

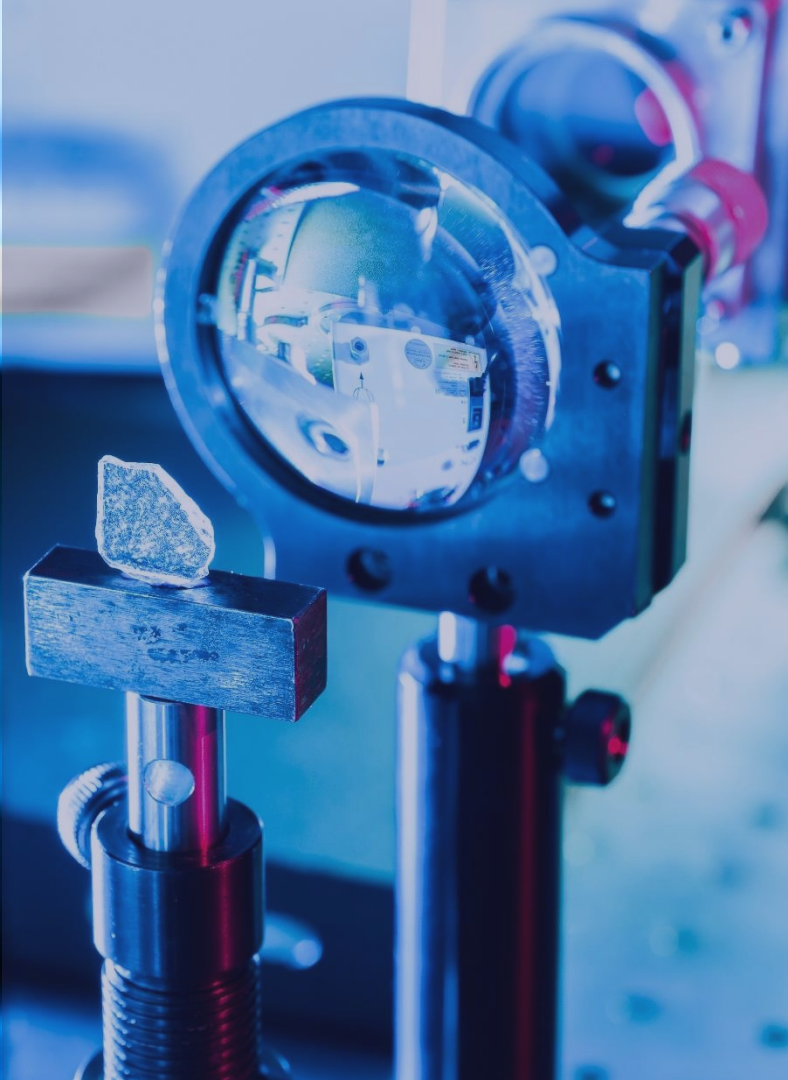


INSTITUTE OF SOLID STATE PHYSICS
UNIVERSITY OF LATVIA

OUTSTANDING PLACE FOR
RESEARCH AND INNOVATION

Director
Dr.phys. Andris Anspoks

PASSION DRIVES PROGRESS!
Since 1978



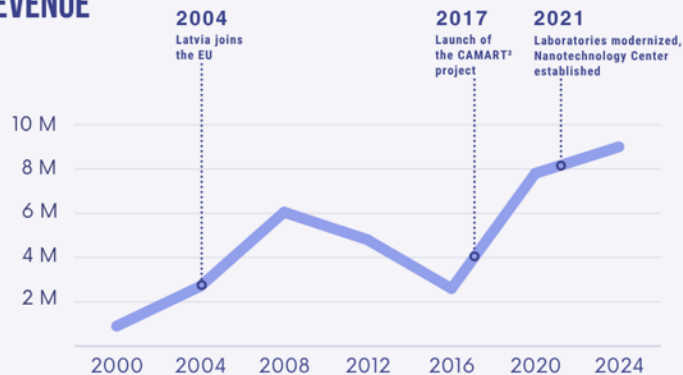
VISION

To be a world-class recognized Excellence Centre in our selected research areas – an excellent place for research and innovation.

MISSION

To create a dynamic environment for solutions of global societal and technological challenges, strengthening the role of Latvian and European science in the world.

REVENUE



NUMBER OF PUBLICATIONS IN SCOPUS DATABASE

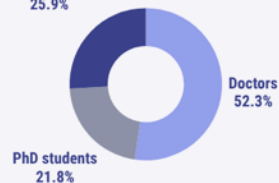


5x INCREASED
INTERNATIONAL
PROJECT ENGAGEMENT

IN 10 YEARS

300 EMPLOYEES
200 SCIENTIFIC
STAFF

BSc, MSc students
25.9%



**GENDER
BALANCE**



A PLACE WHERE SCIENCE
MEETS INNOVATION



**PASSION DRIVES
PROGRESS!**

MATERIALS FOR PHOTONICS AND INTEGRATED PHOTONICS



Materials for Photonics

Luminescent, scintillator, detectors, light emitting, OLED.
Third- and fifth-order nonlinear optical effects for quantum photonics and all-optical devices

Heterogeneous Integration for PIC

Different materials and technologies based on polymer photonics platform

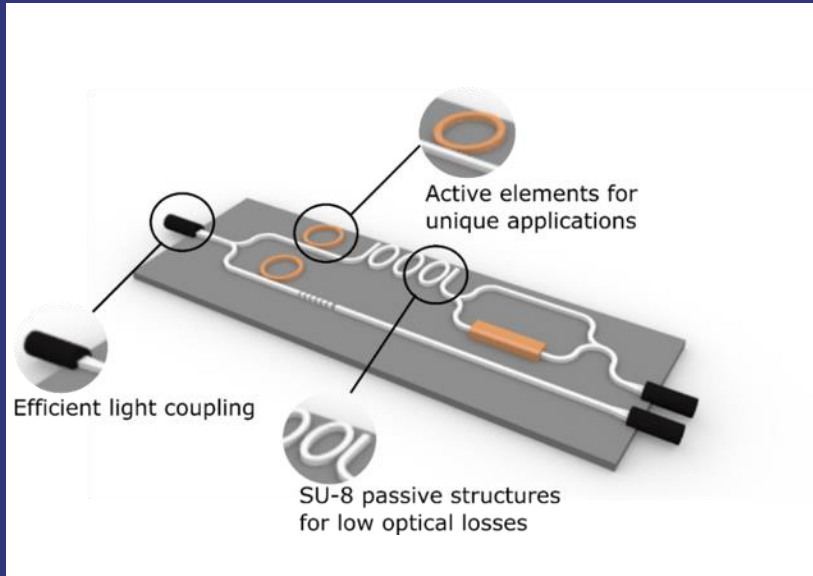
Quantum Photonics Research

Exploiting NLO with focus on single-photon and entangled photon sources using organic materials

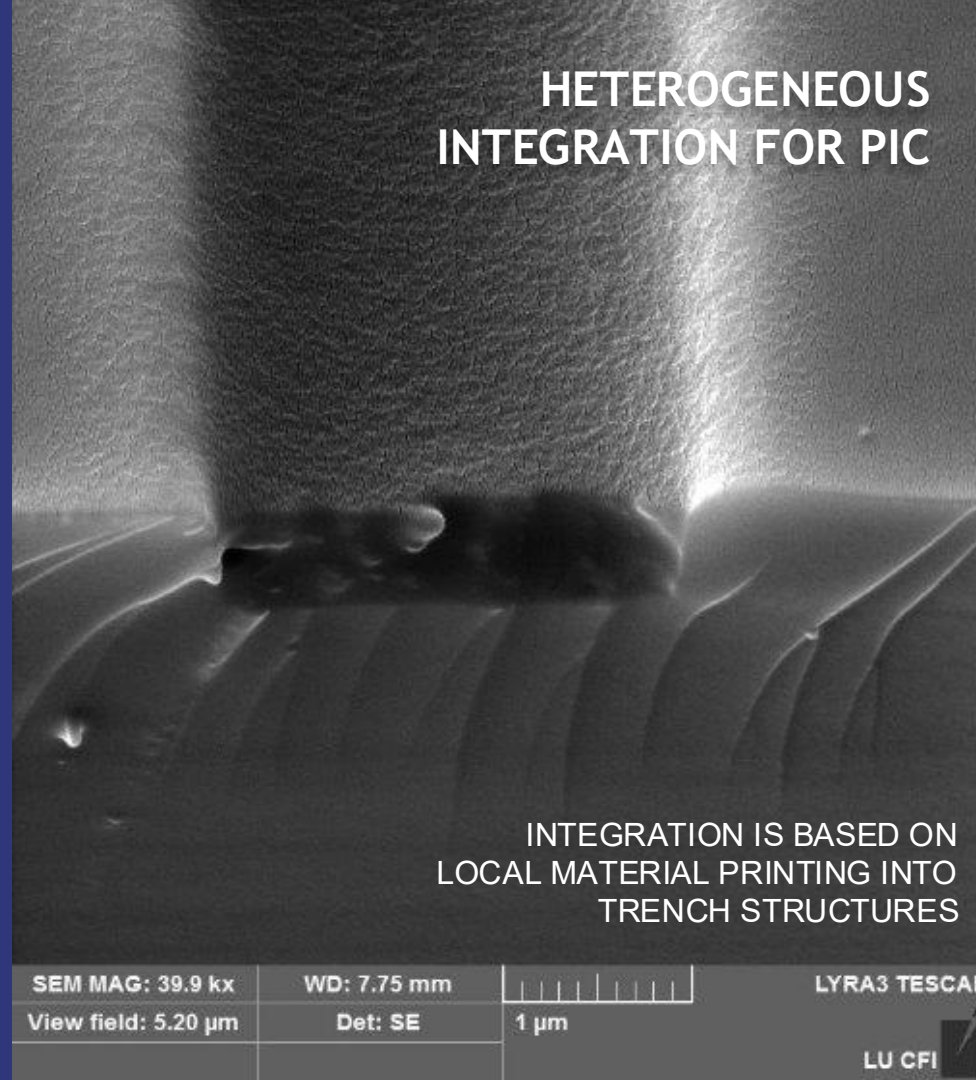


ToEQPL
Quantum Photonics

PHOTONIC INTEGRATED CHIPS (PIC) BASED ON POLYMER



HETEROGENEOUS INTEGRATION FOR PIC



INTEGRATION IS BASED ON
LOCAL MATERIAL PRINTING INTO
TRENCH STRUCTURES

SEM MAG: 39.9 kx

WD: 7.75 mm

View field: 5.20 μm

Det: SE

1 μm

LYRA3 TESCA

LU CFI

MATERIALS FOR ENERGY



Advanced Battery Research

Materials for lithium-ion and sodium-ion batteries for performance and enhanced sustainability. Ageing and Cycle Life Extension of battery materials and cells



Hydrogen Production & Catalysts

From recycled materials and methane pyrolysis; nanostructured catalysts for CO₂ reduction. FC test bed.

Materials for Energy Harvesting

Thermoelectric, piezoelectric, Photovoltaics



Next-Generation Semiconductors

Ultra-wide bandgap materials such as gallium oxide and germanium oxide for power electronics and UV photodetectors

Smart Functional Coatings

Industrial-scale roll-to-roll magnetron sputtering for photochromic, thermochromic, and electrochromic coatings



ONGOING RESEARCH IN ENERGY STORAGE

Projects



Inert protective coatings for NCM
Li-ion cathode active material

Energy storage in batteries and
hydrogen, smart energy grids

Carbon-based electrodes for
supercapacitors

Sustainably produced Li-ion battery
electrodes and cells

Aqueous Na-ion cell integrated with
thermoelectric generator

Low Temperature Ionic-liquid-based
Li-ion battery cells

Innovative catalyst and its regeneration
for clean hydrogen production
via methane pyrolysis

ERASMUS+ project
H2VE - GAP-101 194 163

2023-2027

2025-2029

2023-2027

2022-2026

2021-2025

2024-2025

2023-2026

2025-2029

Key partners



MICROFLUIDICS AND BIOSENSING PLATFORMS



Organ-on-Chip Technology

Models of human organ biology using 3D cell arrangements for drug testing and personalized medicine

Integrated Biosensors and Microfluidics

TEER, oxygen, carbon dioxide, and pH monitoring for cellular environments in real time

Extracellular vesicle

Microfluidic platforms for EV manipulation and quantitative sorting for label-free biomarker discovery

Blood stream

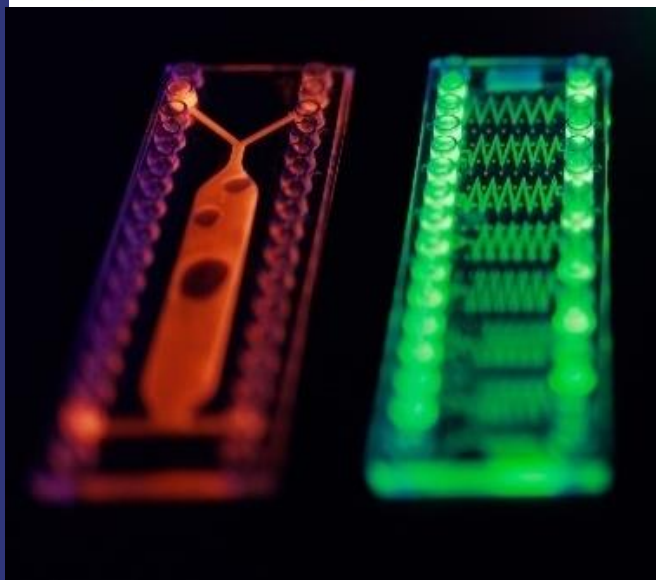
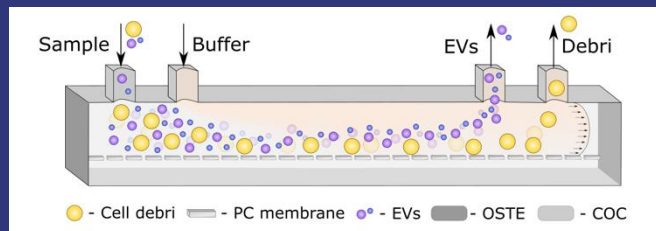
Blood in the microcirculation: combined experimental/in-silico models of flow, RBC mechanics, and the transport of external agents

Microfluidics Pilot Line

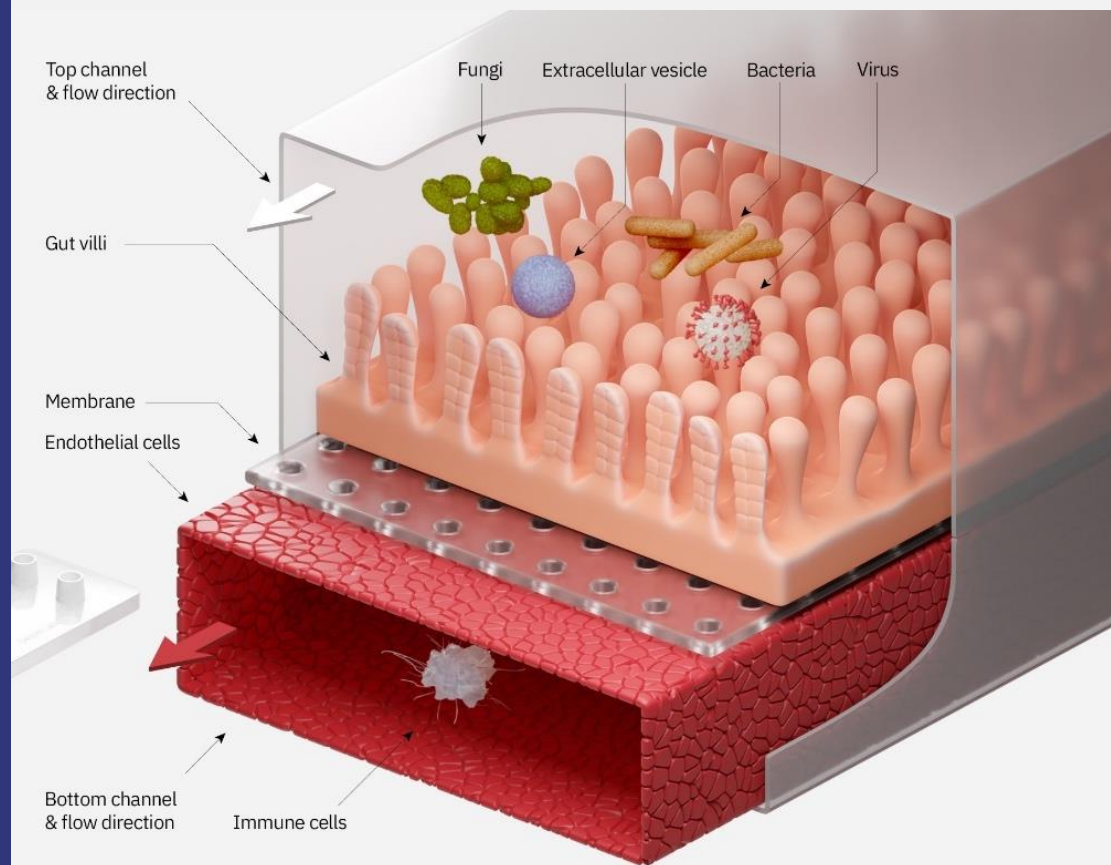
Offering design-to-prototype services in Baltic-Nordic region

Cellbox Labs

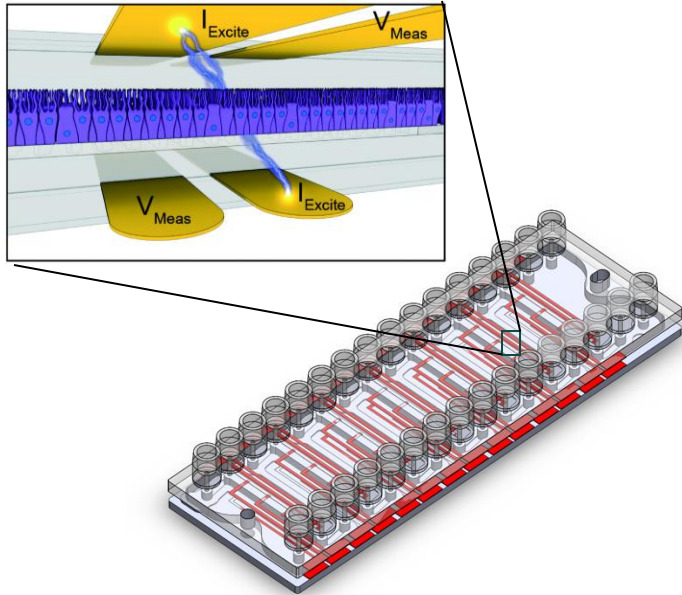
EXTRACELLULAR VESICLE SEPARATION



GUT-ON-CHIP MODEL



TRANS-EPITHELIAL/ ENDOTHELIAL ELECTRICAL RESISTANCE SENSOR



MICROFLUIDIC BLOOD VESSEL MODELS

