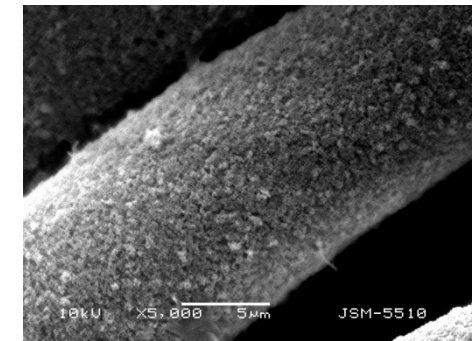


Research Team name: **UT-EFSM**  
Presenter name: **Victoria Dutschk**

Inkjet printed conductive lines

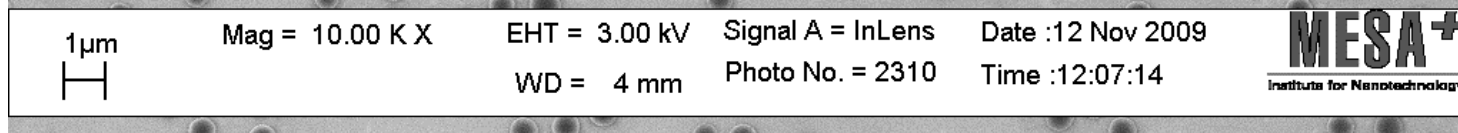
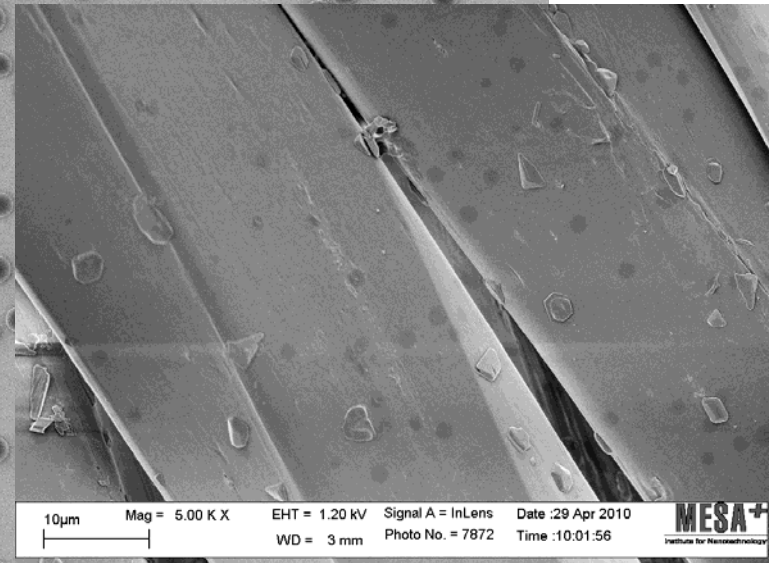


TiO<sub>2</sub> nanoparticles on PES fibre

Team Presentation – Annual Workshop, COST Action MP1106  
Dublin, September, 2012

**Research Team Name: UT-EFSM**  
**Number of team members: 9**

**1 associate professor**  
**1 post doc**  
**1 technical assistant**  
**2 PhD students**  
**2 undergraduate students**  
**2 undergraduate exchange students**



Research interests related to **MP1106**:

- Developing of inks, containing dyes and nanoparticles with some new functionalities for textile materials
- Inkjet printing as a process, i.e.
  - drop-substrate interactions
  - inks properties: colloidal stability, adjustment of surface tension and rheological properties
- Organic electronics for smart textiles
  - electro-active polymers for e.g. artificial muscles
  - electrical conductive polymers for printable organic electronics
- Development of optical methods for screening textiles materials with antibacterial/antimicrobial treatment, inclusive probiotics
- Microgel for polymeric textile and foils treatment: pH and thermo-responsiveness

## Basic facilities, equipment, devices:

- Drop and bubble shape tensiometer PAT, including double capillary method (Sinterface, Germany)
- Tensiometer (DataPhysics, Germany)
- UV-Vis spectrophotometer (Varian) with temperature controller for liquids and solid surfaces for reflectance spectroscopy
- Contact angle measuring device OCA 40 Micro (DataPhysics, Germany); high speed camera up to 1000 images/s and pico-liter droplets in volume (micrometer sized) also suitable for measuring on a single fibre
- Inkjet printer with 1 nozzle and high-speed video camera
- Apparatus with a high pressure cell to studies with CO<sub>2</sub> in liquid and supercritical states



#1 project:



Title: **Wash&Load**

Duration: 3 years, running

Funding organization: **EC**

People involved and their function: 15 partners, incl. PhD

Facilities/equipment: equipment by all of the partners

Most interesting results: developing of re-loadable liquid systems for textile materials during industrial laundering with 3 functionalities  
soil repellency; flame retardancy, antibacterial properties

#2 project:

Title: **DIGITEX**

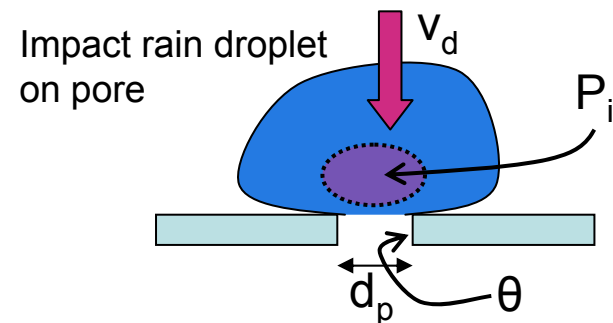
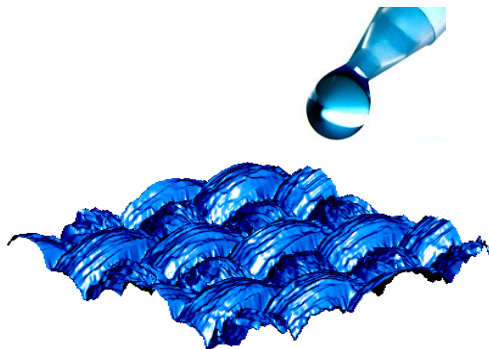
Duration: 4 years, finished

Funding organization: **EC**

People involved and their function: PhD, postdocs

Facilities/equipment: industrial inkjet printer (Xennia, Tencate)

Most interesting results: Developing slow- and controlled-release systems by digital finishing technology based on host-guest systems on cotton and cyclodextrins



#3 project:

Title: **Dry-cleaning of textiles using liquid CO<sub>2</sub>**

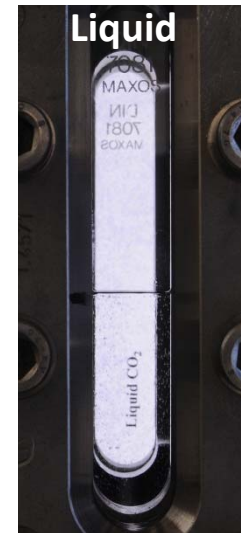
Duration: 4 years, running

Funding organization: **STW** (national agency)

People involved and their function: 3 Universities,  
incl. PhD

Facilities/equipment: high pressure cell for CO<sub>2</sub> in  
liquid and supercritical state

Most interesting results: new surfactant  
formulations for dry-cleaning using liquid CO<sub>2</sub>



#4 project:

**Title: Implementing moisture management properties to artificial grass**

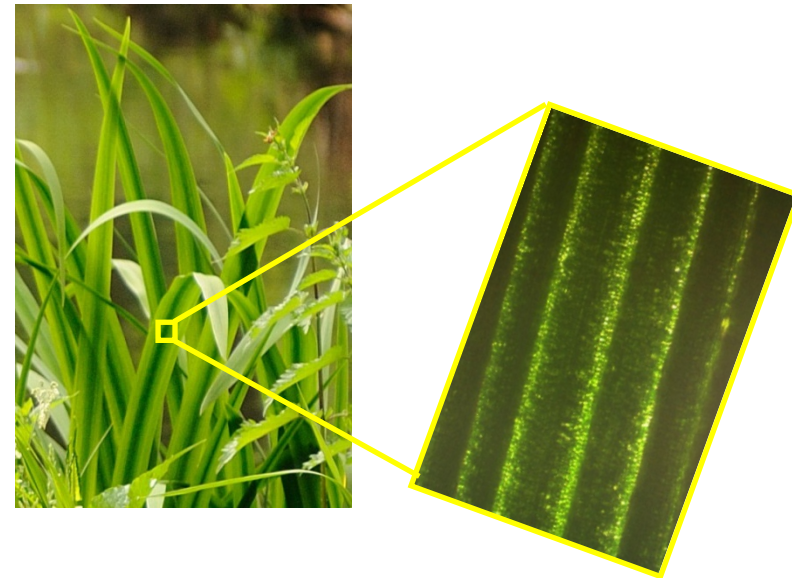
Duration: since 2011, running

Funding organization: **TENCATE** (industry)

People involved and their function:

Facilities/equipment: available in the laboratory

Most interesting results: a feasibility study to hydrophilize artificial grass by microgel technique





#5 project:

**Title: Improving detergency by adding Soil Release Polymers in laundry detergent composition**

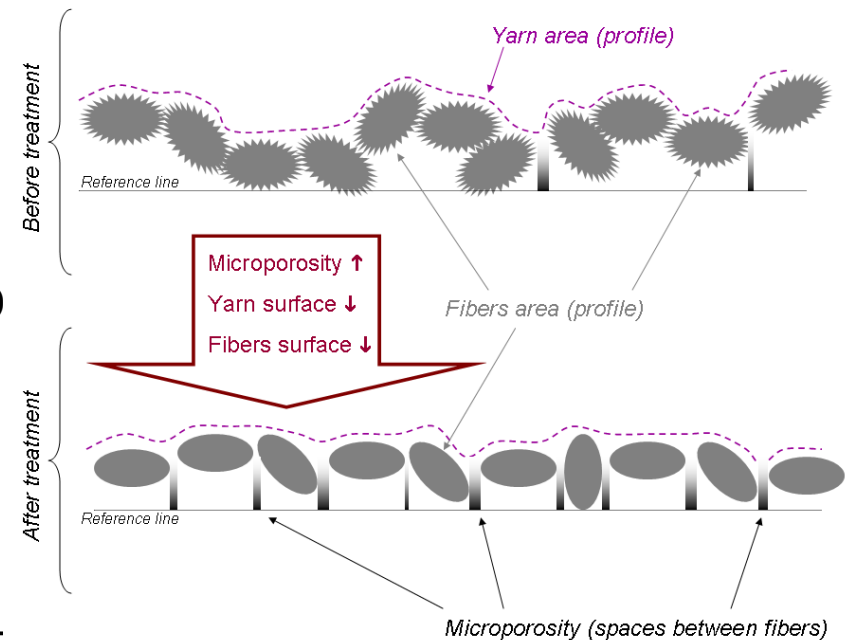
Duration: 4 years, finished

Funding organization: **P&G** (industry)

People involved and their function: PhD technician

Facilities/equipment: confocal microscopy, different wetting devices, SEM, AFM

Most interesting results: improving detergency by synergetic effects of SRF and enzymes; bio-polishing effect on cotton



#6 project:

Title: **Basic investigations of wetting kinetics of aqueous surfactant solutions on solid surfaces aimed to developing a screening method**

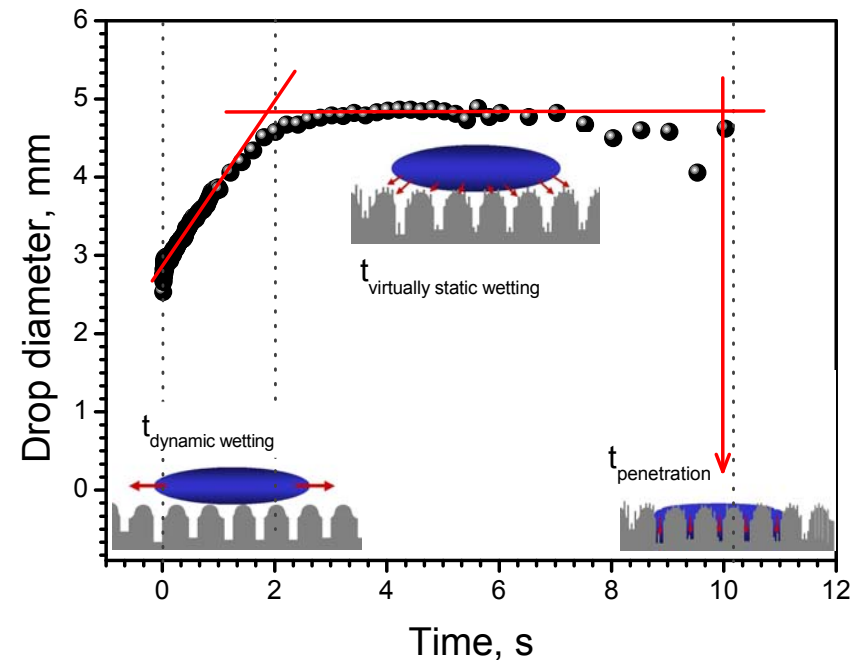
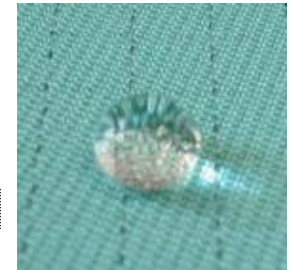
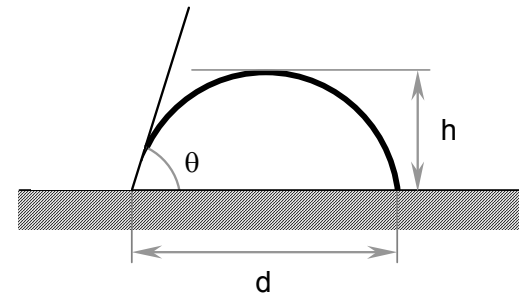
Duration: 9 years, finished

Funding organization: **SASOL**  
(industry)

People involved and their function:  
me, habilitation

Facilities/equipment: confocal microscopy, different wetting devices, SEM, AFM, FTIR, mechanical testing

Most interesting results: new insights into wetting dynamics



## #1 Topic

### Title: **NANO-INK**

Development of inks containing nanoparticles and dyeing pigments for inkjet printing to functionalize textile materials

Promotion images & text: company interested in **STORCK PRINTS, TANATEX, XENNIA-TENCATE (NL), SASOL (DE)**

Duration: 4 years

Expertise required: fluid dynamics, stabilization agents, modification of nanoparticles to be irreversibly attached to textile surfaces, surface rheology

Facilities/equipment required:

## #2 Topic

Title: **ORG-SMART**

Developing organic electronics technologies for future textile applications

Promotion images & text: interfaces, efficiency, stability, processability problems

Company interested in: **STROCK PRINTS, TENCATE, TANATEX (NL)**

Duration:

Expertise required: synthesis of organic electronics,

Facilities/equipment required:

### #3 Topic

Title: **ART-MUSCLES**

Developing artificial muscles to be embedded into textile materials

Promotion images & text: different NL companies interested in

Duration:

Expertise required: synthesis and characterization of electro-active polymers

Facilities/equipment required:

Joint activities of COST Actions **MP1106** and **MP1105**

Training School?



Sustainable flame retardancy for textiles and related materials based on nanoparticles substituting conventional chemicals

Thank you for your attention