



Sensor Systems

Sensory organs of digital life.

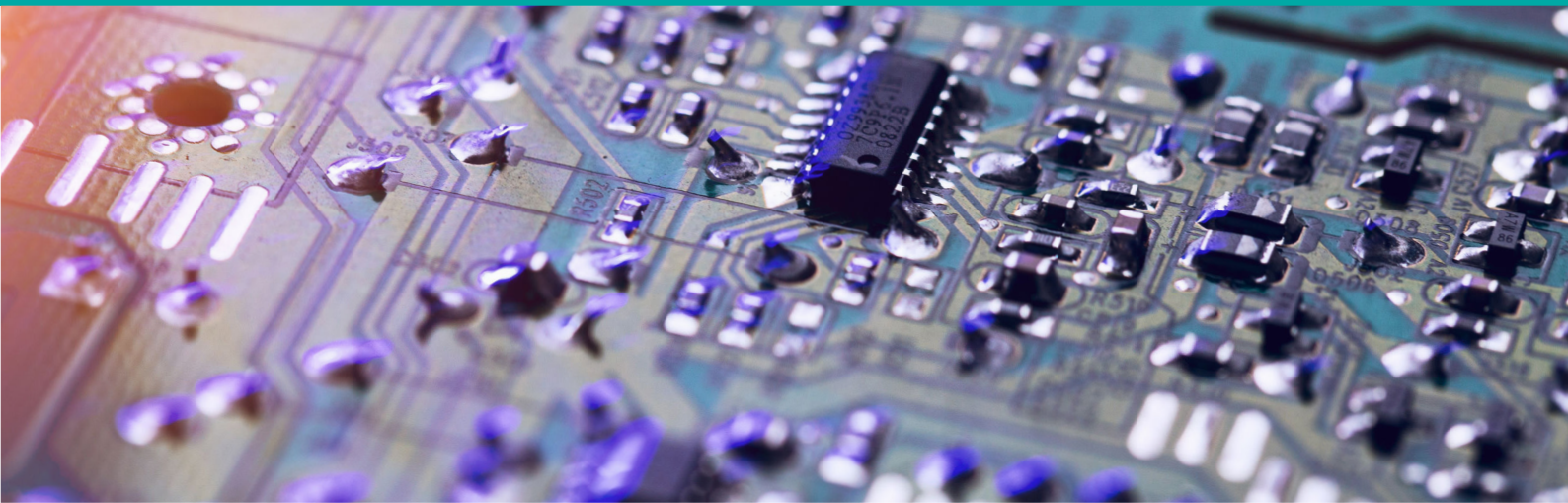
In the Sensor Systems division, our teams use the basis of state-of-the-art technologies to work on different sensors that collect information from the environment, inspired by all five senses.

It is important to find the optimum combination of the multitude of sensors to expand the heterogeneous integration of smart sensor systems for various applications. This can be achieved with the help of intelligent algorithms and the latest developments in this field.



"In addition to high-end research, we also offer our partners from industry and research services in the areas of simulation, characterization, and manufacturing. Our customers benefit from our extensive know-how, flexibility, and state-of-the-art infrastructure. It is essential for us to support them in a highly competitive environment so that they reach market maturity as quickly as possible."

Christina Hirschl, Head of Division Sensor Systems



Electronic Sensors

Design & Simulation

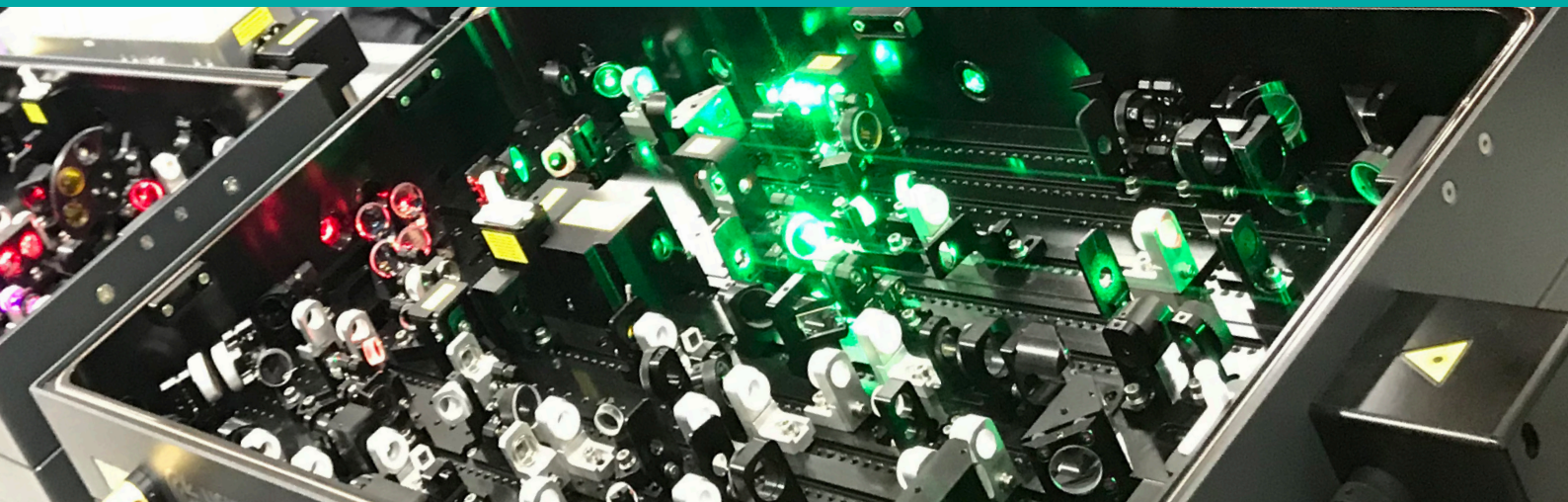
- » Electronic read out circuits for custom made sensors
- » Optimization of ultra-low-signal level and ultra-high-resolution signal processing with respect to wireless energy and data transfer
- » Electrical analysis from DC to the GHz level
- » Development of the whole sensor read out-, data processing- and data displaying system
 - System on Chip programming (ARM/FPGA, Xilinx, Vivado, Vitis)
 - SPICE circuit simulation
 - Altium PCB design

Measurement, Characterization & Testing

- » Prototyping and testing of electronic based systems
- » Programming and testing of novel, AI-based, signal analysis algorithms
- » Functional, lifetime, aging and reliability testing
- » In-operation characterization of EBS under varying environmental conditions (-70°C – +180°C, controlled humidity)
- » Gas sensor testing

Key Equipment

- » Weiss Umwelttechnik ShakeEvent C/600/70/15/V
- » Schwingprüfanlage TIRA TV 51110



Photonic Systems

Design & Simulation

- » Optical Simulation & System Design
 - Including Optical Raytracing and Full Wave Simulation (Zemax/Optics Studio, Lighttrans-Virtual Lab, Comsol, Rsoft, OptiLayer)
- Custom Simulation Development and Assessment
- Bulk Optical Systems, Filter- & Coating Design, Anisotropic Media, Fiber Optics, Nonlinear Optics, Laser

Measurement, Characterization & Testing

- » FT-IR Spectroscopy on solid and liquid samples
- » Raman Spectroscopy of macroscopic and microscopic samples
- » Hyper-spectral imaging in the spectral range of 400nm-2500nm
- » UV-VIS spectroscopy of transparent samples in the range of 190nm-1100nm
- » Optical measurement & data analysis
- » Ultrafast time resolved and non-linear spectroscopy
- » Quantum sensing based on color centers

Key Equipment

- » Raman microscope, Renishaw inViaTM Qontor
 - In combination with Tip Enhanced Raman option, Bruker, Innova SPM
- » FT-IR microscope, Bruker, Lumos
- » UV-VIS spectrometer, Agilent Cary60
- » Fiber coupled spectrometers UV-VIS-NIR
- » Fs-Laser system for non-linear spectroscopy
- » Digital holographic microscope, LynceeTec, DHM
- » Scientific and industrial imaging systems
- » High power laser for material processing, Lightconversion, Pharos
- » Microsystem analyzer, Polytec, MSA-500
- » Fiber processing equipment
- » Profilometer, Keisleigh
- » Photonic Probe station, Formfactor
- » Photonic assembly station, Ficontec



Sensor Applications

Sensor Design & Application Support

- » Application specific sensors
- » Printed sensors
- » Sustainable sensors
- » Flexible and conformable sensors

Surface Modification & Functionalization

- » Targeted deposition and assembly of (conducting and insulating) polymers
- » Electrode surface functionalization
- » Metal nanoparticle deposition on electrodes

Fabrication & Rapid Prototyping

- » Inkjet printing of functional inks
- » Photonic curing and sintering of printed layers
- » Stencil and Screen printing of functional inks and coatings
- » Ultrasonic spray coating of functional inks (2D and 3D)
- » Slot die printing for extremely thin film coatings ~80 nm
- » Aerosoljet printing for high-resolution (~10 µm) printing of functional inks (2D and 3D)
- » Laser-induced Graphene

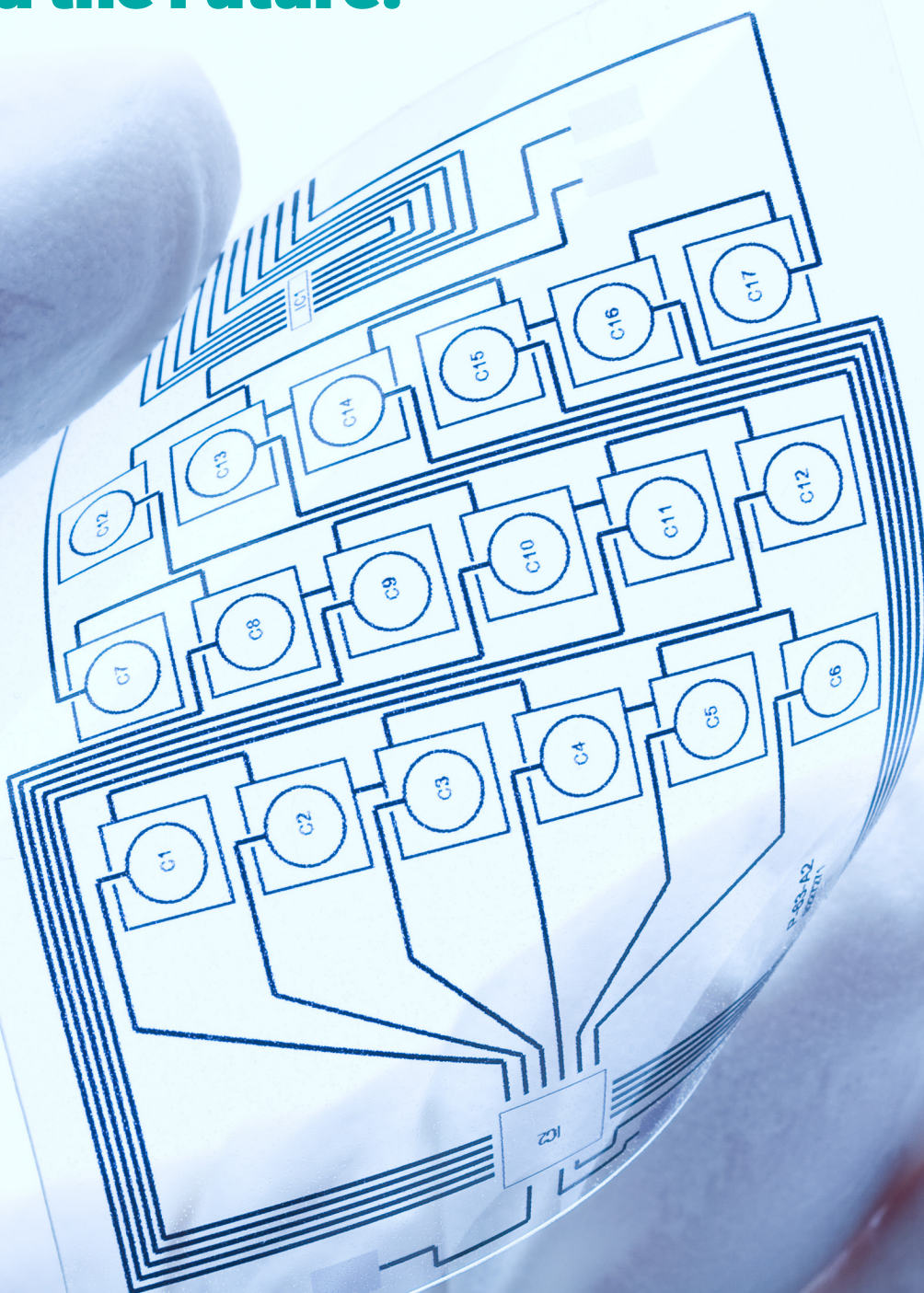
Measurement, Characterization & Testing

- » Push- and pull testing of materials and sensors
- » Ablation and peel-off testing of coated and printed layers
- » Bending testing
- » Accelerated aging of sensors
- » Contact angle and surface energy measurements
- » Biodegradability assessments

Key Equipment

- » Force test bench, Zwick|Roell
- » Inkjet printer Pixdro LP50, Süss MicroTec
- » Photonic curing system PulseForge 1200, Novacentrix
- » Laser cutter platform, PLS150D, Universal Laser Systems
- » Semi-Automatic Universal Screen Printing Machine SCF300DE, Eickmeyer GmbH
- » Slot coater with flexographic and bar coating unit, InfinityPV RLC 3DPrint Slot
- » Ultrasonic Spray Coater ND-SP, Nadetech Innovations
- » Pad Printer, Inkcup ICN2200PS

Unfold the Future.



ABOUT SAL

Silicon Austria Labs (SAL) is a top European research center for electronic based systems (EBS). The application-oriented center offers cooperative research & services at three locations – Graz, Linz and Villach – in the pioneering research areas of Sensor Systems, Microsystems, Intelligent Wireless Systems, Power Electronics and Embedded Systems.

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