

AI Ignite



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WEIZMANN
INSTITUTE
OF SCIENCE

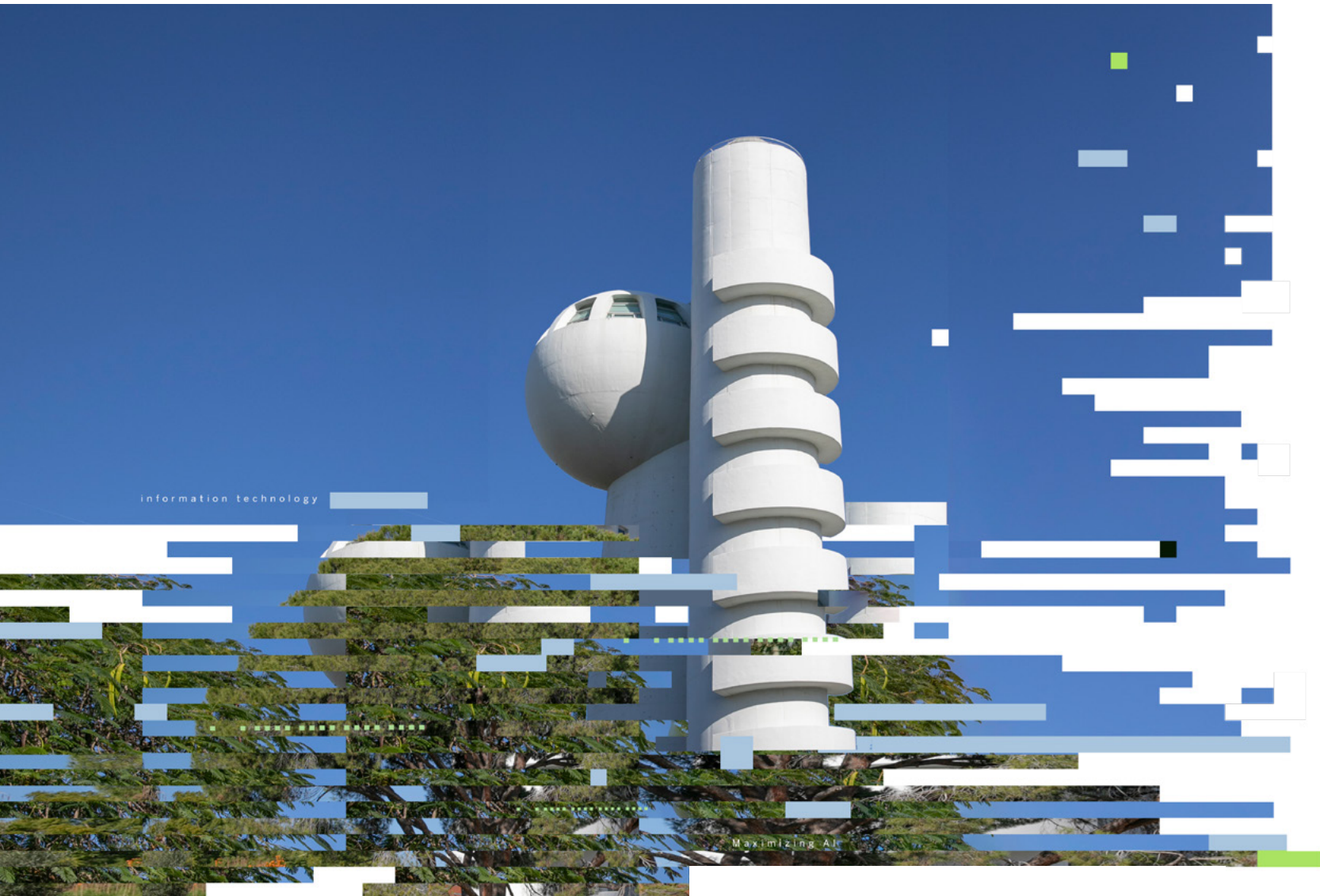
AI Ignite:

The artificial intelligence road to
game-changing discoveries
at the Weizmann Institute of Science

Artificial intelligence is accelerating and broadening research across every scientific discipline and driving the development of real-world applications.

Few generations have ever been able to redefine the boundaries of what science can do for humanity. This unique moment in time is our opportunity to shape AI capabilities, applications, and ethics in the early stages of this evolving technology.

Now is the time. AI Ignite is the way.



Maximizing AI for Science

The Weizmann Institute is recruiting experts in AI and information technology to help researchers and students find new and better ways to apply AI to scientific challenges. The Institute is also investing in next-generation tools and infrastructure, so innovative solutions can come to life as quickly as possible. This massive effort is already serving as a catalyst for new collaborative work between Weizmann research groups and world-class investigators around the globe.

Through AI Ignite, scientists are driving advancements in drug discovery, disease prediction, and personalized medicine, as well as sustainability, computing, astrophysics, education, and more.

Support for this flagship project spurs research teams to accelerate discovery and take science further, answering questions we haven't yet thought to ask.

Magnified Medical Imaging

Prof. Yonina Eldar,

Department of Computer Science and Applied Mathematics

Using AI deep learning techniques, Prof. Eldar has pioneered innovative methods to enhance the resolution of medical images like X-rays and ultrasounds and allow technicians to interpret them with greater precision. Prof. Eldar's groundbreaking work has also been crucial in lung tissue imaging and analysis, playing a key role in COVID-19 diagnosis.

Building Global Leadership

The world needs leaders in academia who will develop AI technology with an eye toward fulfilling humanity’s most pressing needs. With that vision, the Weizmann Institute has designed AI Ignite around three critical pillars:

The Knell Family Institute for Artificial Intelligence

Nurturing collaboration and innovation while supporting all AI-based research on campus, The Knell Family Institute for Artificial Intelligence includes the Center for Core AI Research, the AI Hub for Scientific Discovery, and AI Ignite Challenge Grants.

Computing Infrastructure

The expansion of local and cloud-based computational resources and equipment is integral to creating the robust infrastructure required for AI-driven research.

AI-IT Building

The new AI and information technology (IT) building will provide a base for the people and systems necessary for Weizmann scientists to maximize the power of current AI tools while generating new and improved applications.

From Birds to Brains

Dr. Yarden Cohen, Department of Brain Sciences

Dr. Cohen has co-invented machine-learning technology that decodes one of nature’s most intricate patterns: the “syntax” behind the trills and chirps of birdsong. Now, he is taking this expertise to the operating room, collaborating with neurosurgeons to study the neural activity behind language and speech in patients undergoing brain surgery.



The Knell Family Institute for Artificial Intelligence

The heart of AI Ignite, The Knell Family Institute for Artificial Intelligence drives the advancement of AI capabilities through strategy, innovation, and the facilitation of AI-based research across campus.



Prof. Shimon Ullman, Director of the Institute for Artificial Intelligence, is a 2015 Israel Prize laureate in mathematics and computer science and a renowned global authority on computer vision. He held joint appointments at the Weizmann Institute of Science and the Massachusetts Institute of Technology for many years.

Immunotherapy Insights

Dr. Leeat Keren, Department of Molecular Cell Biology

Dr. Keren and her colleagues created TissueNet, a dataset designed to teach AI computer vision systems to identify cell boundaries. Using this sophisticated dataset, she trained an algorithm to recognize the typical cellular architecture in tumors that respond well to cancer immunotherapy.

Center for Core AI Research

Here, scientists advance fundamental technologies for AI and machine learning. They also lay critical groundwork for ethics, fairness, responsibility, privacy, and other topics that will influence how AI is used for decades to come and how it can best serve humanity.

AI Hub for Scientific Discovery

This “computational clubhouse” is where students, scientists, and leading AI professionals collaborate, using AI to answer some of the world’s most pressing scientific questions.

The Hub strengthens the skills of AI learners at all levels, accelerates research, and generates new solutions that can be applied to multiple disciplines.

The AI Hub comprises:

- **Students:** Selected to join for a three-month period based on a call for proposals, who return to their labs with AI skills that can be applied to other projects.
- **Tutors:** Weizmann PhD students and postdoctoral fellows who are already experts in AI or data science.
- **Fellows:** Engineers, programmers, and R&D professionals with a deep understanding of AI, who join the Weizmann Institute for 1-3 years.
- **Faculty:** Weizmann principal investigators who collaborate with AI Fellows on special projects.

AI Ignite Challenge Grants

Awarded on the basis of competitive calls for proposals, challenge grants support Weizmann researchers seeking to use AI to address key questions in five areas of science:

BUILDING BLOCKS OF LIFE

Weizmann scientists are the inventors of powerful AI tools for designing novel proteins that do not exist in nature, but have specific, useful properties. Their approach is opening the door to advancements that may include new clinical therapies, industrial enzymes, and sources of biofuel.

AI FOR HUMAN HEALTH

Investigators at the Weizmann Institute are pioneers in the application of AI to health-related research. Cutting-edge life science technologies, in tandem with the AI-enabled mining of population-wide digital medical records, are generating biomedical discoveries that promote more effective and personalized treatment of disease while uncovering new topics of biomedical inquiry that may benefit patients around the world.

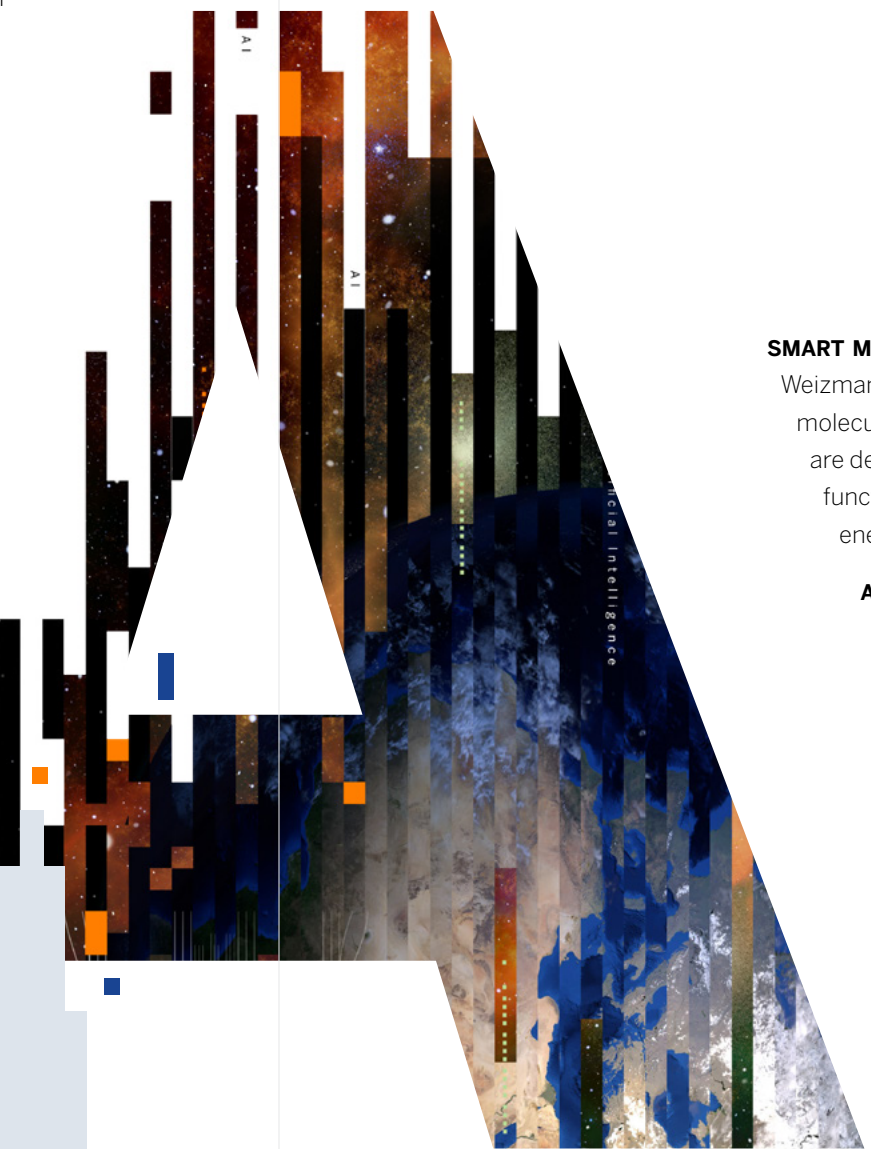
PREDICTING A SUSTAINABLE FUTURE

Sustainability science strives to address current needs without compromising future generations, while ensuring a balance between economic growth, human health, and environmental protection. Weizmann scientists are using AI to achieve exciting breakthroughs, including advances related to green industrial processes and the search for cost-effective, non-polluting sources of energy that can replace fossil fuels.

Cloud and Climate Mapping

Prof. Ilan Koren, Department of Earth and Planetary Sciences

Prof. Koren is developing an AI-powered approach to cloud analysis, called Cloud Tomography. Using medically inspired CT algorithms and a fleet of 10 shoebox-sized satellites, this inventive system captures 3D images of clouds and the distribution of water droplets within them. His new technology aims to enhance the accuracy of current climate models and help us better understand climate change.



SMART MATTER DESIGN

Weizmann scientists are using AI to probe the behavior of atoms, molecules, and crystals. Their work is revolutionizing how materials are designed, manufactured, and used, spurring the development of functional materials capable of solving critical problems in health care, energy generation and storage, and quantum computing.

A NETWORK OF THOUGHTS

AI is key to the design of diagnostic tools for brain-based diseases and drugs needed to fight everything from neurodegeneration to depression. Research augmented by AI is also expected to help generate insights about the cognitive, psychological, and emotional processes that make us who we are. Ultimately, AI-powered neuroscience will contribute to the development of “artificial general intelligence”—autonomous systems that can learn from and interact with their environments in a human-like manner.



Driving Science Forward for the Future of Humanity

At the Weizmann Institute, we frequently talk about changing the world through science. This is our moment to redefine how we can do that.

The dawn of AI presents the greatest opportunity since the industrial revolution to create the kind of seismic shift that can touch the lives of virtually everyone on the planet. Through AI Ignite, the Weizmann Institute takes its place as the global home for scientific pioneers and thought leaders, guiding humankind through this transformative point in history.

With your generous support, we can:

ACCELERATE AND BROADEN DISCOVERIES

Weizmann scientists will push the boundaries of knowledge and achieve breakthroughs across all scientific domains, leading to swifter and more impactful discoveries.

ELEVATE GLOBAL COMPETITIVENESS

Investing in AI research and infrastructure helps the Weizmann Institute grow as a world leader—drawing in top talent, becoming a more attractive partner for prestigious institutions, and bolstering Israel's position as a hub for progress and innovation.

SOLVE COMPLEX PROBLEMS

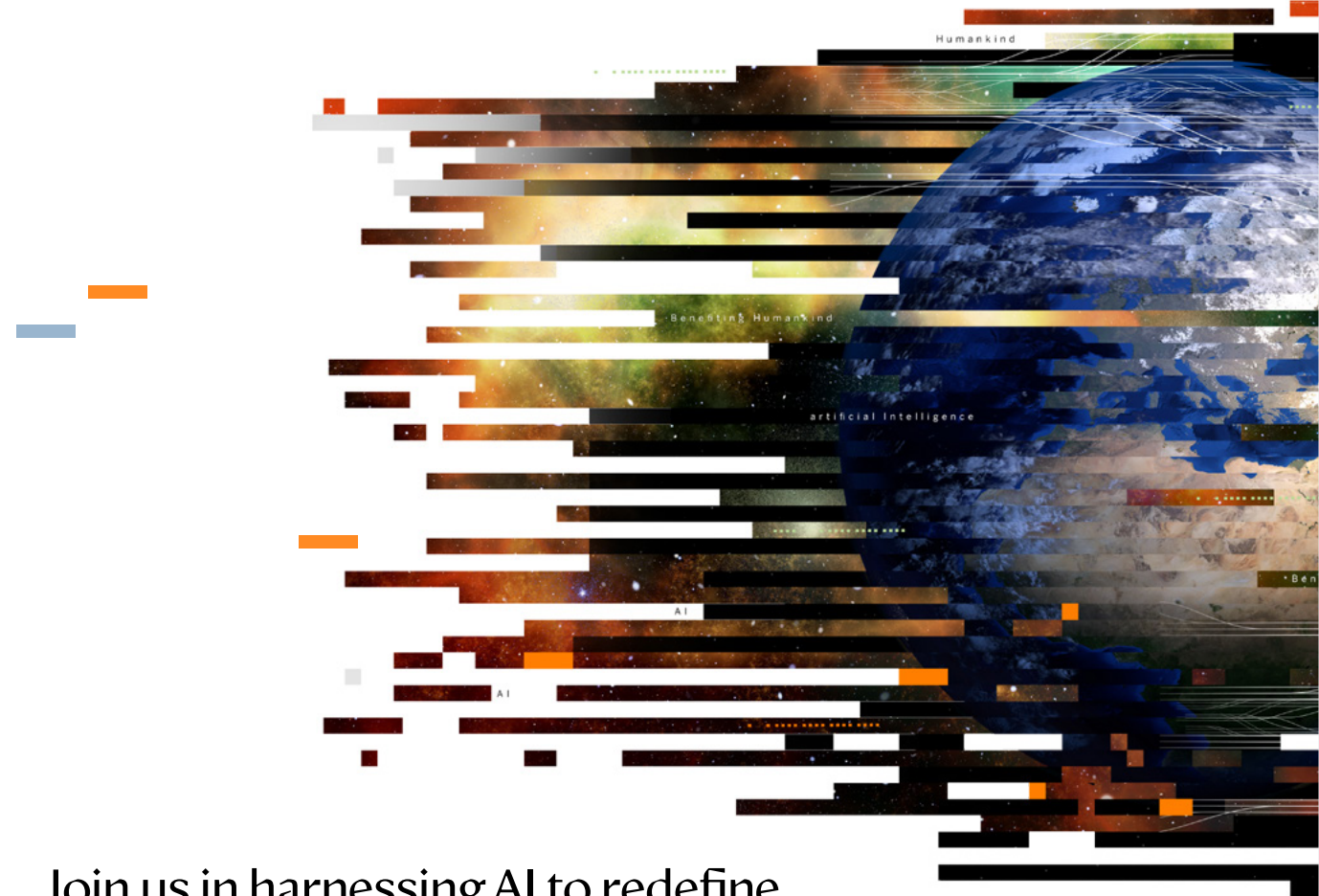
Tackling many of today's scientific challenges requires analyzing vast amounts of data. Weizmann's world-class AI program allows our scientists to solve problems faster and generate the kind of answers that broaden the horizons of human knowledge.

Turning Light into Energy

Dr. Sivan Refaely-Abramson,

Department of Molecular Chemistry and Materials Science

Dr. Refaely-Abramson has derived a new AI method to study how light interacts with crystals and analyze the behavior of quantum particles excited by light. This innovative approach helps her understand how the design of crystals affects their ability to capture light, which holds great promise in creating more efficient, eco-friendly energy sources, including solar energy.



Join us in harnessing AI to redefine
the boundaries of science
and build a bold, bright future for all.



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