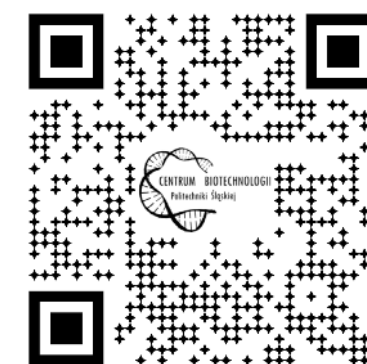


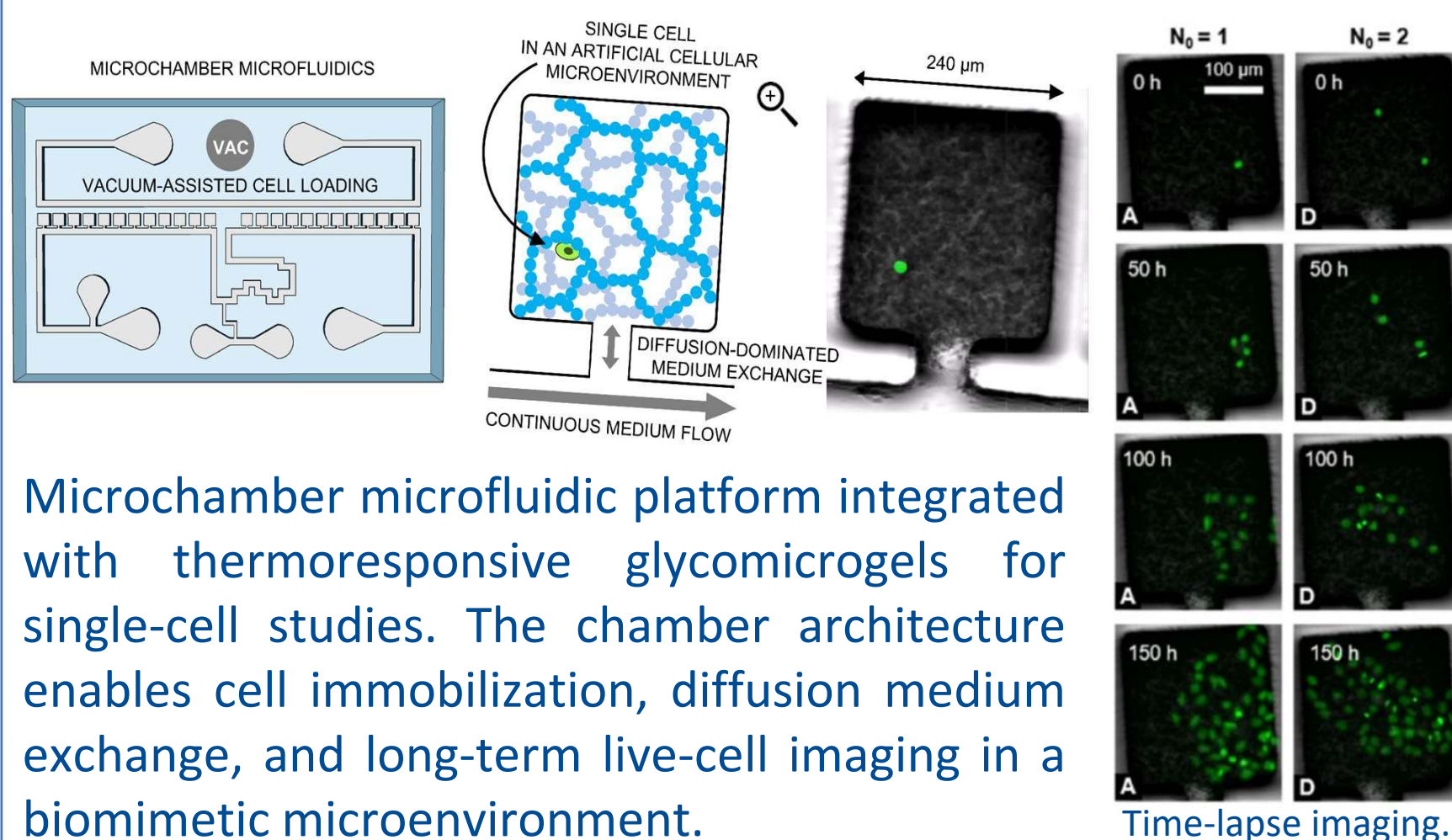


Emilia Witek-Żelazny, Zofia Bosowska, Alicja Stańczak, Olga Kocikowska, Weronika Losa, Piotr Bartosz, Sebastian Student / sebastian.student@polsl.pl



We study biological systems at the microscale using advanced microscopy. Our microfluidic systems enable drug testing and cell-based experiments in miniaturized, precisely controlled environments. Beyond experiments, we design, prototype, and fabricate custom 3D microfluidic devices, including laser-cut components produced using our in-house laser system. We also develop computational models and dedicated image analysis and system control software covering the entire path from idea to a fully functional device.

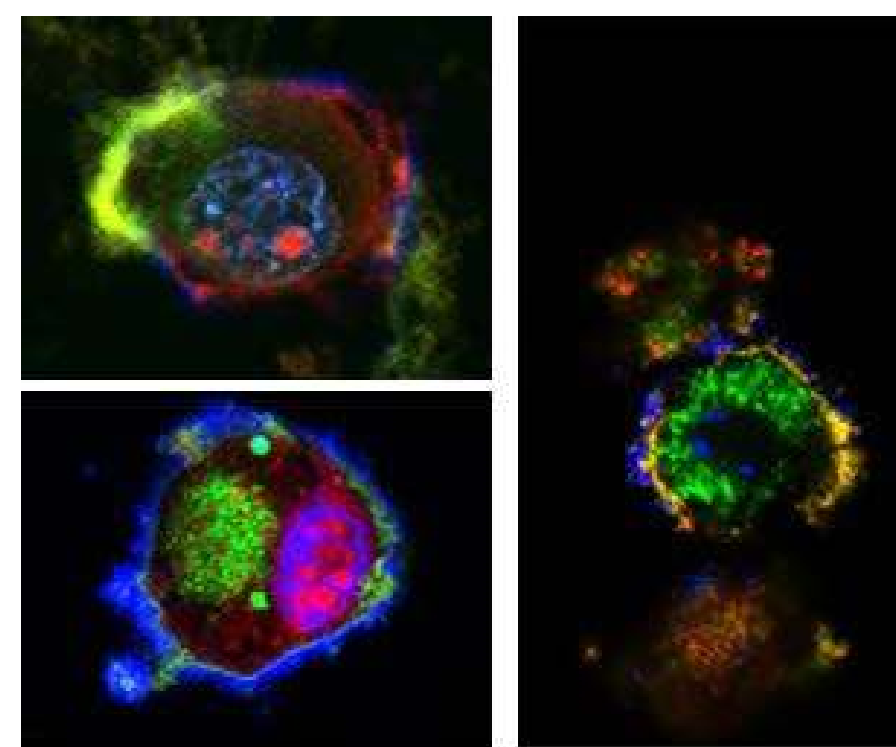
3D CELL CULTURE IN GLYCOMICROGEL MATRICES



Microchamber microfluidic platform integrated with thermoresponsive glycomicrogels for single-cell studies. The chamber architecture enables cell immobilization, diffusion medium exchange, and long-term live-cell imaging in a biomimetic microenvironment.

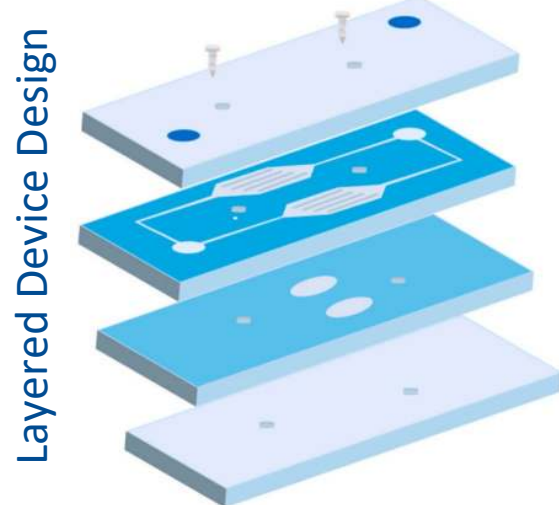
MICROSCOPY AND IMAGE ANALYSIS

- Brightfield, fluorescence and confocal microscopy
- Live-cell and time-lapse imaging
- 3D/4D visualization and reconstruction
- Automated image processing and quantitative analysis
- Cell morphology, proliferation and viability assessment

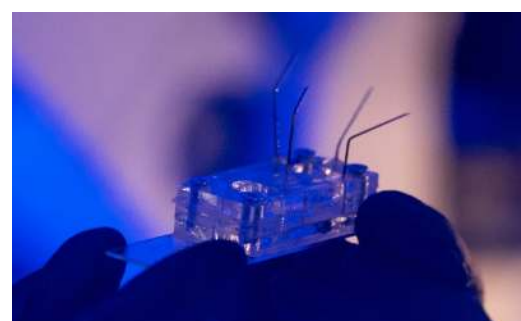
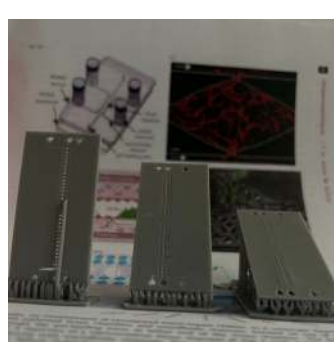
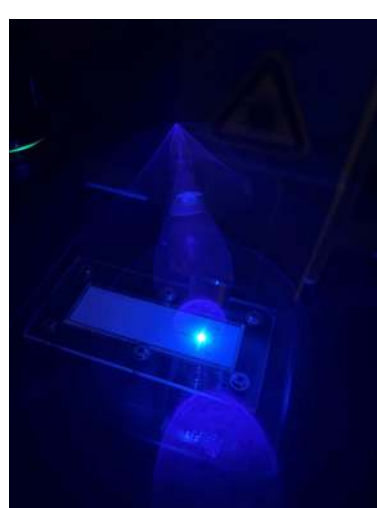


Fluorescence Imaging of Cellular Structures

LASER CUTTING, PROTOTYPING AND DEVICE FABRICATION



Custom-designed laser micromachining system enabling high-precision fabrication and prototyping of microfluidic device components. The platform allows the development of fully customizable solutions tailored to specific research and application needs.



In-house laser cutting platform

Fabricated custom devices.

Acknowledge



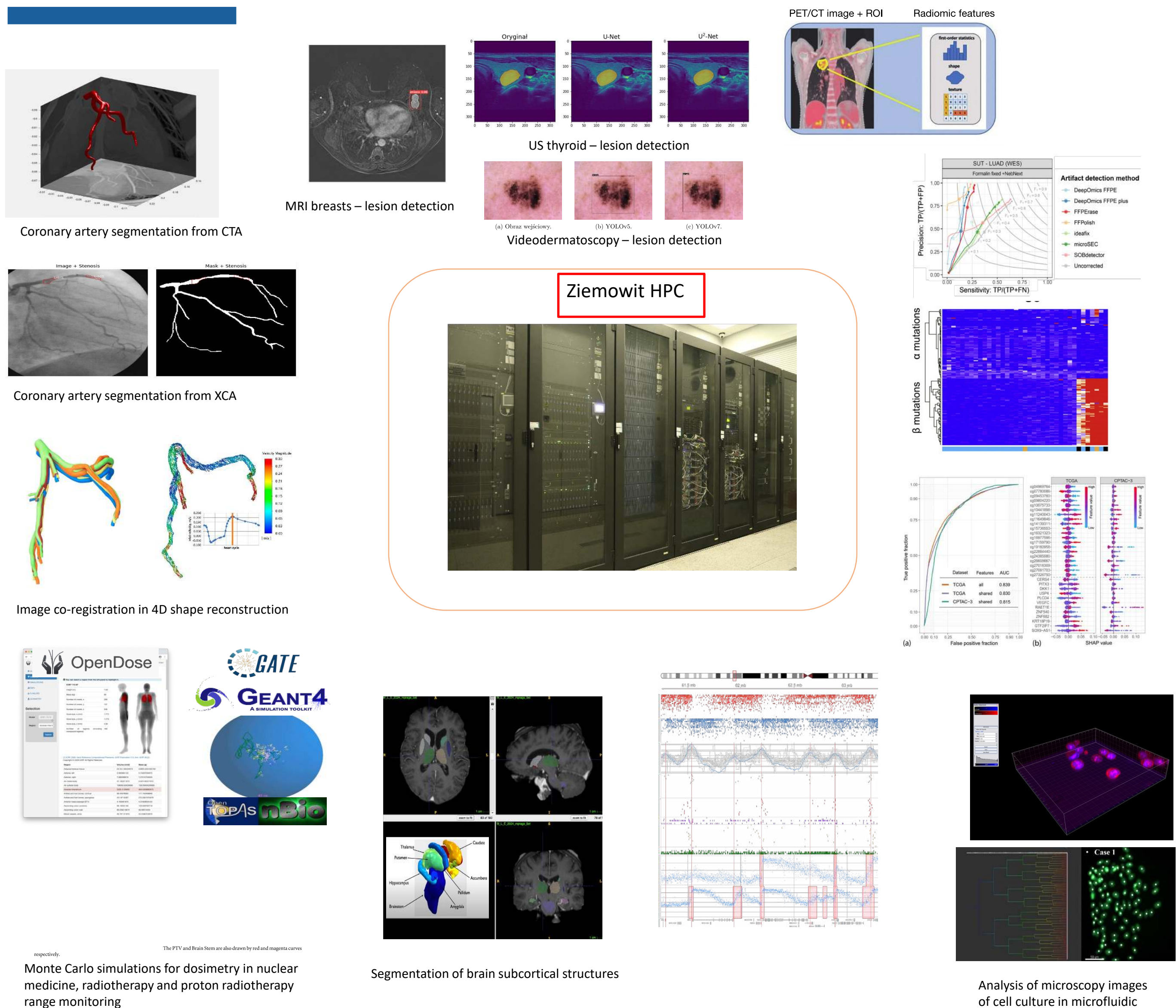
MEMBRANE-BASED CO₂ DELIVERY SYSTEM

Membrane-based CO₂ delivery enables stable gas exchange, improving control of the cellular microenvironment in microfluidic culture systems.

Damian Borys, Krzysztof Psiuk-Maksymowicz, Roman Jaksik,
Sebastian Student

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<https://www.polsl.pl/rau1/>

Our research group focuses on leveraging the computational power of the Ziemowit HPC cluster for advanced scientific applications. We specialize in large-scale processing and analysis of genomic data, medical imaging, and Monte Carlo simulations for medical physics and dosimetry. We also develop and accelerate deep learning and AI methods using modern hardware accelerators. By integrating high-performance computing with cutting-edge methodologies, we enable efficient and scalable solutions to complex biomedical and computational challenges.



Acknowledgments, our Partners and Co-operators: