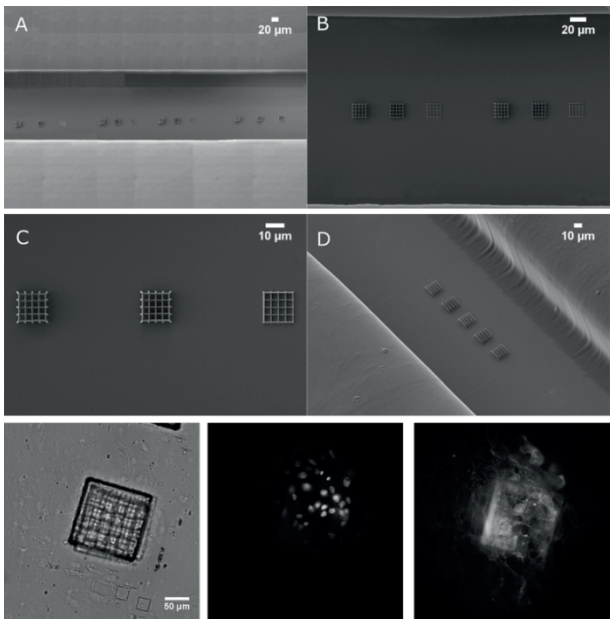
TIMed CENTER
Technological
Innovation in Medicine

TIMED CENTER CORE FACILITIES

# MEDICAL 3D-NANOLITHOGRAPHY FOR ADDITIVE MANUFACTURING




## Functions

- Micro- or nanoscopic structuring
- Research in the field of biomolecular bio sensor technology (microfluidics, micro-fluidic channels)
- 3D-lithography which allows the real time-visualization of biomolecules, interactions and dynamics

## Services

- 2D- and 3D-rapid prototyping of micro- and nano-structures
- Prototyping of microfluidics
- Cell growth on biocompatible polymers (application field: bioassays)
- Modification of surfaces
- Protoyping: 3D-cell cultures and bio-chips

The latest trends in bio technology show that there is an increasing demand for systems in personalized medicine. As the market for in-vitro-diagnostics is growing, research activities in the fields of **tissue engineering** and **organ printing** need to be intensified.

All devices are getting smaller, especially in medicine. The predominating reason for this development is the saving of resources: With miniaturization, the amount of sample material taken from patients for analysis purposes can be reduced. The same is true for the material that is used to produce these devices. To produce biomedical devices of a smaller size in the future, new resources are necessary.

The studies of the research group at the *FH Upper Austria, Linz Campus* focus on the **design of bio-compatible 3D-structures** that consist of **chemically functional polymers**. They carry proteins to imitate tissue environment or contribute to molecular bio sensor technology (microfluidic channels).

The methods of choice used to reach the research goal are **multiphotone lithography** and **UV-lithography**. Both technologies allow the production of 3D-structures at a **microscopic, even at a nanoscopic scale**. Moreover, the scientists are involved in the further development of these technologies.

The portfolio of accessible and biocompatible polymers used in 3D-lithography is steadily increasing. New polymers carry functional groups and allow the selective binding of diverse proteins. To characterize the samples, advanced imaging procedures are used, for example atomic force microscopy (AFM) and high-resolution fluorescence microscopy (localization microscopy, STED).

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