BRICS Meeting on Photonics: *Biophotonics*

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Biophotonics thrust areas in India

A. Academic:

1) Ultrafast spectroscopy, other biophysical spectroscopy
2) Multidimensional microscopy
3) Bio-sensors
4) Plasmonics

B. Industry-academia interface:

1) Scientific instrumentation
2) Medical devices, especially diagnostics

Academic efforts

- Microscopy development: TIFR (multiphoton, single molecule) , NCBS (Fluorescence microscopy, light sheet), IISc (single molecule), SINP (single molecule), IISER Kolkata (polarization microscopy), Optical tweezers (IIT Bombay, RRCAT)
- Ultrafst bio-spectroscopy (IACS Kolkata, TIFR, IIT Kanpur, IIT Bombay, JNU)
- Bio-sensors: Affordable SPR (IIT Bombay), cTIRF (IIT Delhi)
- Plasmonics (IISER Pune, JNCASR)

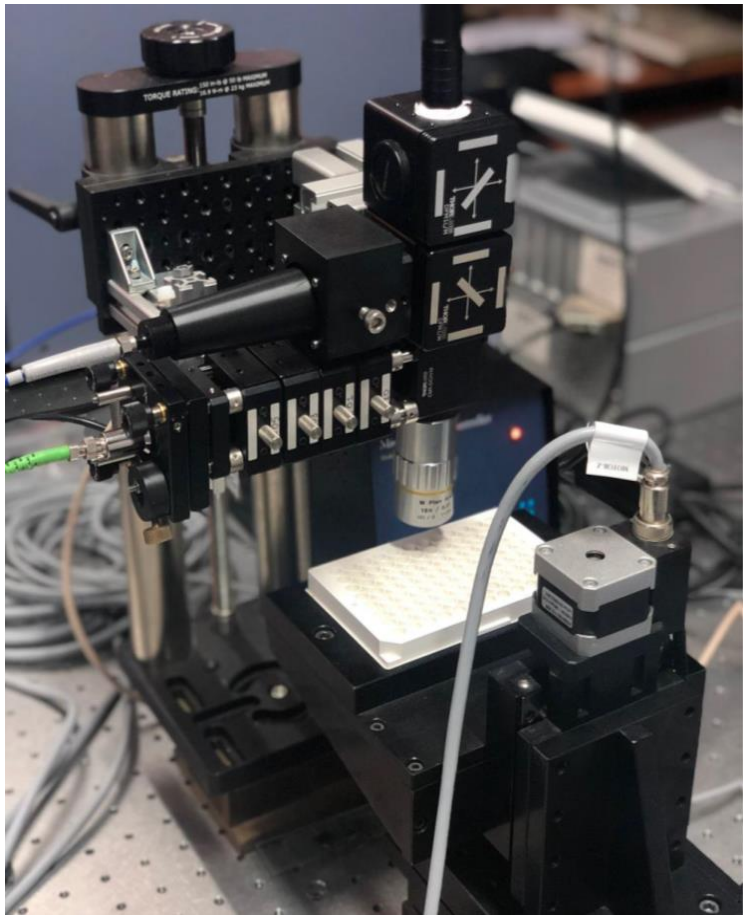
Industry-academia: Scientific Instrumentation

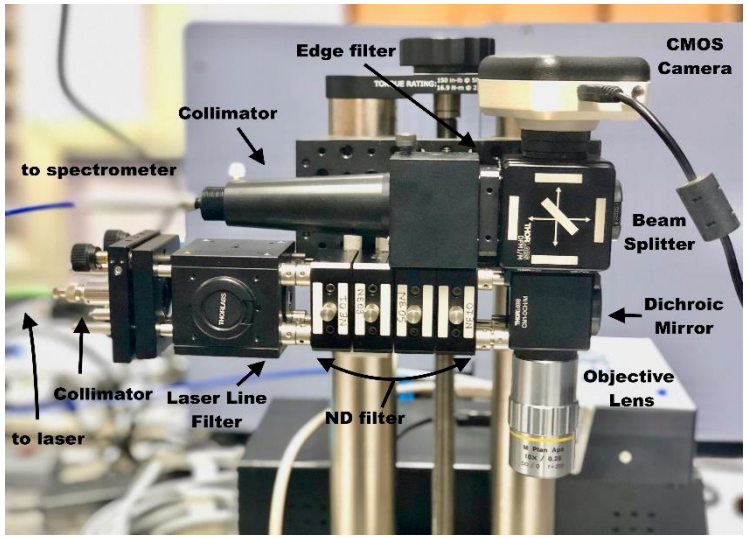
- Significant effort in making microscopy related devices, includng high end single molecule spectrometers and confocal microscopes

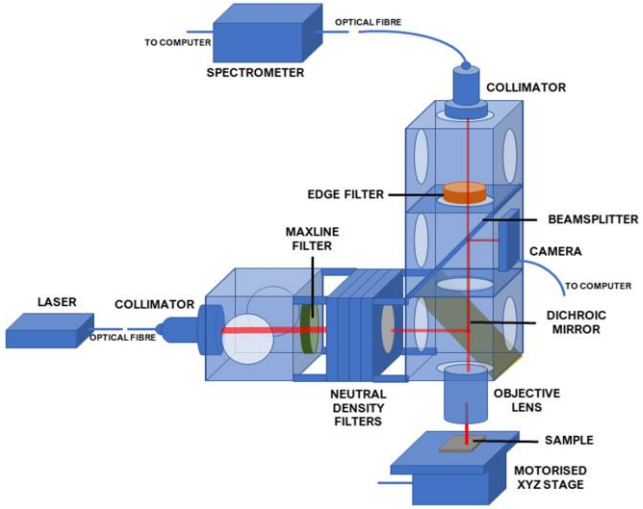
https://www.holmarc.com/fcs.php

Technology from Maiti Lab, TIFR
US Patent (2010)

Diagnostic devices: Small Raman Spectrometer







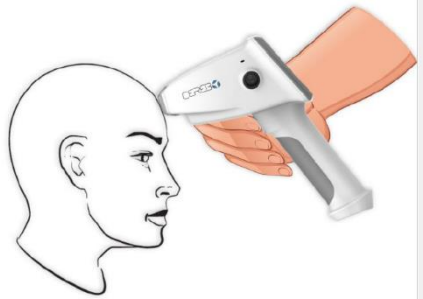
Technology from Narayana Lab, JNCASR

Can scan 384 well plate in a dignostic lab

Biophotonic Devices in Clinical Trial

Brain injury

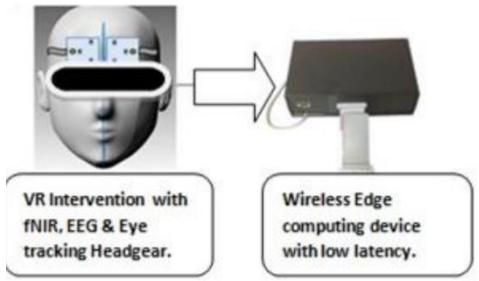
BIOSCAN® RESEARCH



Clinical Validation study ongoing at Civil Hospital, Ahmedabad

Autism

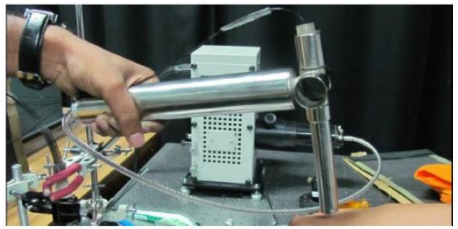
Embright Infotech
automate your dream



Prototype Development

Cervical cancer

Light kindles Hope
PhotoSpIMeDx



Prototype Development

STARTUP INCUBATION AND INNOVATION CENTRE IIT KANPUR

Start-ups at SIIC Incubation center at IIT Kanpur

Some devices hitting the market

EyeRa-Sense™

State-of-the-art spectroscopes for smartly measuring the ultra-sparse biomarkers

prantae.solutions

Where we could join hands …

- Russia: basic laser tech, which can be added to the instrument level designs we have in India
- China: A lot of lasers and optics, again, can join for a similar reason
- Brazil and South Africa; Need a database of efforts to connect effectively

Thank you