

# Optical Systems

Creator  
Developer  
Manufacturer



Bioimaging Use Cases from  
Custom Microscopy and Spectrometry Systems

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**LAMBDA-X** | HIGH-TECH  
INNOVATION

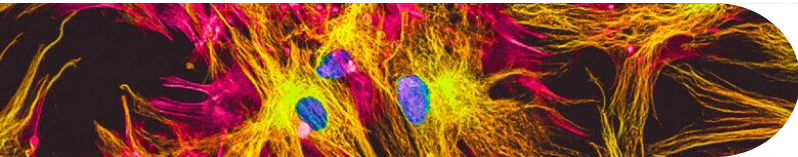
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# Explore widely - Cocreate - Derisk

## LAMBDA-X | HIGH-TECH INNOVATION

*“Optical Excellence, designed & built for You, designed & built for the Field”*

Active since  
**1996**

**30** projects each year  
**9M** € in 2022

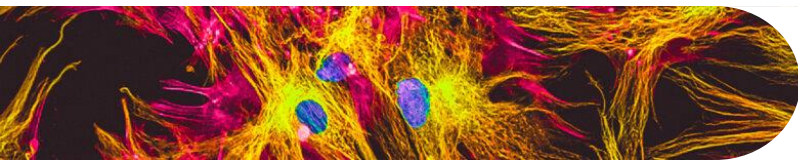
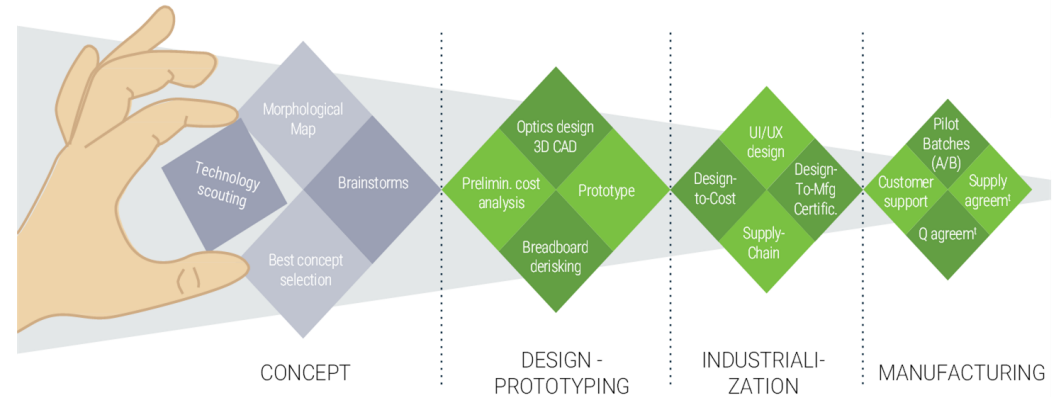
**45+** employees  
**300+** developments

**LAMBDA-X**  
SPACE & SECURITY

Space & security

**LAMBDA-X**  
INDUSTRY

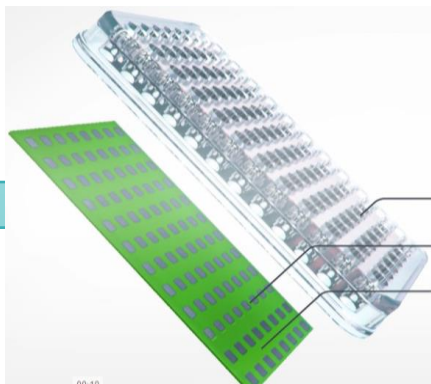
Medtech & Life Sciences  
Quality & Process Control



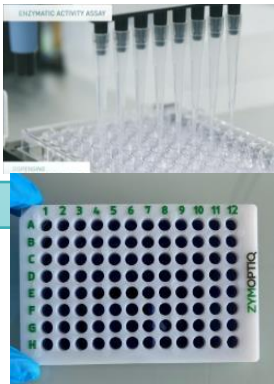
Bioimaging Use Cases from Custom Microscopy and Spectrometry Systems  
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# Case 1 – Custom microscope for enzymatic activity QPC

CONTEXT OF APPLICATION



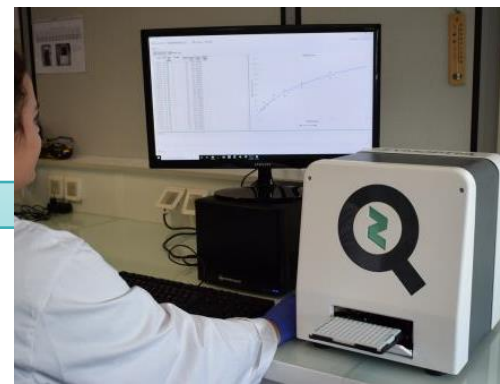
Biopolymer micro-structures on Si plate



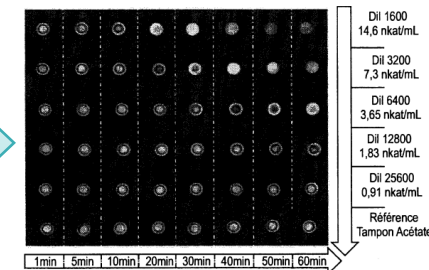
Solution dispense



React in incubator

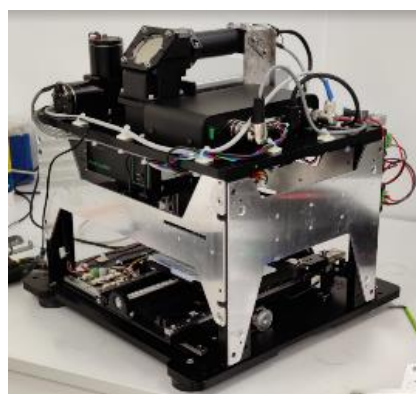


Microscope reads the results



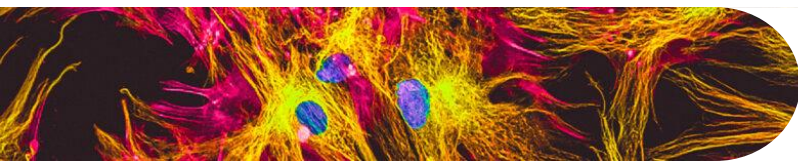
Analyze of optical pattern with software

LAMBDA-X DEVELOPMENT



CONTRIBUTIONS & CHALLENGES

- 3D imaging of biopolymers of specific shape
- Robust & reliable design, no instrument-to-instrument variation
- Design-to-cost & industrialization
- Advanced custom AutoFocus system
- OEM manufacturing in quantities 10~50/year






# Case 2 – MID-IR spectroscopy & imaging on biopsies



www.admir-analysis.com

CONTEXT OF APPLICATION

## ONCOLOGY



**ANATOMIC PATHOLOGY**  
Diagnosis, prognosis, therapeutics

(BIOPSIES / TISSUES / CELLS) \$3.7 B


- More tests each year
- Fewer anatomopathologists + 0.1% of the biopsies read + 25% results discrepancy
- ➔ Need for faster & more reproducible reading (biopsy analysis down to 1mn)
- ➔ Automated fast IR imaging

REF TECHNIQUE (LAB)

Infra-Red Technology inspired

**Fast Fourier Transform IR**

- Robust, proven for anatomopathology & microbiology
- Selective
- Well known



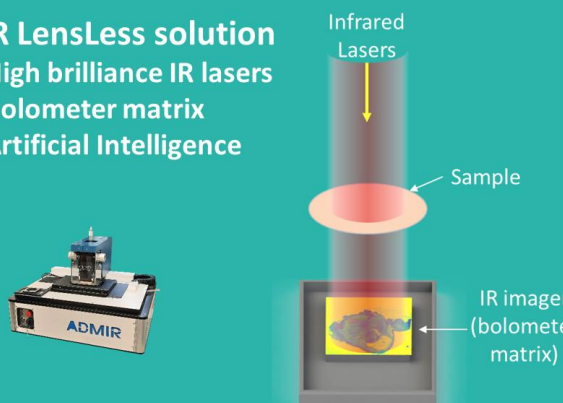
- Acquisition time: Hours

ADMIR TECHNIQUE (HOSPITAL)

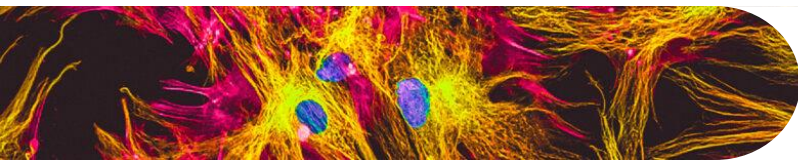
**ADMIR**

**D-FIR LensLess solution**

- High brilliance IR lasers
- Bolometer matrix
- Artificial Intelligence

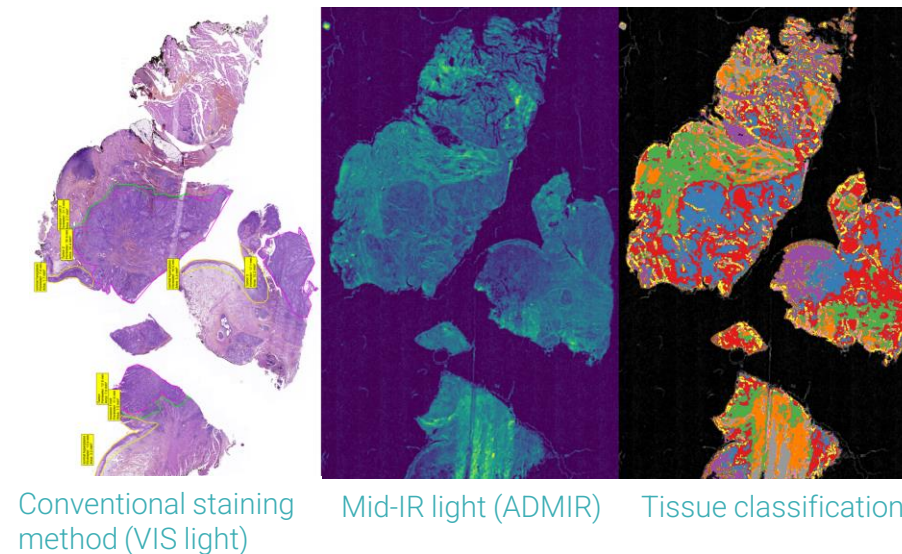
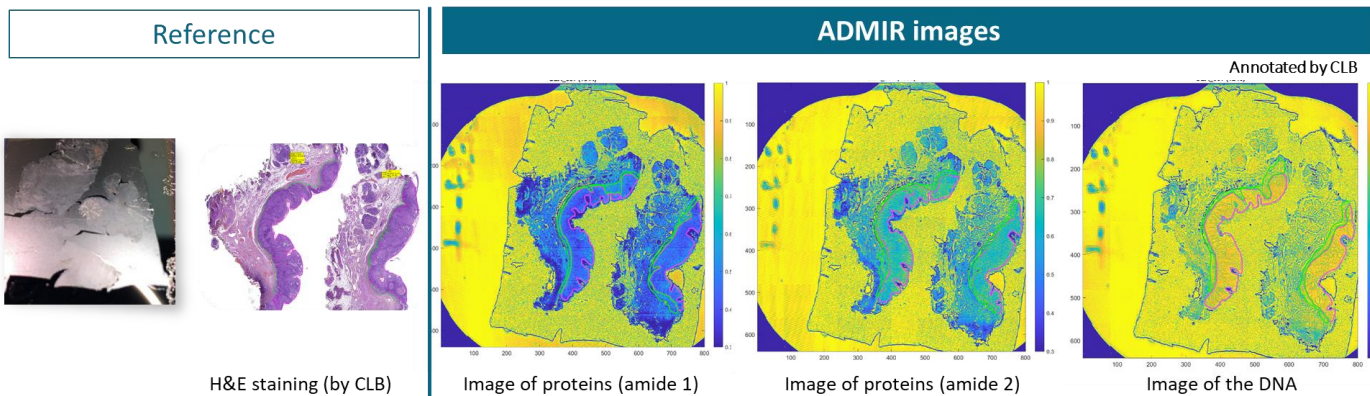


- Acquisition time < 20s - 1 min

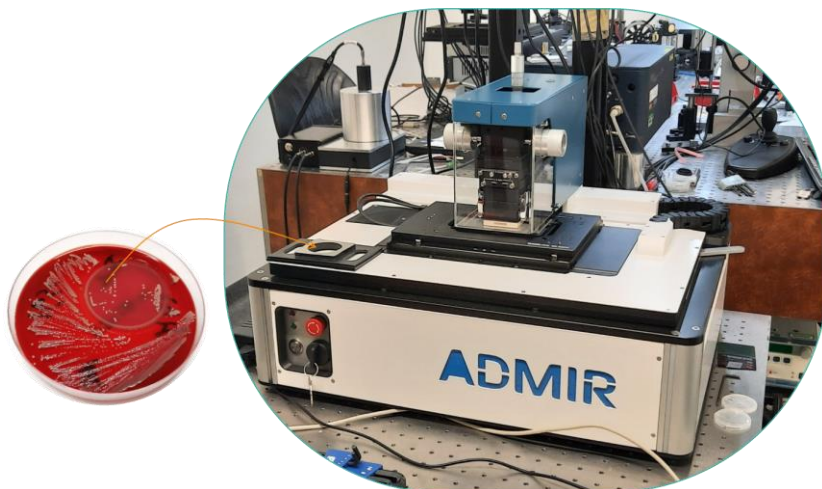


# Case 2 – MIR spectroscopy & imaging on biopsies

IMAGES

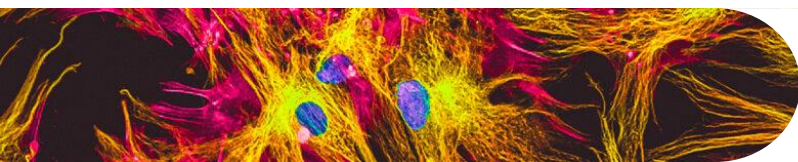


LAMBDA-X DEVELOPMENT



CONTRIBUTIONS & CHALLENGES

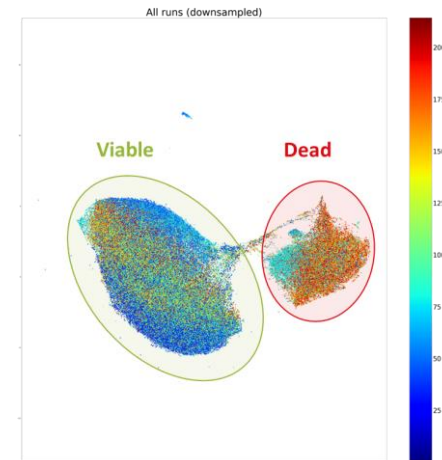
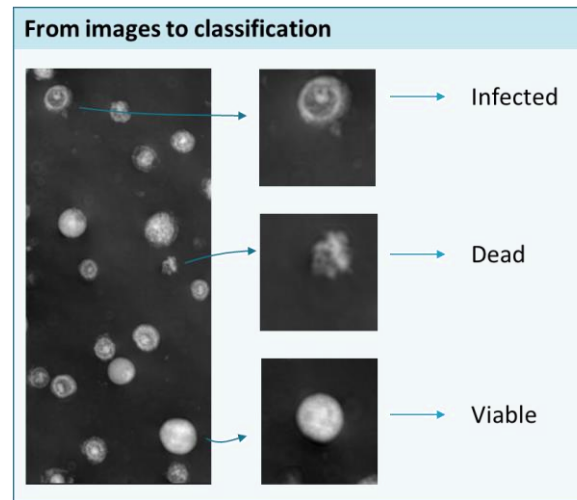
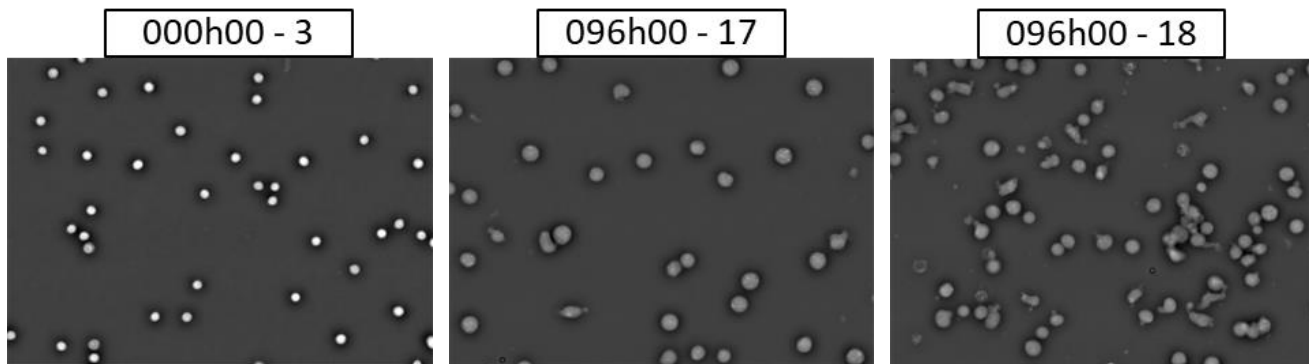
- MIR Spectroscopy + imaging
- Custom illumination box design & Mfg
- 8 multiplexed QCL sources (5-11 $\mu$ m)
- Manage speckles & reach homogeneous illumination ( $\pm 10\%$ )
- High enough SNR for fast measurements





# Case 3 – Cell expansion monitoring by label free 3D live imaging

CONTEXT OF APPLICATION

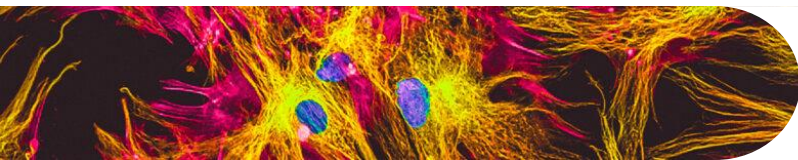


LAMBDA-X DEVELOPMENT



CONTRIBUTIONS & CHALLENGES

- On-line control of cell expansion in cell therapy
- Digital holography: self-calibrated, volumetric analysis, fast, real-time
- Microscope industrialization (full GMP and UL compliancy)
- OEM Manufacturing (200 units manufactured)



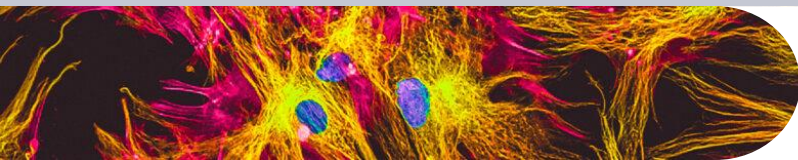
# EPIC questions

## What can we do for you ?

- Be your partner to innovate with optics
- Elaborate new product concepts in co-creation
- Derisk product development
- Test innovative components (lasers, others...)
- Provide OEM manufacturing capability in EN9100/ISO13485 environment

## What can you do for us ?

- Work on new bio-imaging applications with optics
- Propose innovative components for bio-imaging applications





# Thank you for your attention !

Thierry Emeraud

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MedTech & Life Sciences - QPC Industry

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INNOVATION