

AUSSEN
WIRTSCHAFT
FORUM

MIT EUROPE CONFERENCE 2023

A CHANGING WORLD. HOW TECHNOLOGY TACKLES GLOBAL CHALLENGES.

Wednesday, March 29 – Thursday, March 30, 2023

ABSTRACTS KEYNOTES 29.03.2023

Venue: Wirtschaftskammer Österreich | Julius-Raab-Saal | Wiedner Hauptstraße 63, 1045 Vienna

Language: English

The past two and a half years have witnessed the rapid gathering of unexpected and unprecedented global forces—a world-wide pandemic, energy scarcity, climate change, sustainability issues, and geopolitical tensions are coalescing like weather fronts into a driving storm that is radically changing the world. With net zero, resilience, and technology the basis for growth and well-being, how are we writing a new narrative for reshaping the world to be a better one? We invite you to join MIT faculty members in a conversation about the future.

in co-operation with:



John Fernandez

**UNCERTAINTIES OF THE ANTHROPOCENE –
AND THE CERTAINTY OF SOCIETAL TRANSFORMATION**

Uncertainties of the Anthropocene – and the Certainty of Societal Transformation

Humanity's past actions and current behaviors have resulted in dramatic damage to people and nature, and pose huge risks for our planet's future. From declining fisheries to acute urban pollution to record-breaking global temperatures, the evidence of human impact on the environment continues to mount. Across the MIT community, scholars and students are working to understand, address, and reverse the negative effects of humanity's footprint on the Earth. Prof. Fernandez is the Director of MIT's Environmental Solutions Initiative which seeks to accelerate environmental solutions across three vital domains: Climate Science and Earth Systems, Cities and Infrastructure, and Sustainable Production and Consumption.

History has shown that effective solutions to challenging environmental problems nearly always depend on multiple disciplines. To advance a durable, sustainable relationship between humans and the environment, we require contributions not only from science, engineering, and technology, but also from the humanities, arts, economics, history, architecture, urban planning, management, policy, and more. MIT's exceptional strength in all of these areas is matched by our proficiency, born of long experience, in bridging them. Prof. Fernandez will highlight the many opportunities that are now arising from the enormous endeavor to secure a sustainable future through societal transformation.

Ariel Furst

BIO-INSPIRED MATERIALS FOR HUMAN AND ENVIRONMENTAL HEALTH

This talk will discuss novel, equitable technologies for improving human health, remediating environmental contamination, and circularizing the carbon economy. Global inequality is the highest in recent history, and disenfranchised groups are disproportionately burdened by pollution while receiving little benefit from the industrial infrastructure causing it. These inequities are exacerbated by limited access to healthcare resources, contributing to lower life expectancies and preventable deaths. The Furst lab seeks to address these inequalities by developing technologies that tackle the grand challenges of human health, environmental remediation, and sustainability. Specifically, the Furst Lab takes inspiration from Nature. Over four billion years of evolution, natural systems have acquired critical advantages that engineered systems have yet to replicate. By understanding fundamental biological processes, we can improve engineered environments.

in co-operation with:



Mircea Dinca

SEARCHING FOR MATERIALS THAT COLLECT AND STORE ENERGY

The Dincă Lab is focused on addressing research challenges related to the storage and consumption of energy and global environmental concerns.

Dincă develops new kinds of metal organic frameworks (MOFs), a type of material that has long been used for gas storage and separation. But MOFs also have promising and relatively unexplored electronic properties with applications to the storage and consumption of energy and global environmental concerns. The Dincă lab has spent the last five years focusing on the development of a new class of highly porous materials. If one were to unfold the internal surface area of one gram of the material, it would cover an entire football field. It has by far the largest surface area of any material known to humankind. Dincă said his work on water sorption in MOFs has led to the isolation of particularly tunable “sponges on steroids” that can produce fresh water by absorbing moisture from air.

The basic science that Dincă pursues lays the groundwork for technological advances that can address some of our society’s most challenging problems, and not just in ways that we can predict, such as improving solar technology, increasing crop yields, or extracting atmospheric water, but also in ways that we cannot yet imagine.

Fadel Adib

SENSING THE PHYSICAL WORLD IN UNPRECEDENT WAYS

This talk will cover a new generation of technologies that can sense, connect, and perceive the physical world in unprecedented ways. These technologies promise transformative impact on areas spanning climate change monitoring, ocean exploration, healthcare, food security, robotics, and even extraterrestrial exploration.

The talk will cover three core technologies invented by Prof. Adib and his team. The first is an ocean internet-of-things (IoT) that uses battery-free sensors for climate-change monitoring, marine life discovery, and seafood production (aquaculture). The second is a wireless sensing technology that can “see through walls” and monitor people’s vital signs (including their breathing and heart rate) without requiring any contact with the human body. The third is a physical intelligence platform that extracts new data from billions of already-deployed IoT devices to enable new applications in retail, robotics, and automation.

The talk will touch on the journey of these technologies from their inception at MIT to international collaborations and startups that aim to translate them to real-world impact in areas spanning healthcare, climate change, and supply chain.

in co-operation with:



AJ Perez
David Hardt

**PERMANENTLY AND SUSTAINABLY SOLVING HOMELESSNESS
USING RECYCLED CONSUMER PLASTICS
TO 3D PRINT ENVIRONMENTALLY FRIENDLY HOME STRUCTURES**

Amidst growing anxiety over pollution and global warming, the humanitarian issue of homelessness and the lack of adequate housing is a cause of rising concern. **The United Nations Human Settlements Program estimates 1.6 billion people around the world are living in inadequate housing and over 100 million people with no housing at all. Developing countries are particularly vulnerable**—in Africa alone, 60-70% of urban households live in slums. Latin America and the Caribbean, with the highest urban growth rates in the world are no exception. These numbers are particularly worrying as we now know that housing is a critical variable in human health.

Over 9 billion tons of plastic has been manufactured since the 1950s. Yet only 9% gets recycled, the rest accumulating in landfills, our oceans, and natural environment. Studies predict that if governments fail to address the plastic crisis, the yearly movement of plastic into the ocean will **triple by 2040**. By 2050, there will be **more plastic than fish in our seas**.

MIT doctoral candidate AJ Perez and Professor David Hardt argue that the technology exists to solve homelessness, permanently and sustainably, using recycled consumer plastics to 3D print environmentally friendly home structures.

in co-operation with:

