

FUTURE LAB 2023 - full listing of invited exhibitors - curator's summary

Introduction

The overall mission statement for Future Lab is to spotlight 'Technology for a Better World'.

Within this mission, Future Lab 2023 presents four themes; under each theme, a curated line-up of pioneering international companies, laboratories and pioneers is invited to represent and exhibit. Many exhibitor activations also include an element of STEM engagement; from fun facts and inspirational stories to full hands-on activities.

Theme 1: Beyond Earth, For Earth

Exploring some of the latest innovations in space transportation, research missions and 'space as a service' propositions; and looking at how investing in space exploration, research and technology development brings positive learnings and benefits back down to Earth. Co-curated by astronaut and space educator, Tim Peake.

James Webb Space Telescope (NASA)

US/UK

- presenting the JWST, NASA's largest and most powerful space telescope yet; explaining the technology involved, displaying some of the incredible photography captured so far, and exploring what the JWST findings are teaching us about the history of the universe, the birth of stars and the atmospheres of alien planets.

> webb.nasa.gov

Additional smaller feature on the imminent launch of Euclid, the ESA telescope departing July 2023 on a mission to explore the dark matter and dark energy of the universe.

> https://www.esa.int/Science_Exploration/Space_Science/Euclid

Argonaut Large Lunar Lander (ESA)

Pan-Europe

- following a FL2022 joint exhibit with NASA presenting the Artemis Missions, ESA returns to present Argonaut, its Large Lunar Lander. This multi-mission delivery craft is designed for versatility, enabling reliable delivery of supplies, equipment and infrastructure to anywhere on the lunar surface, to support astronauts exploring, working and living on the Moon.

> https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Exploration/Argonaut

The SMART Tire Company

US

- since 1967, NASA has been developing ground breaking Lunar and Mars rover tire technologies to avoid punctures on rugged terrain. Now, TSTC is commercialising this technology for terrestrial use. The revolutionary solutions are airless and durable; made from advanced material NiTiNo1+, a shape memory alloy that is elastic like rubber, yet strong like titanium.

> www.smarttirecompany.com

Gravilab Aerospace Services

UK

- transforming access to microgravity and space environments for scientific research and qualification purposes; including testing for future manufacturing processes in space. Through a 'Space as a Service' model they deliver up to 300 seconds of microgravity access, utilising either suborbital or unmanned aerial vehicle technology.

> <https://gravilab.space/>

SaxaVord Spaceport, with RM Technology

Shetland Islands

- this new northerly spaceport, with prime access to sun-synchronous polar orbits, is set to become the leading launch destination in Europe, and the first vertical-launch rocket site in the UK. Gaining its license in Summer 2023, it will be utilised by space companies to deploy satellites, supporting the booming commercial space research industries in Europe and beyond. The activation will include a prototype Spaceport Academy digital STEM experience by RM, leaders in technology provision for education, created in collaboration with SaxaVord.

> saxavord.com

> <https://www.rm.com/>

Theme 2: Powering the Future

Exploring solutions to power the future efficiently, cleanly and at speed; from new fuels and propulsion methods to meet the world's mobility requirements, to large-scale sustainable energy sources and powerful advances in computing to transform global industries.

UK Atomic Energy Authority, UKAEA

UK

- UKAEA oversees the UK's national fusion research programme and operates the record-breaking Joint European Torus (JET), Europe's flagship fusion energy experiment. This showcase explains recent breakthroughs, challenges and solutions, and future steps in the quest to generate abundant low carbon energy through innovation in fusion research and technology development.

> ccfe.ukaea.uk

IBM Quantum

UK

- welcome to the era of quantum utility, where industries are exploring the value that quantum computing can bring to clients, customers, and audiences worldwide. IBM presents the established IBM Quantum System One and the near-launch System Two, a pair of the most advanced quantum computers in the world.

> ibm.com/quantum

BAR Technologies

UK

- among many innovations, this cutting-edge marine engineering consultancy (born of Ben Ainslie Racing) presents WindWings, a radical solution for applying wind propulsion and route optimisation to meet the requirement to drastically reduce cargo ship emissions by 2050; vast wings are retrofitted to the deck, saving c19 tonnes of CO2 per day for fully equipped ships.

> www.bartechnologies.uk

Peak Evolution, by Terren Electric Drive Systems

Switzerland

- electromobility for the world's most extreme environments; emerging from a desire to build an electric multipurpose vehicle for municipal services, agriculture and the mining industry, the team's first fully solar-powered 4x4 truck will aim to beat the world record for the highest altitude ever reached with an e-vehicle (scaling the Ojos del Salado volcano in Chile, at 6,893m).

> peakevolution.ch

AutoNaut

UK

- wave-propelled and solar-powered USVs (Uncrewed Surface Vessel), custom-equipped for each specific client brief, and capable of months-long autonomous ocean missions. Providing ceansurface communication stations and supporting data gathering, weather forecasting, ocean waste tracking, non-intrusive wildlife monitoring, and other remits worldwide.

> www.autonautusv.com

NamX Group, with Pininfarina

France / Morocco

- pioneering mobility start-up presenting CapX Refuelling Solutions, an interchangeable hydrogen capsule system and supply network, to power a new era of automotive, with future application in freight, marine and aviation; and the NamX Automotive premium Hydrogen Utility Vehicle (HUV), integrating the capsule solution. Concept design by De Lussac Studio; HUV designed in collaboration with Pininfarina.

> namx-hydrogen.com

> pininfarina.it

Lilium, with eVolare

Germany / UK

- introducing a revolution in sustainable, high-speed regional air mobility, Lilium is developing the world's first electric Vertical Take-Off and Landing (eVTOL) premium jet; offering a zero operating emissions, low noise, private transport solution that will be faster than existing high-speed alternatives. The jet is being introduced to the UK by private aviation consultants eVolare (subsidiary of Volare Aviation) as the sole UK distributor.

> lilium.com

> volareaviation.gg

Theme 3 : Mobility on a Mission

Looking at how new mobility solutions can benefit industry, keep humans safe, protect the planet and enhance humanity's interactions and understanding through pioneering innovations which solve problems, navigate challenging situations and break new boundaries.

Indy Autonomous Challenge

US

- speeding the field of autonomous driving forward, the IAC is a series of competitions between university teams using AV-21s; full-scale autonomous racecars based on Dallara's Indy NXT series chassis, retrofitted with industry-leading hardware to enable automation. During IAC's participation this year the AV-21 will map the Hillclimb, to be ready for a competitive run in 2024.

> www.indyautonomouschallenge.com

Muddy Machines

UK

- a pioneering agricultural start-up that produces multi-tasking machines that can be equipped with a range of specialist tools to tackle farmers' toughest challenges, such as eliminating manual labour concerns related to high-precision field tasks. MM is using cutting-edge, fully-electric autonomous field robots to revolutionise farming, paving the way for net-zero agriculture.

> www.muddymachines.com

Skyports Drone Services

UK

- the world's leading uncrewed drone airline; elevating access, safety and efficiency through the provision of best-in-class drone operations across industries including maritime, healthcare, energy and infrastructure. This is the first public outing for Skyports Drone Services and its new fleet addition, the world's largest autonomous electric cargo drone, Pyka's Pelican Cargo.

> skyportsdroneservices.com / www.flypyka.com

Academy of Robotics

UK

- relieving staffing pressures and improving efficiency through automation. Introducing the Helper Bot, powered by a navigational 'brain' developed by the team for their Kar-go autonomous lastmile delivery vehicle system. The first bot, Milton, is in trials with a leading NHS hospital trust to deliver non-controlled medicines, assisting staff in easing the pressure on bed waiting times.

> www.academyofrobotics.co.uk

Roam

Kenya

- electric mobility company working to deliver low-cost, zero-emission solutions tailored to the large population in sub-Saharan Africa who primarily rely on public transport; including designing and manufacturing electric buses and electric motorcycles for the huge taxi-bike industry, as well as a robust charging infrastructure, and partnering on accessible credit plans for small traders.

> www.roam-electric.com

Climb-E by Italdesign

Italy

- a future modular mobility solution for urban settings and beyond; formed of private capsules which can be integrated into future buildings and coupled with a shared electric skid system for autonomous transportation. The capsules can also be configured for a 'service-to-customer' proposition, delivering mobile doctors surgeries, private dining or retail pods.

> <https://www.italdesign.it/project/italdesign-climb-e/>

EasyRain

Italy

- introducing the Digital Aquaplaning Information (DAI) software-based virtual sensor, which analyses in milliseconds a car's dynamics and recognises hazardous situations linked to wet and low grip surfaces; it deploys accident-prevention responses such as the Aquaplaning Intelligent Solution (AIS), changing road conditions via a controlled jet of water before the front wheels. Featured on the Climb-E.

> easyrain.it

Theme 4 : Simulated Worlds

Investigating how virtual platforms can benefit industry, culture, education and health through enhanced creative and production processes, digital twinning and collaborative platforms, immersive learning environments and haptic sensation in the virtual world.

Epic Games

US/UK

- unveiling of the first stage of a special lunar project being built using Unreal Editor for Fortnite (UEFN); demonstrating the potential of advanced 3D visualisation and virtual world-building to enable new ways to learn, collaborate, communicate stories and explore places we can never visit in real life. Including collaboration with ESA, another Future Lab guest exhibitor.

> www.epicgames.com

Valkyrie Industries

UK

- pioneering haptic technology which brings the sensation of weight and muscle resistance to virtual world experiences through integration of electrical muscle stimulation (EMS). The first commercial product is the EIR armband for fitness workouts, while future development will see full-body applications in medical rehabilitation and extreme environment/industry training.

> www.valkyrie-vr.com

Dimension Studio

UK

- a new age of entertainment and digital content creation has arrived; Mixed Reality and spatial computing will reimagine the physical world and transform traditional media, while advanced visualisation drives new possibilities in TV and film. This leading virtual production studio presents the latest technology for creating digital humans, utilising the MetaHumans platform.

> www.dimensionstudio.co

Visualskies

UK / Germany

- introducing the future potential of 'volumetric media' for production, education, experience and training applications; across the FOS week this leading international studio will use advanced photogrammetry and Lidar techniques to volumetrically capture the Hillclimb track and construct a full 3D model at an incredible level of detail.

> visualskies.com
