

A MULTIMODAL SYSTEM FOR BREAST CANCER

There is a clear need for an affordable and highly specific point-of-care system for substantially improved in-depth diagnosis of breast lesions.

SOLUS will develop a **multimodal tomographic system**, combining **diffuse optical tomography** and **ultrasound** to support the diagnosis of breast cancer.

More specifically:

- We developed an innovative high performance **smart optode** for in-depth diffuse optical tomography
- We are developing a **multimodal probe** combining the smart optode and ultrasound
- SOLUS will assess the **sensitivity**, spatial **resolution** and **quantitation** in laboratory settings
- The project will validate the multimodal system and demonstrate the advantages in **real clinical settings**

FOR MORE INFORMATION VISIT
WWW.SOLUS-PROJECT.EU



PHOTONICS²¹

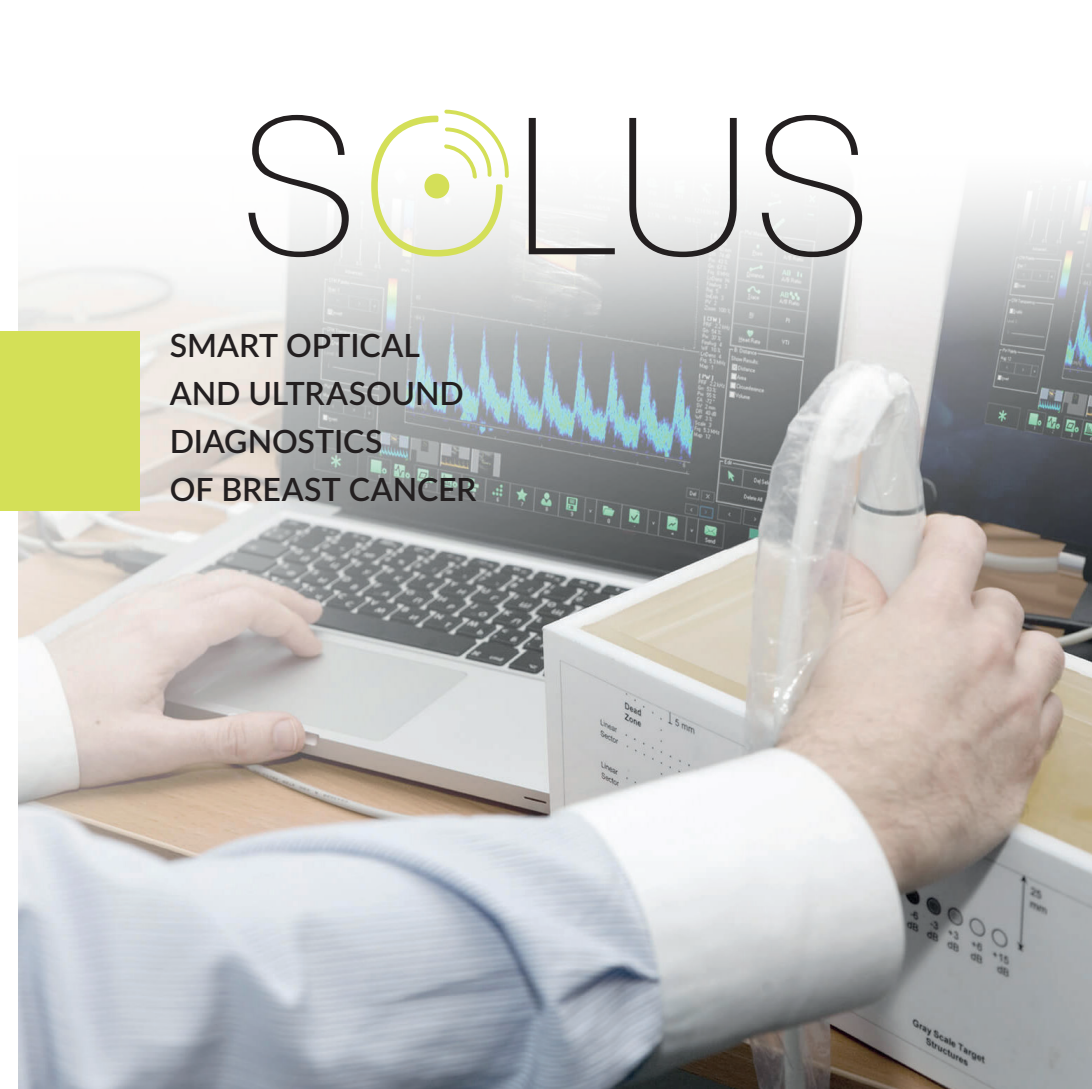
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731877.

The SOLUS project is an initiative of the Photonics Public Private Partnership.

www.photonics21.org

SOLUS

SMART OPTICAL
AND ULTRASOUND
DIAGNOSTICS
OF BREAST CANCER



RATIONALE BEHIND THE SOLUS PROJECT

Early diagnosis of breast cancer is essential to ensure a high chance of survival. Diagnostic tools with high sensitivity and specificity are crucial for early detection.

Currently, large-scale screening programmes result in a significant number of false positive cases, leading to unnecessary invasive procedures like biopsies or surgery, which have a negative impact on the patient's quality of life and are a burden on healthcare systems.

There is a clinical need for a non-invasive diagnostic tool to achieve a more specific breast diagnosis.

IMPACT OF SOLUS

SOLUS develops an affordable point-of-care system, which achieves substantially improved breast cancer diagnosis and avoids unnecessary biopsies.

The improvement in the characterisation of breast lesions also leads to higher specificity in non-invasive breast cancer diagnosis. Women receiving a negative report will be spared unnecessary additional examinations.

The SOLUS system will allow more effective treatment and therapy management. New and improved therapy response prediction and monitoring enable personalised decision-making, therapy planning and optimisation for each patient. This also contributes to a significant decrease of total cost of breast cancer diagnosis.

OUR RESULTS AND ACHIEVEMENTS SO FAR

The project is currently integrating newly developed components into a SuperSonic Imagine Aixplorer® to form the SOLUS demonstrator.

So far we have developed:

- A fast, compact laser system
- A time-gated single-photon detector
- A smart optode
- Highly automated image processing and reconstruction algorithms
- Design of the multimodal probe
- Multimodal phantoms for optical tomography and ultrasound
- A protocol for testing the SOLUS system



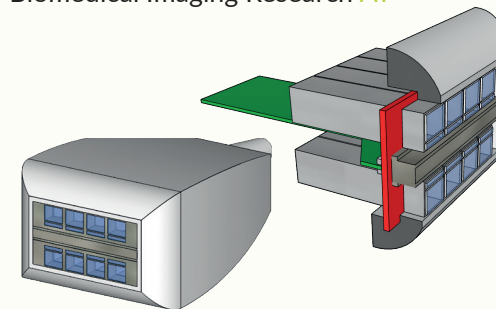
Image of a SuperSonic Imagine Aixplorer® Ultimate

FACTS AND FIGURES

SOLUS is a **four-year project** coordinated by Prof. **Paola Taroni** (POLIMI) running from November 1st, 2016 to April 30th, 2021. The project receives **€3,815,260** in funding under the Horizon 2020 research and innovation programme and is an initiative of the Photonics Public Private Partnership.

The consortium consists of **9 partners** from **5 European countries**:

- POLIMI** Politecnico di Milano **IT**
- CEA** French Alternative Energies and Atomic Energy Commission **FR**
- SSI** SuperSonic Imagine **FR**
- Vernon** Vernon **FR**
- UCL** University College London **UK**
- MPD** Micro Photon Devices **IT**
- OSR** San Raffaele Hospital **IT**
- EIBIR** European Institute for Biomedical Imaging Research **AT**
- iCH** iC-Haus **DE**



Mockup of the multimodal probe with an ultrasound transducer and the smart optodes