



pioNIRS

Photonics for Health



Light and Biological Tissue

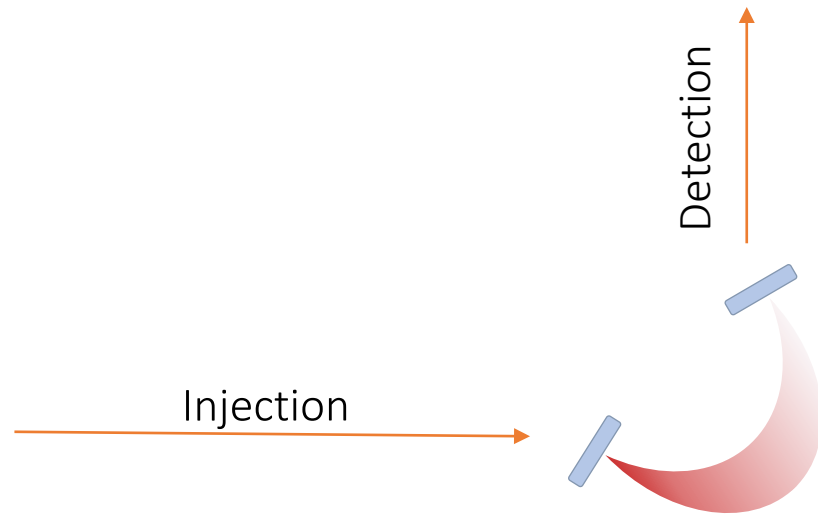
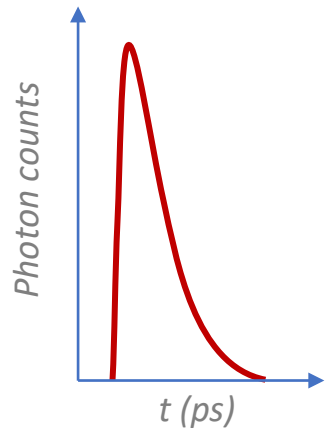
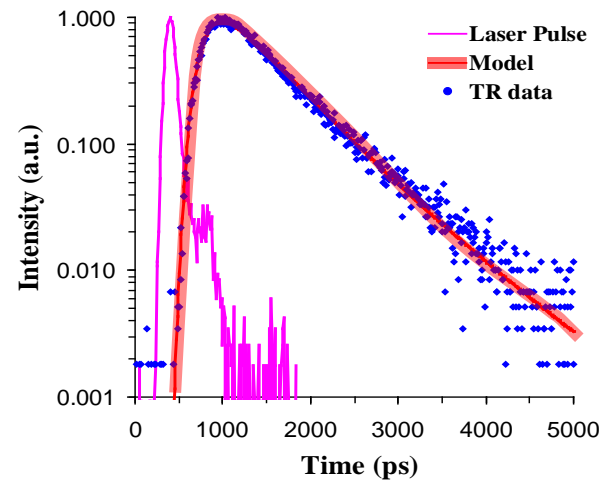


Georges de la Tour – “Joseph the Carpenter”, 1642



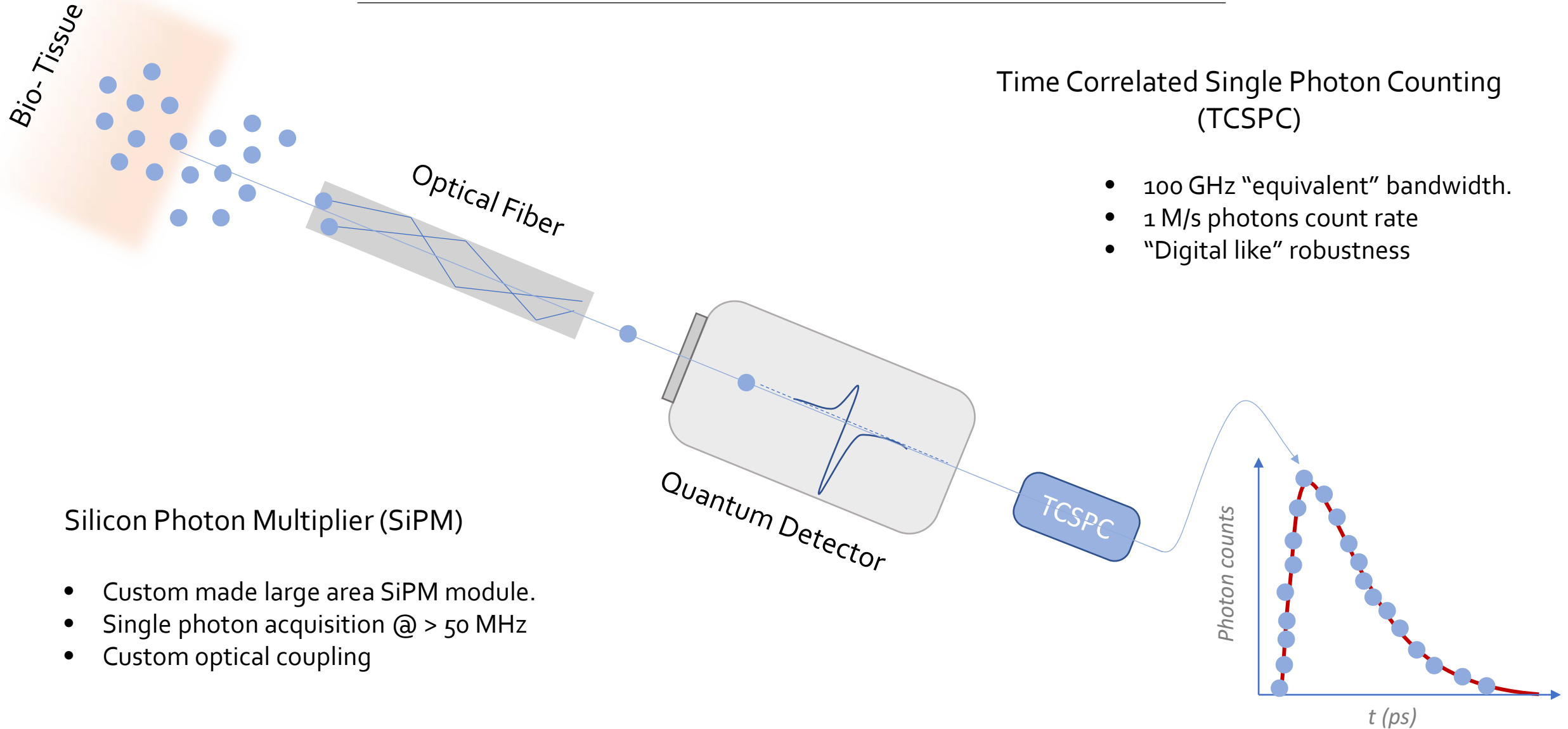
J. Wright of Derby “Two boys with a bladder”, 1769

TD-NIRS time domain near infrared spectroscopy



O₂Hb
HHb
SO₂

Quantum Detector and TCSPC



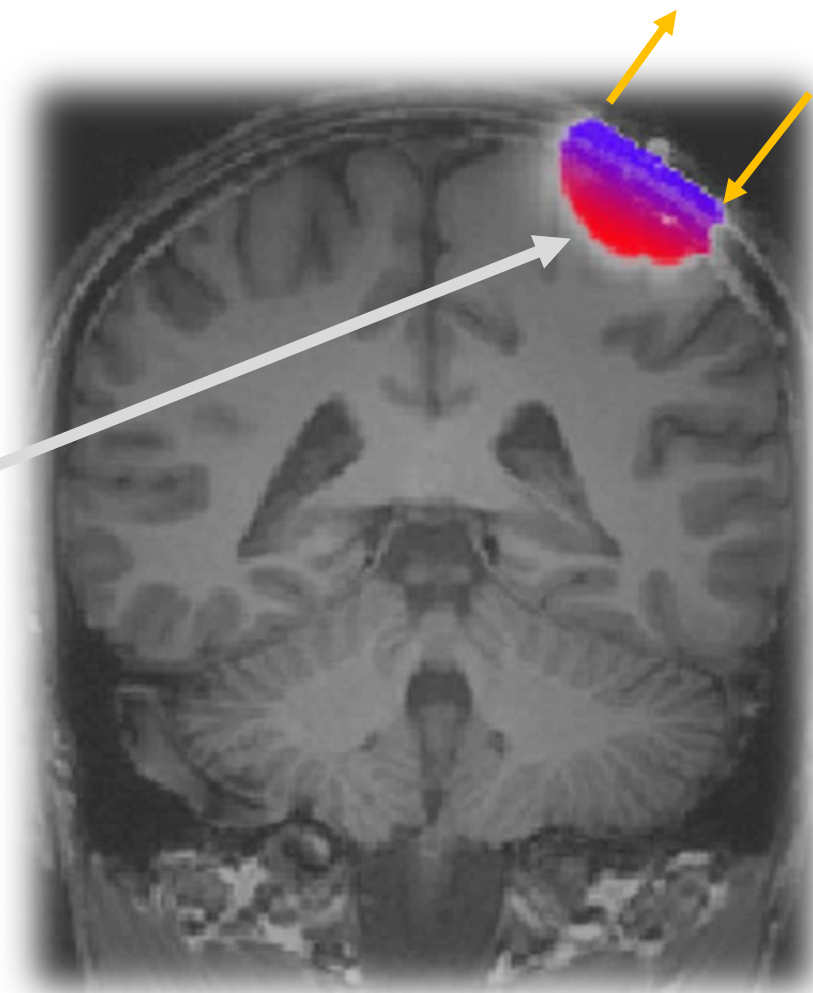
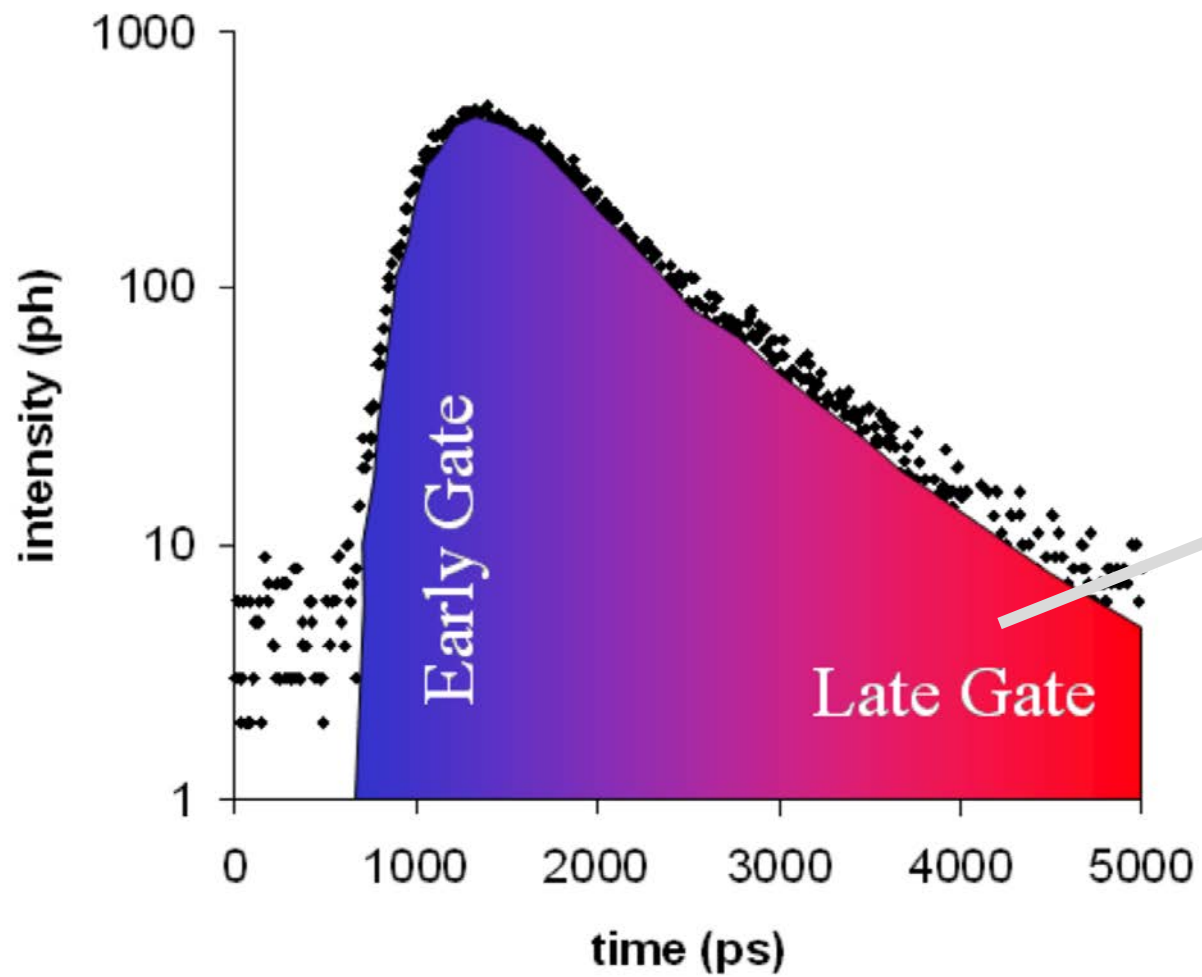
Time Correlated Single Photon Counting (TCSPC)

- 100 GHz "equivalent" bandwidth.
- 1 M/s photons count rate
- "Digital like" robustness

Silicon Photon Multiplier (SiPM)

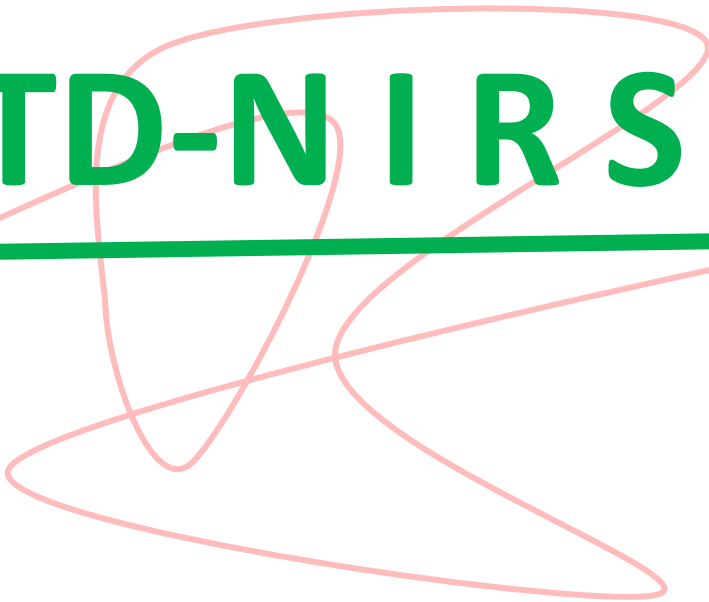
- Custom made large area SiPM module.
- Single photon acquisition @ > 50 MHz
- Custom optical coupling

TD - NIRS





TD-NIRS



COST COMPETITIVE

NON-INVASIVE

CONTINUOUS MONITORING

MRI/PET

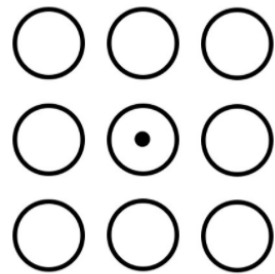
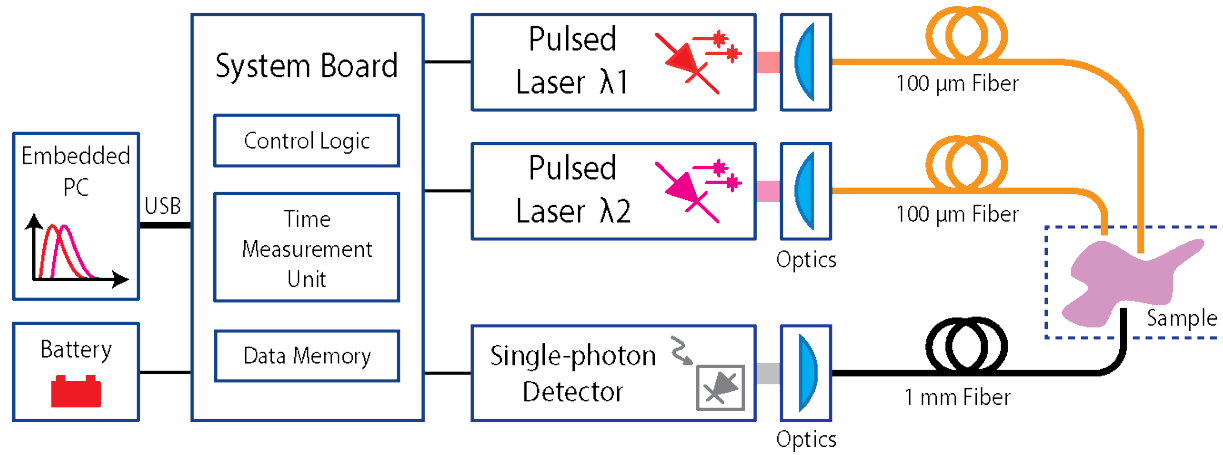


VS.

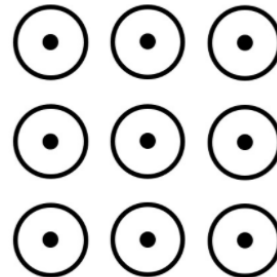
TD-NIRS



NIRS-box



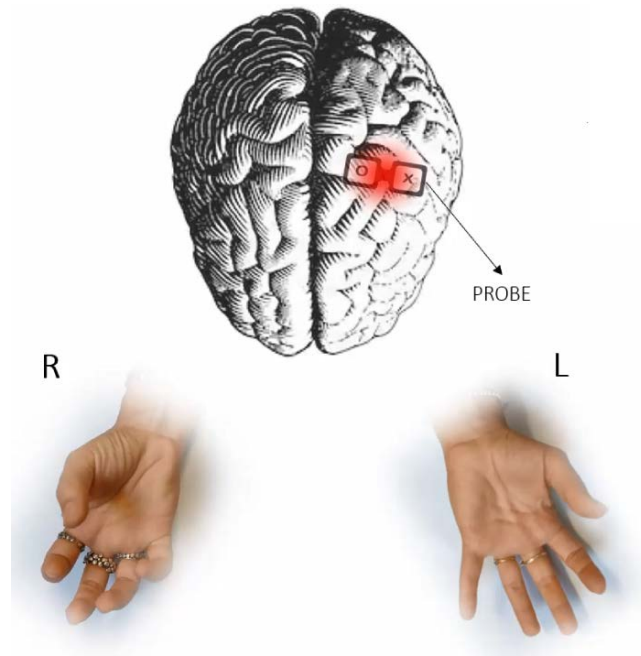
Accuracy



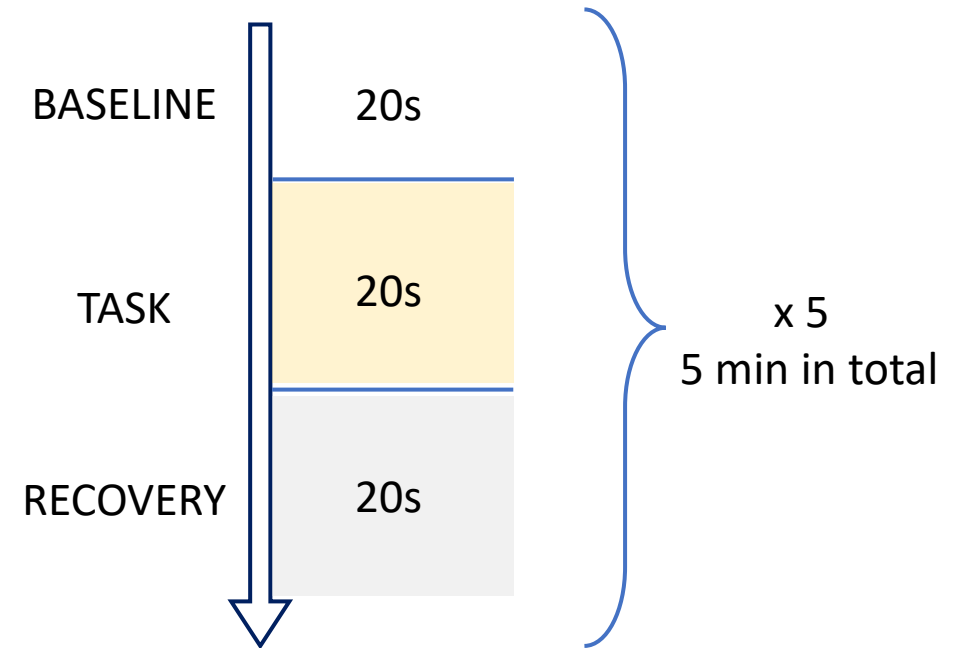
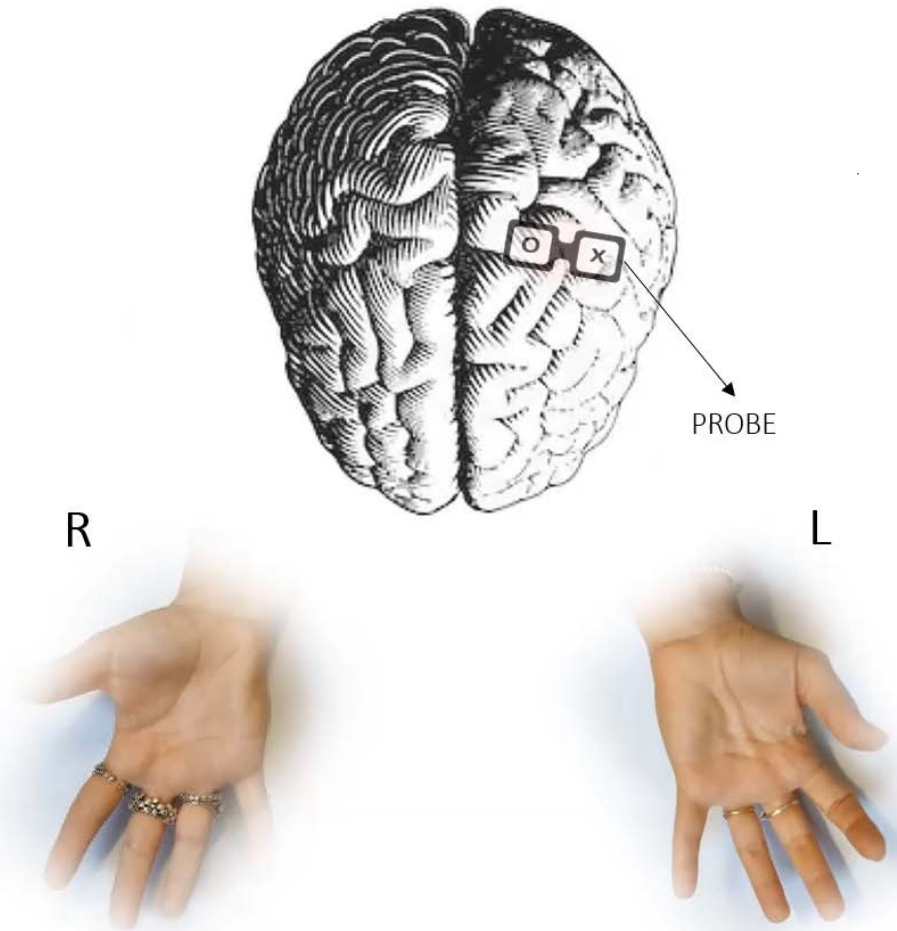
Reproducibility

“ Where compactness meets accuracy. ”

PRECISE



FUNCTIONAL CEREBRAL ACTIVATION



SAFE



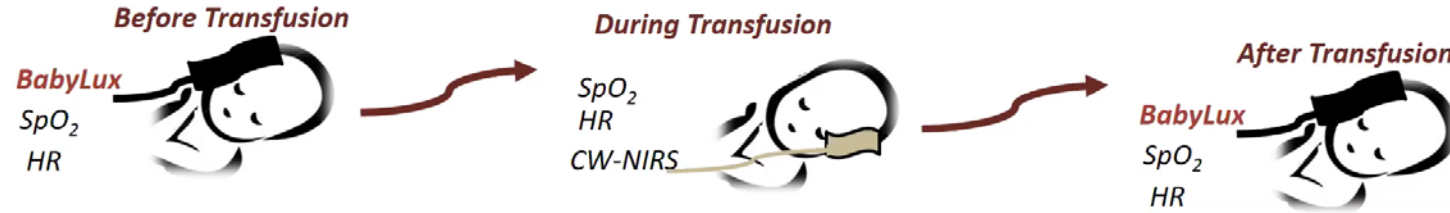
Photo by [Colin Maynard](#)



BabyLux Transfusion Project



90% of extremely low birth weight infants receive red blood cell (RBC) transfusions to **improve oxygen delivery and enhance cardiac output**



$$\text{BabyLux: } StO_2 + BFI \rightarrow CMRO_2$$

AIM: threshold values to decide when transfusion is needed

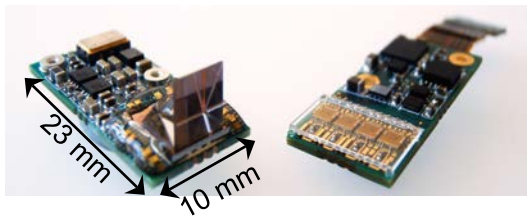


Cerebral Metabolic Rate of Oxygen Extraction

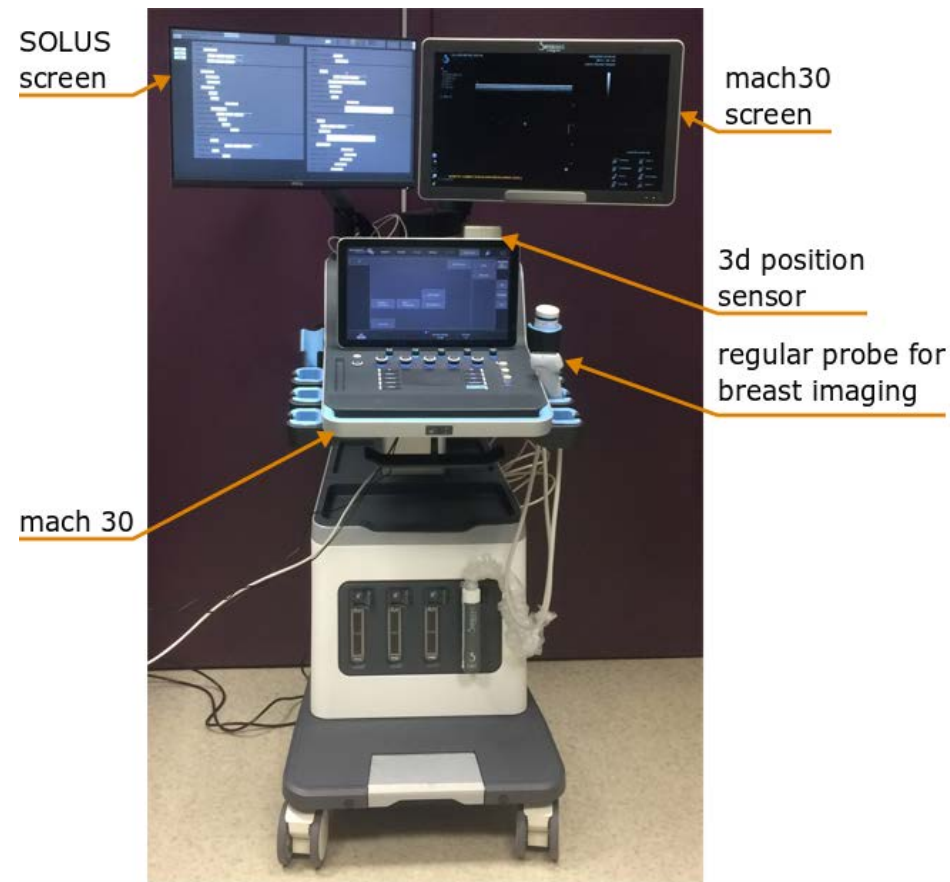
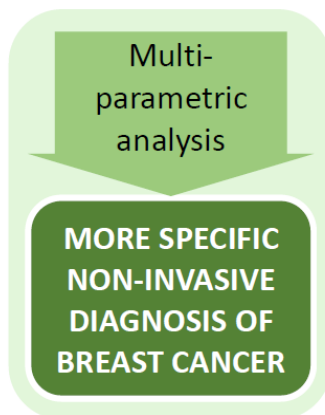
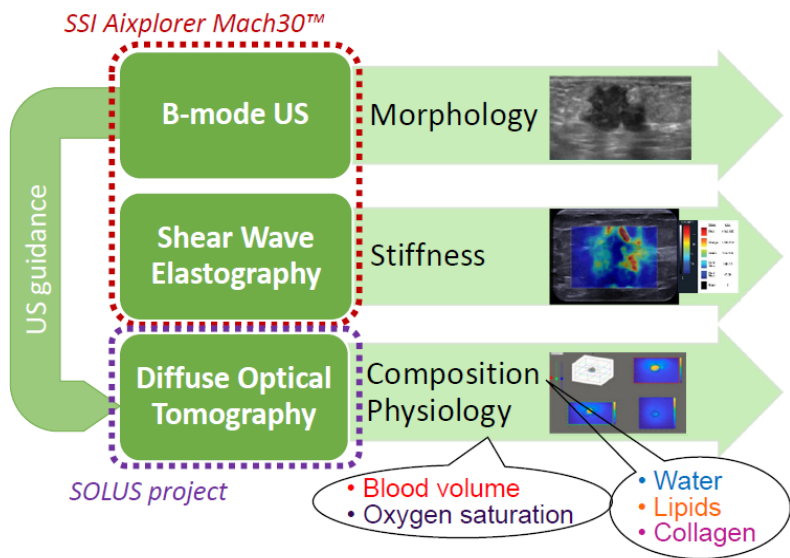
ACCURATE



www.solus-project.eu



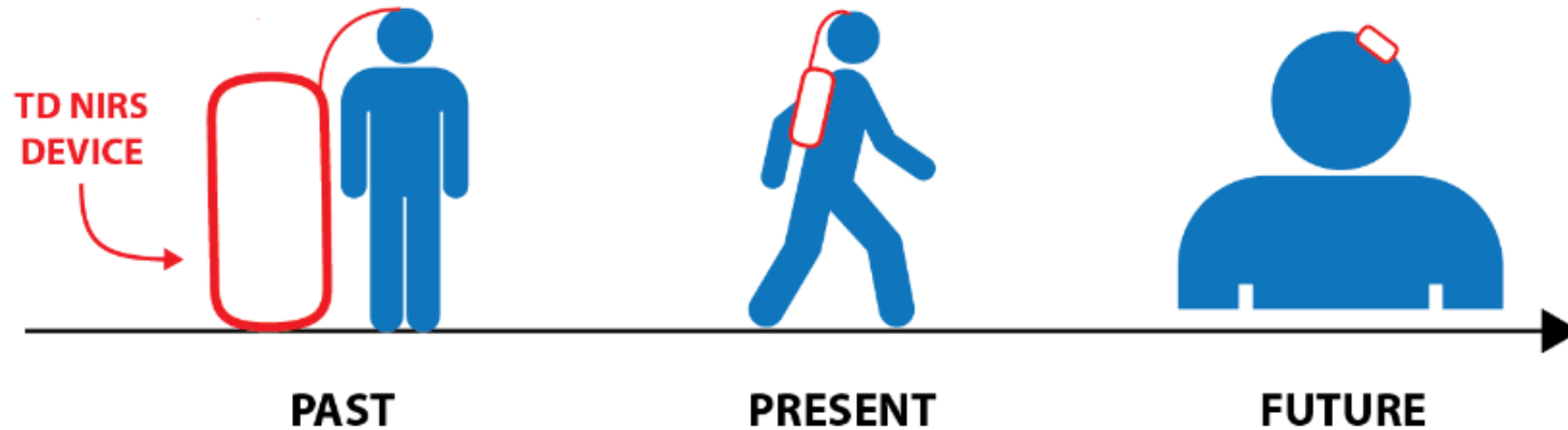
- Picosecond pulsed laser driver
- Wide area gated SiPM detector
- Dedicated acquisition electronics



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A glimpse to the future



“ Opening new frontiers to in-vivo brain monitoring of freely moving subjects – from diagnosis to rehabilitation ”

*Call for action! - Physiologist – Neuroscientists – Physicians - Psychologists
Help the world understanding how we work!*



The TEAM

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ADVISORS (and co-founders)





pioNIRS

Thank you!

