

WHY WORK WITH US?

01 IMEC AS A TECHNOLOGY PROVIDER

Design and develop platforms from concept to prototype

- Based on imec's tested and proven platforms, we build your **next-generation product**.
- Imec offers flexible **access to state-of-the-art technology**, tailored to your application and strategic needs.
- Differentiator:** in-house experts and application engineers work with you to understand your application and translate it to technology.

02 IMEC AS A PARTNER

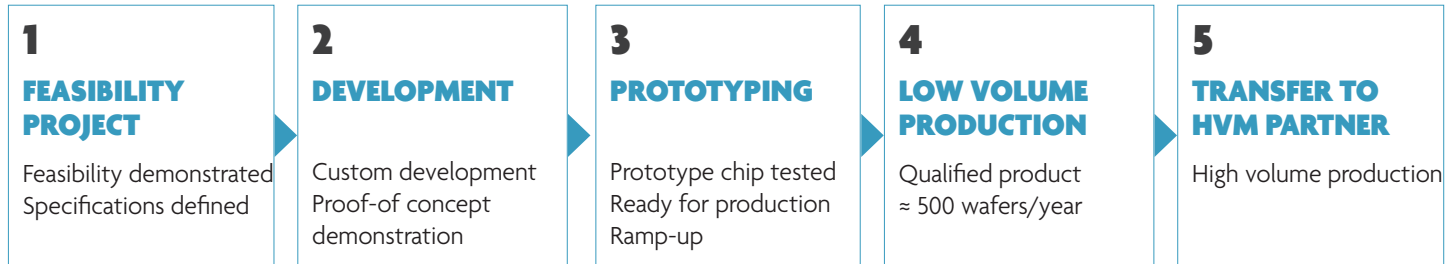
Design, develop and prototype your chips

- We develop and prototype **your silicon-based product**, starting from your concept or roadmap.
- Imec offers the vast engineering **expertise** and unique infrastructure to develop your next-generation product.
- Differentiator:** we work with you to design your system, develop a design into a product, or do a prototype run (or any combination of these). We help you set-up low-volume production and assist with the transfer to large-volume manufacturing.

03 IMEC AS A FAB

Prototype and manufacturing your solution

- In our industrial-grade ISO9001-certified cleanrooms, we can **prototype your silicon-based applications**.
- Our experienced team of processing specialists will work with you to **translate your concept** into a stable and scalable manufacturing process.
- We support you with **manufacturing, from low to high volumes**.



imec
embracing a better life

PIONEERING EFFICIENT HEALTHCARE WITH SILICON CHIP TECHNOLOGY

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CHIP-SIZED TOOLS FOR LIFE SCIENCES RESEARCH AND DIAGNOSTICS APPLICATIONS

Imagine you could integrate an entire diagnostic test system into 1 cm² at the price of a disposable. Imec, the nanotechnology pioneer, brings chip technology to the world of healthcare and pharmaceutical research.

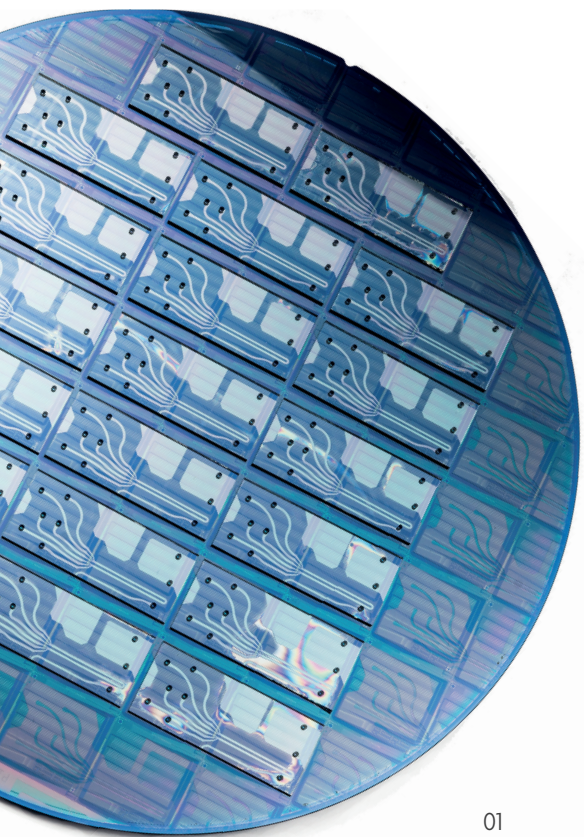
01 HIGHLY MULTIPLEXED BIOSENSING CHIPS

Imagine you could detect more than 100.000 biomarkers in less than 5 minutes.

Imec develops biosensing chips with up to 100 sensors per mm². Sensors for fast and accurate detection of cells, DNA, small molecules, antibodies, gases... in e.g. diagnostics, sequencing and drug screening. This extreme miniaturization is made possible thanks to the use of powerful CMOS chip technology with on-chip electrical or photonic sensors and microfluidics.

KEY BENEFITS

- **Multiplexing:** multiple biomarkers or DNA sequences are measured simultaneously with 100 sensors per mm².
- **Fast:** the technology allows fast measurements of binding events with immediate sample-to-data readout capability.
- **Small reagents volumes:** with integrated microfluidics, samples can be limited to <1µL.
- **Accurate:** low-noise and online measurement of analytes.



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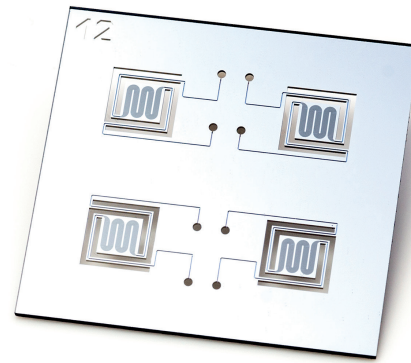
02 MICRO-PCR

Imagine you could perform a PCR-based diagnose in minutes.

We have developed integrated sample-to-answer chips to perform molecular diagnostic tests. With silicon-based microfluidics, these allow fast, simple and sensitive detection of genetic markers (e.g. in blood).

KEY BENEFITS

- **Your assay, just smaller and faster:** performs full PCR analysis from whole-blood in less than 10 minutes.
- **PCR on chip,** using silicon microfluidics for extreme miniaturization and parallelism.
- **Full workflow** via on-chip integration of filters, mixers, lysis, extraction, enrichment, droplet handling.
- **Result at your fingertips:** sample-to-answer in one chip.



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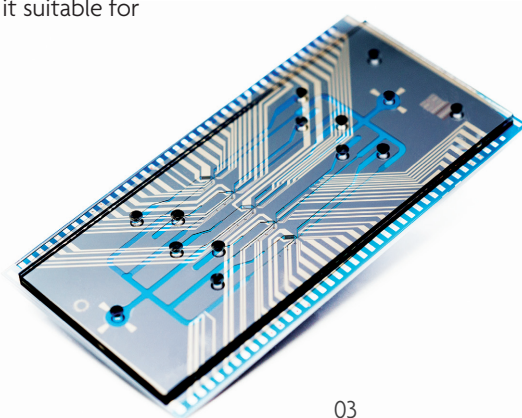
03 HIGH-THROUGHPUT CELL SORTER

Imagine you could sort 30 million cells per minute on one cm² and isolate specific cells for downstream analysis.

Imec has developed a breakthrough cell sorter with integrated on-chip cell characterization. It enables sorting blood cells in minutes, reporting the result to point-of-care applications and early cancer diagnostics.

KEY BENEFITS

- Sorting is based on **bubble-jet technology** and contains no mechanically moving parts. The system is compatible with autoclave and X-ray sterilization.
- **Accurate cytometry:** fluorescent markers and morphology can be combined to produce more precise results. Cells are alive for downstream assays.
- **Fast:** we sort 5,000 cells per second and per channel. We can process 100s of channels on one single chip, reaching composite sorting speeds of up to 20 million cells per minute.
- **Compact:** the smart chip disposable has the size of a microscope slide, making it suitable for point of care application.



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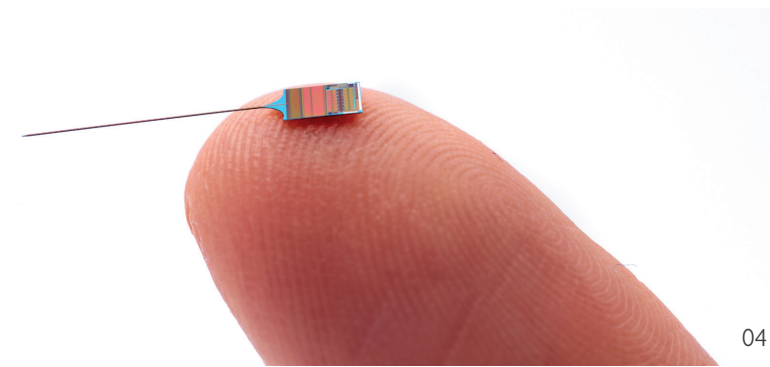
04 MINIMALLY INVASIVE IMPLANTS

Imagine you could record the electrical communication between thousands of neurons with a single probe.

Imec has developed implantable microsystems with advanced capabilities to stimulate, detect, process and interpret neural data at the cellular level.

KEY BENEFITS

- **Minimally invasive:** imec's probes have a minimal footprint and materials are biocompatible, enabling long-term measurements.
- **High-density:** we have integrated 428 electrodes and 64 active channels onto an ultra-thin probe for simultaneous read-out of large populations of neurons. Also photonic and microfluidic additions can be made to the probe.
- **High-quality signals:** via amplification on chip, enabling low-noise measurements (noise level of 5µ VRMS).



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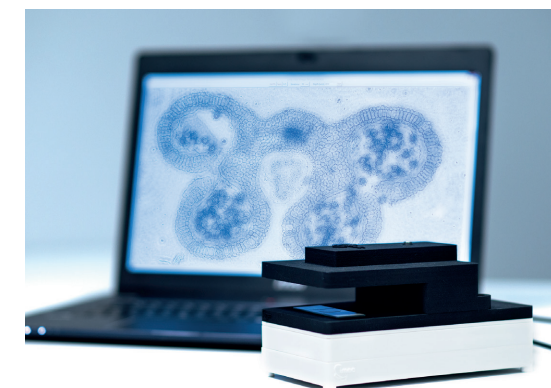
05 BIOPHOTONICS, IMAGING AND SPECTROSCOPY ON CHIP

Imagine a chip sensor could continuously monitor live processes without disturbing them.

Imec is a pioneer in photonic technologies for sensors and diagnostic systems. Using the same technology, we are developing on chip spectrometers and imagers which outperform benchtop tools at a fraction of the size and cost. Such microsystems may be used for microscopy, for medical imaging, for non-invasive, non-destructive, continuous monitoring in.

KEY BENEFITS

- **Compact:** no mechanical parts, no bulky optics required.
- **Non-invasive, non-destructive:** photonic sensors enable continuous monitoring on live samples.
- **Extreme integration**
- **Multiple sensing modes** including Raman, UV-VIS-NIR, photo-acoustics, hyperspectral, etc.



05

IMEC INTEGRATION AND PROCESSING

DESIGN, MODELING AND TESTING

- Low-power circuit design and instrumentation
- Imager design, photonics and optical design, MEMS sensors and transducers, novel transducer technologies, microfluidics, acoustics, biocompatible electrodes
- Strong multiphysics modeling and full system modeling
- Extensive chip testing and wafer qualification equipment

FULL CMOS-COMPATIBLE FLOW

- 200mm (180nm process) and 300mm (20nm process) ISO-certified cleanrooms, operating 24/7
- Wafer exchange between 200mm and 300mm fabs
- Wafer thinning down to 20 µm, grinding and CMP
- Wafer-to-wafer bonding, silicon or glass
- Chip-to-wafer bonding
- Wafer-level bonding of MEMS on CMOS substrates
- Custom post-processing on wafers from other foundries

MATERIALS

- Broad variety of polymers for wafer-scale integration
- Low impedance, corrosion-resistive electrode materials
- ALD with sub-nm thickness control, high-K dielectrics
- Electroplating of Cu, Sn, Ni
- Wafer-level surface functionalization and microspotting for bioassays
- Innovative materials, deposition development

SPECIAL FEATURES

- Through-silicon wafer etch capability
- Bumping and through silicon via integration
- Extensive in-line metrology and defect characterization, features down to 50nm
- State-of-the art optical waveguide performance for visible, IR and NIR light
- Integrated optical filter stacks