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| **Nanomedicine I – bioanalysis Autumn 2016 (in LS41/BS41 unless otherwise specified)**  In addition to lectures, students will chose a biomedical project and review the literature,  explain existing solutions, consider new technological approaches based on nanotechnology,  and come with recommendations.  1st lecture Thursday 2016-09-01 1015 in BS41  Lecture days: **Monday 1215-1400 in LS41, Thursdays 1015-1200 in BS41** | | | | | | |
|  | **Date** | **Title** | **h** | **Lecturer** | **Aff.** | **Keywords** |
| Introduction |  |  |  |  |  |  |
| T0109 | Introduction | 2 | Øyvind Halaas | IKM | What this course is about |
| Bioanalytical techniques |  |  |  |  |  |  |
| M1209 | Single molecule analysis |  | Øyvind Halaas |  | Techniques for watching individual biomolecules |
| T1509 | Biopatterning | 2 | Øyvind Halaas | IKM | How to pattern active biomolecules on surfaces and why |
| M1909 | Cell tools | 2 | Øyvind Halaas | IKM | Cells-on-chips |
| T2209 | Organs on chips I: | 2 | Øyvind Halaas | IKM | 3D-cues and vascularization |
| M2609 | Organs on chips II | 2 | Øyvind Halaas | IKM | Other organs-on-chips |
| T2909 | No lecture | 2 |  |  |  |
| M0310 | Nucleic acid analysis | 2 | Peter Køllensperger | NanoLab | ..and proteins in Lab-on-chip settings |
| M0610 | Protein analysis | 2 | Peter Køllensperger | NanoLab | DNA Nanotechnology, analysis and building blocks |
| Fabrication | M1010 | Microfabrication | 2 | Øyvind Halaas | IKM | Making tools for biology – the hardware |
| T1310 | Electron microscopy/FIB |  | Marianne Sandvold | IKM | Nanoscale resolution cellular imaging |
| M1710 | Hydrogel structuring | 2 | Øyvind Halaas | IKM | How to shape soft materials and what to shape |
| T2010 | Microfluidics | 2 | Øyvind Halaas | IFY | Small flows – special requirements |
| M2410 | Droplet based microfluidcs | 2 | Øyvind Halaas | IKM | Digital biology – one drop at the time |
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| Semester paper |  |  |  |  |  |  |
| T2411  LS42 | Paper presentation | 2 | Øyvind Halaas | IKM | Present your semester papers |

**Syllabus:** Since there are no suitable books available in medical nanotechnology, the syllabus will be exclusively from **lecture notes** and **selected papers**.

**Semester paper:** Deadline is **TUESDAY 22.11.2016 at 1600.** 25% of the grade will be from a semester paper on a topic chosen from the lectures, exceptionally (depending on our approval) from a chosen topic not covered in lectures. This is a good way to find an interesting master project, so consider this when you chose.

The instructions for this paper will be:

**Max 5 pages** not counting references and figures:

“Chose a biomedical project preferably from lectures, review the literature, explain existing solutions, consider new technological approaches based on nanotechnology, and come with recommendations.” With approximate outline;

**Summary** (1/4 page)

**Background** (What is the biomedical problem in question, ½ page)

**Introduction** (How is the problem addressed using current approaches ½-1 page)

**Nano/microtechnological solutions** (main part, describe the technicalities of the nanotech approaches to the problem in question. Use web, pubmed, nanowerk, or similar sources to find information, speak to lecturers or me. You should find more than one alternative solution and use information from more than one source. We will go through where you can find information. This section should be 2 pages)

**Discusson** (Identify major obstacles on why this technology hasn’t been implemented yet, 1 page)

**Conclusion (**Recommend the solution you consider best)

**Preliminary examples on projects**: This is nanotechnology and not biology, emphasis must be put on analytical techniques. For those of you entering research and development, these techniques are the future.

Protein detectors (magnetic, photonic, electrical), protein-conjugation to surfaces (glass, silicon, metal), antibody nanoarrays, DNA/RNA nanoarrays, droplets-based microfluidics, AFM probe modification, cell chips, microfludic devices for biomedicine.

The paper will be scored according to relevance, creativity, feasibility and format

**You will present your semesterpaper (7min, 5-7slides) Thursday 24.11**

**Exam:** **2016-12-14 @ 0900**

**Course responsible.**

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