



Multi-modal, configurable optical lab-on-chip platform for low-cost multipurpose diagnostics & monitoring



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Project overview

Challenge

Developing a miniaturized sensing platform that integrates different detection techniques for various applications, balancing contradictory specifications.

Solution

MultiLab addresses this challenge, by developing a modular multi-sensing platform compatible with wafer scale manufacturing that will integrate multiple sensing modalities to simultaneously detect biological and chemical targets for medical diagnostics and environmental monitoring



Objectives

SENSING MODALITIES

- **Develop ECL bio-sensors for Biomarker Detection**

Fabricate enzyme-based ElectroChemiluminescence (ECL) sensors on low-cost, all-graphite inkjet-printed 3-electrode cells for detecting biomarkers like lactate, uric acids, O₂ and H₂S.

- **Develop PA-AWG sensor**

Integrate an AI plasmonic waveguide in a Plasmonic augmented Arrayed Waveguide Grating (PA-AWG) module to enable simultaneous detection of proteins, miRNA and microorganisms with high scalability and cost-efficiency.

- **Develop mid-IR Photothermal Spectroscopy (PTS)**

Develop PTS sensors for label-free multi-component analysis in the mid-IR range, initially using Mach-Zender Interferometers (MZI) and exploring AWG integration for enhanced performance.

Integrate and validate multi-modality optical sensing platform

Create modular PICs with CMOS-compatible Si₃N₄ photonics and interchangeable bio-sensing modules, combining them with customized microfluidics to improve sensitivity and reduce measurement time.

Develop Machine Learning approaches

Use ML to analyze multiplexed sensor data, implementing advanced techniques.





Photonics Europe 2026

MultiLab was featured at SPIE Photonics Europe 2026 in Strasbourg through CYRIC's participation in the ECREAM cluster.

Photonics West 2026

MultiLab was presented also at Photonics Europe 2026, with the participation of ALPES LASERS, highlighting collaborative efforts in advancing photonics technologies.



4th Youth Tech Fest Cyprus 2026

MultiLab was showcased at the 4th Youth Tech Fest Cyprus 2026 in Limassol, where CYRIC engaged with students and young professionals through interactive discussions and demonstrations.



Contact

Wrapping up our fourth newsletter edition, we're thrilled by the progress within our MultiLab project.

With gratitude to our partners, we stride into the future, eager to pioneer advancements in medical diagnostics and environmental monitoring.

Stay tuned for updates as we revolutionize the field through technology and commitment.

CONTACT US



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@MultiLabproject



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