

MId- to NEaR infrared spectroscopy for improVed medical diAgnostics

MINERVA is a project funded by the European Commission through its Seventh Framework Programme (FP7).

MINERVA aims to develop mid-infrared (mid-IR) photonic technology to improve early cancer diagnosis and increase survival rates. The mid-IR covers the so-called “fingerprint region” of the spectrum, which allows the identification of many fundamental bio-molecules such as fats, proteins and carbohydrates. These compounds can provide important new information which may be used for disease diagnosis.

BUT

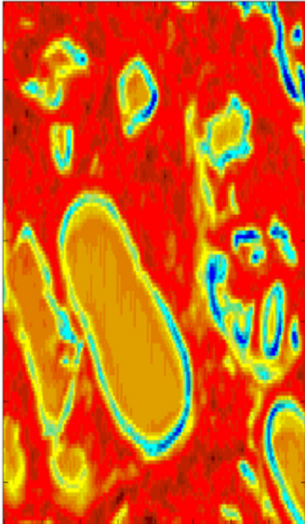
Identifying “cancer markers” is NOT sufficient. In the early stages of disease, the biochemical changes are very difficult to detect. A more subtle imaging technique is necessary: multivariate analysis.

MINERVA brings together experts from several disciplines to tackle this new technology development:

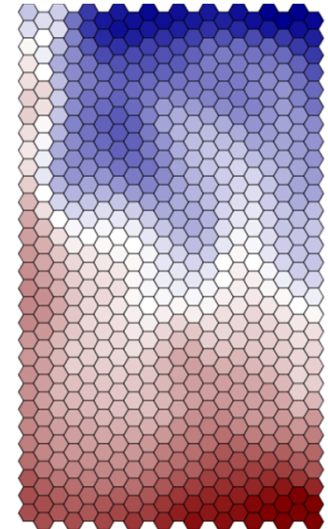
- Photonics: fibre, sources, detectors & components
- Medical: multivariate diagnostic algorithms, tissue interactions, data handling and visualisation

Two important applications are targeted:

- Rapid high volume pathology screening
- Skin cancer identification for human body surfaces.



*Image of prostate tissue using mid-IR.
[Courtesy of University of Exeter.]*



*Schematic of correlation mapping output.
[Courtesy of Glos. Hospital NHS FT]*

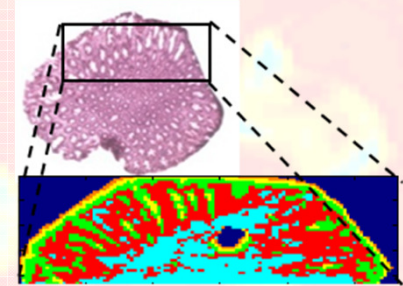




Photonic hardware

- Mid-IR optical fibres
- Mid-IR components
 - Fused couplers
 - AO modulators
 - Calomel crystals
- Ultra-long wavelength supercontinuum sources
 - 1.5-4.5 μm (ZBLAN)
 - 1.5-5.5 μm (InF_3)
 - 4-12 μm (chalcogenide)
- Novel pump lasers
 - 2.9 μm and 4.5 μm
- Detectors
 - T2SL technology.

Please visit the website for more information and to sign up for the newsletter!



Applications

- Skin cancer identification
 - Rigid probe for human skin examination
 - Identification of altered cells & lesions
- High volume automated pathology screening
 - Microscope-based hardware module
 - Rapid analysis of disease-specific chemical signatures
 - Discrimination of abnormal cells.

