Urbana-Champaign, Avior returned to the Technion as an Assistant Professor. He is now building a laboratory focused on understanding and eventually controlling quantum states at the atomic scale. Although the research remains fundamental, it could ultimately inform new materials for quantum computing, next-generation electronics and spintronics, where information is carried using electron spin.

THEME:
Advanced materials

FOCUS:
Scanning Tunneling Microscopy (STM); Unconventional Superconductivity; Defects; Surface; Quantum materials; Topological materials; Quantum Geometry

UNIVERSITY PROFILE:
https://phys.technion.ac.il/en/component/adm/person/735

Photo credits: Dr. Avior Elmualem

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Photo credits: Frederik Fristed

FREDERIK FRISTED

PhD Candidate, DTU Wind and Energy Systems

PLANNING THE ENERGY INFRASTRUCTURE THAT NET-ZERO SHIPPING AND AVIATION WILL NEED

THEME:
Energy Systems

FOCUS:
Energy systems; Decarbonisation; Infrastructure; Transport; Shipping

UNIVERSITY PROFILE:
https://orbit.dtu.dk/en/persons/frederik-fristed/

Cutting emissions from shipping and aviation will take more than cleaner vessels and aircraft. It will also require major investment in the systems that produce, transport and distribute low-carbon fuels. Frederik Fristed studies how Europe can plan these interconnected choices without locking itself into infrastructure that may become costly or obsolete as technologies, markets and climate policy evolve.

His research links transport and energy-system modelling. It examines which fuels and vessels could be deployed, where fuels should be produced, and what electricity, hydrogen and carbon dioxide infrastructure would be needed to support them. By letting green fuels compete with fossil fuels with carbon capture, his models show how decisions in one sector can shift the burden of reducing emissions across the wider energy system.

The findings also challenge the idea that economy-wide reduction targets will automatically decarbonise every sector. Without dedicated sectoral targets, fossil fuels may remain economically attractive in heavy transport and other sectors, affecting the need for hydrogen and carbon dioxide infrastructure and how scarce biomass is best used. His work further suggests that cost-effective net-zero systems may rely on a combination of technologies rather than one single pathway.

At DTU, Frederik contributes to Nordic and Danish infrastructure projects and is one of the main developers of the open-source OptiFlow model. His work, published in Applied Energy and Energy, aims to support more coordinated decisions by policymakers, network operators, fuel producers, ports and transport companies.

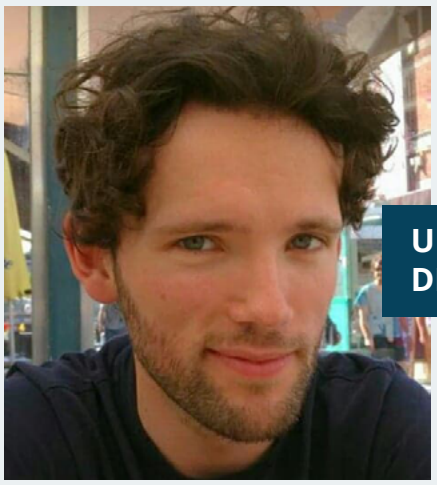


Photo credits: Antoine Guédon

ANTOINE GUÉDON

from the École nationale des ponts et chaussées, member of IP Paris

Tenured Researcher, IMAGINE Computer Vision Group, Gaspard-Monge Informatics Laboratory (LIGM)

UNDERSTANDING 3D WORLDS THROUGH DEEP LEARNING

THEME:
Artificial Intelligence & Robotics

FOCUS:
3D reconstruction; Computer vision; Gaussian splatting; Autonomous exploration; Flow matching

RESEARCHER PROFILE:
https://anttwo.github.io/

Turning photographs into accurate 3D environments is increasingly important for robotics, digital twins, simulation and virtual reality. Yet many current methods need large numbers of images or produce models that look realistic but are difficult to edit and reuse. Antoine Guédon develops deep-learning techniques that create more complete and practical 3D representations of real-world scenes.

His research spans the reconstruction pipeline, from deciding which viewpoints are most useful to generating detailed models from multiple images. Some of his methods help autonomous systems explore unfamiliar environments visually. Others, including SuGaR and Gaussian Frosting, combine realistic appearance with explicit 3D geometry, making reconstructed scenes both lifelike and easier to manipulate.

More recently, Antoine developed Surflo, which applies a machine-learning approach known as flow matching to reconstruct coherent surfaces from several views. The aim is to improve the consistency and geometric quality of the resulting 3D models rather than focusing on appearance alone.

His work has been recognised at major international AI and computer-vision conferences, including NeurIPS, CVPR and ECCV, with papers selected for oral, spotlight and highlight presentations. Antoine also releases code and tools openly. By improving the efficiency, accuracy and usability of 3D reconstruction, his research can support advances in autonomous systems, virtual environments and AI that understands and interacts with the physical world.

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DTU



Photo credits: Sotiria Lagouvardou

SOTIRIA LAGOUVARDOU

Assistant Professor

ENABLING SHIPPING'S ENERGY TRANSITION: BUILDING THE ALTERNATIVE MARINE FUEL SUPPLY CHAINS OF THE FUTURE

THEME:
Climate, Sustainability & Clean Technologies

FOCUS:
Maritime decarbonisation; Alternative marine fuels; Supply chain optimization; Climate policies; Energy efficiency

UNIVERSITY PROFILE:
https://orbit.dtu.dk/en/persons/sotiria-lagouvardou/

Decarbonising shipping is not only a question of choosing cleaner fuels. Green methanol and ammonia will also need production facilities, storage, transport links and bunkering infrastructure that work together reliably. Sotiria Lagouvardou studies how these emerging supply chains can be designed so that low-emission shipping becomes practical at scale.

Her research combines supply-chain modelling with economic, regulatory and industry analysis. It asks where alternative fuels should be produced, how they should reach ports and where new infrastructure and investment are most urgently needed. Looking across the maritime value chain allows her to identify network designs that are both cost-effective and resilient, while addressing the uncertainty that can hold back shipowners, fuel producers and ports.

Sotiria brings a strong record of scientific achievement to this challenge. During her PhD, she published eight peer-reviewed papers, including work in Nature Energy. Her research has also received several distinctions, among them the ITF-OECD Young Researcher of the Year Award, recognition from DTU and second prize in the SCAIEM Doctoral Thesis Award.

By turning climate targets into practical evidence for investment and policy, her work can help accelerate the development of the fuel infrastructure needed for maritime decarbonisation, reduce dependence on fossil fuels, and strengthen resilient and sustainable clean-fuel supply chains globally.

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY



Photo credits: Oisín Nolan

OISÍN NOLAN

PhD Candidate

NEXT-GENERATION ULTRASOUND IMAGING BY CLOSING THE PERCEPTION-ACTION LOOP

THEME:
Artificial Intelligence & Robotics

FOCUS:
Echocardiography; Active inference; Deep generative modelling; Wearable ultrasound; Inverse problems

RESEARCH PROJECT WEBSITE:
https://tue-bmd.github.io/casl/

High-quality ultrasound can require expensive hardware that collects and processes very large amounts of data. Oisín Nolan is developing AI-based methods that allow an ultrasound system to decide what information it actually needs, with the aim of making advanced cardiac imaging faster, more efficient and easier to deploy.

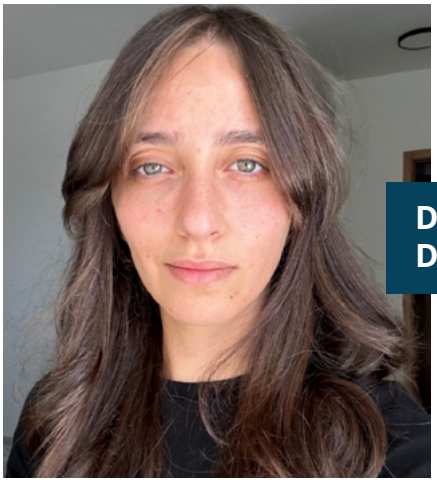
His research in "cognitive ultrasound" treats imaging as an adaptive process. Instead of acquiring the same measurements for every patient and task, the system uses information it has already collected to determine what to measure next. By exploiting patterns in ultrasound signals, it can reduce data requirements while preserving the information needed to form images or assess heart function.

Oisín has shown that this approach can speed up 3D ultrasound imaging and track indicators of cardiac function using fewer measurements. His research has appeared in IEEE Transactions on Medical Imaging and Transactions on Machine Learning Research and was presented at ICASSP 2026. He also contributes to zea, an open-source software library for cognitive ultrasound, and is a joint first author of OpenH-RF, a large open dataset of raw ultrasound measurements.

At TU/e, he is now working with academic and industry partners to validate these methods on wearable ultrasound devices. The longer-term goal is compact, lower-cost systems for continuous heart monitoring beyond specialist hospital settings.

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TECHNION
Israel Institute
of Technology



JULIA SALEH NATUR

PhD Candidate in Astrophysics

DEVELOPED AND BUILT A GAMMA-RAY DETECTOR WITH DIRECTIONAL CAPABILITIES

Gamma-ray bursts are among the most energetic explosions in the Universe. Pinpointing where they come from allows other telescopes to turn quickly towards the source, but instruments with directional capability are often large and complex. Julia Saleh Natur has developed GALI, a compact detector designed to locate these short-lived cosmic signals with high accuracy.

Rather than using one large detector, GALI combines hundreds of small detectors in a compact array. The system determines direction by comparing how many gamma rays reach each element and how the elements partially shield one another. About the size of a shoebox, the instrument could offer a smaller alternative to conventional space-based systems with directional capability.

Julia has designed, built and extensively tested GALI in the laboratory. Her work has produced peer-reviewed publications, including a 2026 paper in Nuclear Instruments and Methods in Physics Research A. The project is now moving towards space-environment testing ahead of a planned launch, and international research teams have expressed interest in the technology for future missions.

The same detection principle may also have applications on Earth, including locating radioactive sources during nuclear decommissioning and clean-up. By combining compact engineering with precise directional measurements, Julia's work could make gamma-ray detection more accessible to smaller space missions while supporting new approaches to nuclear safety.

THEME:
Semiconductors, Photonics & Quantum Technologies, Space Research

FOCUS:
Gamma-ray detectors; Exploding stars; Nuclear decontamination and decommissioning

PUBLICATION WEBSITE:
https://www.sciencedirect.com/science/article/pii/S0168900225010289

Photo credits: Julia Saleh Natur

EPFL



NINA VAN TIEL

PhD Candidate

USING AI TO MAP BIODIVERSITY AT SCALE AND TURN DATA INTO CONSERVATION ACTION

Protecting biodiversity depends on knowing where species live, how ecosystems are changing and which areas are most vulnerable. Yet observations remain uneven across the world. Nina van Tiel combines artificial intelligence with ecological data to fill these gaps and build a clearer picture of biodiversity under environmental and climate pressure.

Her research brings together species observations from community-science platforms and expert surveys with climate and environmental datasets. She develops computational methods designed for ecological questions, improving predictions of where species are likely to occur even in places with limited observations. Her work also examines broader biodiversity patterns and how species and ecosystems respond to a changing climate.

Nina has contributed to studies published in Nature Communications and the Proceedings of the National Academy of Sciences. Results from her research have also been incorporated into Restor, an online platform that provides spatial ecological information to restoration practitioners around the world.

She is now developing models that better reflect ecological processes, including interactions between species, while making their predictions easier to interpret. By turning large and varied datasets into evidence that can be acted on, Nina's work could help conservation organisations and public authorities identify vulnerable areas, track biodiversity trends and make better-informed decisions about where and how to protect ecosystems.

THEME:
Climate, Sustainability & Clean Technologies

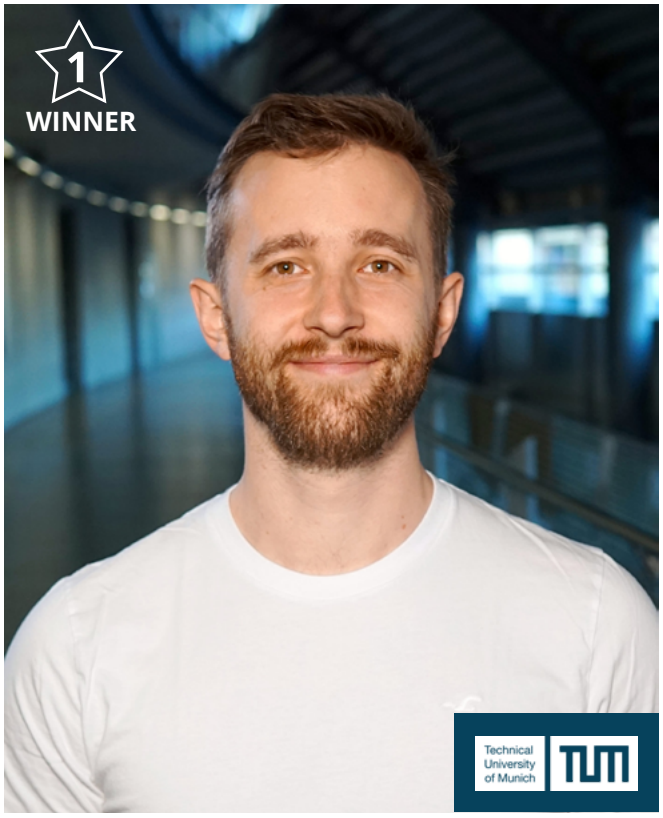
FOCUS:
Aritficial intelligence; Deep learning; Ecology; Biogeography; Earth observation

RESEARCHER PROFILE:
https://ninavantiel.github.io/

Photo credits: Nina van Tiel


INNOVATION

Innovation







LUKAS BURGHOLZER

Building the software layer that makes quantum computers usable



ALEXANDER HOLM OHRT

Building a European lead in ultra-antireflective nanotechnology - from displays to space



HADAS OMER

Defeating the world's #1 killer with DNA nano-capsule for immediate, targeted treatment



REMCO VAN ERP

Microfluidic cooling for high-power AI and HPC chips

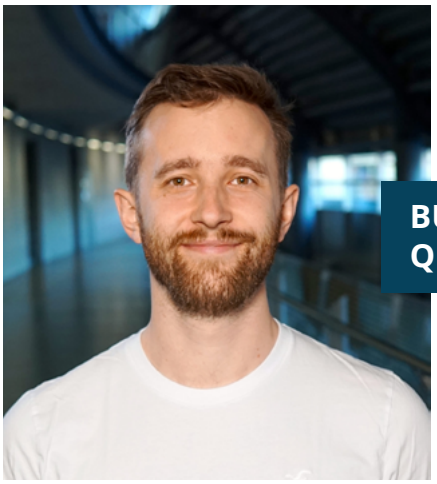


Photo credits: Lukas-Burgholzer

1 WINNER

LUKAS BURGHOLZER

Postdoctoral Researcher, CTO & Co-Founder of MQSC

BUILDING THE SOFTWARE LAYER THAT MAKES QUANTUM COMPUTERS USABLE

THEME:
Semiconductors, Photonics & Quantum Technologies

FOCUS:
Quantum software; Design automation; Quantum compilation and verification; Quantum-HPC integration; Open-source infrastructure

MQSC WEBSITE:
https://mq.sc/

Quantum processors are improving rapidly, but using them reliably alongside conventional software and high-performance computing remains difficult. Lukas Burgholzer develops the software tools and interfaces that connect quantum hardware with classical computing systems, helping turn experimental quantum algorithms into programs that can be executed and verified in practice.

His work includes the Munich Quantum Toolkit (MQT), an open-source ecosystem for quantum simulation, compilation and verification, and the Munich Quantum Software Stack (MQSS), which supports integration with wider computing infrastructure. These tools can optimise quantum programs for different processors and check that software transformations preserve the intended computation.

The software has achieved substantial international reach. As of October 2026, MQT had recorded 4.5 million downloads through PyPI and attracted 1,400 GitHub stars. Lukas has also received major research distinctions, including the ACM SIGDA Outstanding PhD Dissertation Award, the EDAA Outstanding Dissertation Award, and the 2026 High-Tech Young Talent Award by the Bavarian State Ministry of Science and the Arts.

In 2025, he co-founded MQSC, the Munich Quantum Software Company, to bring these capabilities into industrial use. Working with quantum-hardware vendors and high-performance computing centres, the company aims to make quantum-classical integration more repeatable and accessible. By developing reusable software layers and common interfaces, Lukas is helping lower barriers to quantum computing and strengthen Europe's emerging quantum technology ecosystem.

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Photo credits: Alexander Holm Ohrt

ALEXANDER HOLM OHRT

PhD Candidate, Founder & CEO of LumenAR

BUILDING A EUROPEAN LEAD IN ULTRA-ANTIREFLECTIVE NANOTECHNOLOGY - FROM DISPLAYS TO SPACE

THEME:
Semiconductors, Photonics & Quantum Technologies

FOCUS:
Nanophotonics; Anti-reflective surfaces; Nanoimprinting; Display technology; Optical manufacturing

LUMENAR'S LINKEDIN PAGE:
https://www.linkedin.com/company/105121688

What do satellite solar panels, AI data-centre optical interconnects, cameras and displays have in common? Reflections waste light – reducing power output, weakening signals, degrading images and washing out screens. Alexander Holm Ohrt is building LumenAR to solve this at industrial scale.

LumenAR develops a new class of nanostructured surfaces that suppress reflections across broad spectra and wide angles without the usual trade-offs in performance, clarity or cost. On silicon, the team measured reflectance over 200 times lower than that of untreated silicon across the visible spectrum and replicated the structures over larger areas.

Europe already builds world-leading roll-to-roll nanoimprint machines capable of reproducing these structures at scale. LumenAR brings the optical design and IP to turn them into a production platform for ultra-antireflective surfaces. Displays are the beachhead; scaling production matures the technology for camera optics, interconnects and space solar cover glass.

Founded during Alexander's PhD at DTU, LumenAR secured €280,000 in non-dilutive funding. Five letters of intent from B2B collaborators and customers, over 1,000 survey responses and 30 interviews confirm demand. LumenAR is working with European manufacturers to bring its first products to market. Europe has the printers – LumenAR brings the missing piece: the breakthrough surface technology they can print, opening a path into some of the world's most valuable optical markets.

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TECHNION
Israel Institute of Technology

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HADAS OMER

PhD Candidate in Biomedical Engineering; Founder & CEO of DNAmi

DEFEATING THE WORLD'S #1 KILLER WITH DNA NANOCAPSULE FOR IMMEDIATE, TARGETED TREATMENT

Heart attacks and ischaemic strokes demand treatment within minutes, yet clot-dissolving drugs can cause serious bleeding when circulating throughout the body. Hadas Omer is developing a DNA-based delivery system designed to release treatment where abnormal blood flow signals a dangerous blockage.

Her innovation is a programmable DNA nanocapsule that remains stable under normal flow conditions but opens when it experiences mechanical forces associated with a narrowed or obstructed artery. In principle, this could concentrate a therapeutic drug at the site where needed while reducing exposure in healthy body tissues.

Hadas developed the concept into an in-vitro proof of principle by combining nanotechnology, biophysics and biomedical engineering. The work was published in Nano Letters in 2026, featured on the journal's cover and supported by a patent application. Her achievements include first place at Falling Walls Lab Israel in 2025 and the BizTEC entrepreneurship programme in 2026.

She is now translating the research through DNAmi, a Technion spin-off focused on responsive DNA-based drug-delivery systems. Next steps are to test the platform under more physiologically realistic flow conditions and advance towards preclinical validation. The company's initial focus is acute cardiovascular emergencies, where selectively delivering clot-dissolving therapies could help address the limitations of systemic treatment. Beyond medicine, the technology could have broader applications wherever mechanically responsive DNA nanostructures enable controlled cargo release. In the longer term, this platform could be adapted to a wider range of payloads and applications across different fields.

THEME:
Biotechnology & Health Technologies

FOCUS:
DNA origami; Mechanosensitive drug delivery; DNA nanotechnology; Targeted drug delivery; Cardiovascular therapeutics

LINKEDIN PROFILE:
https://www.linkedin.com/in/hadas-omer-260630237/

Photo credits: Hadas Omer

EPFL

SPECIAL MENTION



REMCO VAN ERP

Co-founder and CEO of Corintis

MICROFLUIDIC COOLING FOR HIGH-POWER AI AND HPC CHIPS

As artificial intelligence and high-performance computing become more powerful, the chips that drive them are producing ever more heat. Keeping these processors cool is becoming a major engineering and energy challenge. Remco van Erp is translating research from EPFL into microfluidic cooling technology designed to remove heat much closer to where it is generated.

The approach places microscopic liquid-cooling channels directly in or alongside semiconductor devices. By bringing coolant near the heat source, the technology can support higher chip power densities while reducing the energy required for cooling. Remco's PhD research at EPFL's POWERlab helped establish this concept and led to a landmark first-author paper in Nature in 2020.

In 2022, he co-founded Corintis to take the technology into data centres and other high-performance computing environments. The company is developing and deploying advanced cooling solutions for increasingly powerful processors. Corintis has raised approximately $58 million and ranked first in the Top 100 Swiss Startup Awards in both 2025 and 2026.

The innovation addresses two closely linked pressures: the need for more computing performance and the need to limit the energy footprint of digital infrastructure. By turning laboratory research into deployable cooling systems, Remco is helping advance more energy-efficient computing while strengthening Europe's capabilities in semiconductor and data-centre technologies.

THEME:
Semiconductors, Photonics & Quantum Technologies

FOCUS:
Microfluidics; Thermal management; Power electronics; Liquid cooling; High-power computing

CORINTIS WEBSITE:
https://corintis.com/

Photo credits: Remco van Erp

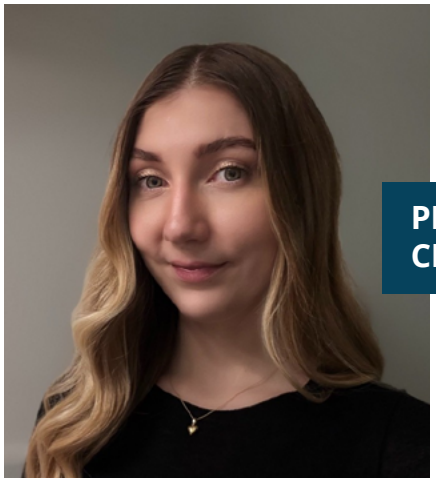


Photo credits: Éléonore Aïdonidis

ÉLÉONORE AÏDONIDIS

PhD Candidate in Physics, Laboratoire des Solides Irradiés (LSI)

PROGRAMMING MATERIALS DURING 4D PRINTING TO CREATE STRUCTURES THAT MOVE, TRANSFORM AND ADAPT

THEME:
Advanced Materials

FOCUS:
4D printing;
Programmable materials;
Material alignment;
Additive manufacturing;
Soft robotics

LINKEDIN PROFILE:
https://www.linkedin.com/in/el%C3%A9onore-aidonidis/

What if a printed object could be programmed to change shape or behaviour after it is made? Éléonore Aïdonidis is developing 4D-printing methods that build this responsiveness directly into materials, creating structures that can move, transform or adapt when exposed to specific external conditions.

Her research uses digital light processing together with controlled material alignment during printing. Magnetic fields or carefully managed material flow can organise functional components inside the structure, determining how it will respond later. This makes it possible to programme directional behaviour and shape change without adding separate motors, sensors or other complex mechanisms after fabrication.

In 2026, Éléonore published two studies in Advanced Functional Materials, including research on programmable magnetic properties and 4D-printed microrobots designed for targeted de-icing. Related work has explored structures that change shape when heated. She was also selected for IP Paris's Innovation for PhD Students programme, which supports researchers in translating scientific results towards practical use.

Éléonore is now applying these advances to a first prototype that performs a targeted mechanical function through programmed shape change. By embedding function into the material itself, her work could lead to simpler and more adaptable responsive systems, while reducing the need for additional electronics or conventional actuation components.

INSTITUT POLYTECHNIQUE DE PARIS



Photo credits: Gabriel Betton

GABRIEL BETTON

PhD Candidate, Lab-STICC, ENSTA

A BIO-INSPIRED AUTONOMOUS ROBOT TO EXPLORE AND MAP HIDDEN FRESHWATER NETWORKS

THEME:
Artificial Intelligence & Robotics; Climate, Sustainability & Clean Technologies

FOCUS:
Underwater robotics;
Autonomous navigation;
Bio-inspired propulsion;
Karst aquifers; Environmental monitoring

RESEARCH WEBSITE:
https://sites.google.com/view/robots-for-karst-exploration/accueil-rek

Karst aquifers form hidden networks of water-filled caves and tunnels that can be difficult, dangerous or impossible for humans to explore. Gabriel Betton is developing an autonomous underwater robot designed to enter these confined environments, map their structure and help researchers understand the freshwater resources they contain.

Conventional underwater robots often depend on cables, which can snag in narrow passages, while GPS and radio communication are unavailable underground. Gabriel's design combines autonomous navigation with fish-inspired propulsion. A flexible tail fin allows the robot to manoeuvre through tight spaces while aiming to limit energy use and avoid disturbing sediment that could reduce visibility.

A physical prototype has already demonstrated the proposed propulsion and manoeuvrability concept. The next development stage will integrate the full system and add autonomous navigation for testing in ENSTA's experimental facilities. The project is supported by the French National Research Agency's Electro-Karst programme and has been selected for IP Paris innovation support, providing both funding and technology-transfer guidance.

If successful, the robot could help hydrogeologists map underground passages, monitor water flows, investigate pollution and better understand the effects of drought or extreme rainfall. The same approach may also prove useful in other confined underwater environments where conventional robotic systems are difficult to operate.



Photo credits: Artur Alexandre Da Conceição Chaves

ARTUR ALEXANDRE DA CONCEIÇÃO CHAVES

PhD Candidate

ADAPTIVE ROBOTIC BIOREACTORS FOR STRONGER, PATIENT-SPECIFIC TISSUE-ENGINEERED LIGAMENTS

THEME:
Biotechnology & Health Technologies

FOCUS:
Adaptive bioreactors; Soft robotics; Tissue engineering; Mechanical conditioning; Ligament and tendon regeneration

LINKEDIN PROFILE:
https://www.linkedin.com/in/artur-chavescasl/

Ligaments and tendons develop under repeated mechanical forces, yet reproducing those conditions while growing replacement tissue in the laboratory is difficult. Artur Alexandre Da Conceição Chaves is developing ARIES, an adaptive robotic bioreactor designed to help tissue-engineered grafts mature under more realistic and individually controlled loading conditions.

Unlike many existing bioreactors, which apply the same fixed stimulation programme throughout tissue cultivation, ARIES combines soft robotic actuation with force sensing and independent control of each tissue sample. The system can therefore adjust mechanical loading as a construct develops, potentially improving tissue quality and consistency while allowing laboratories to test several samples in parallel.

The technology has reached prototype stage and is covered by a patent application. It was selected for TU/e's inaugural Tech Transfer Challenge and progressed to the Grand Finale at ASML. Input from a knee surgeon at Máxima Medical Center has also helped shape the project's potential route towards clinical relevance.

Artur is developing ARIES with a future spin-off in mind. The goal is to provide university, hospital and commercial laboratories with a more flexible platform for tissue engineering. In the longer term, the technology could support the development of stronger, more personalised ligament and tendon grafts and contribute to advances in regenerative medicine and biomanufacturing.



Photo credits: Bertrand Charpentier

BERTRAND CHARPENTIER

Co-founder, President & Chief Scientist of Pruna AI

MAKING AI ACCESSIBLE AND SUSTAINABLE WITH AI MODEL POST-TRAINING

THEME:
Artificial Intelligence & Robotics

FOCUS:
Efficient & Sustainable AI; Reliable & Uncertainty AI

RESEARCHER PROFILE:
https://sharpenb.github.io/

Running advanced AI models takes considerable computing power, energy and money. Bertrand Charpentier develops methods that make these models smaller, faster, cheaper and greener, helping developers achieve strong performance with fewer resources and lower operating costs.

His research covers a wide range of compression techniques and how to combine them. These include pruning, which removes unnecessary parts of a neural network; quantisation, which lowers the numerical precision used in computations; distillation, which trains smaller or faster models to reproduce the behaviour of larger ones; compilation, which adapts models to run efficiently on specific hardware; and caching, which reuses earlier calculations to speed up generative AI. Many of these methods are available in Pruna's open-source framework, letting developers optimise existing models with small changes to their code. Others power Pruna's own optimised models.

The work is already used commercially at large scale. Pruna AI has compressed tens of thousands of models, and its optimised image and video models run in production at significant scale. Optimised models can be up to 100 times more energy-efficient than alternatives performing comparable tasks.

As co-founder, President and Chief Scientist of Pruna AI, Bertrand turns these research methods into tools for developers, start-ups and businesses. By reducing the computing needed to run capable models, his work brings economic and environmental benefits: lower infrastructure costs, lower energy use and wider access to AI. Making generative AI deployment more efficient and sustainable also strengthens Europe's competitiveness in the field.

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EPFL



AARON PETRUZZELLA

Co-founder & CEO of Biodelphis Therapeutics

TARGETED PROTEASE INHIBITORS FOR CANCER AND AUTOIMMUNE DISEASES

THEME:
Biotechnology
& Health Technologies

FOCUS:
Drug discovery; Precition therapeutics; Proteash inhibition; Antibody-Peptide conjugates

BIODELPHIS WEBSITE:
https://biodelphis.com/

Photo credits: EPFL

Many proteins that contribute to disease also perform essential functions in healthy tissue, which makes them difficult drug targets. Aaron Petruzzella is developing a precision-therapy approach designed to block disease-driving enzymes only where they are harmful, while limiting unwanted effects elsewhere in the body.

During his PhD at EPFL, Aaron combined highly selective peptide inhibitors with antibodies that can guide them towards particular cells. The resulting antibody-peptide conjugates are designed to target cysteine cathepsins, a family of proteases implicated in cancer and other diseases. The research was validated in cellular and in-vivo models and led to a first-author publication in Nature Chemical Biology in 2024.

In January 2026, Aaron co-founded Biodelphis Therapeutics to translate the platform into potential medicines. The company reports four preclinical candidates directed at different cathepsins, with proof-of-concept data in animal models of lymphoma and solid tumours. Its pipeline also includes possible applications in lung cancer and osteoporosis.

The challenge now is to turn this targeted-delivery concept into therapies that can be developed safely and effectively. By combining selective inhibition with cell-specific delivery, Aaron's work could expand the range of disease targets that can be addressed and open new treatment options where conventional approaches have struggled with toxicity or insufficient precision.

TU/e EINDHOVEN UNIVERSITY OF TECHNOLOGY



CATHARINA MARIA VAN RIET

PhD Candidate in Industrial Design and Mechanical Engineering

DEMOCRATISING SOFT ROBOTICS THROUGH AN OPEN-SOURCE FABRICATION PIPELINE

THEME:
Artificial Intelligence
& Robotics

FOCUS:
Soft robotics;
Democratisation;
Fabrication;
Open-source tools

SOFT CIRCUITS TOOLKIT WEBSITE:
https://softcircuitstoolkit.com

Photo credits: Catharina Maria van Riet

Soft robots can bend, stretch and interact safely with people, making them promising for healthcare, rehabilitation and wearable devices. Yet the manufacturing methods behind them are often complex and difficult to reproduce. Catharina Maria van Riet is developing an open-source fabrication pipeline designed to make soft robotics easier to design, build and teach.

Her work focuses on accessible tools that help users move from early prototypes to integrated devices. One example is the Soft Circuits Toolkit, which borrows ideas from electrical circuit design and applies them to pneumatic systems. This gives engineers and designers a more intuitive way to assemble and test soft robotic devices without requiring highly specialised manufacturing knowledge.

The toolkit was evaluated with 86 participants, won Best Demo at the 2024 Dutch Soft Robotics Symposium, and was published in the journal Soft Robotics. Catharina's sheet-based fabrication methods have also been adopted at five international universities, including TU/e, EPFL and MIT. Her work has resulted in two patents and five peer-reviewed publications, alongside workshops, educational collaborations and open-science outreach.

By making fabrication methods more transparent and reusable, Catharina aims to lower the entry barrier to soft robotics for researchers, students and designers. Wider access to these tools could accelerate experimentation and support future applications in assistive wearables, rehabilitation technologies and other devices that need to interact safely with the human body.



Photo credits: Andrea Russo

ANDREA RUSSO

Postdoctoral Researcher, CEO & Founder of the startup FIBERNEX ApS

TURNING A PHD DISCOVERY INTO NEXT-GENERATION ELECTRODES FOR CHEAPER, GREENER HYDROGEN

THEME:
Advanced Materials

FOCUS:
Green hydrogen; Alkaline electrolysis; Nanofibers electrodes; Nickel coating; Deep-tech spin-out

FIBERNEX APS WEBSITE:
https://www.fibernex.dk/

Green hydrogen depends on electrolysers that split water using electricity, but conventional alkaline systems rely heavily on nickel and can lose efficiency. Andrea Russo is turning research from his PhD at DTU into a new electrode design that uses far less of this critical material while improving performance.

His approach combines a lightweight scaffold of polymer nanofibres with a very thin nickel coating. The structure creates a much larger active surface than a conventional electrode, allowing the system to use up to 97% less nickel while increasing efficiency by up to 10%. Laboratory tests have also shown stable operation for more than 350 hours.

Andrea is the main inventor on a European patent filed by DTU and is now moving the technology towards industrial use. In July 2026, he founded FIBERNEX ApS, a deep-tech spin-out focused on scaling production and validating the electrodes with industrial partners. The company has attracted interest from electrolyser manufacturers and secured a place in the Bio Innovation Institute's Venture Lab programme.

By combining advanced materials science with commercial development, Andrea is working to make hydrogen production more resource-efficient and easier to scale. If successfully industrialised, the technology could reduce material use, lower costs and support the wider deployment of green hydrogen in Europe's energy transition.



Photo credits: Dr. Or Sharir

DR. OR SHARIR

Assistant Professor; Head of the Efficient Intelligence Lab

TOWARDS AI THAT LEARNS AND REASONS AS EFFICIENTLY AS HUMANS

THEME:
Artificial Intelligence & Robotics

FOCUS:
Efficient AI; Neural network expressivity; Data-efficient learning; Incremental computation; Reasoning models

RESEARCH WEBSITE:
https://efficiencylab.ai

Powerful AI systems often depend on enormous datasets, computing clusters and energy budgets. Dr. Or Sharir studies how AI can achieve useful capabilities with fewer resources, making advanced models more efficient to develop and easier to deploy beyond the largest technology companies.

A central theme of his research is the "sufficiency frontier": the limits of how little data, computation and model capacity are needed to achieve a given performance level. His theoretical work has shown that neural-network architecture can dramatically change how efficiently functions are represented. At AI21 Labs, he co-led the pre-training of Jurassic-1, where architectural and tokenisation choices enabled text processing up to 1.8 times faster than its GPT-3 counterpart.

He also develops techniques that reuse previous computations when information changes, rather than starting from scratch. These ideas apply to quantum physics simulations, document processing and AI-generated text. Other work explores learning from self-generated experience and generalising across equivalent problems.

At the Technion, where he leads the Efficient Intelligence Lab, Or investigates the fundamental requirements for intelligence while making capable AI more accessible. More efficient models could reduce infrastructure demands, support local deployment and give universities and companies greater control over sensitive data and computing resources. He is also a co-founder of doubleAI, a frontier AI lab developing systems to tackle challenging scientific and engineering problems through advanced reasoning, search and verification.

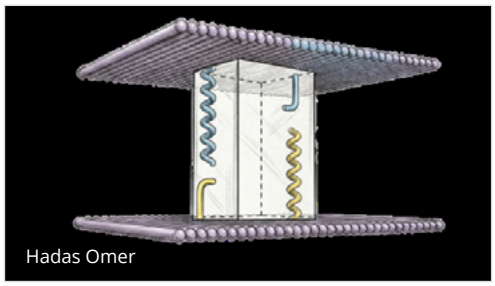
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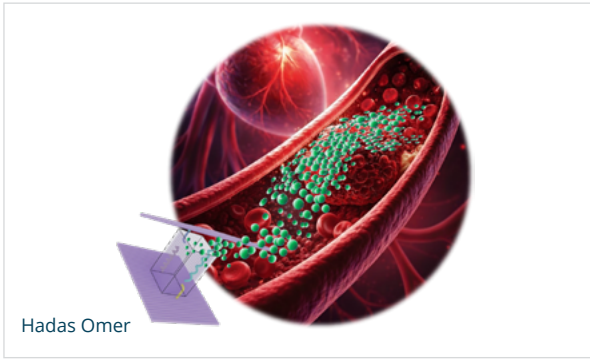


Alexander Holm Ohrt


Omer Can Karaman


Yosta de Stigter


Hadas Omer


Hadas Omer


Yosta de Stigter



Lukas Burgholzer


Andrés Felipe Castro Méndez

brussels_team@eurotech-universities.eu

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