IMMS

We develop microelectronic systems for

Point-of-care testing

www.imms.de/biosensors

MICROELECTRONIC POINT-OF-CARE SYSTEMS

In the interdisciplinary field between microelectronics and life sciences we are specialised on the development of application-specific integrated circuits (ASICs) and electronic sensor components.

We offer customer specific microsystems and sensor solutions for point-of-care testing (POC) and in-vitro diagnostics (IVD) in the fields of personalised multiplex diagnostics of infections and cancer screenings, and for bioanalytics. Due to diverse applications and multi-physical effects in biology, biotechnology, chemistry and medicine we integrate our systems into customer's devices such as microfluidic pumps and channels as well as individual optical sensor components.

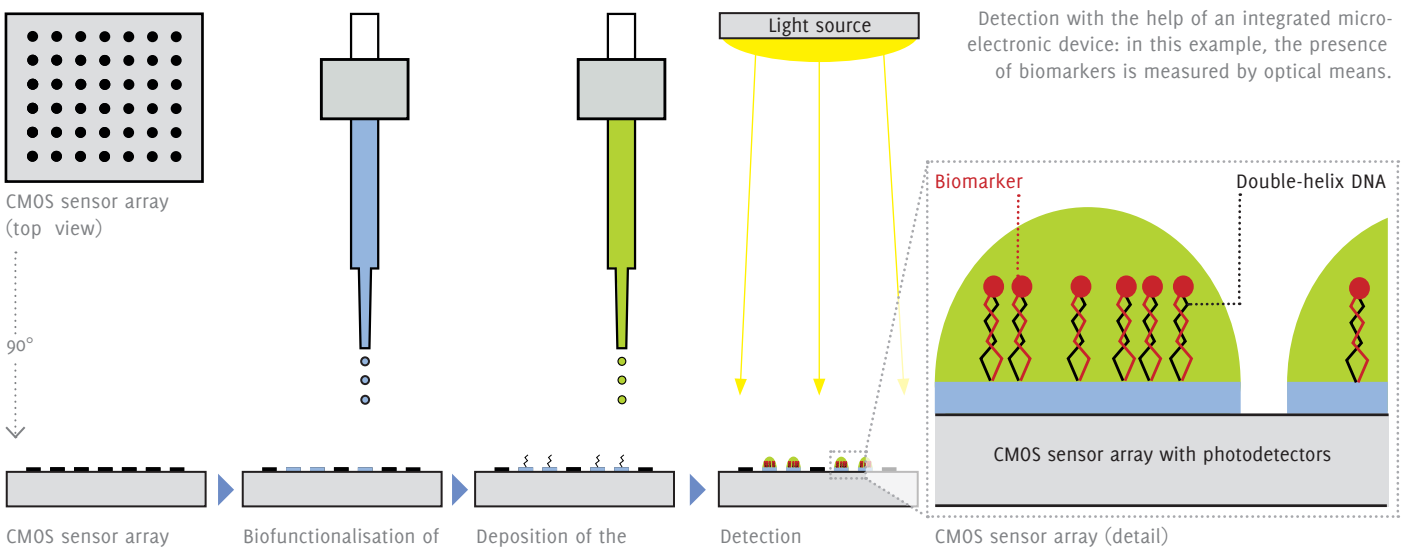
We conduct both product developments and proof-of-concept studies in cooperation with our industrial and research partner companies. We work closely together with our customers to find individually made cutting-edge solutions for their life sciences applications.

RAPID AND COST-EFFICIENT TESTS

IMMS applies a variety of sensor principles to the simultaneous detection of different biological and chemical measurands with the help of one integrated electronic device for extensive and precise diagnostics. Our work is based on cost-efficient standard semiconductor manufacturing processes (CMOS) which we also use for these new diagnostic approaches.

We adapt our systems to application-specific needs by means of particular functionalisation of surfaces and the use of biocompatible material. Our solutions pave the way for fast, reliable, cost-efficient and automated in-vitro diagnostics, such as early recognition of cancer.

EXAMPLE: SYSTEM FOR EARLY RECOGNITION OF CANCER



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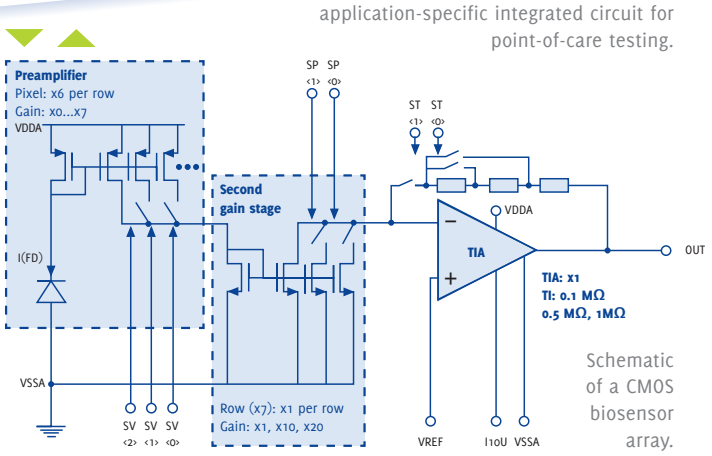
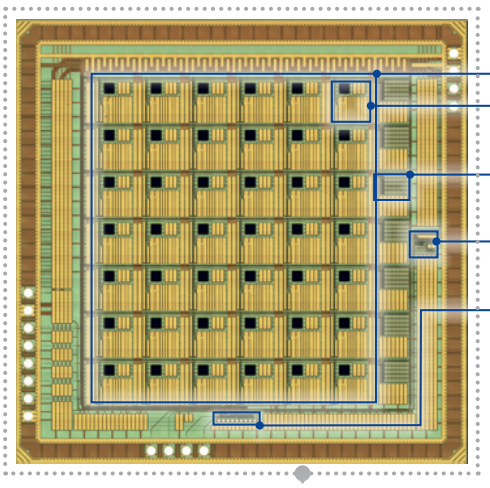
Development of an application-specific integrated circuit for point-of-care testing.

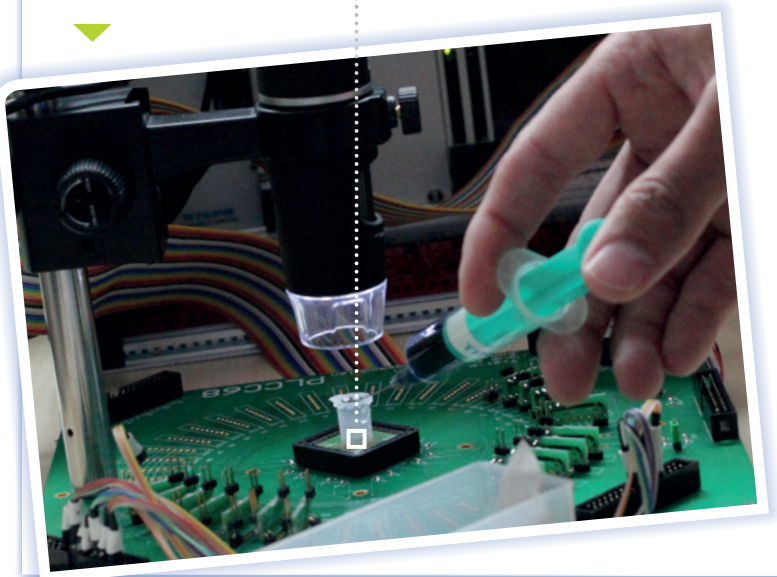


Schematic of a CMOS biosensor array.



Sensor array
Photodiode and preamplifier
Second gain stage
Transimpedance amplifier (TIA)
Digital control

Chip photo of a CMOS biosensor array (size: 3.8 mm x 3.8 mm).



Test setup for a microelectronic biosensor system for medical diagnostics and personalised medicine.

COMPETENCIES

- System development for point-of-care testing and in-vitro diagnostics
- Design of electronic components including individual sensors, sensor arrays and autonomous sensor systems
- Multi-physical detection
  - Electric, amperometric, voltammetric, impedimetric, capacitive
  - Electrochemical (pH, pNa, pO_2, ...)
  - Optical
- Development of systems that include sensors and actuators
- Surface coatings compatible with ions and biomaterials (DNA, proteins, ...) in cooperation with external partners
- Wireless signal acquisition and transmission to keep biological samples intact and germ-free
- Application-specific and biocompatible packaging and encapsulation in cooperation with external partners

WE PROVIDE FULL R&D SUPPORT ... ... FROM CONCEPT TO PRODUCTION

We focus on product development ranging from the design of mechanical and electronic devices to hardware and software system integration services as well as prototype construction and transfer to industrial production:

- Concept design and feasibility studies
- Design, construction, and characterisation of functional demonstrators and prototypes
- System verification, test methodology development and test services
- Access to innovative, certified manufacturing partners
- Design according to industrial standards
- Risk and quality management.

WE CONNECT INFORMATION TECHNOLOGY TO THE REAL WORLD

We design and implement smart electronic and mechatronic sensors and precision actuators, signal processing, automation and control solutions. We develop and optimise electronic, mechanical, and software components as well as data communication links for connecting embedded hardware/software systems to industrial IT environments.

WE BRIDGE THE GAP BETWEEN SCIENCE AND INDUSTRY

Transferring scientific research results into industrial products is often a complex process with a lead time of several years. Our mission is to enable our customers to bridge the industrialisation gap quickly for a broad range of innovative products and technology that benefit from the integration of electronic and mechatronics systems solutions.

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