NTNU

Course: Light and force based molecular imaging

The Department of Physics at NTNU is planning a new PhD course, **Light and force based molecular imaging**, to take place during autumn 2011. The course is organized in two sessions, each of five days. PhD candidates from other universities participating in this course, will receive reimbursement of their travel- and accommodation costs from the Norwegian Research School in Medical Imaging (for more information, see www.medicalimaging.no)

The formal approval of the course is in progress. Pending this approval, it is expected that completion of the course will result in 5 ECTS credits.

Contact person: Associate Professor Marit Sletmoen – marit.sletmoen@ntnu.no

Outline of main topics – a more extensive course description is forthcoming

Week 1

Light – molecule and light - tissue interactions
Optical basis for light microscopy
Light microscopy techniques:
- Bright field
- Phase contrast,
- Differential interference contrast
- Fluorescence microscopy
- Confocal laser scanning microscopy

Non linear optics:
- multi-photon microscopy

Super resolution microscopy
Light sources:
- Lasers
- Lamps

Detectors
Flow cytometry

Laboratory exercise 1: Light Microscopy
Laboratory exercise 2: Fluorescence microscopy, Confocal microscopy

Lecturers: Catharina Davies and Tore Lindmo

Week 2

Single molecule studies: Beyond the ensemble average
Single molecule FRET and Total Internal Reflection Microscopy (TIRF)
Intermolecular forces
Optical traps and Optical tweezers
Atomic force microscopy

Dynamic force spectroscopy

Laboratory exercise 3: Optical tweezers
Laboratory exercise 4: Atomic force microscopy

Lecturers: Marit Sletmoen and Bjørn T. Stokke