

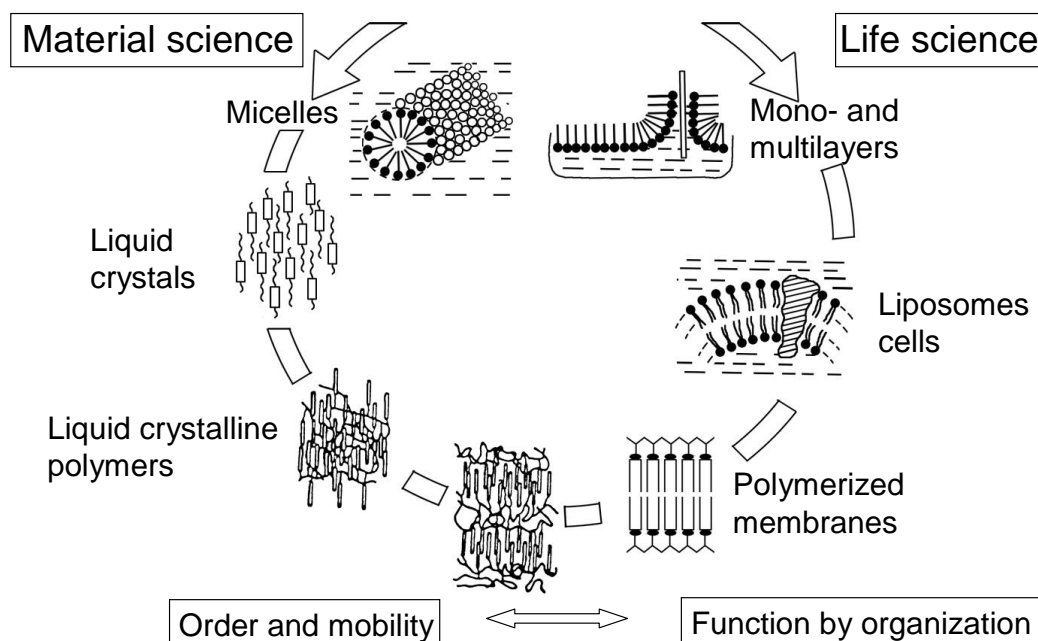
# *Self-Assembly in Life- and Materials Science*

2019

Lectures taught at the PhD school in  
**"Chemical Sciences"**  
of the Department of Chemistry, Life Sciences and Environmental Sustainability  
of the University of Parma

by  
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## Self-organized systems



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| Lecture # |  |
| 1         | <b>Introduction</b><br>Fundamentals  |
| 2         | <b>Langmuir Monolayers</b><br>Amphiphiles<br>$\pi$ -A Isotherms<br>Fluorescence Microscopy<br>X-Ray Reflectivity   |
| 3 - 5     | <b>Langmuir/Blodgett/Kuhn Multilayer Assemblies</b><br>Transfer of Monolayers<br>X-Ray Reflectometry<br>Surface Plasmon Spectroscopy (SPR)<br>Waveguide Spectroscopy<br>Model Systems for Optical Experiments<br>Energy Transfer (FRET)<br>Photothermal Spectroscopy<br>Electron Diffraction   |
| 6         | <b>Self-Assembled Monolayers (SAMs)</b><br>Thiol-SAMs<br>AFM/STM<br>Bifunctional Architectures<br>Surface Plasmon Fluorescence Spectroscopy  |
| 7 - 8     | <b>Layer-by-Layer Assemblies</b><br>Polyelectrolytes<br>Solution-Adsorption<br>Dendritic Polyelectrolytes<br>Layer-by-Layer Deposition<br>Nanocapsules/ Nanotubes<br>Patterned Deposition  |
| 9 - 11    | <b>Bilayer Membranes</b><br>Multi-Lamellar Lipid Water Systems<br>Model Membranes<br>Structural Determination<br>X-Ray Scattering<br>Neutron Diffraction<br>Electron Microscopy<br>Thermodynamics, Phases, Phase Transitions<br>Lyotropic and Thermotropic Polymorphism<br>Differential Scanning Calorimetry<br>Density Measurements<br>Raman Spectroscopy<br>Label Techniques<br>Optical<br>Nuclear Magnetic Resonance Spectroscopy<br>Mixtures<br>Phase Diagrams<br>Critical Demixing<br>Charged Membranes, Demixing<br>Neutron Scattering<br>Lipid Protein Interactions |
| 12        | <b>Bimolecular Lipid Membranes (BLMs)</b><br>Black Lipid Membranes<br>Carrier Transport<br>Pore Formation<br>Mixed Bilayers  |