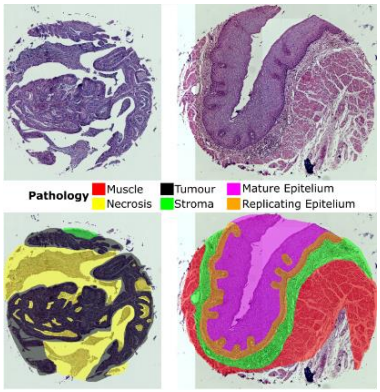
Centre of Applied Photonics

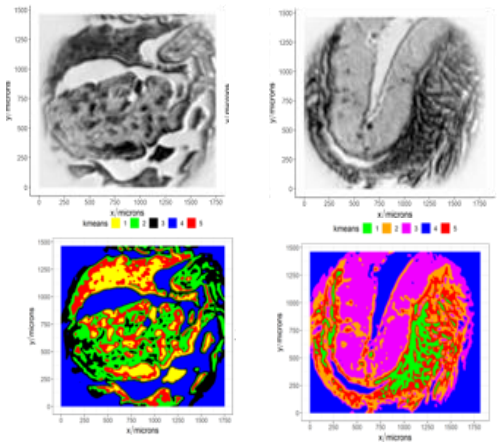
Technical University of Denmark

Mid-IR hyperspectral imaging

- Imaging the chemical composition of complex objects



Figur 1. A cancerous (left) and non-cancerous (right) H&E stained biopsy annotated by a pathologist.



Figur 2. Adjacent biopsies analysed by computer assisted, staining-free hyperspectral imaging in the 3-4 µm range. Note that colours in figur 1 and figur 2 do not match.

Value Proposition

The mid-IR wavelength range, including wavelengths from 2 µm – 25 µm is excellent for vibrational spectroscopy. The vibrational spectrum provides a specific chemical fingerprint, which can be used to identify the molecular composistion of an object or scene. Mid-IR spectroscopy enables:

- ✓ Identification of complex molecules (such as tissue, food, plastics)
- ✓ Access to the strongest absorption bands of gasses for high sensitivity gas sensing (such as CH_4, CO_2, NO_X, SO_X)
- ✓ Measurements of heat from room temperature objects

Business Opportunity/Commercial Perspectives

The technology can find applications in several fields:

- Computer assisted, label-free biopsy diagnostics used at hospitals and clinics
- Environmental or combustion gas sensing, where high sensitivity is needed, e.g. when a gas is found in low centration
- Uptimisation or inspection of chemical processes, e.g. pharmaceuticals.

Technology Description

We have developed a novel mid-IR detector hyperspectral imaging set-up, that enables high sensitivity mid-IR detection at room temperature. Normal mid-IR detectors are noisy, slow or requires cryogenic cooling for demanding applications.

Development Phase/Current State

The technology is ready for implementation in many cases. In other cases, like for mid-IR cancer biopsy screening more development and research is needed.

Note: We have established a start-up company, NLIR (NLIR.com) that may be best owner for certain products.

The inventor
Christian Pedersen
DTU Fotonik

Different patents and patent applications exits. Contact DTU.

Contact Information
Christian Pedersen
DTU Fotonik
+45 46774508
chrp@fotonik.dtu.dk

Seeking

- Funding/Investors
- Partner/Research Collaboration