Monitoring

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EPSRC Engineering and Physical Sciences Research Council
The University of Nottingham UNITED KINGDOM · CHINA · MALAYSIA
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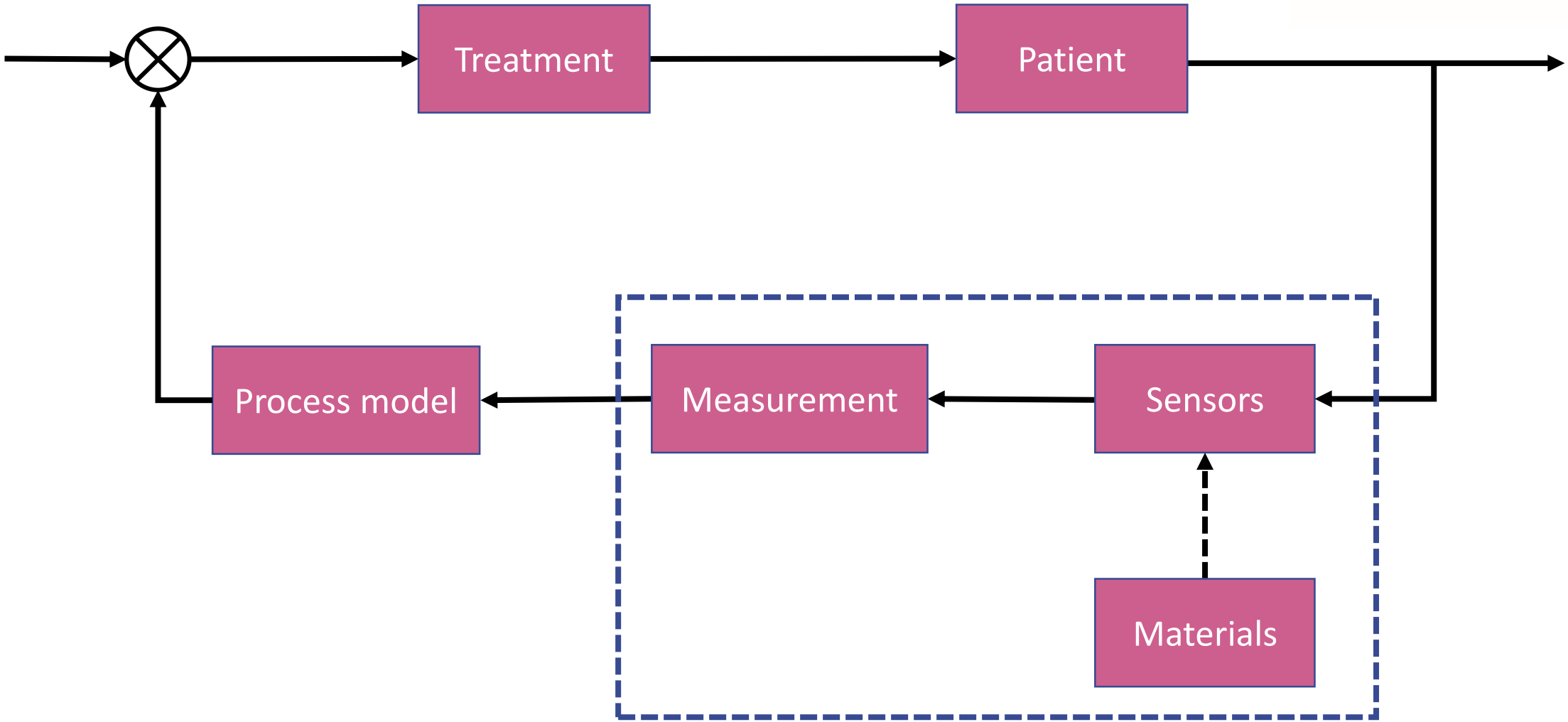
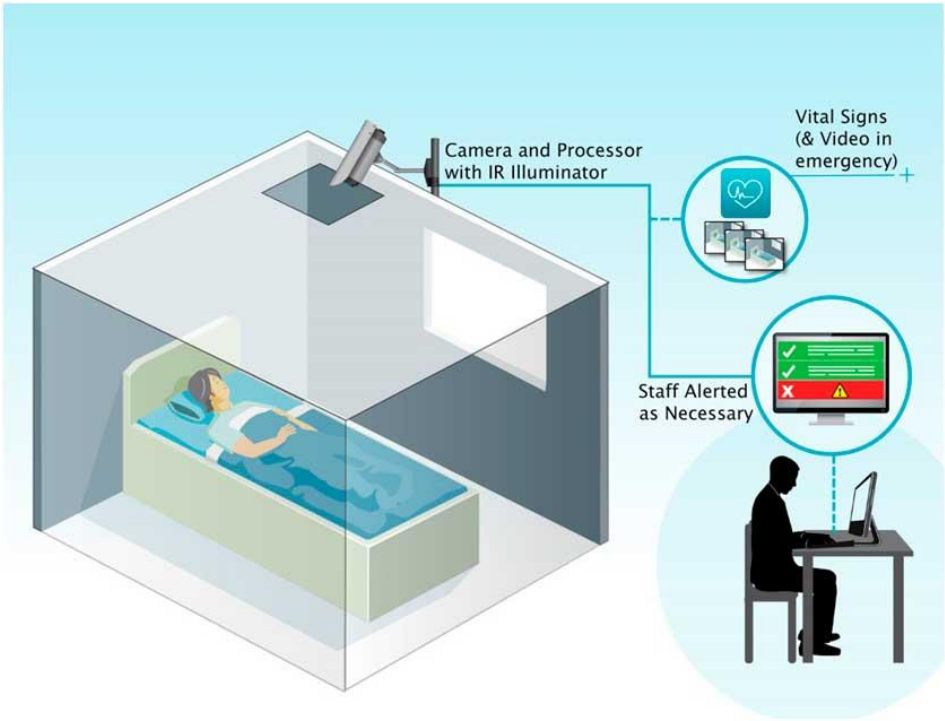
Monitoring


Treatment
Patient
Process model
Measurement
Sensors
Materials

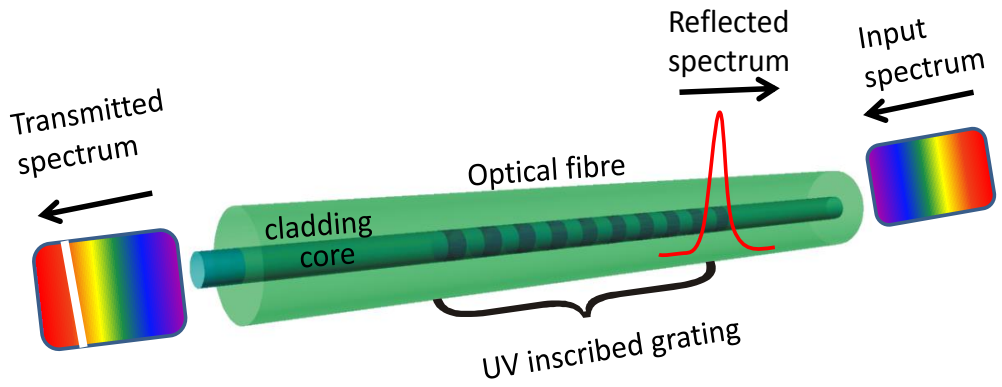
Commercially available

ICU highly instrumented e.g. controlling propofol based on EEG

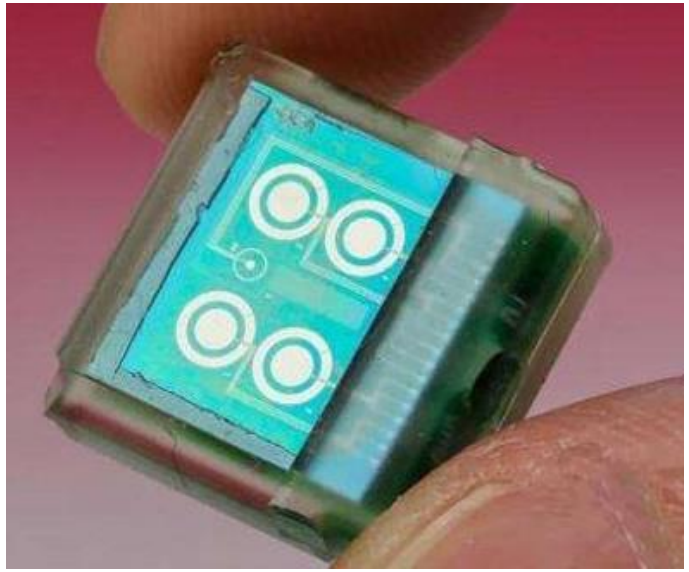
Cameras + image/signal processing to extract vital signs and e.g. oxecam



New sensors – sensing platforms



doi:10.1038/nature12314

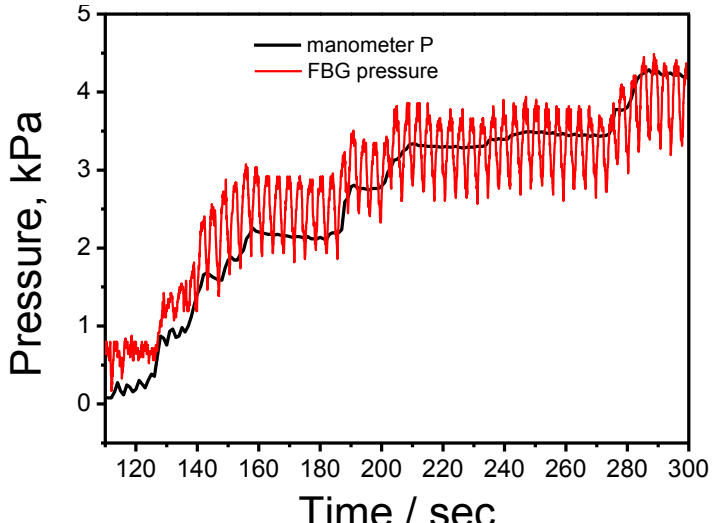


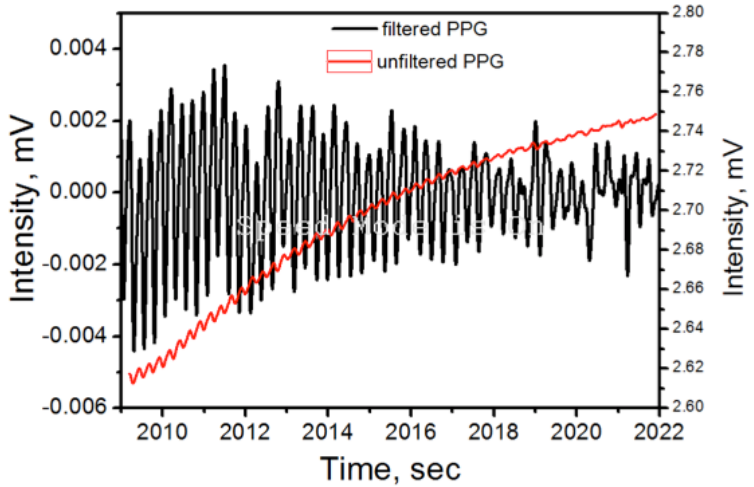
Modifications to provide physical and biochemical sensing

Other platforms electrochemical, implantable

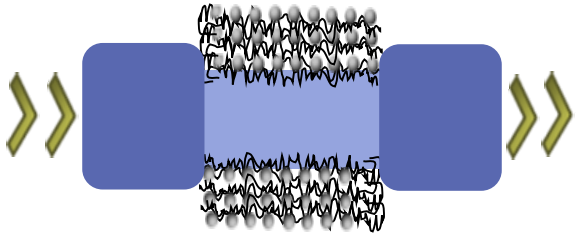
Optical fibre sensing examples

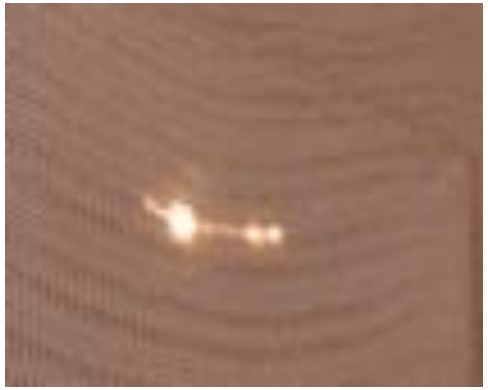
- Monitoring in critical care, endotracheal tubes

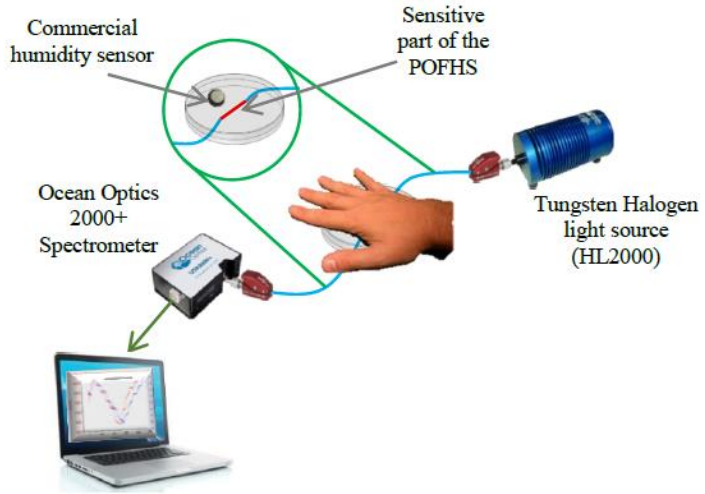


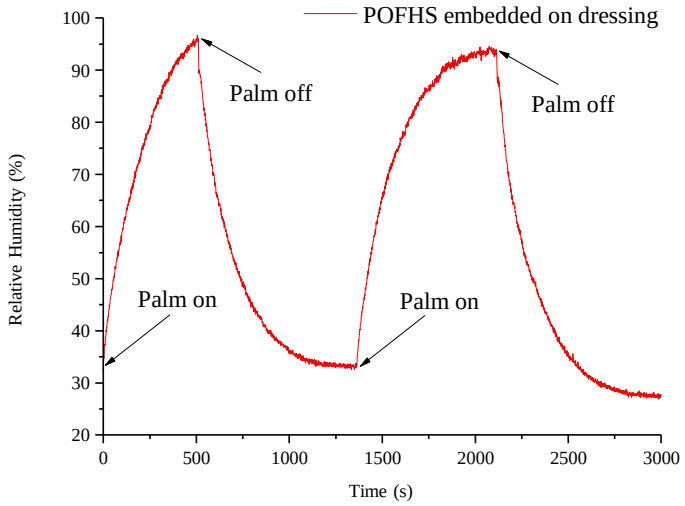


Optical fibre sensing examples





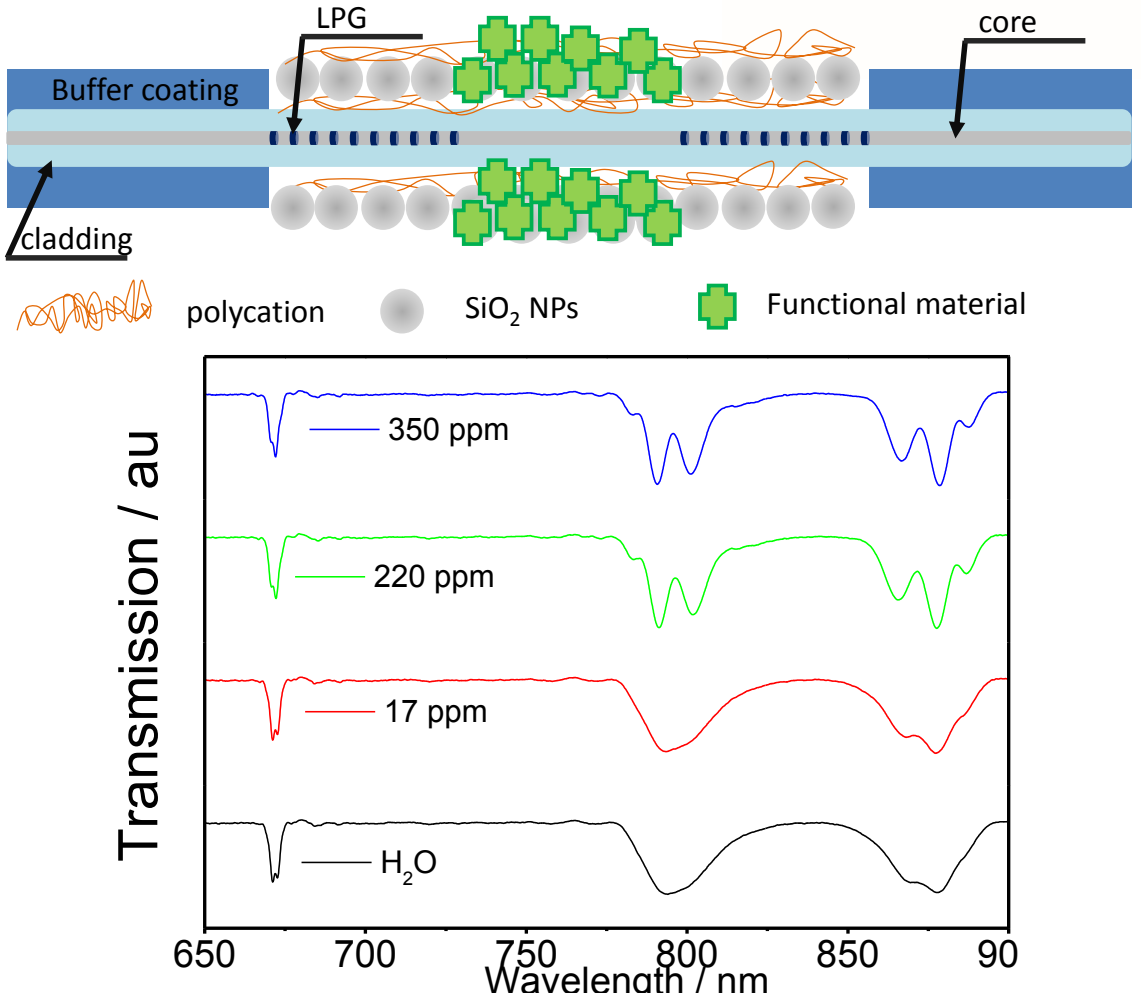




Wound care

Optical fibre sensing examples

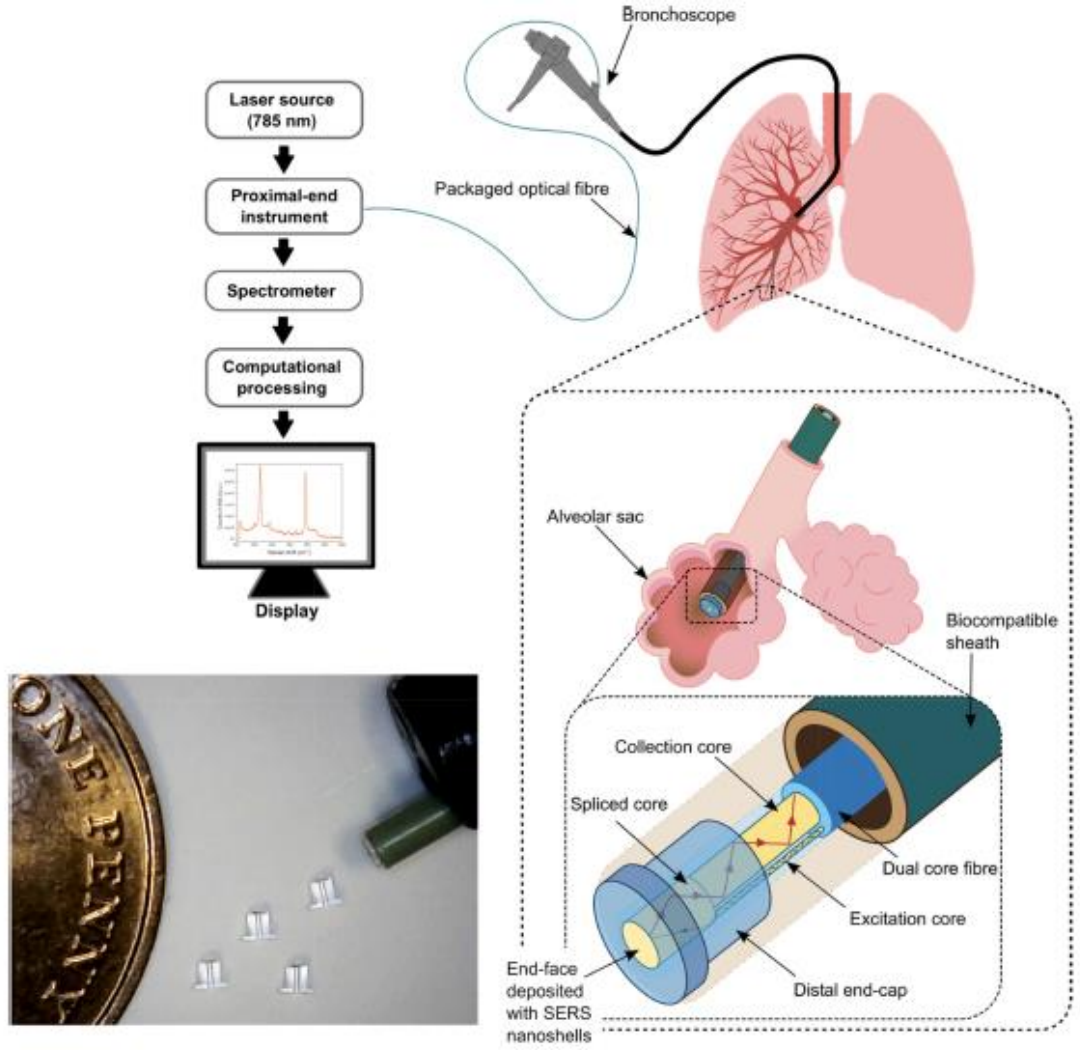
Disease	Biomarker
schizophrenia	pentane, CS_2 [1]
angina pectoris	CO
hyperbilirubinemia	CO [2]
diabetes (type 2)	acetone
asthma	NO
liver diseases	OCS, NH_3
lung cancer	VOCs
Helicobacter pylori infection	CO_2 (urea breath test)



Breath analysis, lung cancer diagnosis

Optical fibre sensing examples

Lung diseases,
fluorescent probes



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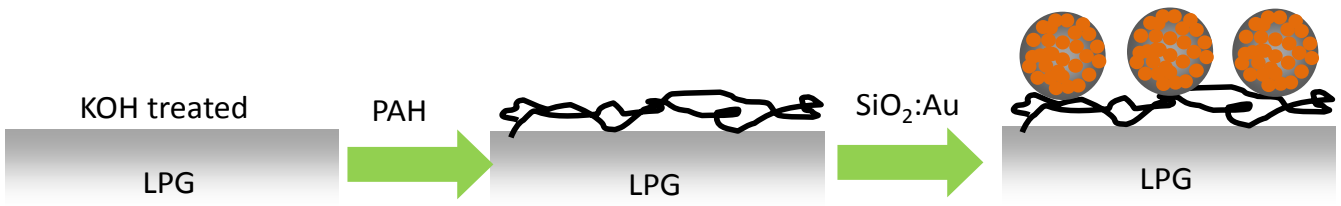
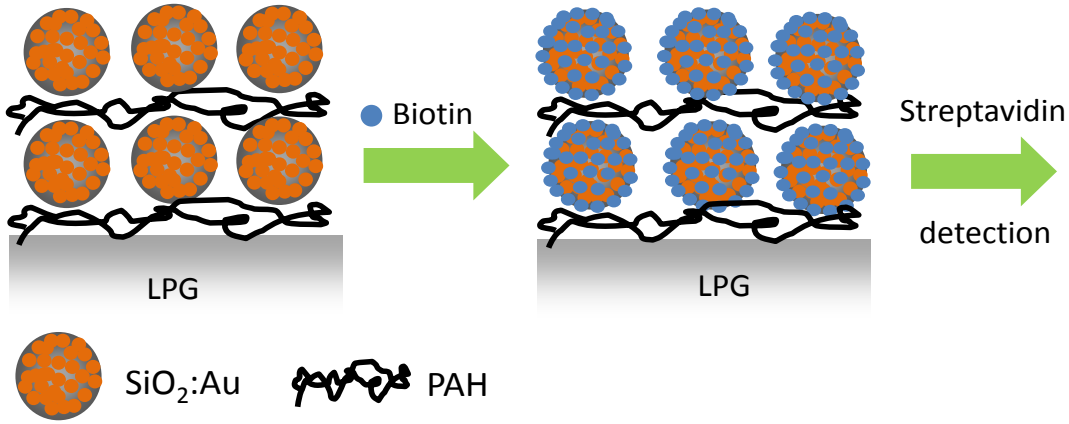
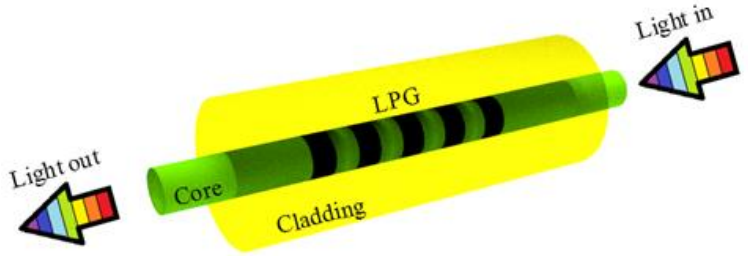
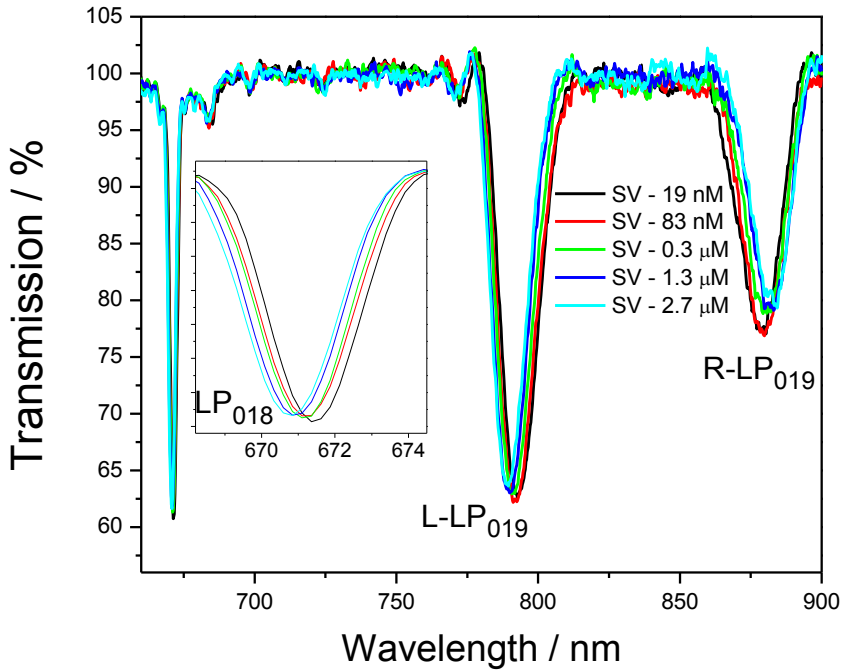
PROTEUS

Functionalising









- Protein example
- Different materials enable sensing of different biomarkers in blood, breath, urine, saliva

Summary

- Commercial sensors
- Sensing platforms
- Functionalising sensor