

## Course information 2018

### Cross Institutional Molecular Biophysics

---

#### iNANOschool

Information, program and registration are available on:

[The course webpage](#)

Deadline February 16 2018.

#### Spring 2018

The Cross Institutional Molecular Biophysics course is interdisciplinary and cross-institutional and will be given by a series of lecturers who are experts within each their subfield of biophysics. The coherence of the course is assured by emphasizing the molecular basis of modern biophysics. The course will take place at different institutions in order to expose the students to different research groups, their researchers and experimental research facilities. The course will thus give the student a unique opportunity of orienting him or herself within an active and diverse field of interdisciplinary science.

The course is relevant for biophysically oriented PhD students within physics, chemistry, biochemistry, molecular biology, nano-bioscience, pharmaceutical sciences, agricultural science or biology. The emphasis of the course is a molecular description of biophysical systems and phenomena and it covers experimental methods, theoretical concepts, as well as molecular modeling.

#### Time schedule for the course

The course starts 5<sup>th</sup> March 2018, and runs for 11 consecutive weeks at different institutes and by different lecturers. Each day of the course covers around six hours, from 10:00-16:00 (SDU), 10:30-16:30 (AU) or 11:00-17:00 (KU, RUC, DTU). These times are selected for the benefit of students travelling from different parts of the country. In general, the morning session will consist of a set of lectures and the afternoon session will predominantly involve either the student's active participation in experiments, specific numerical exercises, or inspection of the local experimental facilities.

#### Course credit and evaluation

The workload of the course corresponds to 10 ECTS. Credit for the course requires the student's presence at a minimum of **7 out of the 9 lectures**. The student presentations on April 16 and evaluation and student talks on May 22 are mandatory.

On April 16 all participants will give ten minutes presentations (just a few slides) introducing their respective PhD project to each other. The presentations have to focus on the challenges within the project, conceptual as well methodological, and not on the results obtained. Further, the presentations should include what the participants expect to gain from the course in relation to their project and challenges within the project. The presentations are followed by discussion, input and ideas from the other participants.

---

For the evaluation on May 22, the participants have to choose between two types of final presentations:

1. The participant gives a 15-20 minutes presentation about a topic or technique related to the course curriculum. Importantly, the presentation should not be related to the student's own PhD project.
2. Participants team up in groups of two persons and give a presentation on a hypothetical project that combines the competences that each student has. The students should not already be working on closely related projects in the same group. Ideas for projects could come from the student presentation day on April 16.

The seminars serve to provide an overview as well as an evaluation of the course. In order to get credits for the course, every student has to be present at all the other students' talks.

### **Topics covered**

Proteins, lipids, membranes, DNA, enzymes, receptors, transport, permeability, photoactivity, electrostatics, scattering theory, thermodynamics, forces in biological systems, light-, neutron- and X-ray scattering, magnetic resonance, protein folding, calorimetry, (confocal) fluorescence microscopy and spectroscopy, molecular modeling and simulation, mechanical spectroscopy, optical tweezers, micromechanics, atomic-force microscopy, single-molecule techniques, and ellipsometry/neutron reflectometry, electrophysiology.

### **Lecturers**

Lars Øgdenal (KU); Dorthe Posselt & Peter Westh (RUC); Himanshu Khandelia, David Needham, Koji Kinoshita, Adam C. Simonsen, Beate Klösgen, Jonathan Brewer, and Anders Ultoft (SDU); Lene Oddershede, Thomas Heimburg & Lise Arleth (NBI, KU); Daniel Otzen & Thomas Vosegaard (AU) and Claus H. Nielsen (DTU).

### **Organizers**

**iNANOschool, Interdisciplinary Nanoscience Center (iNANO), Aarhus University**

- Daniel Otzen, iNANO, AU.  
email: [dao@inano.au.dk](mailto:dao@inano.au.dk).
  - Ditte Høyer Engholm, iNANO,  
AU. email: [dhe@inano.au.dk](mailto:dhe@inano.au.dk).
  - Maria Kragelund (after January 2018), iNANO,  
AU. email: [maria@inano.au.dk](mailto:maria@inano.au.dk).
-