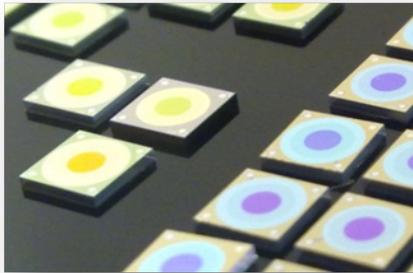


## Key technologies and know-how

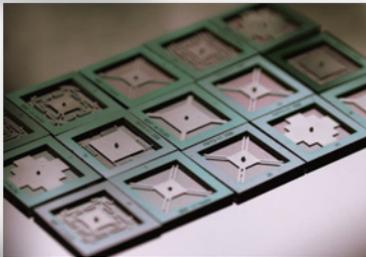
- MEMS and MOEMS technologies
- Optical coherence tomography
- Micro-mechanical actuators
- Micro-optical technologies
- High speed camera
- Heterogeneous integration
- Multi-wafer assembly
- 3D packaging

## Preliminary achievements

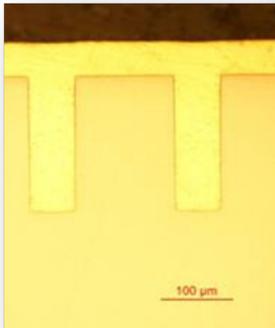


MEMS filters  
(VTT)

Microactuators  
(FEMTO-ST)



Trench filled by  
electroplating of Cu  
in structured silicon  
wafer for TSV  
application (ENAS)



## Consortium



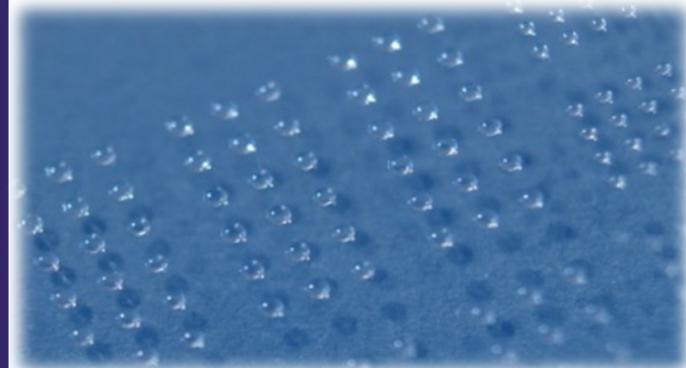
## Small & medium-scale focused research projects

Call FP7-ICT-2011-8



## Vertically Integrated Array-type Mirau-based OCT System

for early diagnostics of skin  
pathologies



1 October 2012 – 30 November 2015



## Framework

VIAMOS is a collaborative project (Small and Medium-scale focused research projects) funded by the European Union within the seventh framework program (FP7), Information and Communication Technologies (ICT). Its aim is to develop a miniaturized and low-cost OCT based instrument for early detection of skin pathologies. VIAMOS relies on 7 partners having complementary expertises in optical design, micro-optics, MEMS/MOEMS, electronics, dermatology and system integration.

**Project Funding:** 3 400 000 €

**Partners involved:** Université de Franche-Comté (FEMTO-ST Institute - *coordinator*, Faculty of medical and pharmaceutical sciences, CHRU) (France), VTT Technical Research Center of Finland, University of Stuttgart (Germany), Fraunhofer-ENAS (Germany), CSEM SA (Switzerland), DermoScan GmbH (Germany), Static SAS (France)

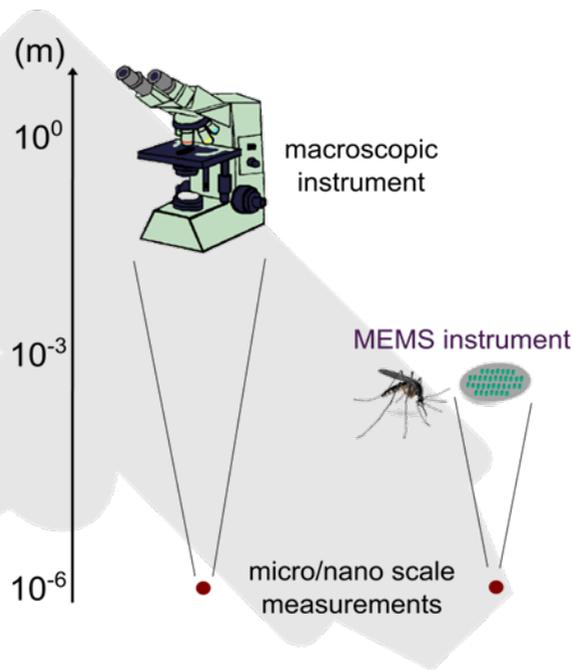
## Contact

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**Email:** christophe.gorecki@univ-fcomte.fr

## Website

<http://www.viamos.eu>



## VIAMOS approach

Skin cancer is the most commonly diagnosed type of cancer. Its early diagnosis is essential since it can be treated more effectively when detected earlier. Visual inspection followed by histological examination is, still today, the gold standard for clinicians. However, a large number of unnecessary surgical procedures are still performed.

New diagnostics aids are emerging including the recent techniques of optical coherence tomography (OCT) which permits non-invasive 3D optical biopsies of skin, improving patient's quality of life. Nevertheless, the existing bulk systems are expensive, only affordable at the Hospital and thus, not sufficiently used by physicians or dermatologists as an early diagnosis tool.

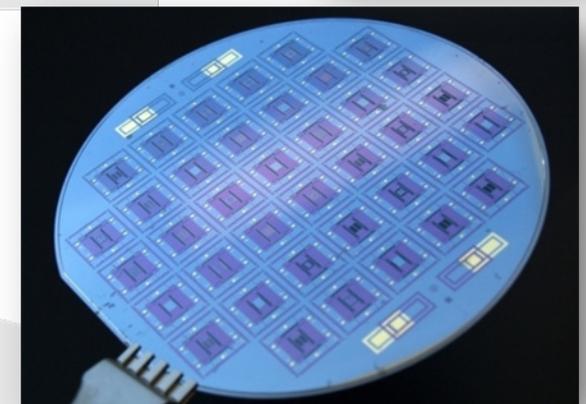
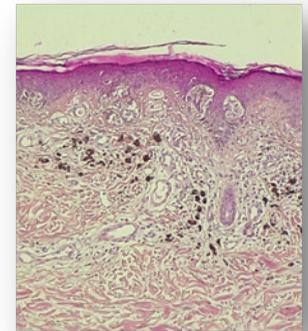
The goal of VIAMOS is to benefit from advanced MOEMS technologies, enabling a new generation of miniature and low-cost instruments.

## VIAMOS challenges & objectives

The challenge is to provide handheld, low-cost, fully parallel spectral domain miniature OCT devices (10 times cheaper, 150 times smaller), adapted for early diagnosis of cutaneous pathologies. The system will acquire full 3D images at video rate with a lateral and axial resolution of 5  $\mu\text{m}$ , a depth penetration >500  $\mu\text{m}$  and an imaging field of 10x10  $\text{mm}^2$ .

Thanks to its ability to deliver high-resolution 3D topography of skin with multifunctional modules, VIAMOS will propose an OCT microsystem able to revolutionize the field of microscopes for dermatology imaging, leading eventually to a decrease of the incidence of skin cancers worldwide.

Superficial spreading melanoma  
(histopathology, magnification 100, tumor thickness 300 $\mu\text{m}$ )  
(CHRU)



4-inch wafer micro-actuators (FEMTO-ST)