

Biomimetics and Biological Soft Materials

From 27th June till 30th June 2018

Overview:

The curriculum for workshop consists of four theory and two lab-based modules. The theory modules were: A: Concepts in Soft Matter Systems, B: Biomimetics, self-assembly and surface interactions, C: Biological membranes and protein folding and D: Transport and signalling in biological systems. The lab-based modules were: E: Biomaterials and scaffolds, F: Simulations in soft matter systems. Lectures were delivered by faculty from IIT Hyderabad and lab-sessions were ably assisted by research scholars from IIT Hyderabad.

Modules:

Module A: ***“Concepts in Soft Matter Systems”*** included:

1. Introduction to polymers
2. Introduction to soft matter
3. Phase behaviour in soft matter solutions
4. Gelation: thermodynamic concepts and mechanical response

Module B: ***“Biomimetics, self-assembly and surface interactions”*** included:

1. Introduction to biomimetics
2. Principles of self-assembly: surfactant systems
3. Interaction between colloidal surfaces
4. Colloidal stabilization

Module C: ***“Biological membranes and protein folding”*** included:

1. Biological membranes: structure and function
2. Phase transitions in bio-membranes
3. Principles of protein folding

Module D: ***“Transport and signalling in biological systems”*** included:

1. Systems approach to transport in biological systems
2. Calcium signalling in neuronal systems
3. Ligand-receptor binding in the context of calcium signaling

Module E: ***“Biomaterials and scaffolds”*** included:

1. Introduction to biomaterials and their applications
2. Electrospinning synthetic and natural polymers
3. Gelation techniques and spincoating
4. Hydrogel preparation, crosslinking and swelling

Module F: ***“Simulations in soft matter systems”*** included:

1. Introduction to MD simulations in LAMMPS
2. Simulations for simple colloidal, surfactant, polymer and lipid systems
3. Introduction to biomimetic simulations

You Should Attend If...

The workshop was intended for faculty, research scholars and students from academia and relevant industries interested in the areas of soft matter, biomimetics and bioengineering. No prior knowledge of the area was expected.

Fees:

For TEQIP Participants, the workshop was free of cost.

About Speakers:**Dr. Balaji Iyer (Ph.D., IIT Bombay)**

Assistant Professor, Chemical Engineering,
IIT Hyderabad

Research interests: Soft condensed matter, Multi-scale modelling and simulation, Biomimetics and intelligent materials

**Dr. Satyavrata Samavedi (Ph.D., Virginia Tech)**

Assistant Professor, Chemical Engineering,
IIT Hyderabad

Research interests: Polymeric biomaterials, Controlled drug delivery, Stem cell differentiation, Immunomodulation

**Dr. Lopamudra Giri (Ph.D., University of Iowa)**

Assistant Professor, Chemical Engineering,
IIT Hyderabad

Research interests: Systems biology, Bio-chemical engineering, Drug design and pharmacogenomics

Conveners**Dr. Satyavrata Samavedi & Dr. Balaji Iyer**

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