

We innovate Materials

microelectronic test methods

Non-destructive Analytics

Destructive Physical Analysis

Thermal Management

Environmental Simulation Laboratory

Thin Film Analysis

Raman Characterization

Electronic Laboratory

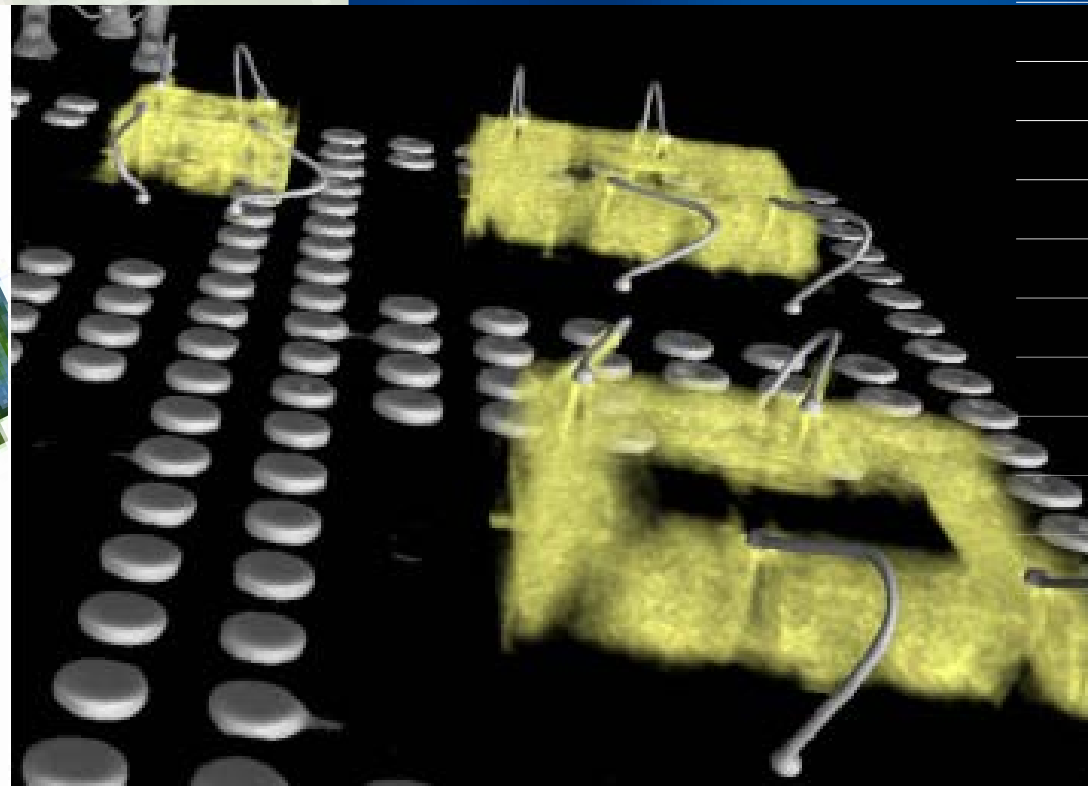
Phase, Morphology and Residual Stress Analysis

Seminars @ MCL



COMPETENCE & RELIABILITY

Non-destructive Analytics



Non-destructive quality assurance and failure analysis for microelectronic devices

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Contact

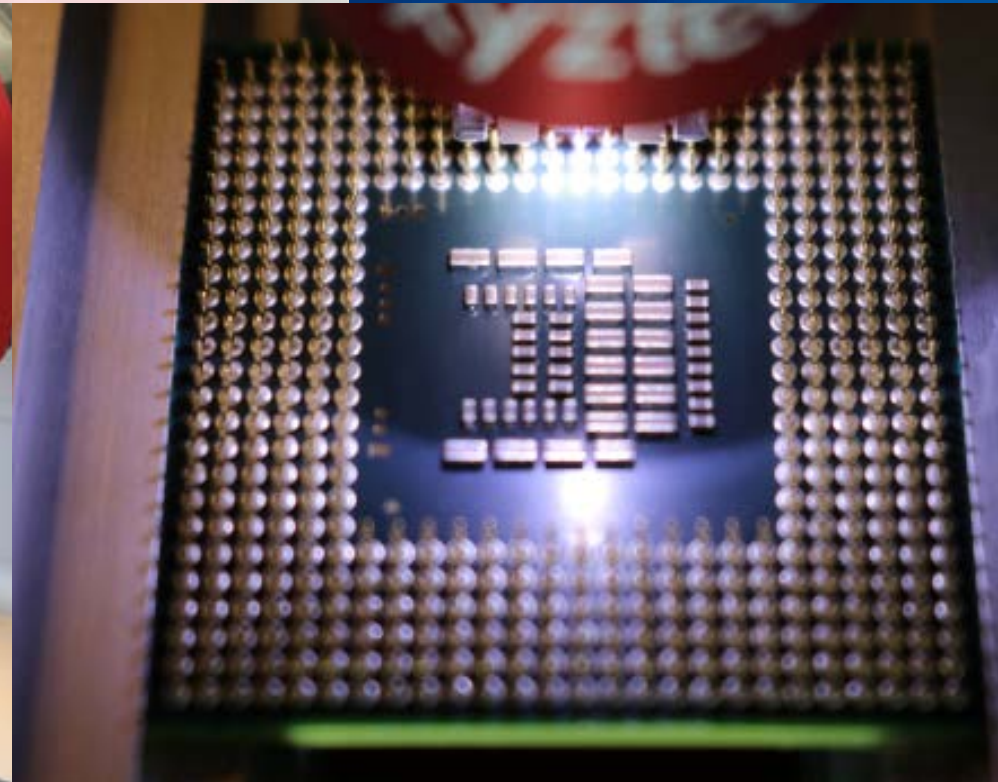


Mag. Jördis Rosc
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Our focus / competences

- Defect analysis - localization and evaluation of defects
- 2D and 3D porosity analysis
- Acquisition of geometry data
- Nominal/actual comparison
- Texture analysis - phase segmentation
- In-situ testing with mechanical / thermal / electrical loading

Destructive Physical Analysis



Reliability of structure and integrated circuit packaging

Contact



Dr. Barbara Kosednar-Legenstein
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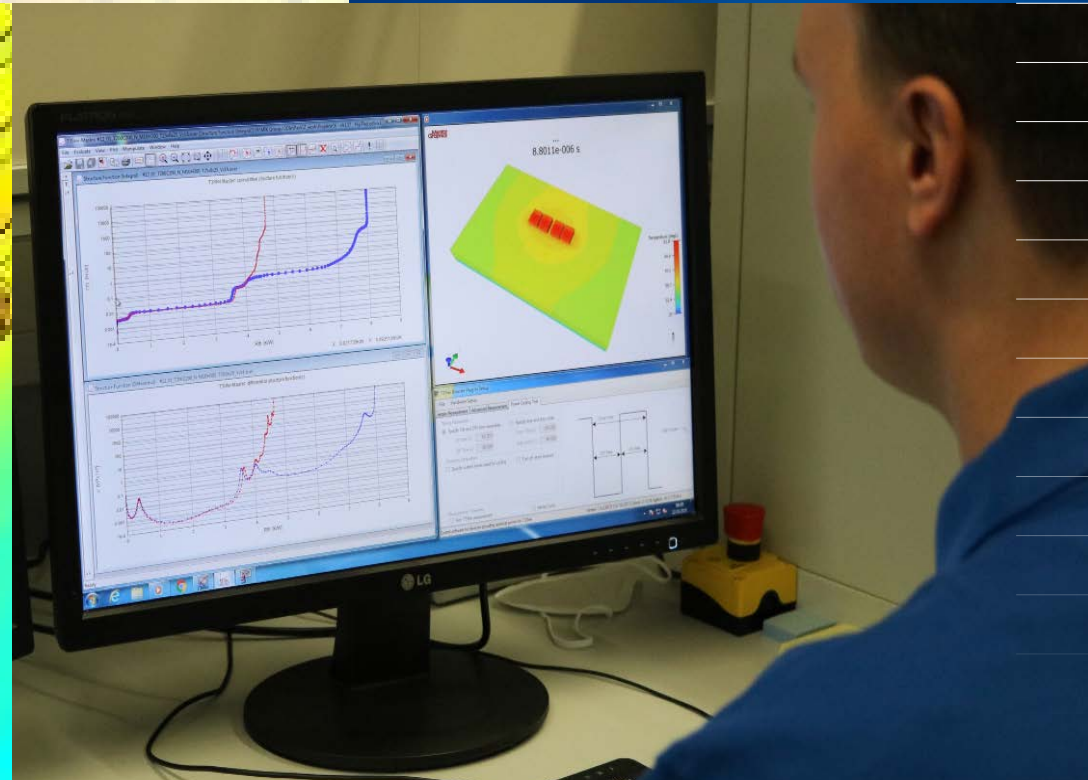
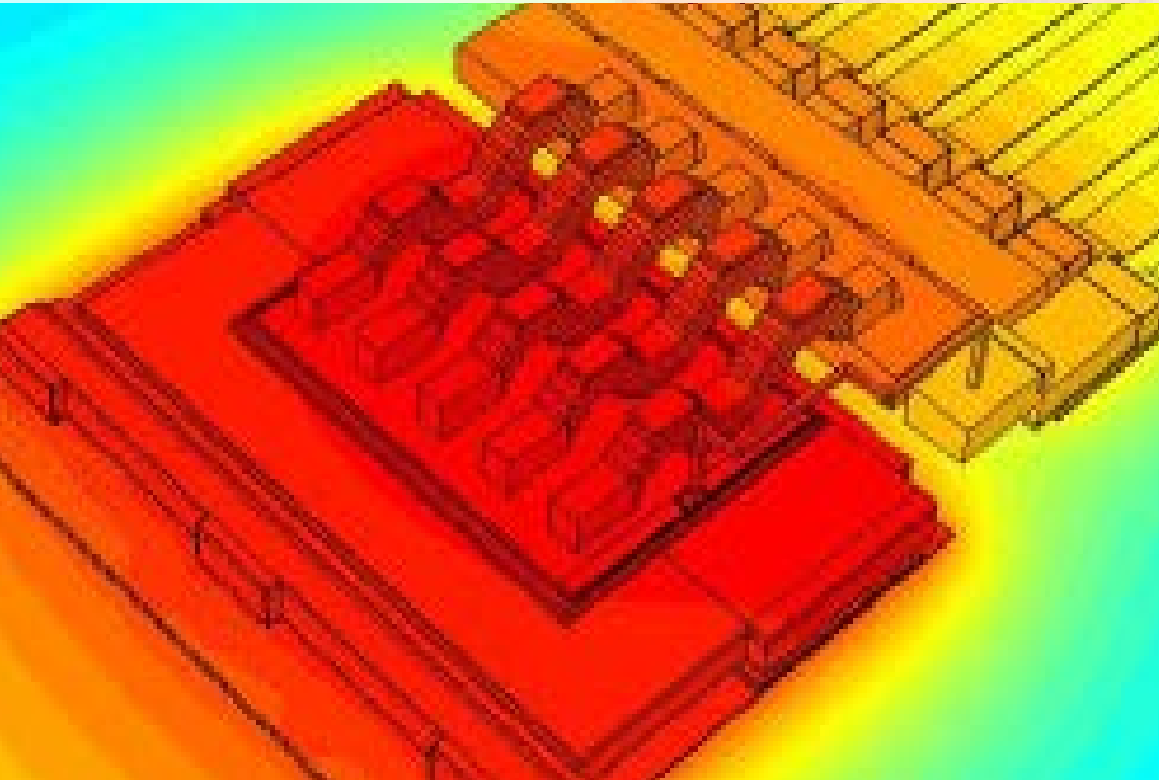
Dr. Julien Magnien
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Our focus / competences

- Visualization of surface structures
- Detection of geometry and microstructure
- Failure and root-cause analysis of electronic components (inclusions, cracks, aging processes)
- Determination of deformation, damage and fracture behavior of different assembly and interconnection technologies
- Evaluation of mechanical peel, shear and tensile stresses
- 3-point and 4-point bending test
- Digital Image Correlation (DIC)

Thermal Management



Thermal analysis from material to electronic systems

Contact



Dr. Lisa Mitterhuber-Gressl
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Our focus / competences

- Thermal resistance analysis of materials and systems (thermal impedance analysis)
- Derating analysis up to $\leq 160^{\circ}\text{C}$
- Heat path analysis of microelectronic packages and systems
- Determination of thermal properties of thin films (temperature dependence) - temperature range: 20°C to 500°C
- Determination of the thermal interface resistance
- Validated thermal models for failure analysis and design guidelines

Environmental Simulation Laboratory



Active and passive thermal reliability testing

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Contact

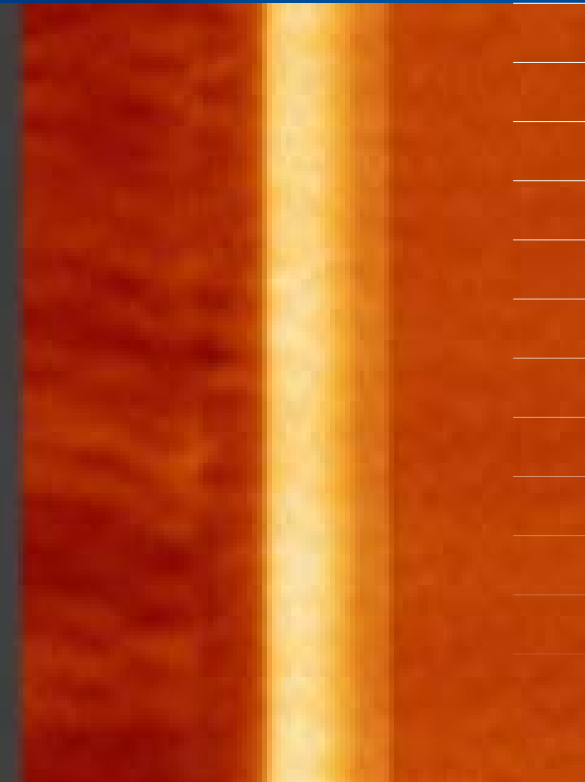
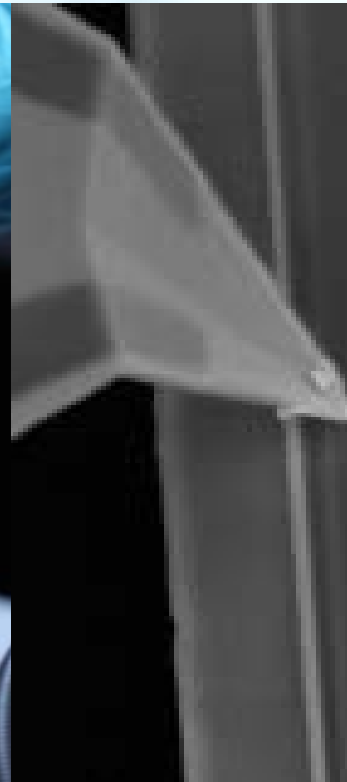
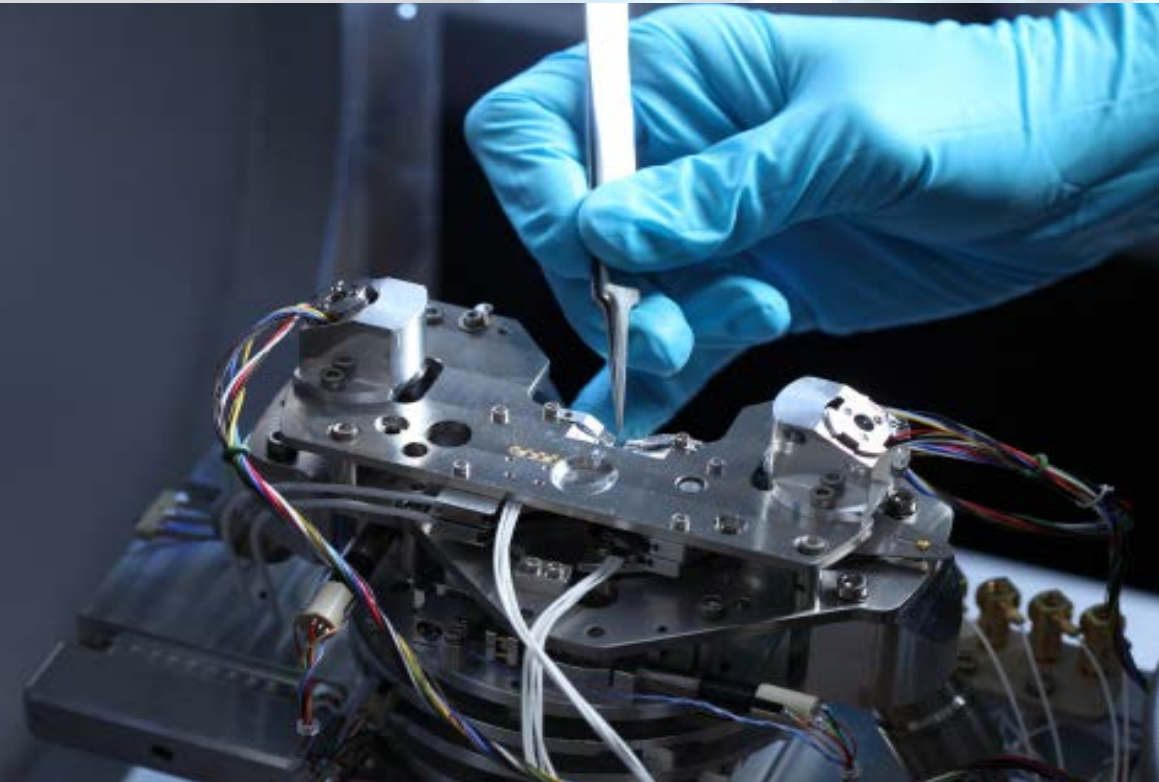


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Our focus / competences

- Temperature shock test -80°C to 220°C
- Drying and heating oven up to 300°C
- Alternating climate chamber -40°C to 180°C
- Power cycle test up to 80 A
- Condition monitoring by means of Temperature Tensitive Electrical Parameters (TSEP)
- Data exploration and processing for early failure detection and lifetime modeling

Thin Film Analysis



Single and multilayer systems in the nm to μm range

Contact



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Our focus / competences

- Scanning Probe Microscopy (SPM) analysis under different atmospheres (Ar, N, vacuum, air)
- Topography and roughness analysis
- Kelvin Probe Force Microscopy (KPFM)
- Scanning Thermal Microscopy (SThM)
- EBAC (Electron Beam Absorbed Current) / EBIC (Electron Beam Induced Current)

Raman Characterization



Non-contact analysis method for material characterization

Contact



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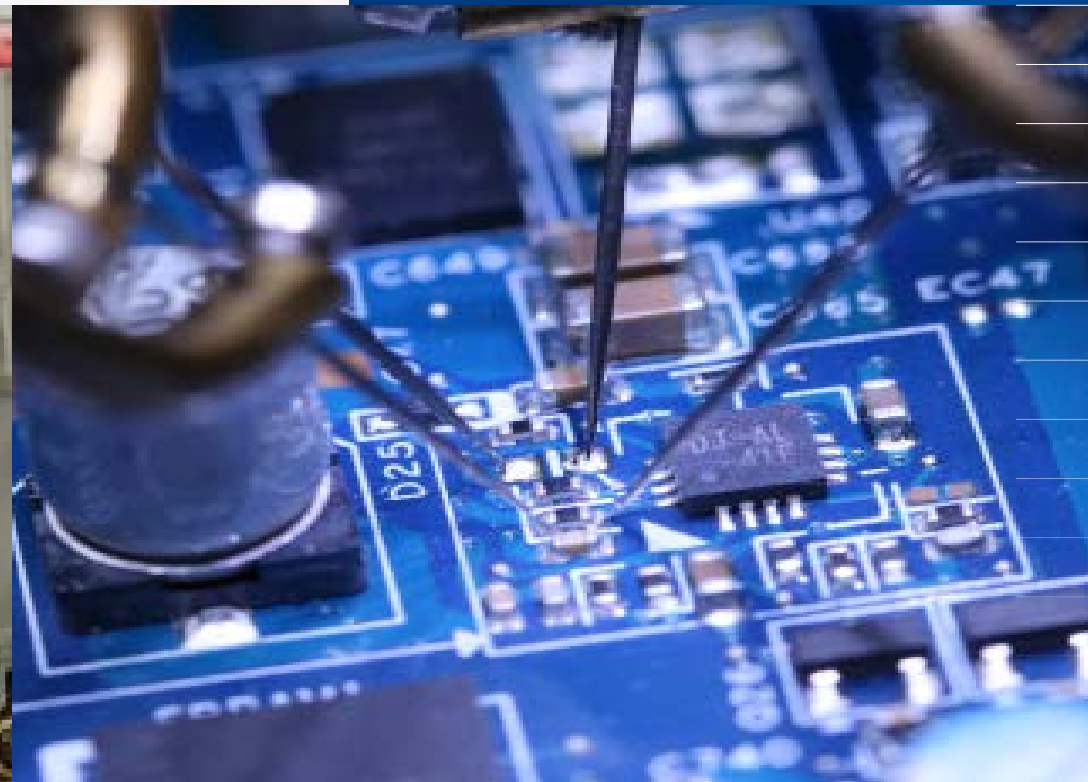
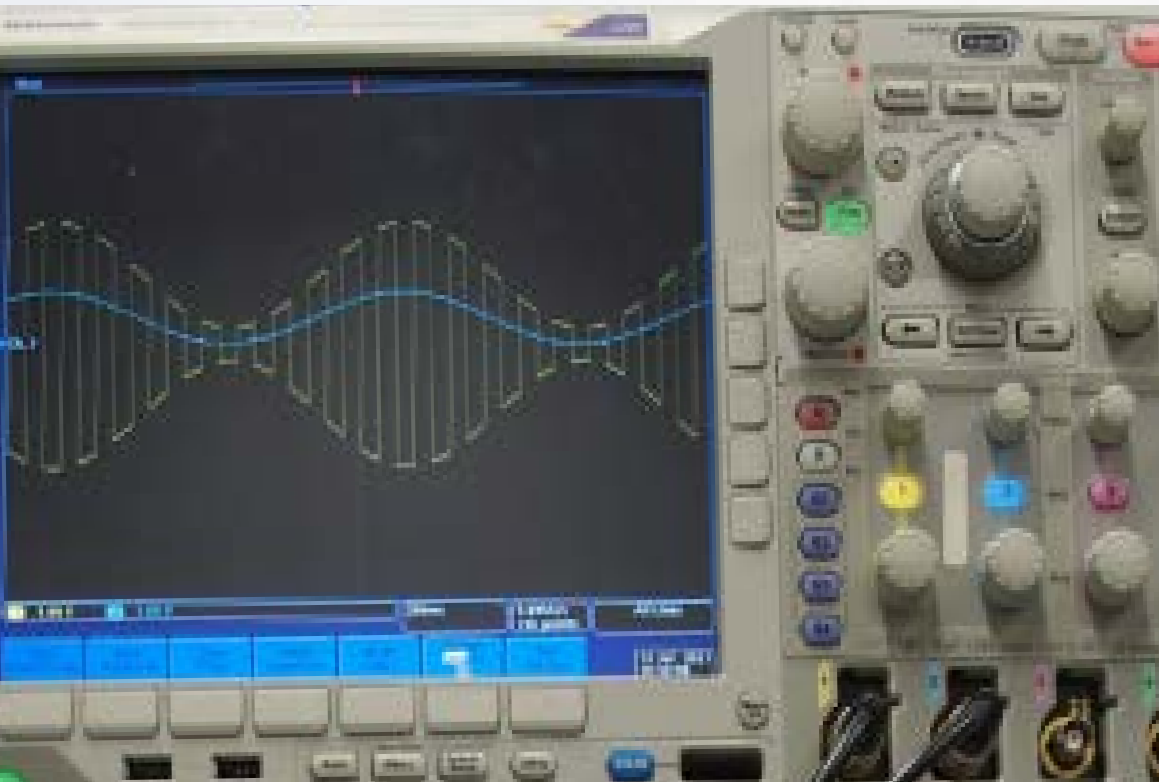
Dr. Marco Deluca
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Our focus / competences

- Chemical composition of materials
- Crystallinity, phase transformations and phase compositions
- Impurities and defects
- Polarization analysis
- Residual stress analysis
- Texture analysis
- Temperature range -196°C to 600°C

Electronic Laboratory



Analysis of functional materials up to electronic systems

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Contact

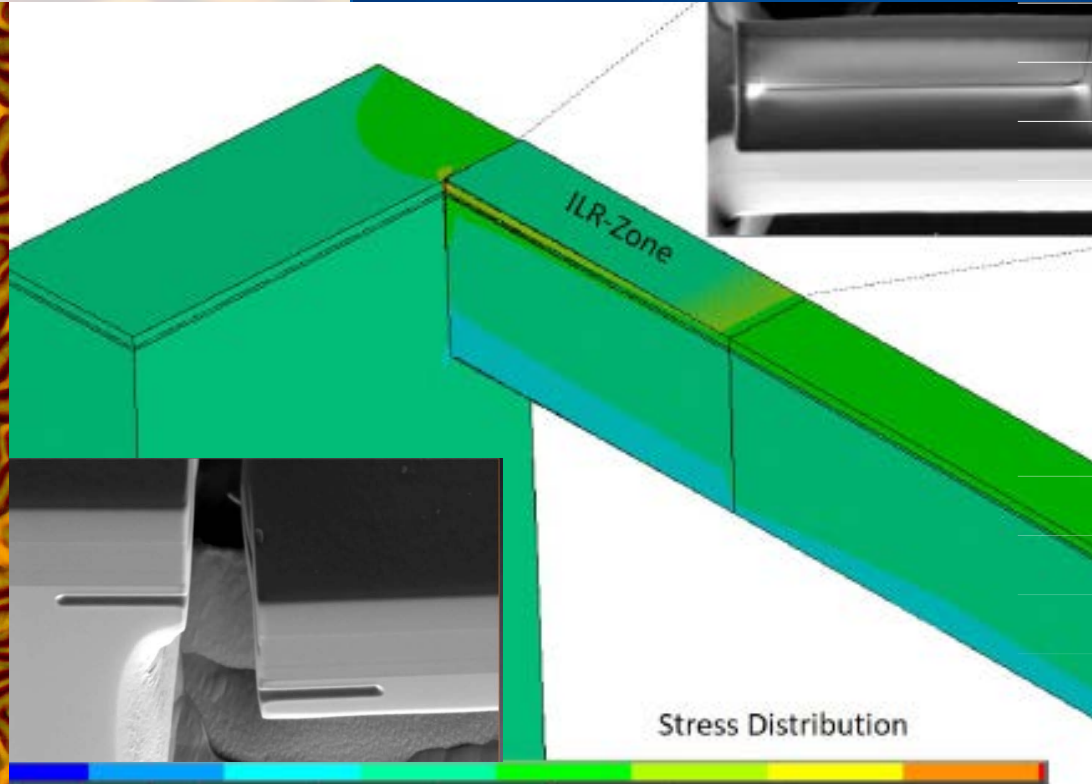
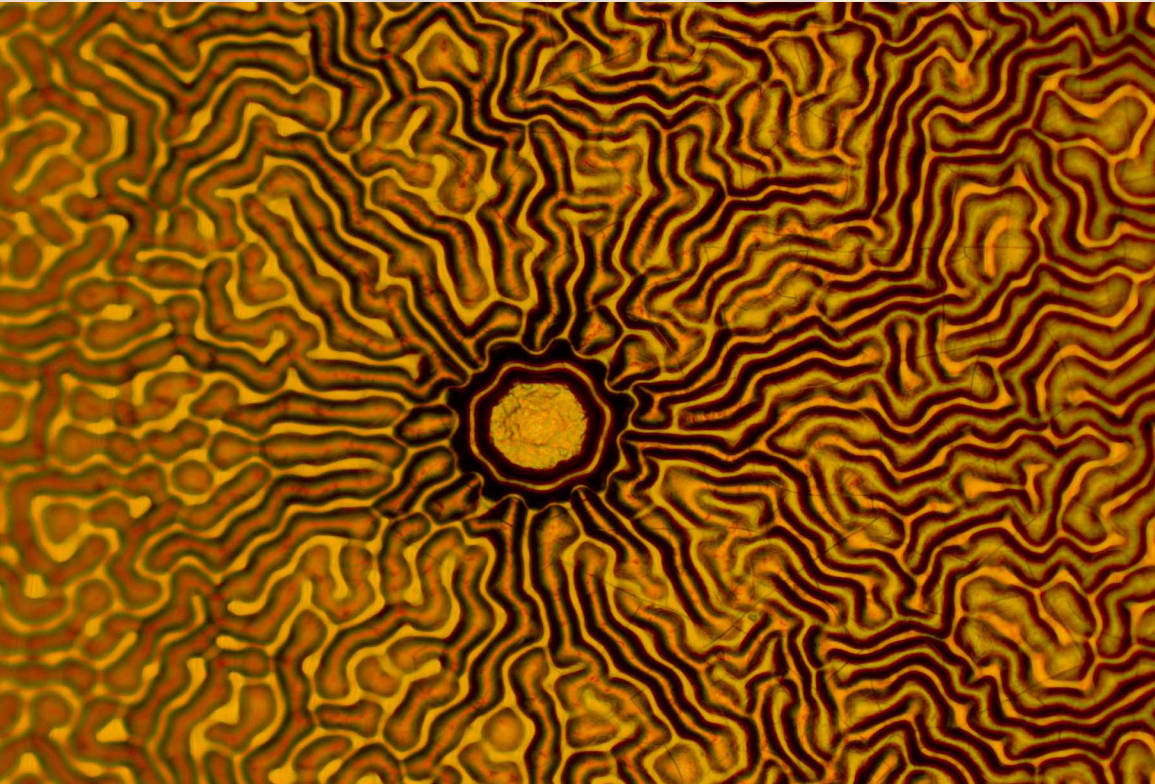


Dr. Julien Magnien
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Our focus / competences

- Analysis of static and dynamic hysteresis
- Piezoelectric analysis
- Breakdown voltage analysis ± 1 A (± 500 V)
- Current/voltage characteristics
- Frequency range 0.01 Hz to 150 MHz (2 GSa/s)
- Temperature range -50°C to 400°C
- Electrical impedance analysis

Phase, Morphology and Residual Stress Analysis



Structure and morphology influence on residual stresses in single and multilayer systems

Contact



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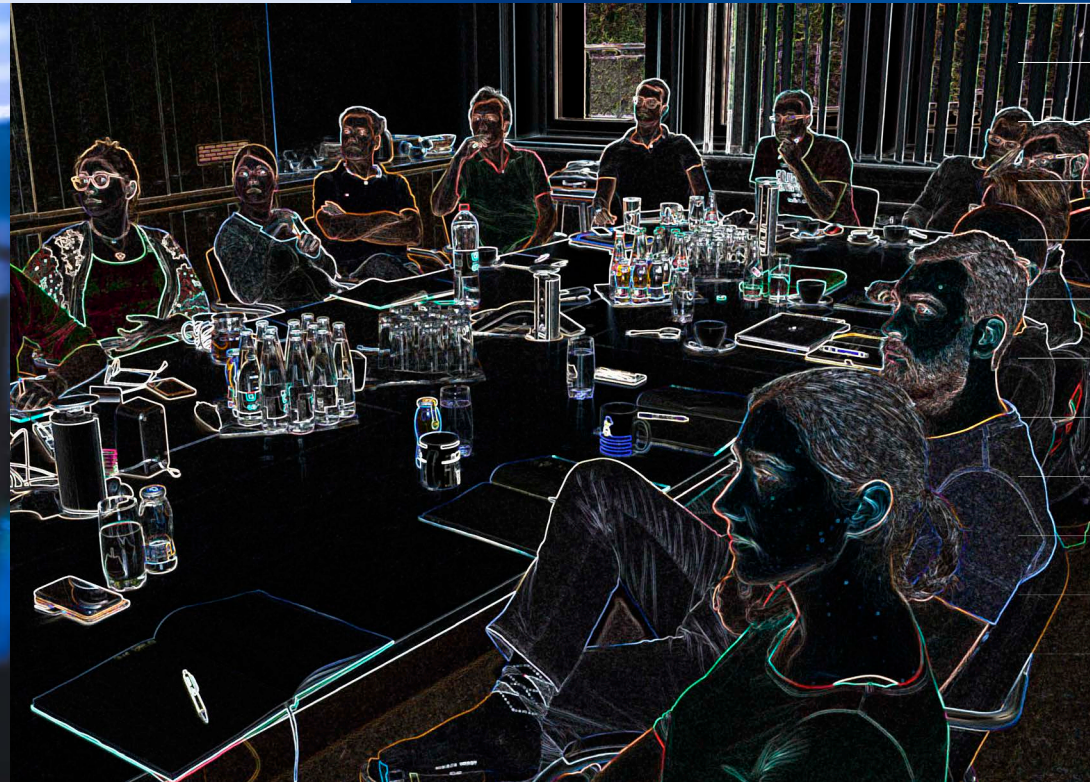
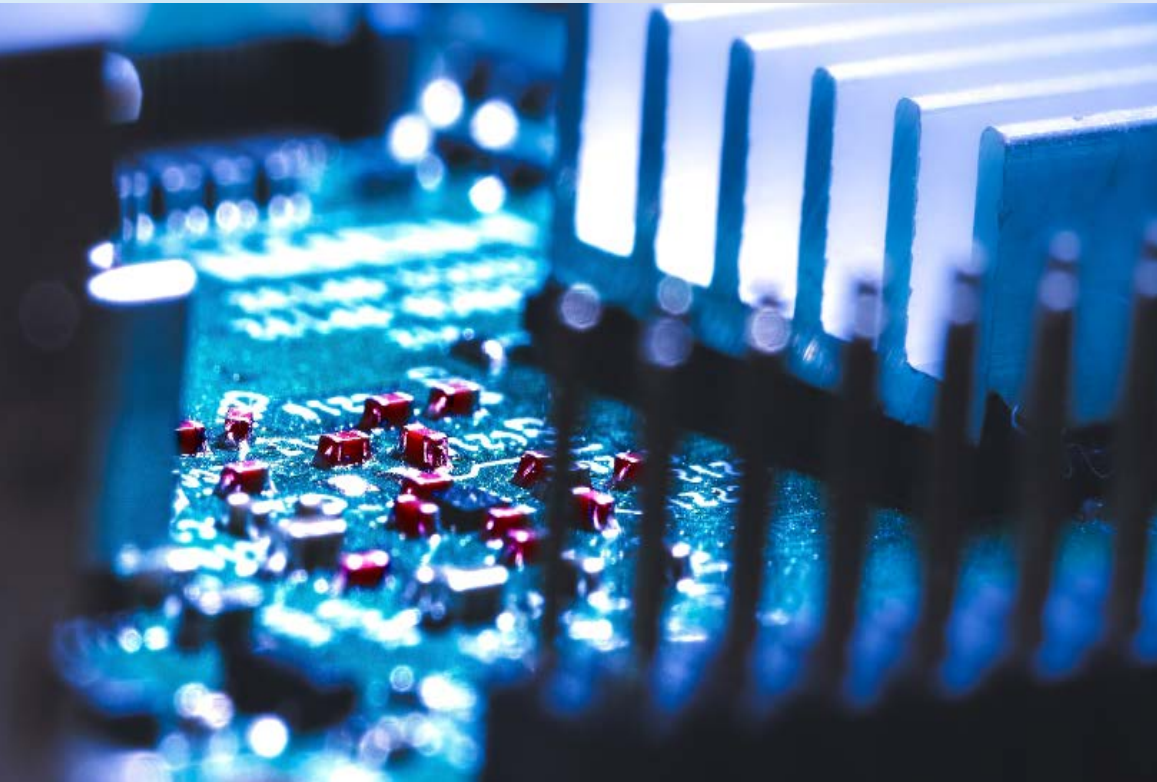
Priv. Doz. Dr. Roland Brunner
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Our focus / competences

- High resolution EDX & EBSD analysis in the nm range
- High resolution morphology characterization by FE-SEM
- Interface & phase analysis
- Local residual stress analysis by IL-R (Ion Layer Removal) method

Seminars @ MCL



Staff training in microelectronic test methods, analysis chains and material characterization

<https://www.mcl.at/services/mcl-academy/>

Contact



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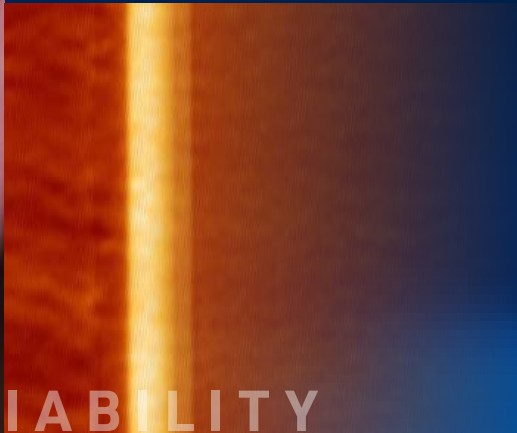
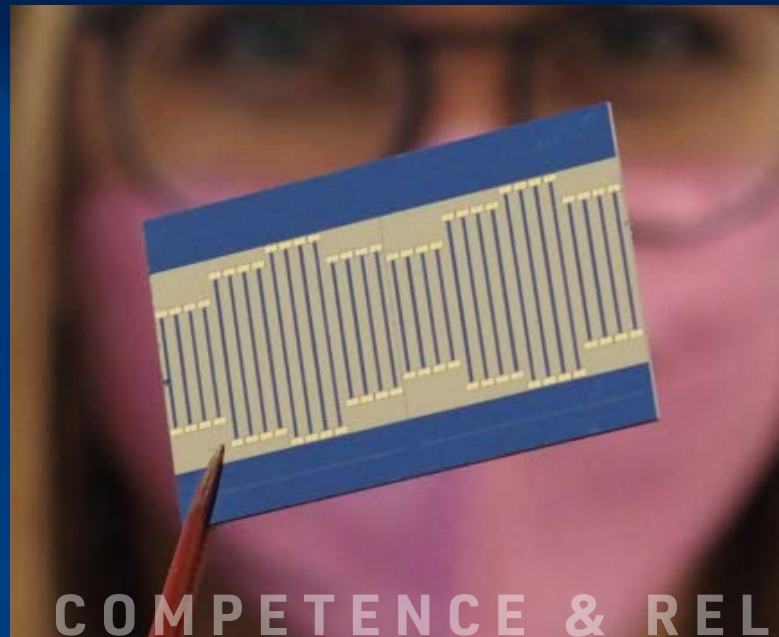


Dr. Kerstin Chladil
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Our focus / competences

- Analysis chains for microelectronics
- Applied Thermal Impedance Analysis
- New methods in thermal analysis of thin film systems
- Material, layer and microstructure characterization using high-resolution 3D methods (SEM, CT)



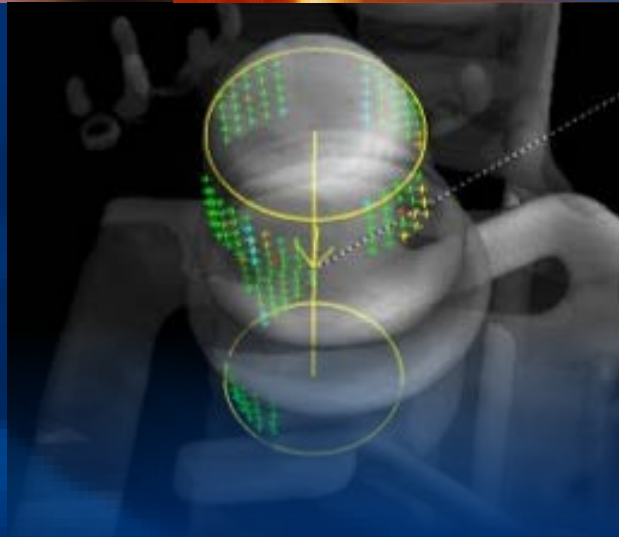
COMPETENCE & RELIABILITY

Service offer

- Analyses of materials, products, process defects, PCB defects and component failures
- Thermal analysis on material and system level
- Mechanical testing (tensile, shear test, nanoindentation, ...)
- Determination of aging phenomena and processes
- Localization and visualization of material and/or system failures
- Environmental simulation (TS, TC, PTC, HTOL, ...)
- Thin film analysis (material analysis and physical properties)
- Phase, Morphology and Residual Stress Analysis
- System evaluation of new materials
- Physics of Failure (PoF)
- Seminars and Workshops

Equipment

- Computer tomograph - Nanotom
- SAM 400 (PVA TePla)
- Confocal UV Raman microscope - alpha300R (Witec)
- Bond tester - SigmaCondor (xyzTec)
- μ DMA - RSA-G2 (TA-Instruments)
- MK56 & 53 thermal cycling ovens (Binder)
- Temperature shock - ShockEvent T/60/V2 (Weiss-technik)
- TF Analyzer 3000 (aixACCT Systems)
- TDTR - PicoTR (Netzsch)
- Scanning Probe Microscope (Semilab)
- PU / SMU / Frequency Generators
- Leica TXP EM



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