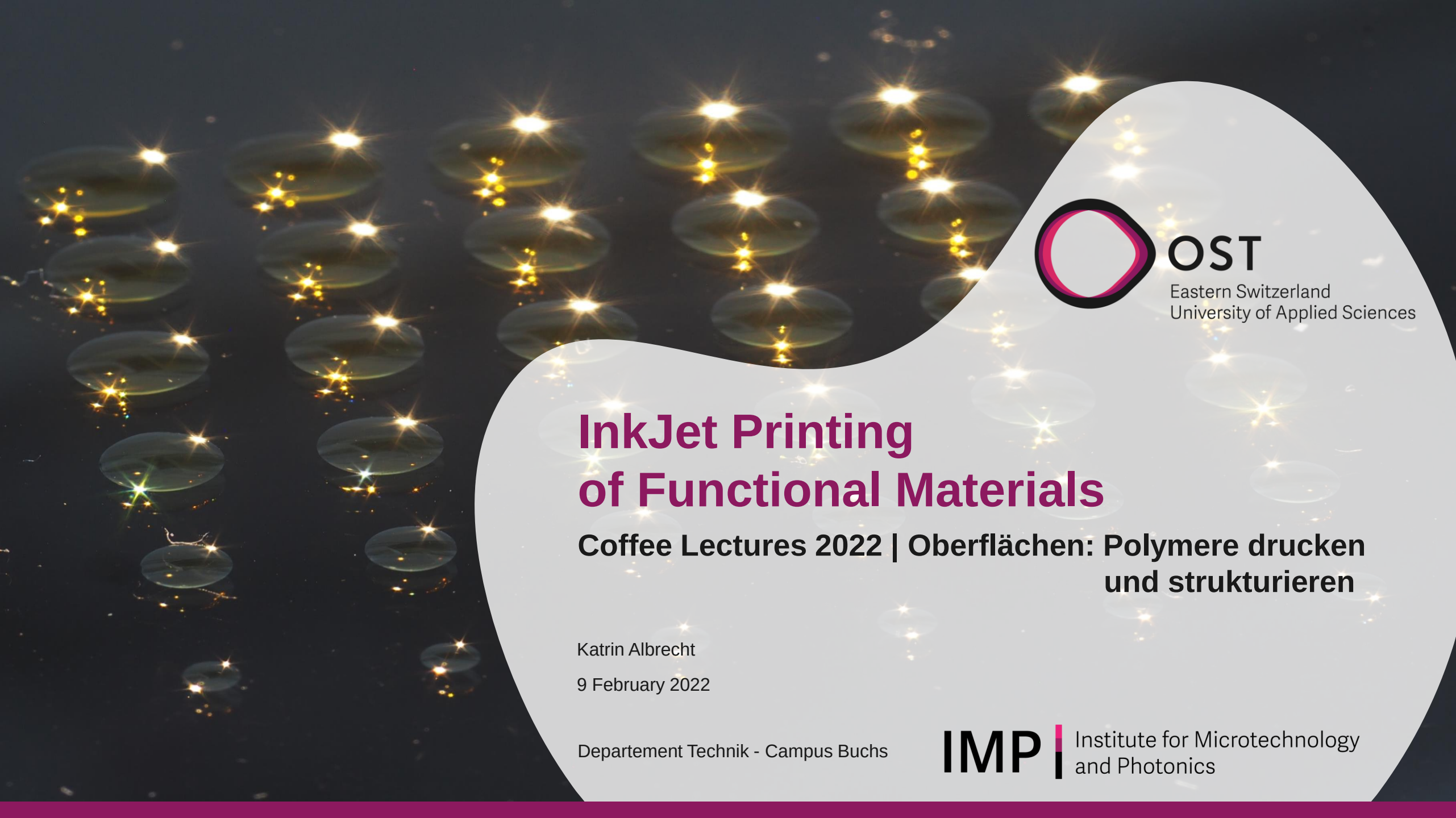


OST
Eastern Switzerland
University of Applied Sciences

InkJet Printing of Functional Materials

Coffee Lectures 2022 | Oberflächen: Polymere drucken und strukturieren

Katrin Albrecht

9 February 2022

Departement Technik - Campus Buchs

IMP | Institute for Microtechnology and Photonics

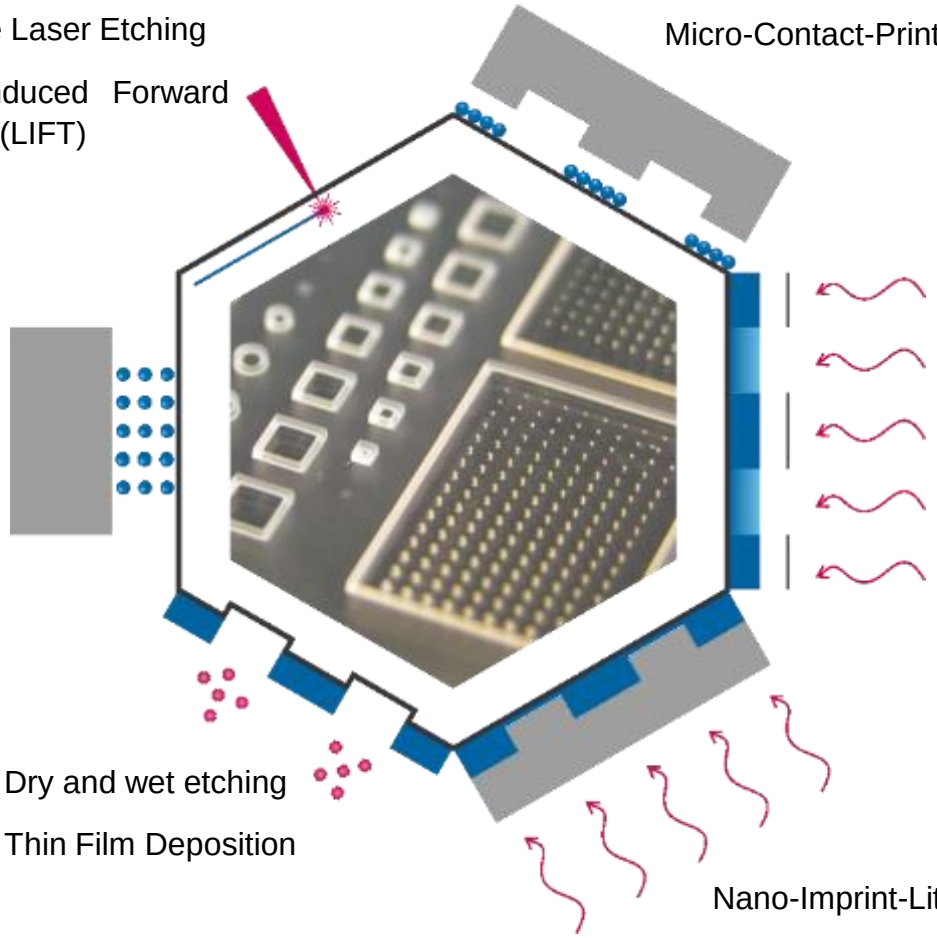
Additive Subtractive Advanced Precision Patterning

Laserablation

Selective Laser Etching

Laser Induced Forward Transfer (LIFT)

Micro-Contact-Printing (µCP)



InkJet Printing (2D, 2½D, 3D)

Precision Dispensing

Photolithography

Dry and wet etching

Thin Film Deposition

Nano-Imprint-Lithography (NIL)

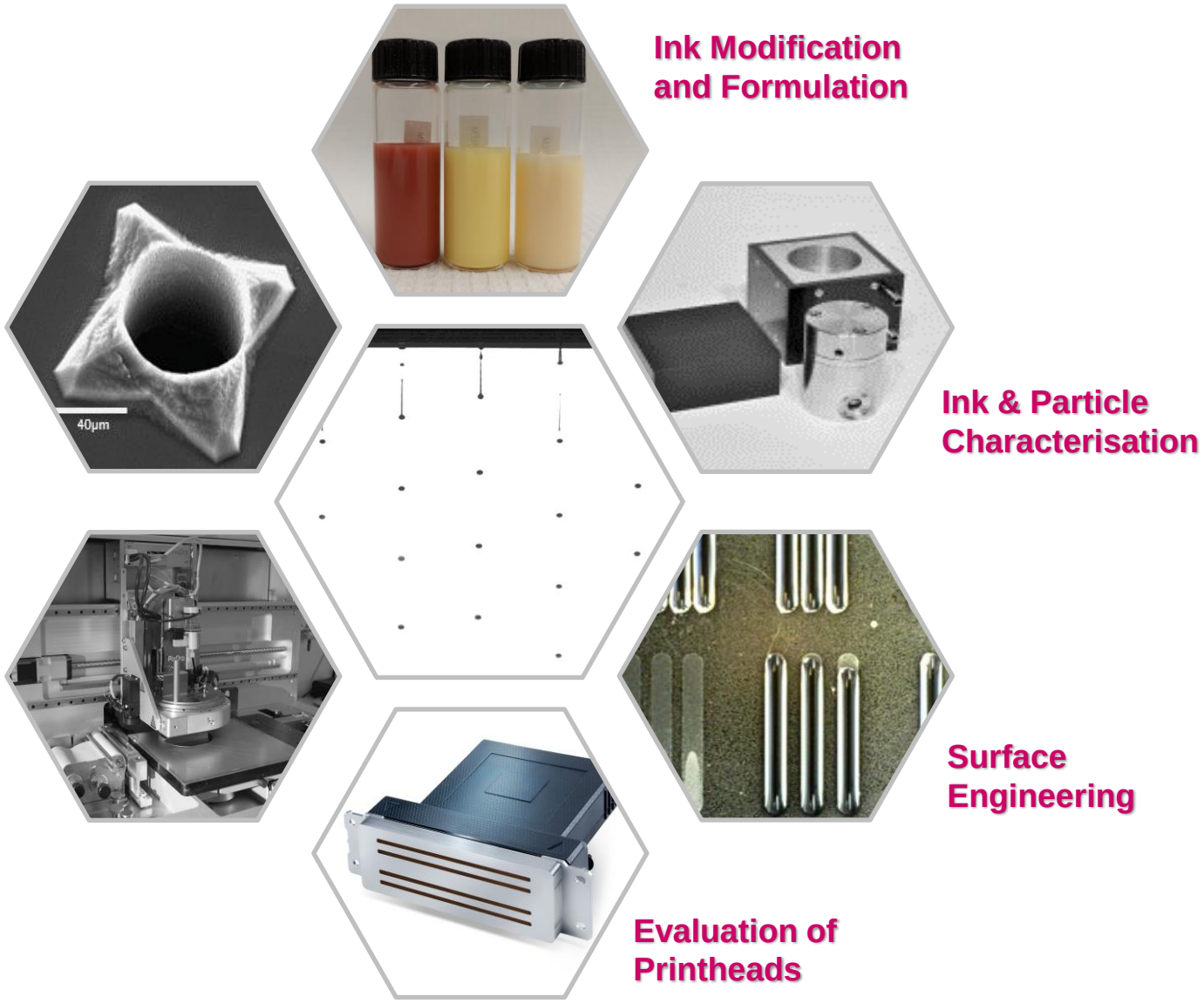
Analytics

- Scanning Electron Microscope
- Surface Topography: WLI, AFM
- Light Microscopes
- X-ray Diffraction
- Contact Angle Measurements
- Electrical and Thermal Conductivity
- DSC, TGA, Infrared Spectroscopy
- Viscosimetry
- **TriPAV - high frequency rheometer**
- **TriMaster - filament stretching rheometer**

Focus

Transfer to production

Topics at IMP



Holistic printing process development (2D-3D)

1 Customer request

2 Ink formulation & characterisation

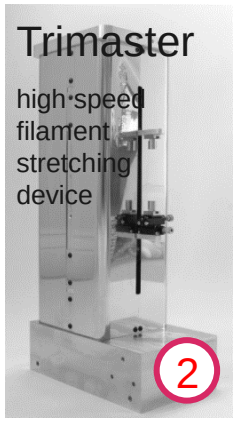
3 Jetting tests

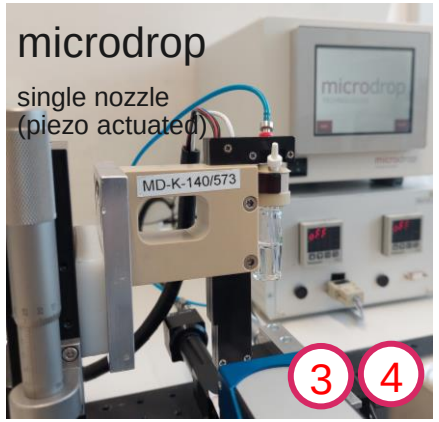
4 Printing tests

5 Characterisation ink / substrate interaction

6 Customised specific characterisation

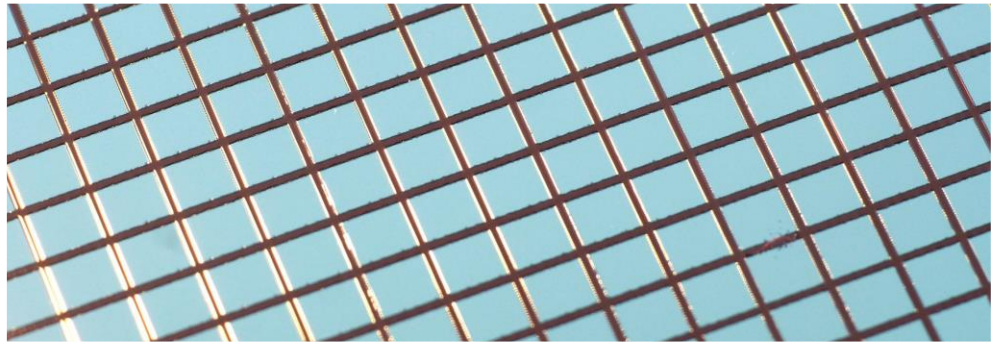
7 Final goal realized



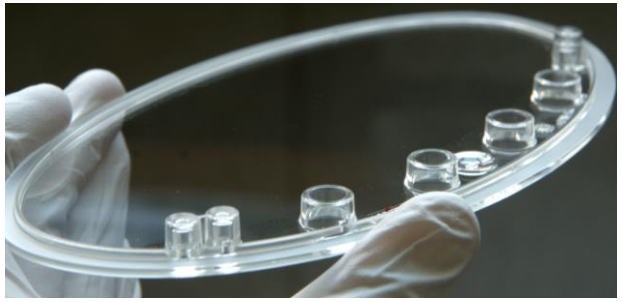


Patterning surfaces & structuring materials

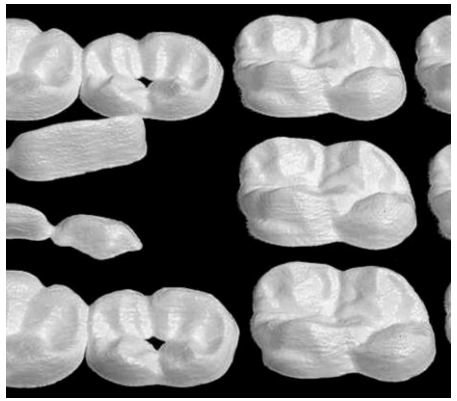
Printing of Photoresists

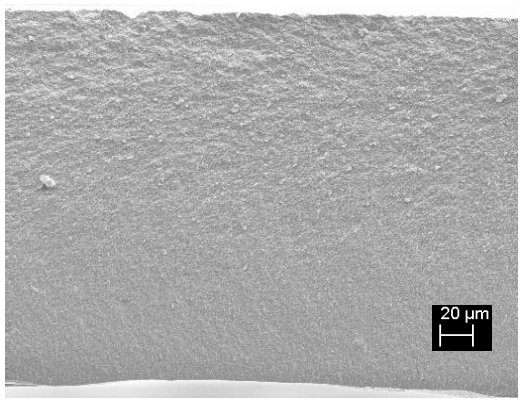


Printing of anti-fog and anti-scratch resistant coating onto 3D substrates

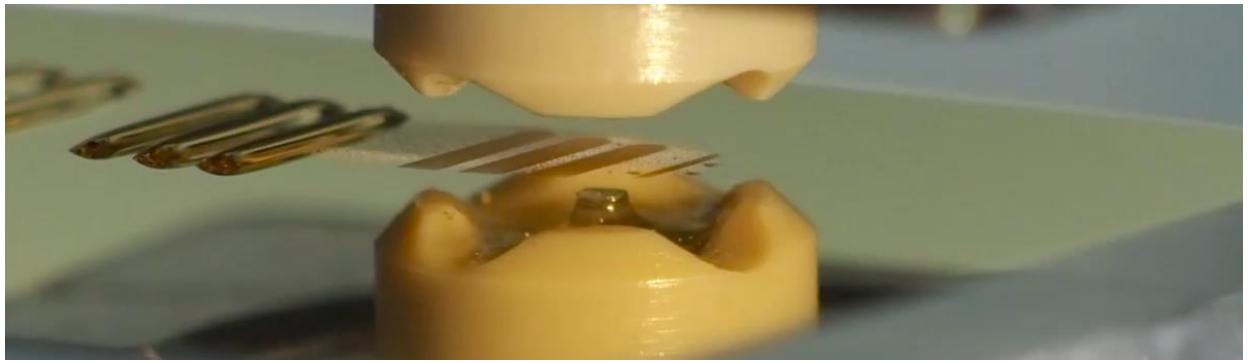


Printing of ceramic slurries for generating 3D printed parts



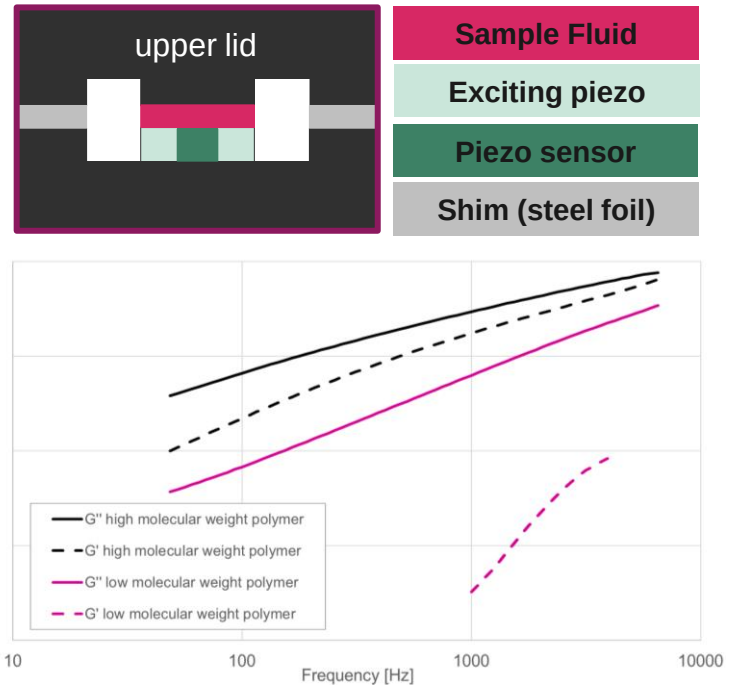


Combining various printing technologies



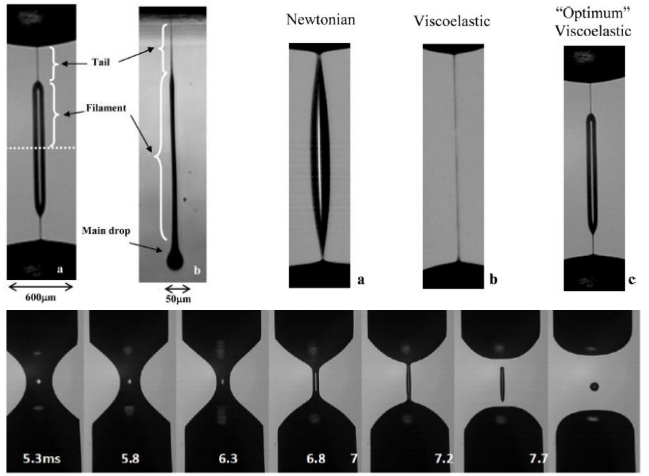
Rheological Characterisation Techniques at IMP

TriPAV (High Frequency Rheometer)



- Complex rheology analysis (oscillatory, sinus signal): Studying jet-ability of inks
- TriPAV printhead mode - standard square waveform: Characterisation of ink damping behaviour

TriMaster (Filament Stretch Rheometer)



- TriMaster is a capillary breakup extensional rheometer to measure the extensional and filament stretching behaviour of complex fluids – colloids, polymer solutions, paints inks, food, consumer products and melts.
- The Trimaster investigate the elongation properties of viscoelastic fluids by stretching a small amount of fluid attached between two identical pistons.

Reference source: Vadillo, D.C. Evaluation of the inkjet fluid's performance using the "Cambridge Trimaster" filament stretch and break-up device. The Society of Rheology, Inc. J. Rheol. 54(2), 261-282, 2010.

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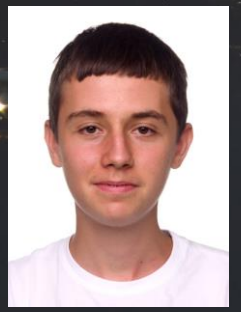
Prof. Dr. Tobias Lamprecht
tobias.lamprecht@ost.ch

Katrin Albrecht, MSc
katrin.albrecht@ost.ch

Jakob Birkhölzer, Dipl. Phys.
jakob.birkhoelzer@ost.ch



Marco Hölzle
marco.hoelzle@ost.ch

Dr. Arno Maurer
arno.maurer@ost.ch