3D Pioneers Challenge
Pushing Boundaries
2022

3DPC 2023
Verticals

WHAT

... we design & make
Design- aesthetics, functionally, innovative

| MedTech | Design | FashionTech | Mobility | Architecture |

Small   Medium   Large

HOW

... we design & make
Technology & Processes

| Digital | Electronics | Machinery | Material |

WHY

... we design & make
... for a better world

| Sustainability |

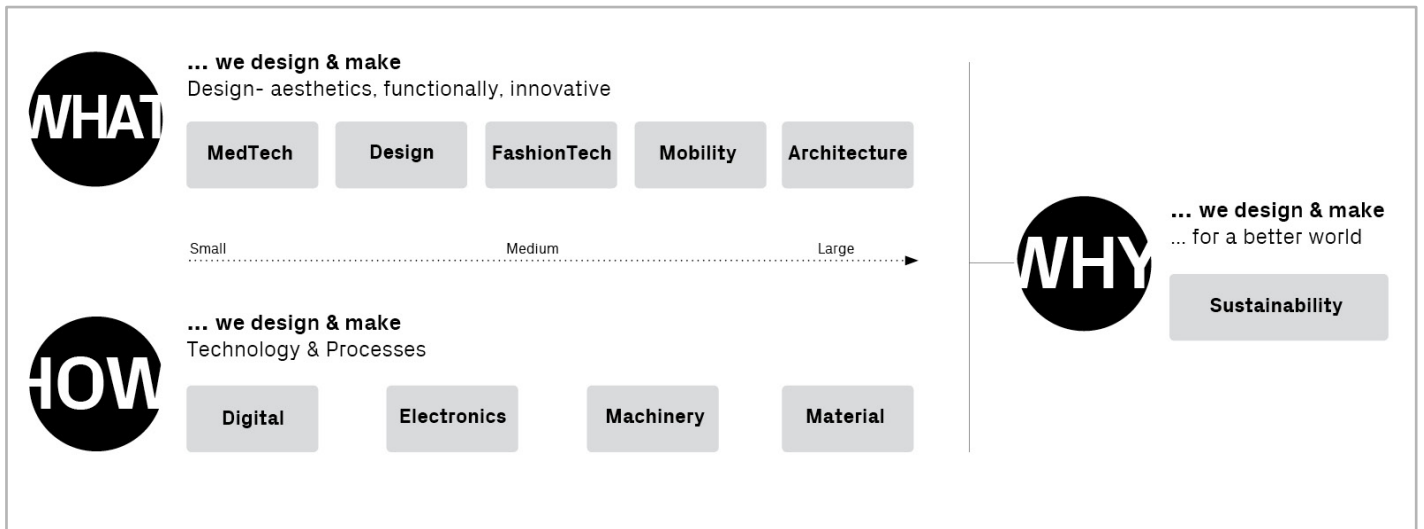# WHAT we design & make:

MedTech

How can Advanced Technologies improve the medical sector for the care of patients human or animal?

The spectrum in this vertical is deliberately broad and can encompass a diversity of entrants including (but not limited to): products like prosthesis, orthesis or implants to bio-printing and 4D medicine that changes through indicators, until clinical process support and educational improvements. The MedTech vertical showcases the advantages of where Advanced Technologies directly interfaces the human body. It is also open to the exploration of how MedTech can be advanced through multi-material printing, metal printing, and/or material gradients.

Design

How will the complete design-development process of products be disrupted by Advanced Technologies?

This vertical will highlight the complete design-development process. Designing a product needs to balance a series of competing goals including, aesthetics and functionality, but also usability, increasing performance of the product and a de-located manufacturing in regards to sustainability. Topics like circular economy and circular design are a basic movement and mega trend and need to keep in mind the social impact of what designers do. Rethink today's products and their processes and do create future products to complete the mission Advanced Technologies can offer. Exploration of how the design process is being disrupted through multi-material printing, metal printing, and/or material gradients is of particular interest. Furthermore, explorations of design that takes supply-chain and the concept of a material passport can be taken into account.

Mobility

Water - Land - Air ...and even in Space! Mobility moves people. New technologies are constantly entering the market of mobility and pushing forward boundaries. For example, e-mobility is increasing its performance. How will different areas of mobility be disrupted by advanced technologies?

This vertical will cover a wide spectrum related to all forms of mobility: from the upgraded performance of an engine to spare parts of a vehicle, to the last mile of transport, of persons and logistics. Furthermore, this category encourages ideas that push the entire concept of our current mobility options. Not to forget the question how vehicles will be able to interface with our environment through advanced technology systems.

FashionTech

The fusion of human and machine becomes tangible in the FashionTech sector. The merging of design, fashion and new technologies makes it possible to turn visions into reality by developing not only material innovations but also new production processes.

This vertical will cover a wide range of explorations – including inspiration from lifestyle and art which can influence applications such as workwear, personal safety wear (PSA) and wearables that support the interaction with belongings, comfort, safety, and surroundings.

Architecture

Advanced manufacturing technologies can affect architectural innovation at numerous scales! It can happen in every part and detail- from the interior to the facade, all the way up to the way digital construction is being imagined.

This vertical will highlight how some of the latest technologies, material innovations and tools like computational design or robotics are being used to disrupt the architectural design-build process, and how it can support topics like digital construction side.

HOW we design & make:

Digital

The digital world is now completely ubiquitous. The question is "how can we leverage it for topics related physical production"?

For example, additive technologies require digital data to give a product physical form. Extended Reality (XR = Virtual Reality, Augmented, and Mixed Reality) can help designers to understand or generate new designs and can open new forms of communication and collaboration with others and the designs. Some of today's products can even be generated from digital data and leverage data collected from simulations even before production starts. Specifically, algorithms and/or Artificial Intelligence can be used to support design-make workflows and push our products to the next level of optimization and efficiency. The 3DPC is seeking latest digital workflows, data-driven designs or latest improvements for example for digital storage to become physical again.
Explorations that focus on the "digital thread"/"digital twin" concept (data collected in the lifecycle of a design between design, make, and use – and how it will affect the improvement of a design) are of specific interest.

Electronics

There is an increasing duality of digital and physical representations of created objects that surround us. Embedded electronics are an underlying technology that is enabling and unlocking advances of this digital-physical duality.

This vertical is deliberately wide, covering a range of scales from the nano to the meta. Printed electronics are still at its first steps in industrial additive manufacturing but aims to be a key role for sustainable and future-minded electronics. Embedded electronics, pieces that include data or carry information, build the capacity for intelligence in objects. Material-innovations and latest applications seem to path their way to disrupt the electronic industry. Several trends can be stated - "proof-of-concept"-projects in thermal management will lead to additive manufactured serial products; as well as developments of hybrid machines that will enable multi-tool and multi-material production that focus totally new electronic products. Future-minded electronics of course always are related to sustainable production and recycling processes.

Machinery

Additive Technologies have become a powerful column that comprises advanced manufacturing technologies. The question now is "How to implement them wisely"?

How can developments in new machinery be done so that they are not a stand-alone-product but implemented wisely into production processes? Related to this vertical are production lines that focus the technology itself, but further software processes, post processing and logistics of custom services. How can additive technologies support already established manufacturing processes? And finally, this vertical encourages innovations that think beyond the existing techniques, and explore the development of new machines, including robotics and make concepts for future factories.

Materials

The development of materials is a basic column and promises to be a main driver for innovations in Advanced Technologies.

The use of well-known industrial materials is just as much a part of this as the development of new alloys/matrices/processes or the processing of meta-, nano- or biomaterials. The competition is also looking for applications that are improved by the specific use of materials. Where do material developments open up new opportunities? Do the new material developments meet current regulations and standards, or do new standards perhaps even have to be written for these innovations so that they can find their way into industrial use? Especially in this category, a look at sustainability is of great added value.

Sustainability

This overarching category addresses the aspects of enabling "A Better World". Always with the view to sustainability which can be perceived as a multilayered megatrend that includes the ecological, economical and social significance of our actions. Key-topics like climate change, energy demand and nutrition are faced with a demand of innovations in Clean tech, Circular Economy, Zero Waste or Agriculture amongst others. In terms of a responsible manufacturing, topics like rethinking production, product cycles, upcycling, recycling, materiality, marketing concepts and many more focus subjects do apply. As an essential point to allow sustainability, the demand of technical innovations is a must.

Advanced Technologies do have the power to enable solutions to this challenge and to drive a future-proof responsible manufacturing. The 3D Pioneers Challenge wants to promote those sustainable technologies, projects, concepts, products and business models to give a stage to share them with the established manufacturing industry, with partners, stakeholders, governments and to help for nothing less than enabling "A better World" together.
Advanced technologies can play a key role – be a pioneer - use them, implement them wisely and communicate your projects.