UNIVERSITY OF TWENTE. | TECHMED CENTRE

THE TECHMED EVENT

From Silicon to Solutions:

The Role of Chiptech in Modern Medicine

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Applied Nanotechnology

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Saxion
University of Applied Sciences

One of the largest institutions of higher education in the Netherlands (3 locations: Enschede, Deventer & Apeldoorn)

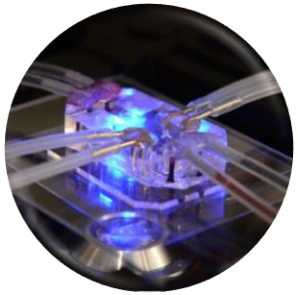
~27,000 students (3,500 int., 74 nationalities), 2,800 employees

Research is organized in **40 different research groups** and together they add to the research agenda focused on **Living Technology** (interplay between technology and society)

Research is organized into 5 different priorities:
- Health, wellbeing and technology
- Safety, security and digitalisation
- Circular innovation and energy transition
- Key enabling technologies (KETs)
- Social and economic innovation methodologies (KEMs)

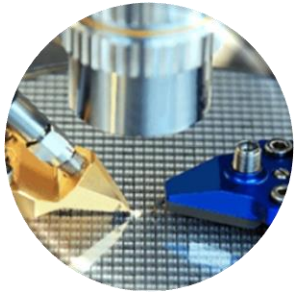
interdisciplinary and practice-oriented research

Research topics



Lab and organ-on-chip

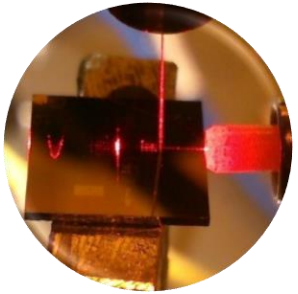
Molecular sensing (POCT)



Testing and probing

Nanoforensics

E-waste



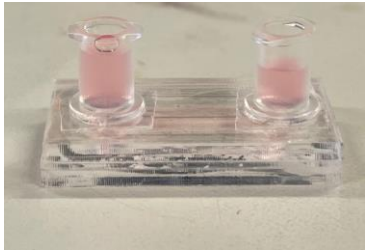
Precision assembly

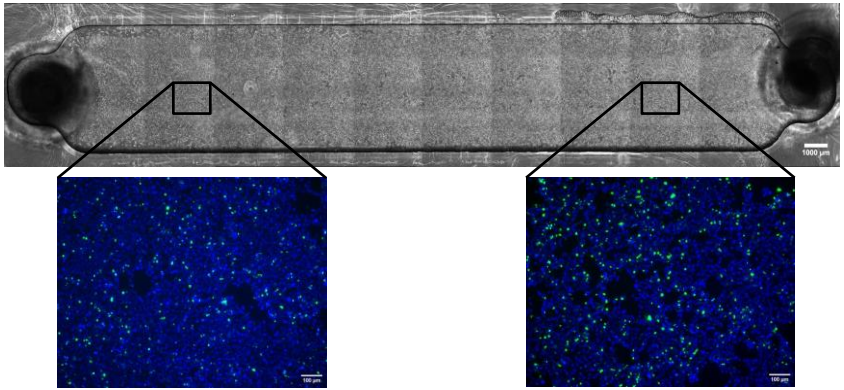
Functional nanostructures

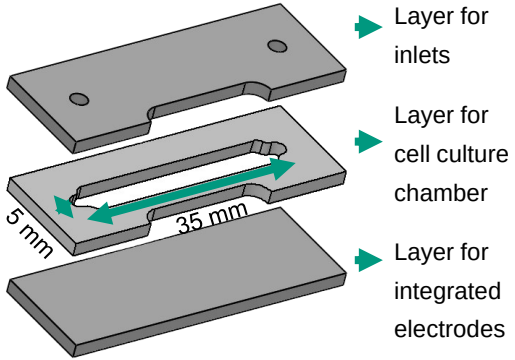
Societal embedding

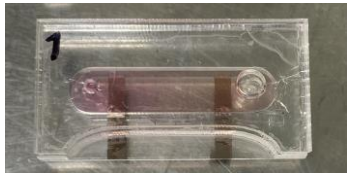
Development of a Heart-on-a-Chip device

- HL-1 cardiomyocytes are cultured in a PMMA chip
- Live/dead staining → 98% alive









Integration of electrodes to measure impedance and pace the cells

CYTOCYPHER

Locsense

micronit microtechnologies

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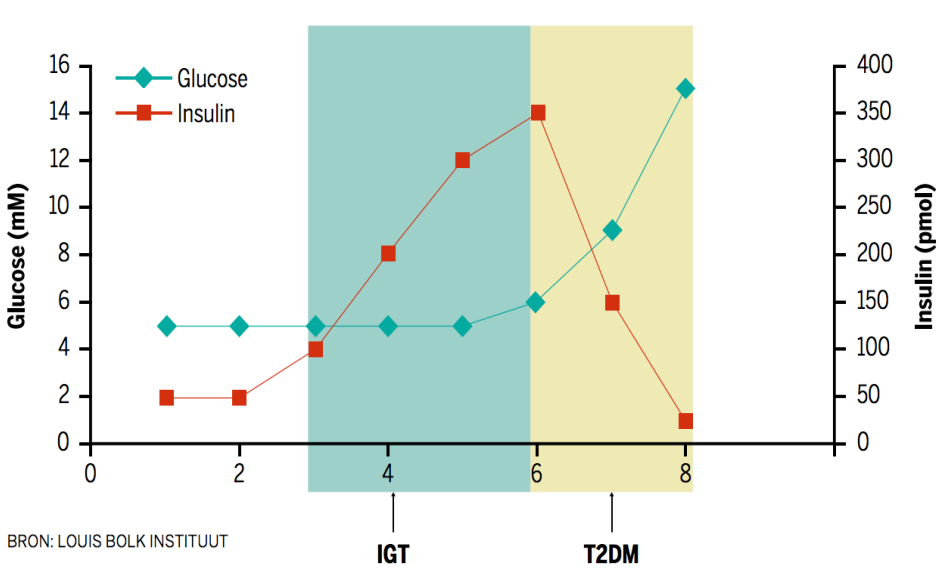
Measuring insulin (next to glucose)



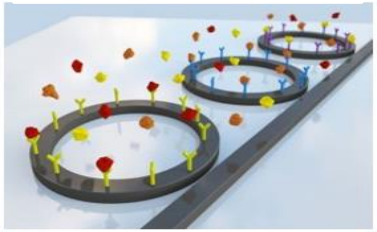
1.3 nm

Insulin

Measuring insulin gives a much more complete picture of the stage of progression towards diabetes, and enables early detection and diagnosis of “prediabetes”

Integrated photonic chips as sensors

Micro ring resonators coated with antibodies



Blood sample (using finger prick)

Photonic chip (1 x 1 cm)

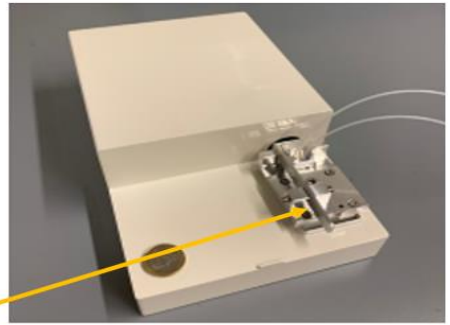
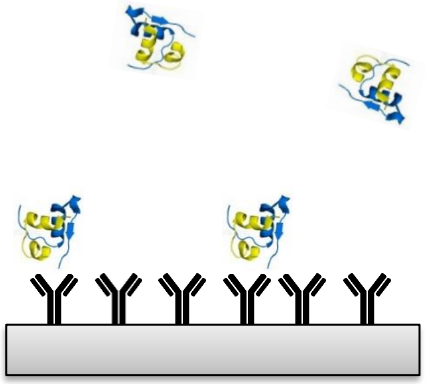
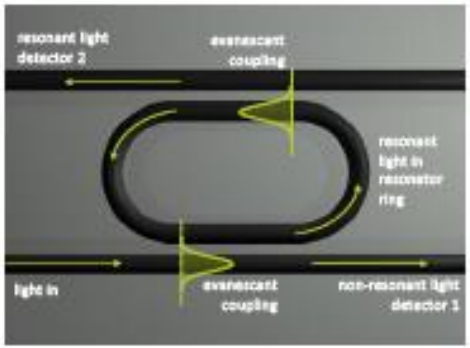


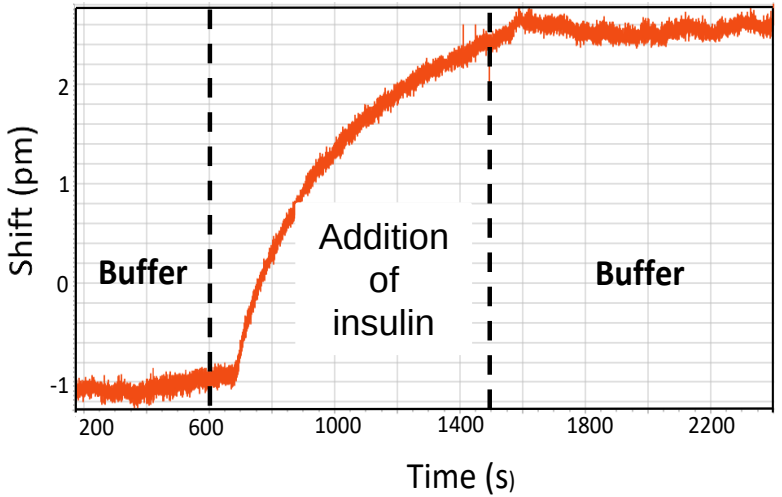
Table-top read-out device

Use of integrated photonic chips (socalled microring resonators) to detect the presence of insulin in a blood sample.

Detection principe







Signal is the wavelength at which the microring is resonating. When anything binds to the surface, this wavelength changes proportionally.

Thank you

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