



Advanced Techniques in Raman Spectroscopy for Bio-medical & Clinical Applications

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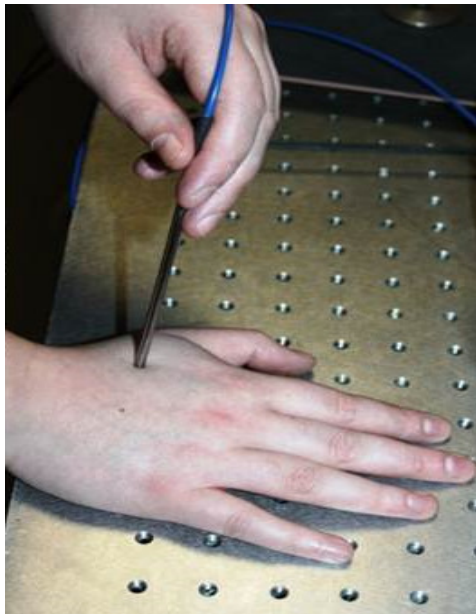
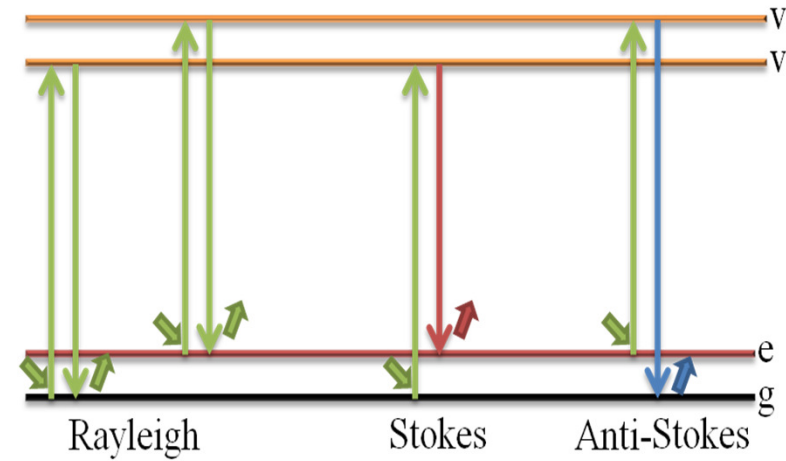
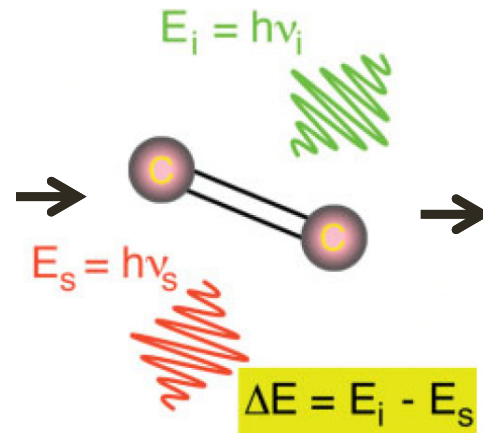
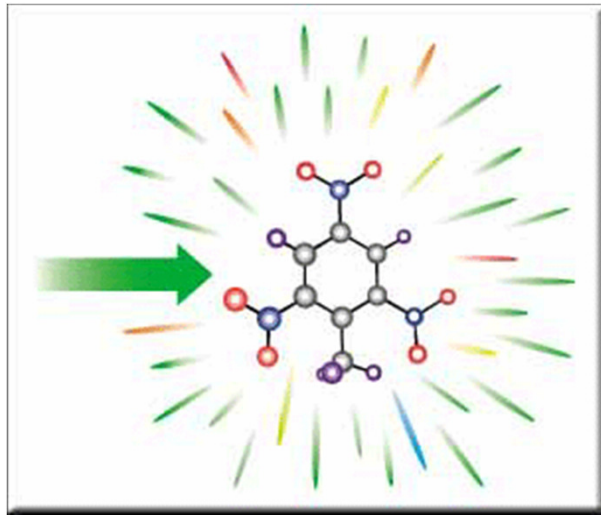
Optical Manipulation Group

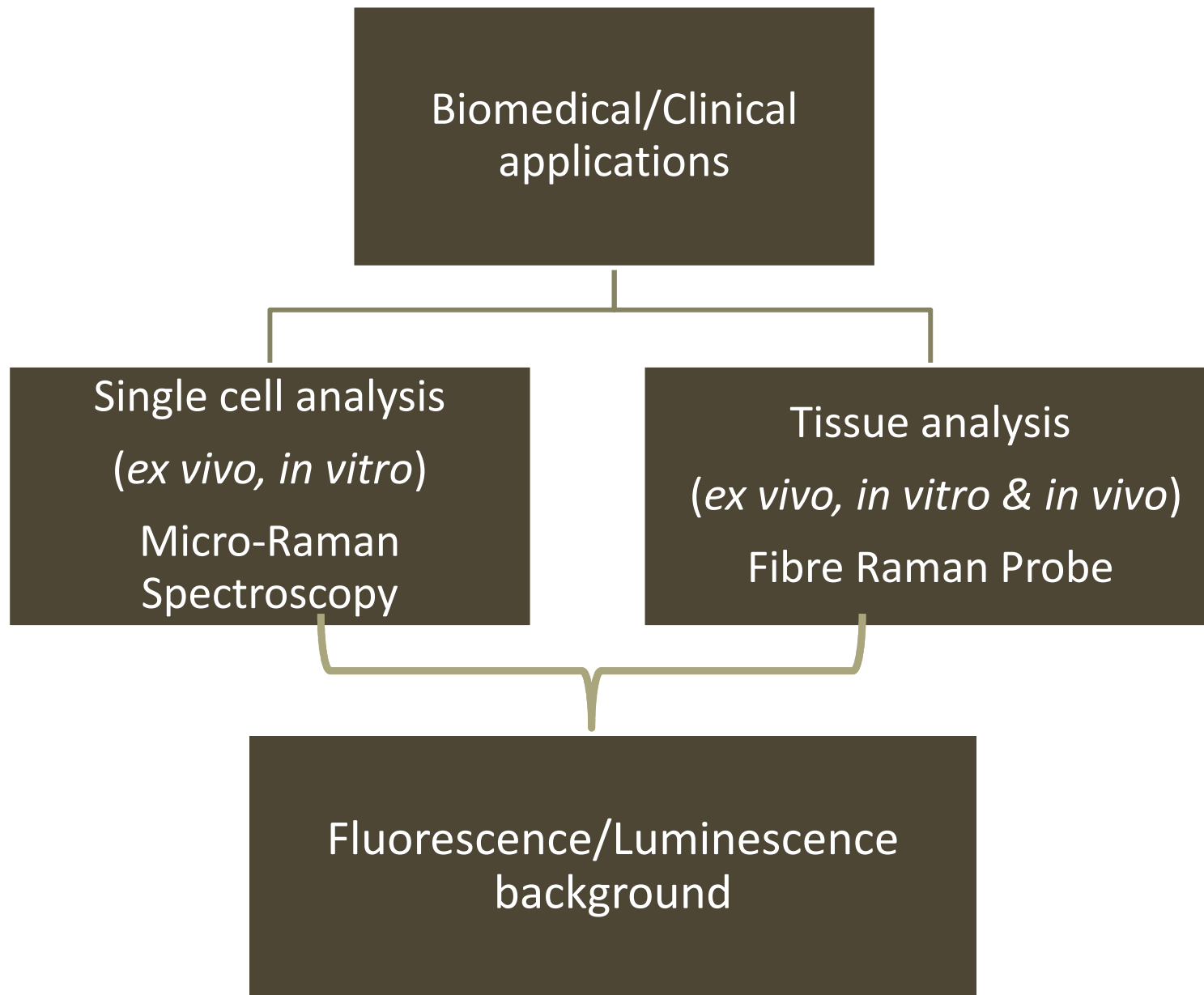
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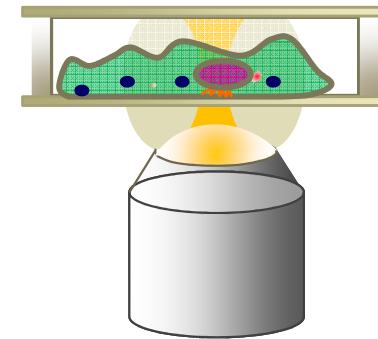
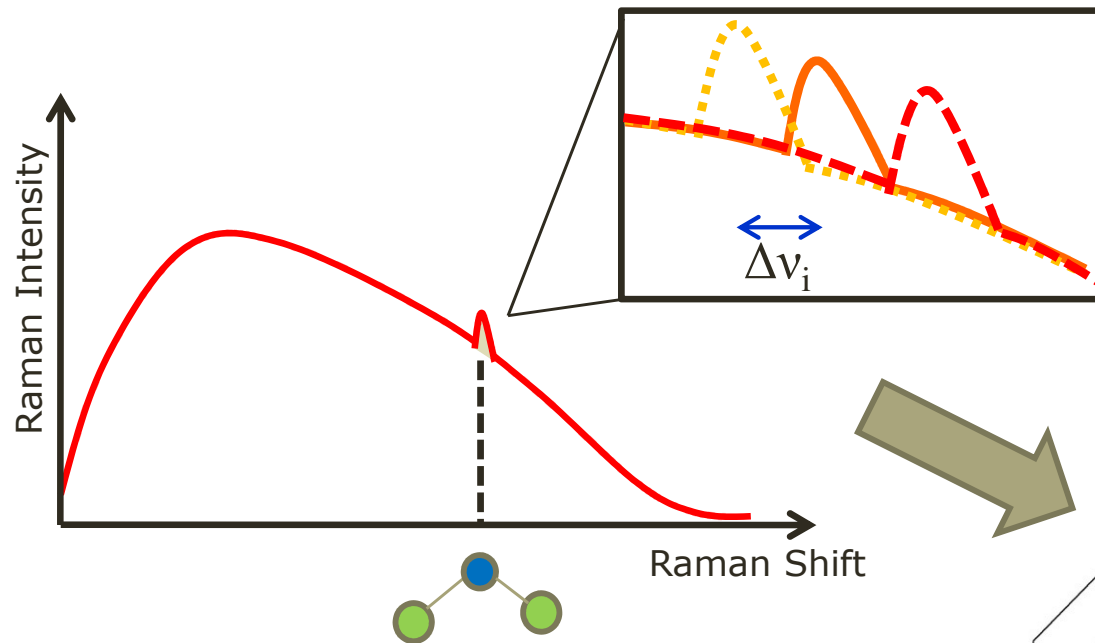
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Raman Spectroscopy

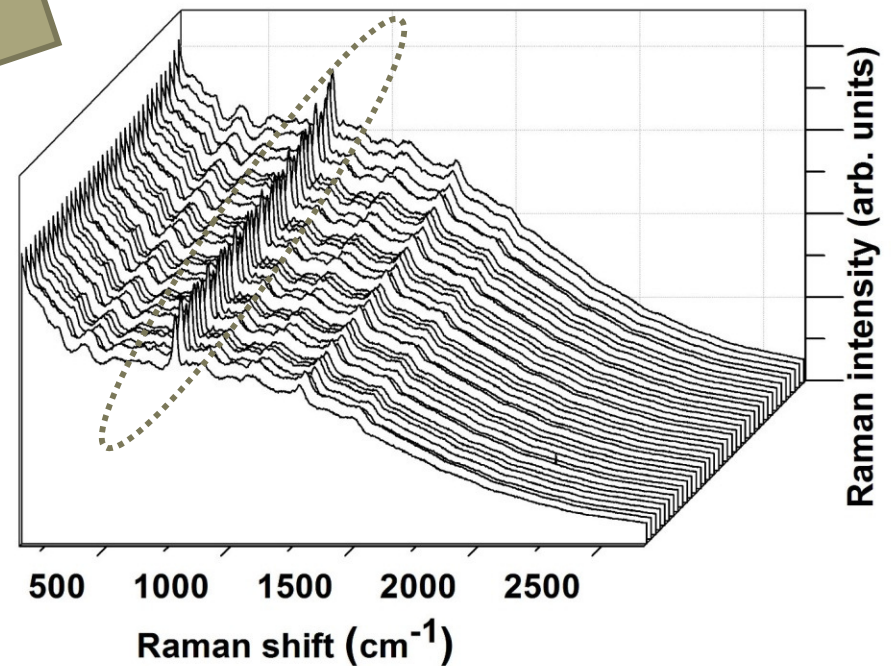
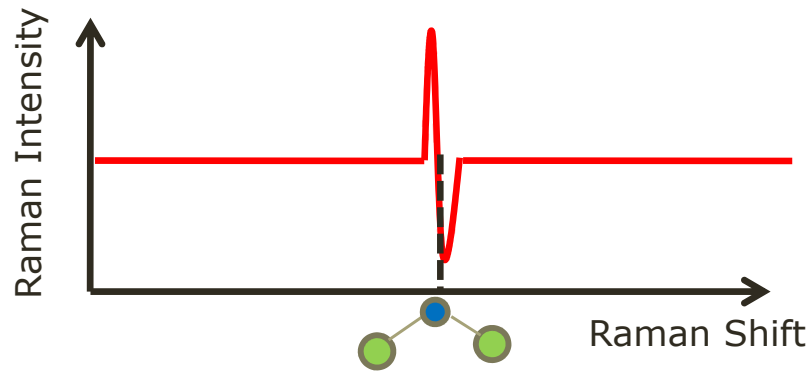




... Wavelength Modulated Raman Spectroscopy (WMRS)



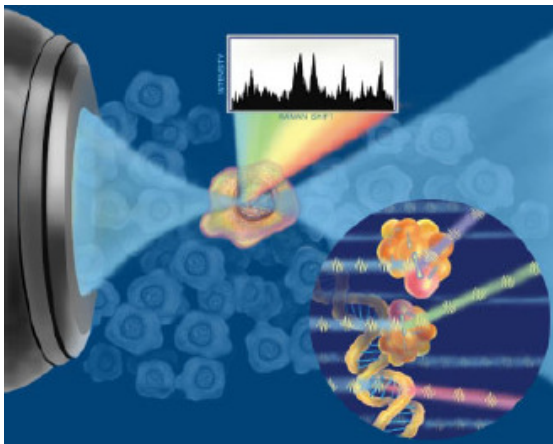
Statistical technique leads to...



1. M. Mazilu, A. C. De Luca, A. Riches, C. S. Herrington and K. Dholakia, *Opt. Express*, 2010, **18**, 11382-11395.
2. A. C. De Luca, M. Mazilu, A. Riches, C. S. Herrington and K. Dholakia, *Analytical Chemistry*, 2010, **82**, 738-745.

Raman Spectroscopy for Biomedical applications

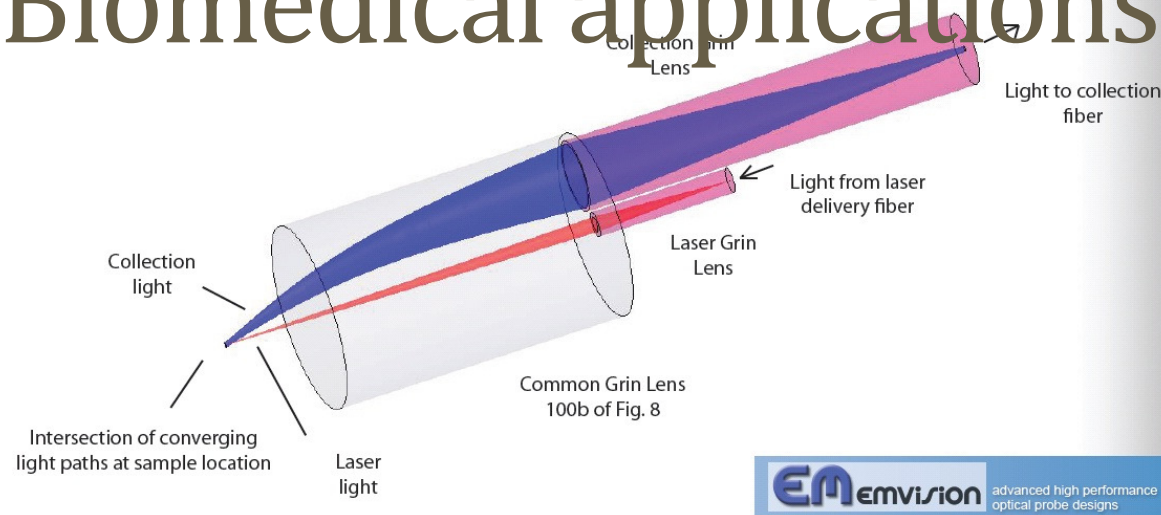
Single cell studies



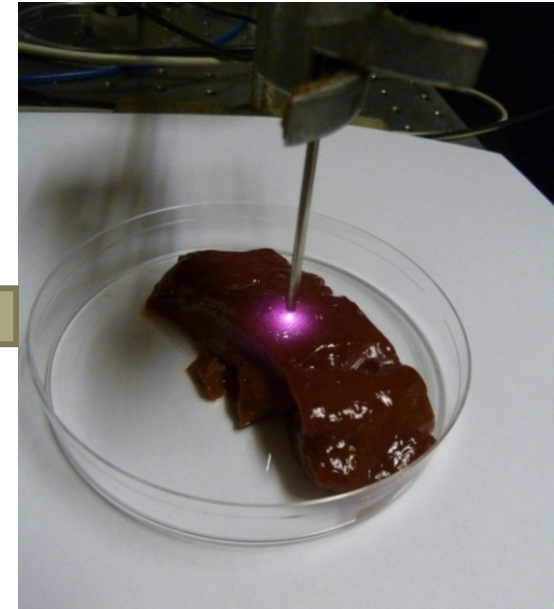
- Cancer studies
 - Bladder Cancer
 - Ovarian Carcinoma ...
- Immunology
- Virology & Microbial Analysis

1. J. Chan, S. Fore, S. Wachsmann-Hogiu and T. Huser, *Laser & Photonics Reviews*, 2008, **2**, 325-349.
2. E. Canetta, M. Mazilu, A. C. De Luca, A. E. Carruthers, K. Dholakia, S. Neilson, H. Sargeant, T. Briscoe, C. S. Herrington and A. C. Riches, *Journal of Biomedical Optics*, 2011, **16**, 037002-037007.

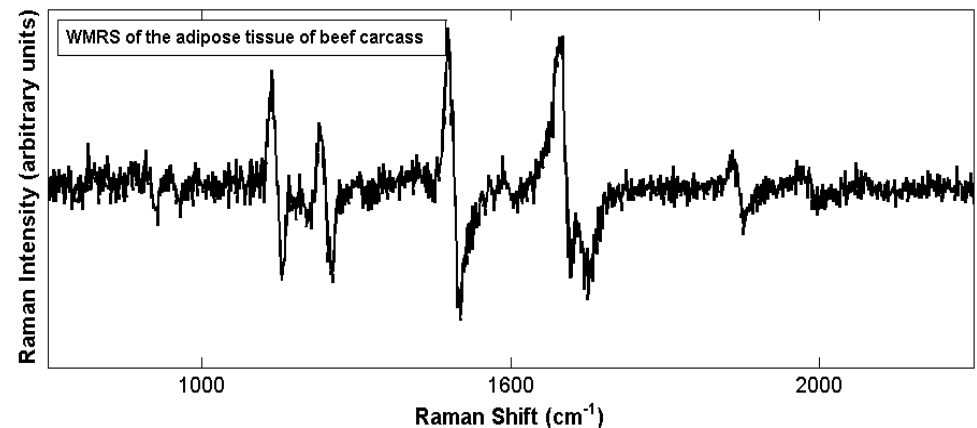
Raman Spectroscopy for Biomedical applications



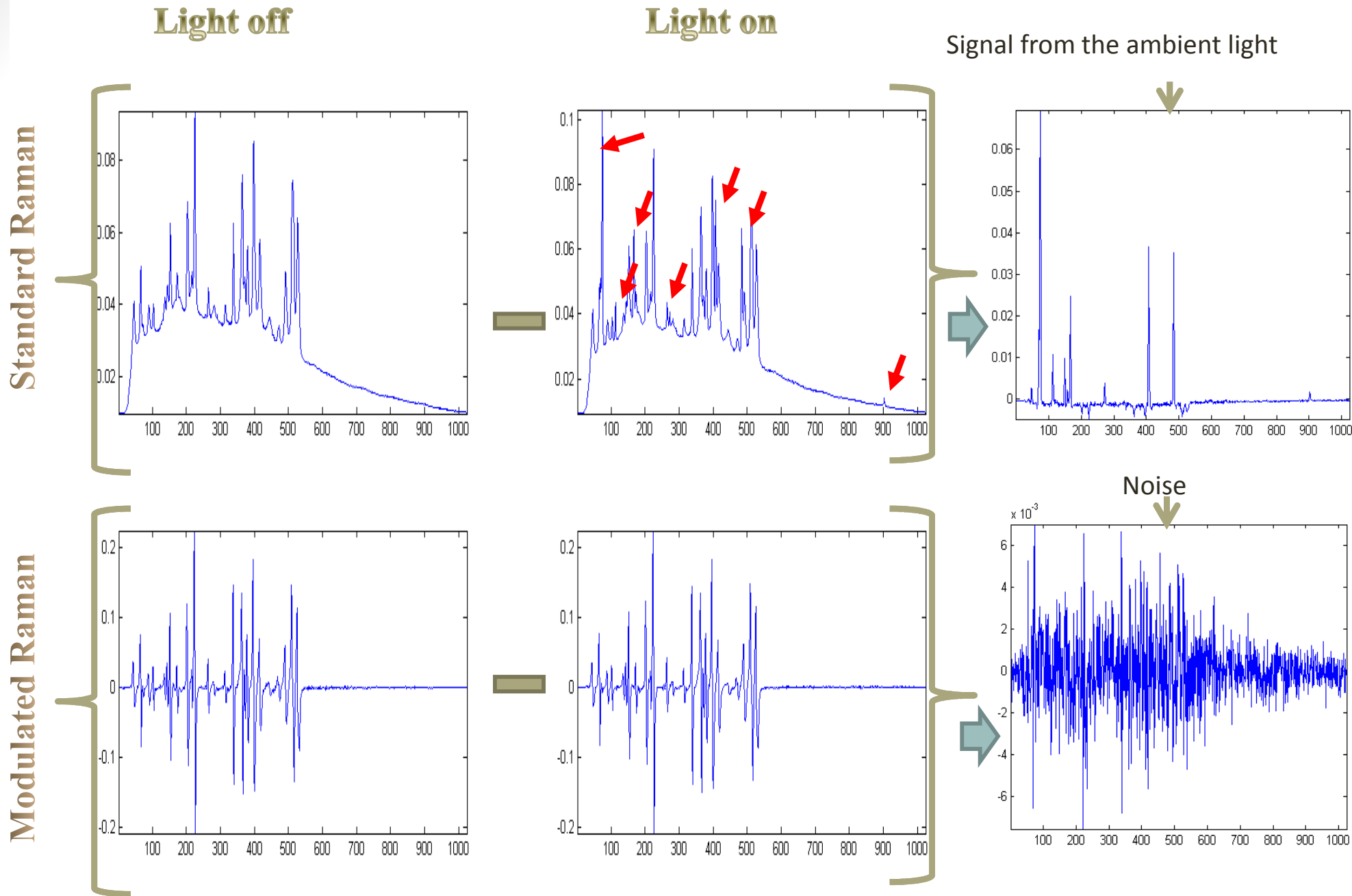
Tissue Studies



- Cancer studies
 - Colon Cancer
 - Skin Cancer ...



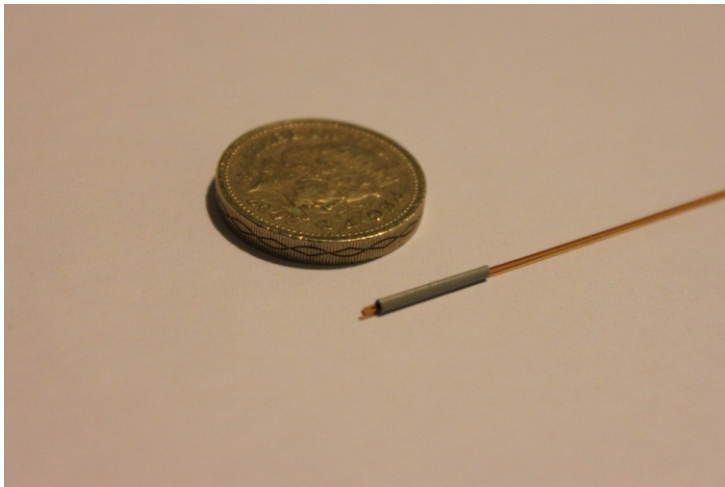
1. B. B. Praveen, P. C. Ashok, M. Mazilu, A. Riches, S. Herrington and K. Dholakia, *Journal of Biomedical Optics*, 2012, **17**, 077006-077006.



S. Dochow, N. Bergner, C. Matthäus, B. B. Praveen, P. C. Ashok, M. Mazilu, C. Krafft, K. Dholakia, and J. Popp, *Biomedical Spectroscopy and Imaging* **1**, 383 (2012).

Raman Spectroscopy for Biomedical applications

Novel Fibre Raman Probes

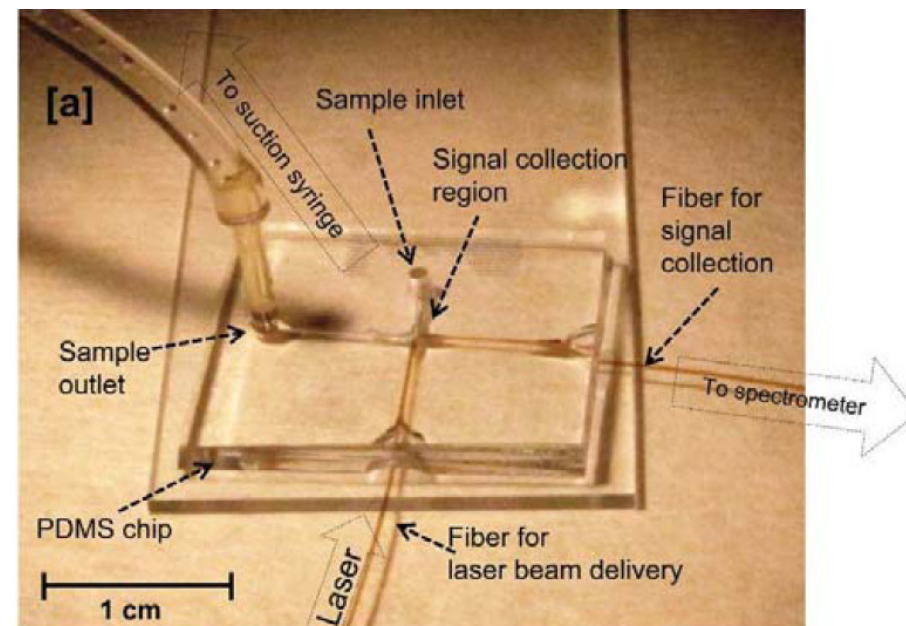


- Compatible with other imaging modalities
 - Magnetic Resonance Imaging
 - Optical Coherence Tomography
 - Multiphoton Imaging

Raman Spectroscopy for Biomedical applications

- Body Fluids
- Alcohol content in liquor
- Liquor toxicology

Microfluidic Raman Spectroscopy



Acknowledgement

- Prof. Kishan Dholakia
- Prof. Andrew Riches
- Prof. Simon Herrington
- Dr. Praveen Cherian Ashok
- Dr. Michael Mazilu
- **Collobrators**
 - Prof. Simon Powis (Medical & Biological Sciences, St Andrews)
 - Prof. Stephen Gillespie (Medical & Biological Sciences, St Andrews)
 - Prof. David Perret (School of Psychology & Neuroscience, St Andrews)
 - Prof. Dr. Jürgen Popp (IPHT, Jena, Germany)
 - Prof. Andreas Melzer (IMSAT, Dundee)
 - Dr. Julie Woods (Lecturer, Ninewells Hospital & Medical School, Dundee)

Thank you