

**Main topic (for Opening Lecture and Industrial Workshop):
“MEMS in our daily life”**

1 Plasma and ion surface engineering

- **Plasma and ion source technologies**
 - New ion and plasma sources
 - Pulsed plasmas including HiPIMS
 - Industrial source technology
- **Plasmas in liquids**
- **Atmospheric plasmas**
 - Arcjet and torch plasmas
 - Atmospheric corona discharges
- **Particles and powders in plasmas**
 - Particle load control and avoidance
 - Nanoparticle synthesis
 - Particle treatment and functional nanoparticles
- **Properties of technological plasmas**
 - Plasma diagnostics and related process control
 - Plasma modelling

2 Surface modification technologies

- **Plasma treatment, cleaning and etching**
 - Principles of plasma surface interaction
 - Surface cleaning and functionalization by plasma and radiation (UV, Laser)
 - Effects on adhesion and bonding
 - Plasma etching, pattern transfer and related effects
- **Physical vapor deposition - PVD**
 - Magnetron sputter deposition
 - Vacuum arc deposition
 - Plasma-activated evaporation
- **(Plasma-enhanced) Chemical vapor deposition – (PE)CVD**
 - Low pressure and atmospheric plasma CVD
 - Plasma polymerization
 - Atomic layer deposition ALD
- **Other plasma based surface processing technologies**
 - Ion beam deposition and ion beam etching
 - Ion and plasma immersion implantation
 - Hybrid processes

3 Coating applications and properties

- **Protective and tribological coatings**
 - Effects on standard tribological coatings
 - Carbon based hard coatings
 - Corrosion resistant coatings
 - Large area scratch resistant coatings
 - Barrier coatings for sensitive devices

- **Optical coatings**
 - Optical multilayer coatings
 - Interface and barrier engineering
 - End point detection methods
- **Electrical and magnetic coatings**
 - Electrical contact coatings including conductive and photocatalytic oxides
 - Sensors based on electrical effects
 - Electrochrome coatings
 - Magnetic coatings including magnetic multilayers
 - Piezoelectric films for frequency filters and ultrasonic applications
 - Structuring of electrical and magnetic coatings and related effects
- **Biomedical & biological applications**
 - Agriculture
 - Biocompatible and biodegradable coatings
 - Biofunctionalization of surfaces
 - Plasma activated media
 - Plasmamedicine
- **Energy production related coatings**
 - Coatings for photovoltaics and new cell concepts
 - Piezoelectric and thermoelectric films for energy harvesting
 - Films for batteries and supercapacitors
 - Coatings for fuel cell applications

4 Characterization and simulation of films and processes

- **Simulation and modelling of growth, structure and properties**
- **Analytics of film structures**
 - Chemical and crystal composition
 - Geometrical and mechanical characterization (thickness, roughness, stress)
 - Optical properties
 - Electric and magnetic properties
- **Methods of in-situ process diagnostics**
 - In-situ control and adjustment of film properties
 - Process end-point detection