

# APPLICATIONS OF INTERACTOMICS USING GENOMICS AND PROTEOMICS TECHNOLOGIES



**BIOTECHNOLOGY  
& BIOSCIENCES**



**PROF. SANJEEVA SRIVASTAVA**

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IIT Bombay

**TYPE OF COURSE** : New | Elective | UG/PG

**COURSE DURATION** : 8 weeks (25 Feb'19 - 19 Apr'19)

**INTENDED AUDIENCE** : (BE/B.Tech) Biotechnology,  
B.Sc. students

**EXAM DATE** : 27 Apr 2019

**INDUSTRIES APPLICABLE TO** : GE Healthcare, Pall Life Sciences, ThermoFisher Scientific, Illumina

## **COURSE OUTLINE :**

Due to rapidly evolving technological platforms in biology, there is a need to keep pace with latest developments in field to explore their versatile applications. Interactions resulting from protein-protein, protein-peptide, protein-RNA, protein-DNA or protein- small molecule have immense application in life-sciences and translational biology. Through this course, we aim to provide an interface between distinguished scientists involved in advanced interactomics research, industrial partners, faculties and students. This course would feature an intensive lecture series followed by some demonstrations designed to provide the much needed training required to explore the endless possibilities in interactomics research using genomics and proteomics approach, that can be useful for a researcher at any stage.

## **ABOUT INSTRUCTOR :**

Prof. Sanjeeva Srivastava was an Assistant Professor, Department of Biosciences and Bioengineering, IIT Bombay from 2009 to 2014, where he now is an Associate Professor, from 2014 onwards. Proteomics describes the study and characterization of complete set of proteins present in a cell, organ or organism at a given time. His laboratory is using high throughput proteomic techniques such as mass spectrometry and protein microarray etc. for biomarker discovery in cancer & tropical diseases of India, to study protein-protein interactions and drug target discovery. Information obtained from research program is also used for in silico studies and computing models to enhance the understanding in systems approach.

## **COURSE PLAN :**

- Week 01** : Introduction to Interactomics and Protein Arrays, Basics and Applications of Reverse Phase Protein Arrays-I, II, III, Weekly Perspective-I
- Week 02** : NAPPA Technology and Protein Arrays - I, II, Using functional proteomics to identify biomarkers and therapeutic targets-I, II, Weekly Perspective-II
- Week 03** : NAPPA Arrays: Workflow, NAPPA and its applications in study of antibody immune response in disease and in drug screening-I, II, III, Weekly Perspective -III
- Week 04** : Biomarkers: Harnessing the immune system for early detection of disease-I, II, III, Multi-variate data analysis to identify potential leads from proteomic datasets-I, II
- Week 05** : The Human Pathology Atlas: A Pathology Atlas of the Human Transcriptome-I, II, Antibody signatures defined by high-content peptide microarray analysis, Introduction to Bioprinting and Iris Optical QC Benefits, Cell-free expression system based protein arrays
- Week 06** : An overview of label-free technologies-I, II, Mass Spectrometry coupled Interactomics-I, II, Biomolecular interactions using Bio-Layer Interferometry (BLI)
- Week 07** : Surface Plasmon Resonance- Principles and Assays-I, II, SPR Application, Biomolecular interaction analytics using MicroScale Thermophoresis, NGS target enrichment workflow for exomes, targeted panels and beyond
- Week 08** : Next-Gen Sequencing Technology-I, II, III, IV, Summary