

# Laser Based mid-IR and Raman spectroscopies as Versatile Techniques in Applied Analytical Chemistry

Speaker: **Prof. Bernhard Lendl**

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**Abstract:** Laser based vibrational spectroscopy including mid-IR as well as Raman techniques have opened a range of new sensing possibilities for performing qualitative as well as quantitative analysis. In this talk the information content available in vibrational spectra will be reviewed and applications for the analysis of liquids, gases and solids shown. Concerning liquids protein folding will be discussed employing external cavity quantum cascade lasers (EC-QCL) for transmission measurements of aqueous protein solutions. Furthermore, the use of distributed feedback QCL for quantification of the trace mineral oil content in waste and produced water will be introduced. Concerning gas measurements two indirect methods allowing for photoacoustic and photothermal detection will be introduced and examples for measurement of SO<sub>2</sub> and CS<sub>2</sub> shown. Concerning Raman spectroscopy results on stand-off detection of explosives using a pulsed excitation (532 nm) and gated detection will be shown and current extension of this method to stand-off Raman imaging discussed.



**Bio:** Prof. Lendl received his Ph.D. degree in Technical Chemistry from Technische Universität Wien (TUW) in 1996. From 1994-2001 he was research assistant at TUW. In 2001 he became associate professor at TUW. From 2003 – 2004, during a sabbatical period, he worked as a guest professor at the Universidad de Córdoba in Spain. In 2008 he founded the TUW spin-off company QuantaRed Technologies GmbH. Since 2011 he heads the research division on environmental and process analytical chemistry at TU Wien where he was also appointed full professor for Vibrational Spectroscopy in 2016. His research focuses on advancing analytical sciences through the development of novel analytical techniques and instrumentation based on infrared and Raman spectroscopy and their application to environmental and process analytical chemistry, material characterization as well as bio-medical diagnostics. So far he has supervised 12 PhD thesis with currently 6 running. So far Lendl obtained a total of 7.900kEuro on funding through national (basic research: 8 FWF projects, applied research: 9 FFG, 1 AWS, 1 ZIT) and international (5 EU projects) as well as direct industry (5) research funding. His scientific work is documented in more than 210 papers published in international journals, 12 book chapters and several patents (7AT, 6PCT, 2 EU, 2 US). Lendl is recipient of the Robert Kellner Lecture DAC (EuCheMS) in 2015, the FACSS Innovation Award in 2011, the Dr. Wolfgang Houska Award (B&C foundation) in 2008, the Christian Doppler Award (government of Salzburg) in 2004 and the Fritz Pregl Award (Austrian Academy of Sciences) in 2002.

Thursday, January 26, 2017, 12:00 noon

Bowen Hall Auditorium, 70 Prospect Ave, Princeton University

Host: Gerard Wysocki, Electrical Engineering, Princeton University

*Light Lunch will be served in the Bowen Hall Atrium at 11:30 AM*

MIRTHE<sup>+</sup>

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