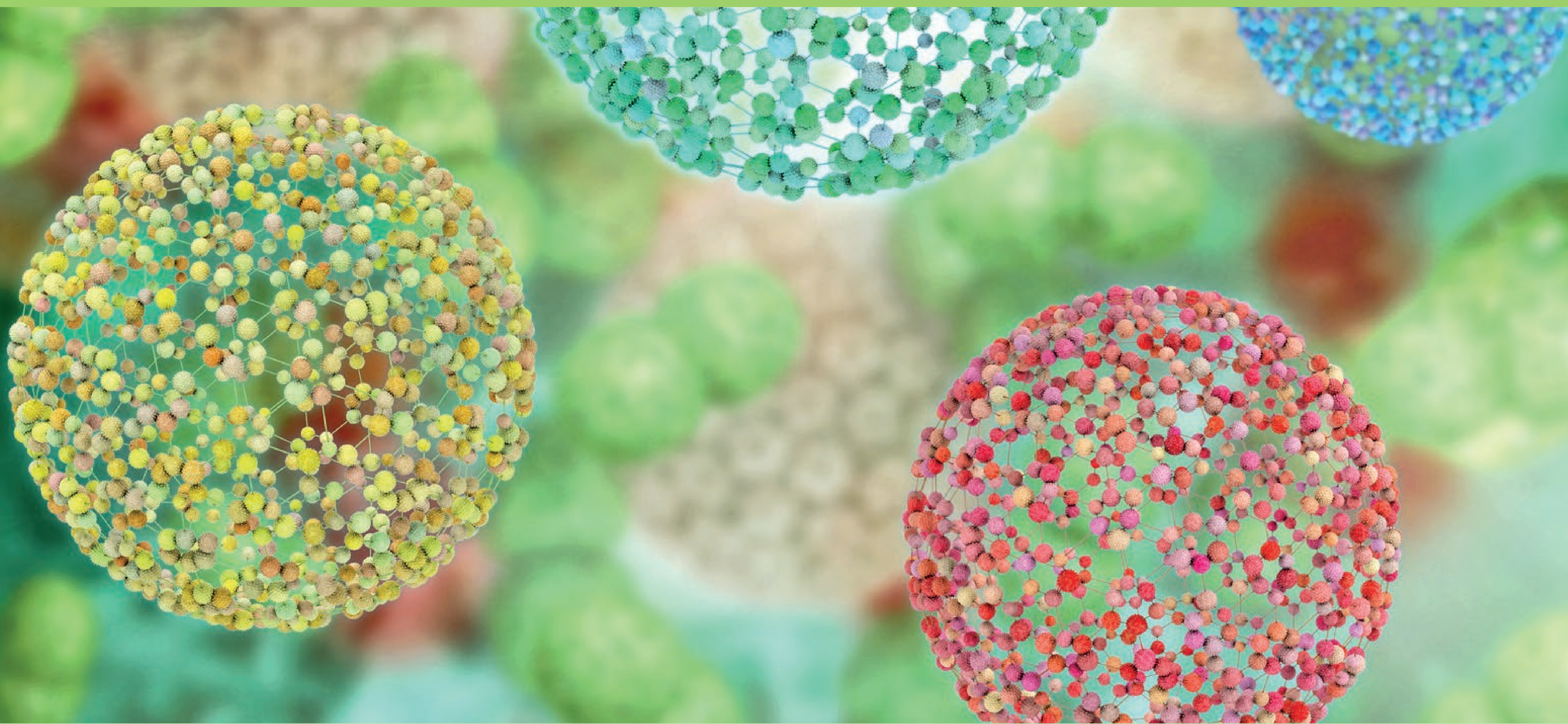


Thermodynamics and energetics of soft matter systems

Institut Laue-Langevin, Grenoble, France
2 - 4 September 2020 - Chadwick amphitheatre



Soft matter pervades into daily life under several forms: biological matter, foams, food products, ink, tires, and many others. In contrast to their very different appearance, all these systems are governed by the same, fundamental physical laws. Aim of the school is providing an overview of the forces governing the behavior of soft matter systems and introducing the most relevant techniques to probe such interactions. The school proposes frontal lectures for doctoral students working in the field of soft matter given by recognized experts from all over Europe. Poster sessions will be opened for discussion on research topic and experimental results between students and invited lecturers.

Lecture 1: Introduction to colloid and interface Science

Matthias Karg - 2 September at 14:00

Introduction to colloid and interface science & its applications. Basic concepts. Van der Waals interactions, the electric double layer, and DLVO theory. Further interaction mechanisms (steric, depletion).

Lecture 2: Physics of macromolecular systems

Julian Oberdisse - 2 September at 16:00

Conformation of polymer chains, chain statistics, polymer solutions and blends, thermodynamics, phase separation, mechanical properties.

Lecture 3: Calorimetric methodologies: principles and applications

Concetta Giancola - 3 September at 9:00

Calorimetry is a powerful physicochemical methodology for measuring the thermal properties of a variety of substances, including soft-materials, and is the only technique for direct determination of the enthalpy change of the processes. Among calorimeters, differential scanning calorimetry (DSC) and isothermal titration calorimetry (ITC) are widely used in many fields of sciences. Here basic principles, data analyses and some applications will be discussed.

Lecture 4: Calorimetry applied to biophysical systems

Heiko Heerklotz - 3 September at 11:00

Application of microcalorimetry and volumetry to biophysical systems.

Lecture 5: Energetics of biomembranes

Emanuel Schneck - 3 September at 14:00

Fundamental forces governing the behavior of biomembranes, interactions with their environment, interactions between membranes. Methods to probe them.

Lecture 6: Small-angle scattering to probe self-assembly and interactions in colloidal systems

Sylvain Prévost - 4 September at 9:00

Fundamentals of small-angle scattering and simple approaches for data analysis. Form factor and structure factors. Examples for aggregating particles, repulsive objects,..

Lecture 7: Computational methods to probe soft matter systems

Ana Celia Vila Verde - 4 September at 11:00

Overview of computational methods available in soft condensed matter. Principles and some applications.