

A short course on: Spectroscopy at Single Molecule Resolution

Overview

Ever since the pioneering works of W. E. Moerner, Eric Betzig and Stefan Hell (Noble Laureates, 2014 in Chemistry), the field of Single Molecule Spectroscopy (SMS) has seen an upsurge with the number of publications increasing exponentially. In just over two and a half decades, SMS being a highly inter-disciplinary spectroscopic tool, has been instrumental in addressing problems at the molecular level, which otherwise get masked in ensemble-averaged experiments. Unfortunately, SMS has not been that popular in India and hence a fundamental course which will deal with both the theory and applications of SMS will be very useful. This proposed course will be aimed at the BS-MS (from fourth year onwards) and Ph.D. students of IISER Bhopal along with college and university teachers and researchers across the country.

Objectives

The primary objective of the proposed course is to introduce the students, in a span of two weeks, the basic concepts of SMS with almost equal emphasis on theory and applications. The lectures will be given by **Professor H. Peter Lu**, who is a world leader in Single Molecule Spectroscopy. The local course coordinator, **Dr. Saptarshi Mukherjee** will also share a few lectures and tutorials.

There will be a series of lectures covering the following key topics within the proposed time frame.

Modules	<p>November 28 – December 8, 2016 (Last date of Registration: November 21, 2016)</p> <ul style="list-style-type: none">• A: Introduction to Single Molecule Spectroscopy: Fundamental Concepts• B: Experimental Set-ups used in Single Molecule Spectroscopy• C: Theory of Single Molecule FRET• D: Protein Conformational Dynamics-I• E: Protein Conformational Dynamics-II• F: Single Molecule Enzymology• G: Force Probes• H: Optical and Magnetic Traps• I: Ion Channels• J: Special Topics on Single Molecule Spectroscopy <p>Number of participants for the course will be limited to fifty.</p>
You Should Attend If...	<ul style="list-style-type: none">▪ You are a BS-MS major or Ph.D. in Chemistry/Physics/Biology interested in spectroscopy.▪ You are a faculty from academia having interest in related areas.
Fees	<p>The participation fees for taking the course is as follows: Participants from abroad: US \$200 Industry/ Research Organizations: Rs. 5000/- Academic Institutions: Rs. 500/-</p> <p>The above fee includes all instructional materials, computer use for tutorials and assignments, laboratory equipment usage charges, 24 hr free internet facility. The participants will be provided with accommodation on payment basis.</p>

The Faculty



Professor H. Peter Lu obtained his Ph.D. degree from the Columbia University (working with Professor K. B. Eisenthal) in 1991. After carrying out his post-doctoral research with Professor Joseph Hupp (in Northwestern University) and Professor Sunney Xie (in Pacific Northwest National Laboratory, PNNL), he joined PNNL as a Senior Research Scientist in 1996 and rose to become a Chief Scientist, Chemical Science Division, PNNL in 2005. Subsequently he moved to the Bowling Green State University (BGSU), Ohio as a full Professor and an Ohio Eminent Scholar in 2006. He received the Olscamp Research Award, BGSU in 2009 and has been elected as a Fellow of the American Physical Society in 2014. His research interests mainly include Single Molecule Spectroscopic studies of interfacial electron transfer dynamics, protein-protein interaction dynamics, enzymatic reaction dynamics, and ion-channel protein dynamics.



Dr. Saptarshi Mukherjee received his M.Sc. from Jadavpur University, Kolkata in 2001 and Ph.D. from IACS, Kolkata in 2006 under the guidance of Professor Kankan Bhattacharyya. Thereafter he moved to Bowling Green State University, Ohio for carrying out his post doctoral research work with Professor H. Peter Lu on Single Molecule Enzymology. He joined as an Assistant Professor in the Department of Chemistry, IISER Bhopal in December 2008 and is presently an Associate Professor there. He is a Physical Chemists by training and uses ultrafast spectroscopy and fluorescence correlation spectroscopy to investigate systems of biological significances. He also works on luminescent metal nanoclusters and surface chemistry. He is a recipient of the INSA Young Scientists Medal 2012 and also a founding and core member of INYAS. Presently he is also the Dean, Academic Affairs in IISER Bhopal.

Course Instructor

Prof. H. Peter Lu
Ohio Eminent Scholar
Bowling Green State
University
Ohio, USA

Phone: +1- 419-372-1840
E-mail: hplu@bgsu.edu

(<http://www2.bgsu.edu/departments/chem/faculty/hplu/peterlu.htm>)

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Course Co-ordinator

Dr. Saptarshi Mukherjee
30, Academic Building II
Department of Chemistry
IISER Bhopal

Phone: 0755-2692-2323
E-mail:

saptarshi@iiserb.ac.in
(<https://sites.google.com/a/iiserb.ac.in/ultrafast-and-molecular-spectroscopy-laboratory/home>)

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