

# Current Trends in Biomedical Applications of Raman and infrared spectroscopy

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This lecture will describe the development of Raman and infrared spectroscopy for biomedical applications in the past ten years. In particular, progress was made in Raman and infrared imaging of cells and tissues. In combination with chemometric data analysis, these vibrational spectroscopic tools can contribute to improved disease recognition. Current trends include (i) grading of primary brain tumors, (ii) determining the primary tumor of brain metastases and (iii) identification of circulating tumor cells. Prospects of nonlinear microscopy such as second harmonic generation, two photon excited fluorescence and coherent anti-Stokes Raman scattering will be discussed.

**Dr. Christoph Krafft** studied physics in Oldenburg. He obtained his PhD in Biophysics from the Humboldt University Berlin and his habilitation in Analytical Chemistry from the University of Technology Dresden. He worked as researcher at the University of Missouri Kansas City (USA) and University of Trieste (Italy). From 2000 to 2006 he led the research group “Molecular Endospectroscopy”. Since 2008 he is leading the research group “Optical Cell Diagnostic” at IPHT and teaching in physical chemistry at the University Jena. His main research focus is to develop and apply Raman and infrared spectroscopic imaging to characterize tissues and cells in biomedical and clinical related problems. His results were published in 89 refereed publications. He also contributed 15 chapters in the field of biomedical Raman and infrared spectroscopy to scientific books. Dr. Krafft’s Impact Factor is 300.

Selected reviews:

C. Krafft, S. Dochow, I. Latka, B. Dietzek, J. Popp. Diagnosis and screening of cancer tissue by fiber optic probe Raman spectroscopy. *Biomedical Spectroscopy and Imaging* (2012) 1, 39-55.

C. Krafft, B. Dietzek, M. Schmitt, J. Popp. Raman and coherent anti-Stokes Raman scattering microspectroscopy for biomedical applications. *Journal of Biomedical Optics* (2012) 17(4) 040801

C. Krafft, B. Dietzek, J. Popp. Raman and CARS spectroscopy of cells and tissues. *The Analyst* (2009) 134: 1046-1057.

C. Krafft, G. Steiner, C. Beleites, R. Salzer. Disease recognition by infrared and Raman spectroscopy. *Journal of Biophotonics* (2009), 2(1-2): 13-28.