

Faculty of Mechanical Engineering TUL presented itself at Invent Arena 2024

A porous glass plasticine for use in fashion or design, a mobile device that produces nano- and microfibres anywhere, and an autonomous utility vehicle for transporting cargo under challenging conditions. These are the three patents and innovations from the Technical University of Liberec that won two gold medals and one silver medal at the just-concluded Invent Arena 2024, a competitive trade fair for technological news and innovations in Třinec. More than 50 exhibitors took part in the event.

Nano- and microfibres can now be produced anywhere

You can now make nano- or microfibres anywhere and cover virtually anything with them. From tree leaves to food or surgical instruments to prevent access to microbes. This revolutionary technique of formation of fibres from polymers by the effect of centrifugal forces is made possible by a new mobile device, which is the result of a collaboration between researchers and students from [the Department of Nonwovens and Nanofibrous Materials](#) of the Faculty of Textiles of TUL and [the Department of Textiles Machine Design](#) of the Faculty of Mechanical Engineering of TUL. The Department of Mechatronics and Technical Informatics of the Faculty of Mechatronics, Informatics and Interdisciplinary Studies of TUL also participated in the design of the equipment.

The device has significant potential for application in the medical, filtration, and food industries and is currently in the final stages of development. It impressed the judges of this year's Invent Arena, who awarded it a gold medal. "It is one of the world's first mobile nano- and microfibre production devices. It's also revolutionary in that it can cover planar structures in 3D anywhere you need it. It also has the advantage that high voltages are not required for spinning and different types of solutions can be spun compared to electrospinning," says Martin Bílek, Head of the Department of Textile Machine Design.

Glass ceramic foam serves design and hydroponics

[The Porous Glass Plasticine material \(PGP\)](#), or porous glass ceramic foam, was developed by scientists at the Department of Glass Machinery and Robotics of the Faculty of Mechanical Engineering of TUL and has an extensive range of applications. The material can be used as interior design walls that let in soft light and dampen noise, it can be used to make perfumed jewellery, and it can also be used as part of filtration devices. PGP also won a gold medal at Invent Arena. It is also the first patent to give rise to a university spin-off company. It will help to put the invention into practice.

Scientists are now focusing mainly on hydroponics, where glass plasticine can serve as a solid substrate for growing plants and also fragrant interior accessories. One of the new material's properties is that it can release fragrance over a long period of time.

Glass ceramic foam is made from conventional raw materials just like glass. Its production is no more costly than glass production. The mixture is mixed and shaped at low temperatures, then sintered at around 1200-1400 °C temperatures. During sintering, gases are produced, which preserve the porosity of the resulting mixture.

Self-steering platform

The silver medal at the Invent Arena 2024 was awarded to a self-driving utility vehicle for transporting cargo in difficult conditions. The platform was created within the ANTeTUL project and is the result of cooperation between the interfaculty team of the Technical University of Liberec.

The autonomous modular platform, developed over four and a half years by an interdisciplinary university team of sixty experts from the Technical University of Liberec, can avoid obstacles and optimise the planned route according to the current situation thanks to its own "thinking". The vehicle is equipped with a unique vision enabled by augmented reality equipment. The European Commission selected ANTeTUL electric mobility as a finalist in the prestigious "Regiostars 2023" competition, recognising the best projects supported by European funds.

At the Invent Arena, scientists presented a small Generation 0 platform. It attracted a lot of attention from visitors. "At TUL, we achieve excellent results in many respects, which have the potential to appeal to young people as well. This was demonstrated at the Invent Arena, where AnteTUL also attracted the attention of students and young children. Our long-term goal is to do cutting-edge research that will inspire young people. It's a natural way to get them interested in technology and to one day apply to technical fields. The Czech Republic needs a technically educated young generation very badly," adds Associate Professor [Michal Petrů](#), head of the Department of Machine Parts and Mechanisms.