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**The Guangdong Medical University in China develops a method for non-invasive prostate cancer screening using Renishaw’s inVia™ confocal Raman microscope**

New research at the Guangdong Medical University suggests a laser-based approach could be the latest breakthrough in prostate cancer detection. The proposed non-invasive blood test uses a combination of two techniques: surface-enhanced Raman scattering (SERS) and a new mathematical analysis technique called support vector machine (SVM). Together, these techniques produce an accuracy up to 98.1 percent; a far cry from the relative guesswork of prostate-specific antigen (PSA) tests. Professor Shaoxin Li, the study leader at the University commented, “Compared to traditional screening methods, this method has the advantage of being non-invasive, highly sensitive, and very simple for prostate cancer screening.” 1

Professor Li continues, “Cancer is one of the diseases that seriously threatens human life. It is important to improve the survival of patients by early diagnosis and treatment. Currently, there are many diagnostic methods available—including B-mode ultrasound, CT scan, biopsy and histopathology assessment—but these techniques have various limitations. For example, B-mode ultrasound only discerns the solid tumour and is therefore not applicable to patients in the early stages of cancer. Biopsy and histopathology assessment are the gold standard of cancer examination but they are invasive and impractical for high-risk patients with multiple suspicious lesions. We hope to develop a rapid, non-destructive, optical diagnosis method to solve these problems.

“Advanced Raman spectroscopy has provided the possibility to meet our goals and after much evaluation of alternative Raman systems, including portable Raman instruments, we chose the Renishaw inVia confocal Raman microscope. We selected the inVia because it offers continuous scanning from 50 to 4000 wavenumbers [using SynchroScan, Renishaw’s patented method of acquiring wide-range spectra] and its high sensitivity makes it suitable for biological tissue measurement. It is also highly automated with software that is powerful and easy to use.”

To illustrate the sensitivity in use, Professor Li shows an example comparing SERS spectra of serum samples with silver colloids. The differences in the spectra reveal the enormous potential to diagnose cancer using the serum SERS technique.

The results above show normalized mean SERS spectra of prostate cancer and normal serum sample. (a) cancer, (b) normal, (c) difference in spectra (cancer-normal). The shaded area represents the standard deviations.

Please visit www.renishaw.com/bio for further details on how Renishaw’s inVia confocal Raman microscope is being used in the life sciences.

**Reference**

1 Non-invasive prostate cancer screening based on serum surface-enhanced Raman spectroscopy and support vector machine; Shaoxin Li et al; Appl. Phys. Lett. 105, 091104 (2014); <http://dx.doi.org/10.1063/1.4892667>

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**About Renishaw**

Renishaw is one of the world's leading engineering and scientific technology companies, with expertise in precision measurement and healthcare. The company supplies products and services used in applications as diverse as jet engine and wind turbine manufacture, through to dentistry and brain surgery. It is also a world leader in the field of additive manufacturing (also referred to as 3D printing), where it is the only UK business that designs and makes industrial machines which ‘print' parts from metal powder.

The Renishaw Group currently has more than 70 offices in 35 countries, with over 4,000 employees, of which 2,700 people are employed within the UK. The majority of the company's R&D and manufacturing is carried out in the UK and for the year ended June 2016 Renishaw achieved sales of £436.6 million of which 95% was due to exports. The company's largest markets are the China, USA, Germany and Japan.

The Company's success has been recognised with numerous international awards, including eighteen Queen's Awards recognising achievements in technology, export and innovation. Renishaw received a Queen’s Award for Enterprise 2014, in the Innovations category, for the continuous development of the inVia confocal Raman microscope. For more information visit [www.renishaw.com](http://www.renishaw.com)

### **For further information**

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