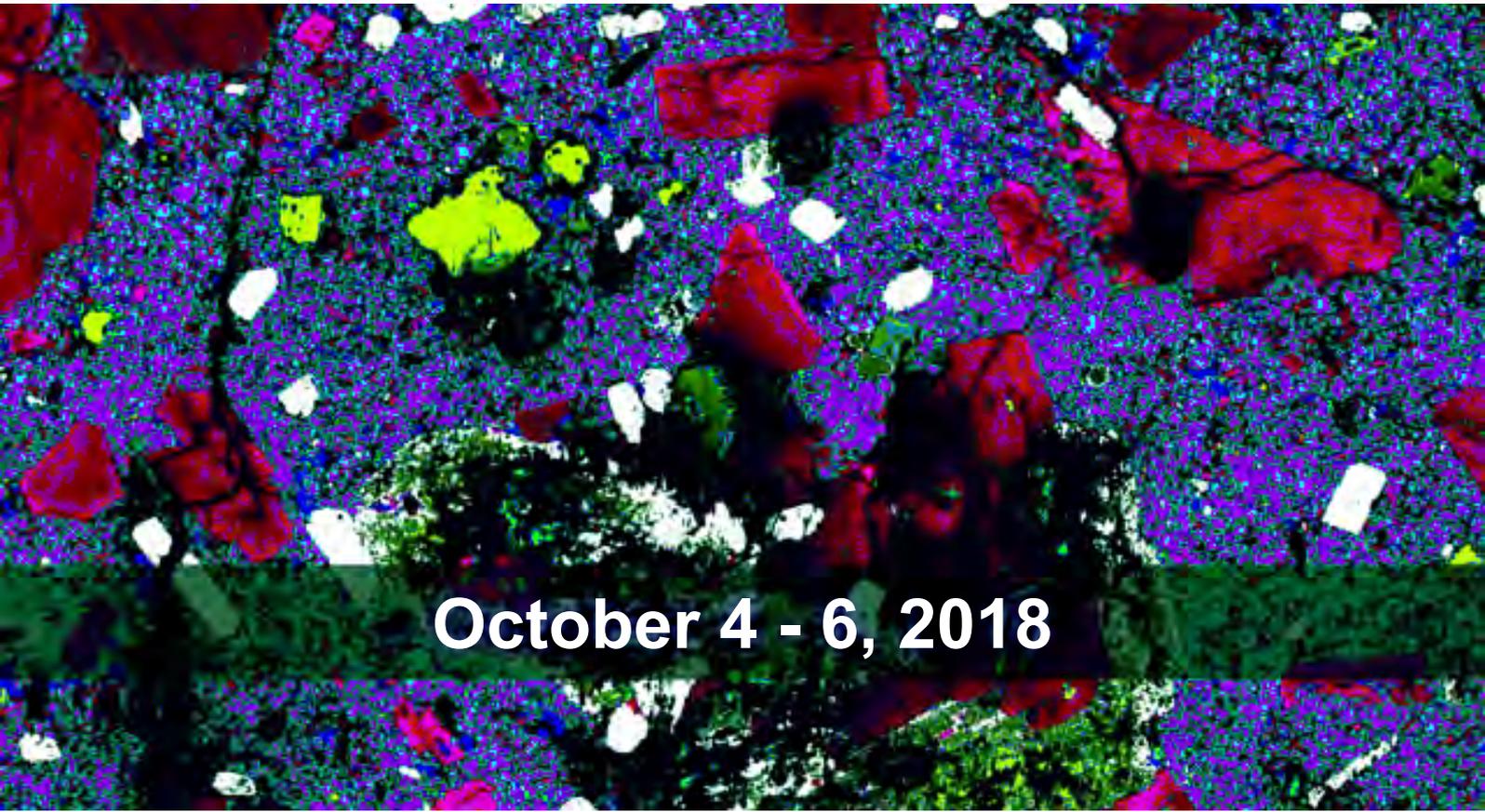
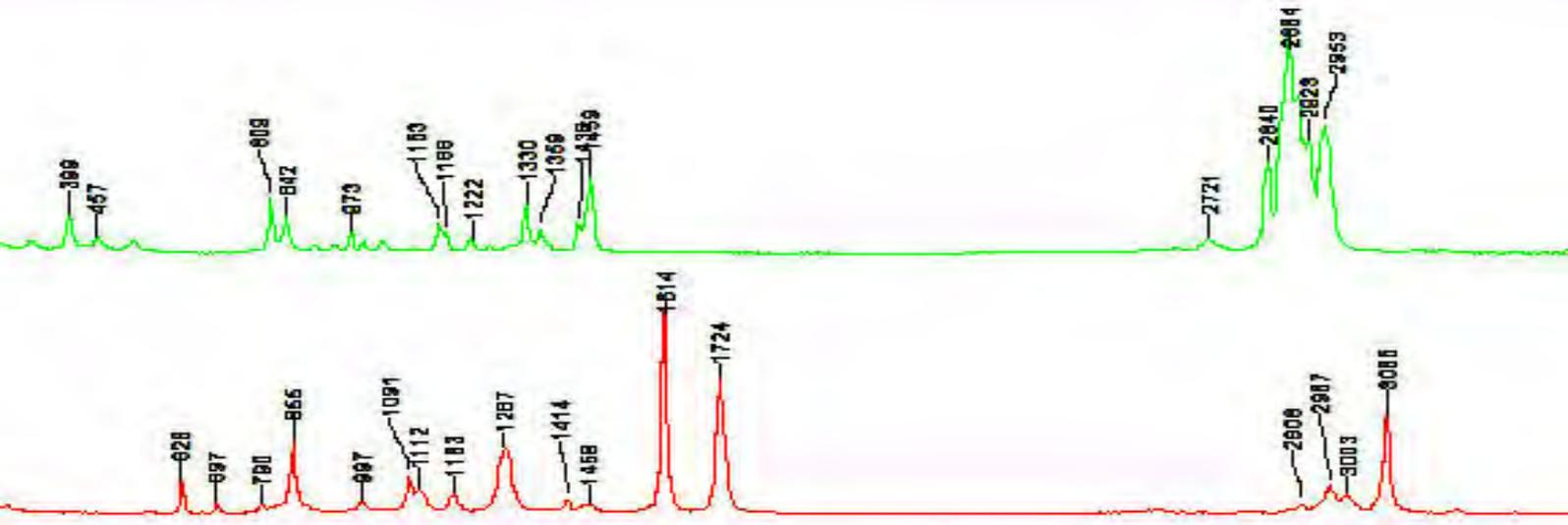


# Confocal Raman Microscopy &

its applications in Materials Science, Medical Science and Biomedical Technology



October 4 - 6, 2018



## Workshop on

# Confocal Raman Microscopy and its Applications in Materials Science, Medical Science and Biomedical Technology

Raman microscopy is a powerful and increasingly common technique for characterizing the components of a sample by looking at the unique “fingerprint” its molecular bonds show, as they scatter light. Raman microscopy is the amalgamation of light microscopy and Raman spectroscopy (named after Indian Physicist Sir CV Raman), a spectroscopic technique used to observe vibrational, rotational and other low-frequency modes in a system. It has varied application from material characterization to forensics and 3D imaging. The importance of Raman microscopy is that it is a non-destructive analytical technique. Water, culture media and buffers typically do not interfere in the analysis, making it suitable for many biological applications in live imaging of proteins, cells, organs and tissues.

The workshop includes lectures on the principles and theoretical basis of Raman spectroscopy, the associated hardware and software of Confocal Raman Microscope (Witec Raman Microscope, alpha 300RA, Germany). A detailed introduction to the operational principles and different instrumental configurations, the latest advances in microscopes and equipment development, will be discussed that helps the delegates to get an idea of the capability of Confocal Raman Microscopy (CRM). The spectral and the spatial resolution, detection limits, different configurations and setups, including the different gratings and wavelength of lasers used etc. will be discussed. Applications of Raman spectroscopy in materials science/chemical and structural analysis, chemical imaging in material science and technology; and biomedicine, particularly in live science applications will be discussed and demonstrated along with data evaluation.

Other related techniques like surface enhanced Raman spectroscopy (SERS), correlative Raman imaging and scanning electron microscopy (RISE), atomic force microscopy (AFM) and scanning near-field optical microscopy (SNOM) will also be discussed.

Morning slots will be filled with lectures and presentations. Afternoon sessions will be set apart for demonstrations.

**Topics proposed** to be covered during the workshop (15 hrs):

- Principles of Confocal Raman Imaging and AFM, resolution, detection limits and acquisition speed with emphasis on CRM (alpha 300RA, Witec, Germany) (1 hr)
- Details of hardware and software and latest advances. Brief overview of related techniques like SERS, RISE and SNOM. Advantages of integrated AFM system (1 hr)
- Micro Raman (single point) and multi-point/multi-area measurements and the fields of applications/Cluster analysis (1 hr)
- Application of micro Raman and chemical mapping in materials science and technology and medical science. Identification of Living cells in physiological conditions, Distinguish cancerous cells from non cancerous (Brain cancer, Skin cancer etc), Monitoring pathological changes in liver tissue, Disease diagnosis (e.g., Malaria, Alzheimers), Biofluid diagnostic assays (Tear, blood) (4 hrs)
- Application of micro Raman and chemical mapping in pharmaceuticals and forensic investigations (1 hr)
- Demonstration of micro Raman and Confocal Raman Microscopy (Raman chemical mapping) on CRM (alpha 300RA, Witec, Germany) (7 hrs)

**Duration of the workshop:** 3 days

**Date:** October 4 to 6, 2018

**Venue:** Biomedical Technology Wing, SCTIMST, Poojappura, Thiruvananthapuram

**Faculty:** Application specialists from M/s. Witec, Germany, SCTIMST, NIIST and VSSC.

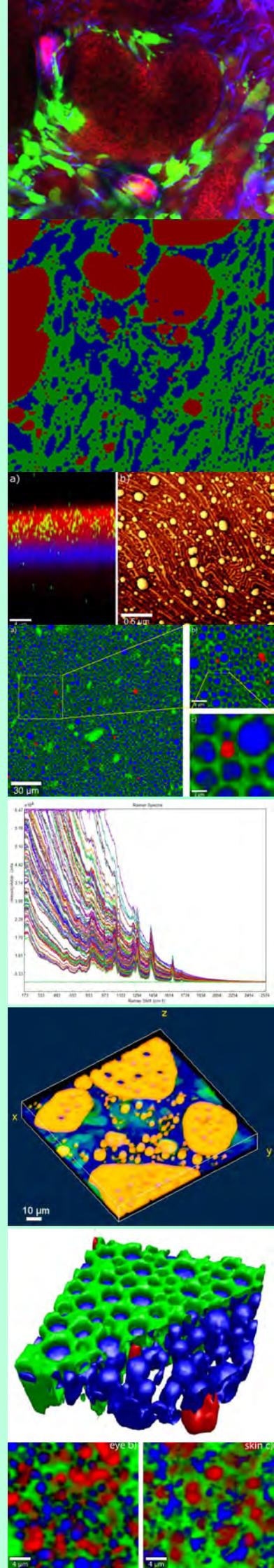
**Who should attend:** Students, Researchers, Scientists and Clinicians.

**No. of seats:** Limited to 20 on a “first come first served” basis.

**Registration Fee:** Registration fee is including 18% GST; per head basis.

**Students: Rs. 2000/- ; Others: Rs. 3000/-**

**Course Coordinator:** Dr. Roy Joseph  
Scientist-in-charge, Central Analytical Facility  
Biomedical Technology Wing  
Sree Chitra Tirunal Institute for Medical Sciences & Technology  
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**Sree Chitra Tirunal Institute for Medical Sciences & Technology (SCTIMST)** has played a pioneering role in the development of medical devices industry in India by developing and successfully commercializing a wide range of biomedical devices and implants such as the Heart Valve, Blood Bag, Oxygenator, Vascular Graft, Hydrocephalus Shunt, Haemoconcentrator, Dental Composites, Bioactive Composites for Orthopedics, Emily IUS etc.

The Biomedical Technology Wing of the SCTIMST has been engaged in the research and development of medical devices and biomaterials and has built up extensive expertise and facilities. Its laboratories are now accredited by COFRAC, France under ISO/IEC 17025 for testing of medical devices and materials.

The process of medical device development is complex and need inputs from varied disciplines of science and technology. The process of medical device development and associated aligned areas of biomedical technology therefore requires extensive learning.

Biomedical Technology Wing of SCTIMST has traveled through this arena for more than thirty years now. The medical device industry being at a budding stage in India and various start ups emerging, the Institute recognizes that the expertise and experience that has been gained through the years are to be shared with the medical device industry, the researchers and students.

“Learning is the only thing the mind never exhausts, never fears, and never regrets”

..... Leonardo da Vinci



The Institute has its Industry Institute Partnership Cell (IIPC) with focus on services like training, problem solving and consultancy in existence for more than a decade now. To support the medical device industry and the start ups in enhanced learning of Biomedical Technology, the IIPC now launches a series of training programs which shall be pre-scheduled for the entire year on various selected topics.

The participants are free to register to any of the programs of IIPC before the last date of registration. If any custom made training programs are to be arranged, the same shall be entertained by IIPC subject to the mutual convenience. You may convey the same to us through our email.

## Workshop Faculty

**Dr. Benny K. George**

*Group Director*

*Vikram Sarabai Space Centre, Thiruvananthapuram*

**Dr. Kaustabh Kumar Maiti**

*Senior Scientist*

*National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram*

**Dr. R. S. Jayasree**

*Scientist F*

*Sree Chitra Tirunal Institute for Medical Sciences & Technology, Thiruvananthapuram*

**Mr. Hitesh Mamgain**

*Application Scientist*

*WiTec GmbH, Germany*

**Mr. Satheesh Kumar**

*Applications Engineer*

*WiTec GmbH, Germany*

### Registration

Please note that the attendance is restricted to registered candidates. Registration will be on a “first come first served” basis. There is no 'spot registration'.

**Last date of registration is**

**29<sup>th</sup> September 2018.**

**Course fee:** including GST per head

**Students: Rs. 2000/- Others: Rs. 3000/-**

### Payments

Demand Draft in favour of “The Director, SCTIMST” payable at Thiruvananthapuram OR by Online Transfer - Bank details of the Institute: SCTIMST

Account Number:	57001148263
IFSC Code:	SBIN0070032
Bank:	State Bank of India
Branch:	Poojappura Branch
PAN Number:	AAAJSO437M
GST No:	32AAAJSO437M1Z4

# For further enquiries

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**The Industry Institute Partnership Cell (IIPC)** was initiated with an approval and funding from AICTE, New Delhi and subsequently encouraged and stabilized by SCTIMST with a mandate to develop awareness and relevance of quality consciousness in the development of biomedical technology in the minds of industrial personnel in India. The IIPC intends to do this through a series of structured symposiums and appropriate workshops. Participants are offered an opportunity to learn from and share the expertise built by the institute. They can interact with the faculty, have laboratory visits and exposure to the facilities and expertise available and explore future collaborative programmes.

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