Recent Advancements in Biophysical Techniques and Virology

15th April -21st April 2018

Last Date for Registration: 1St April 2018

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Overview

Biophysical methods in macromolecules and virus research has witnessed much rapid advancements in recent years. Biophysical techniques used in isolation and characterization of macromolecules, infectious viruses and viral proteins improve the understanding of mechanisms underlying virus replication, infection, and pathogenesis. The experience gained by virologist and biophysicist in last decades leads to the realization that the combination of biophysical techniques has the potential to accelerate the drug discovery process. However, the fields of cell biology and virology require substantial knowledge and expertise in biophysical techniques like microscopy, spectroscopy, crystallography, fluorescence, electrophoresis and calorimetry to understand biological systems and viruses. This understanding of fundamental principles of advanced biophysical techniques will underpin our ability to provide new therapeutics to meet the challenges faced by humans in dealing with various diseases. The main aim of the course is to spark the student's interest and curiosity in biophysics with application in cell biology, structure biology and virology and also to develop an understanding of virology relevant to viral systems of medical and biotechnological relevance, such as Dengue, Chikungunya, Zika, HCVand bacteriophages.The course will be of interest to each and every scientist working on biological systems, infectious diseases and drug development. It will be very useful to both teachers and students at undergraduate, graduate and postgraduate levels.

The course is organised into 14 hrs lectures and 11 hrs tutorials completed in total of 7 days (April 15-April 21) by two faculties- Dr. Gabriel Lander (GL) and Dr. ShaillyTomar (ST).

COURSE DETAILS:

DATE AND DAY	TIME	SESSION DETAIL	FACULTY
15 APRIL, 2018/SUNDAY	9:30 AM-10:30 AM	Overview of Biophysical techniques	GL
	11:00 AM –12:00 Noon	Principles of Virology	ST
	2:30 PM-4:30 PM	Practical session: Virus isolation, propagation, Antiviral screening, Cytopathic effects (CPE), Plaque reduction assays and RT-PCR	ST
16 APRIL, 2018/MONDAY	9:30 AM -10:30 AM	Structural Virology: Cryo-EM, tomography and crystallography	GL
	11:30 AM -12:30PM	Production and biophysical characterization of viral proteins: Application in viral vaccine and diagnostics	ST
	2:30 PM-4:30 PM	Practical session with examples: Novel strategies for sample preparation, imaging and processing for atomic structure model	GL
17APRIL,2018/ TUESDAY	9:30 AM -10:30 AM	Thermodynamics and binding kinetics (ITC and SPR): Application in antiviral therapy	ST
	11:00 AM –1:00 PM	Electron Microscope optics and cryoEM data collection	GL
	2:30 PM-4:30 PM	Problem solving session with examples: Thermodynamics and binding kinetics of ligand binding by ITC and SPR	ST
18APRIL,2018/ WEDNESDAY	9:30 AM -10:30 AM	Symmetry in Macromolecules	GL
	12:00 Noon- 1:00 PM	Recent developments in Fluorescence assays and Differential scanning fluorimetry (DSF)	ST
	2:30 PM-4:30 PM	Practical session with examples: High throughput inhibitor screening	ST
19APRIL, 2018/THURSDAY	9:30 AM -10:30 AM	Image reconstruction from electron microscopy of macromolecules	GL
	11:00 AM –12:00 Noon	Quiz	ST
	2:30 PM-4:30 PM	Practical session with examples: practical use of processing and reconstruction softwares	GL

20APRIL,2018/ FRIDAY	9:30 AM -10:30 AM	Challenges in biophysical characterization of biological molecules	GL
	11:00 AM –12:00 Noon	Biophysical characterization of Virus-receptor and virus-antibody interaction	ST
	3:30 PM-4:30 PM	Problem solving using Integrated Biophysical Techniques	GL
21APRIL,2018/ SATURDAY	9:30 AM -10:30 AM	Validation of cryoEM structures	GL
	11:00 AM –12:00 Noon	Targeting molecular interactions using biophysical techniques: A case study	ST
	2:00 PM-3:00 PM	Exam	ST

You should attend if……	You are BTech/MSc/MTech/PhD, Faculties and scientists from **central government funded reputed academic institutions, technical institutions and research institutions**. You are an executive engineer, researcher and scientist from manufacturing, services and government organizations including R&D laboratories. **Number of participants for the course will be limited to fifty (50).**
Fees	The participation fees for taking the course is as follows: **Participants from abroad**: US $500 **Industry/ Pvt. Research Organizations**: Rs. 10,000/- **Academic Institutions**: Rs. 4500/- (for faculty), Rs. 4000/- (for post-docs), Rs. 2500/- (for B.Tech.and M.Sc. students) and Rs. 3500/- (for Ph.D. students) **For Registration: Registration form is attached below** The above fee includes all instructional materials, computer tutorials, 24hrs free internet facility. Tea and snacks will be provided during lecture sessions.

Accomodation Fees: Accomodation (optional) has to be booked separately. Payment has to be made along with the registration fee. Accomodation fee is exclusive of food.

MSc. /PhD Girls (Hostel)	**Rs. 700 for 7days**
MSc. /PhD Boys (Hostel)	**Rs 1050 for 7days**
Post Doc. / Faculty (Guest house)	**Rs. 4200 for 7days**

THE FACULTY

Dr. Gabriel C. Lander is Associate professor at The Scripps Research Institute, La Jolla, CA 92037, USA. He has more than 13 years of experience in the field of biophysical techniques. He has expertise in various biophysical techniques including CryoEM that have been used to study molecular machineries of cells and molecular interactions in phage lambda and various bacteriophages. During his Ph.D. he has biophysically characterized the architecture of bacteriophages.

Dr. Shailly Tomar is Associate Professor in Department of Biotechnology, IIT Roorkee. She received her Ph.D. in Virology in 2006 from Dept. of Biological Sciences, Purdue University, West Lafayette, in USA. Her research work focuses on molecular virology, antiviral research, discovery of antiviral molecules against RNA arboviruses such as (Chikungunya, Sindbis, Aura, and Dengue). Her laboratory uses biophysical techniques in combination with biochemistry and molecular virology to elucidate the molecular mechanisms of virus replication proteins and targeting of virus specific enzymes like proteases for antiviral development.

Course coordinator

Dr. ShaillyTomar

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http://www.gian.iitkgp.ac.in/GREGN

Application form

GIAN Course on "Recent Advancements in Biophysical Techniques and Virology" @ IIT Roorkee 15th to 21st April 2018

Name	
Gender	
Designation	
Institution	
Address	
Email id	
Contact No.	
Area of Research	
Accommodation Required (Yes/No)	

Payment details

Payment mode	
Online transaction number	
Date (yy-mm-dd) :	
Amount:	
Name of the Bank:	

For online payment of registration fee: Make a transaction to the below mentioned account number and mail this form along with the transaction details to gian2018iitr@gmail.com

Details of payment

Name of Bank	State bank of India
Account number	33136732957
IFSC code	SBIN0001069
Branch office	Indian Institute of Technology Roorkee -247667
Account name	Conference, Seminar and Symposium,IITRoorkee