

Nano2Life Summer School

Micro – Nanotechnology and Nanobiotechnology

25 June-6 July 2007

Programme

MONDAY , 25 JUNE – NCSR “DEMOKRITOS”	
9:00-9:30	<i>Welcome</i>
9:30-10:15	<u>Lecture 1.1</u> : Cell biology principles-Part 1 (Dr Dimitris Mastellos)
10:15-11:00	<u>Lecture 1.2</u> : Structure of biological macromolecules. (Professor Elias Eliopoulos)
11:00-11:15	<i>Coffee Break</i>
11:15-11:45	<u>Lecture 1.2</u> : Structure of biological macromolecules. (Professor Elias Eliopoulos)
11:45-12:00	<i>Coffee Break</i>
12:00-13:00	<u>Lecture 1.1</u> : Cell biology principles-Part 2 (Dr Dimitris Mastellos)
13:00-14:00	<i>Lunch break</i>
14:00-15:30	<u>Lecture 1.3</u> : Microelectronic Materials and Device Technology. (Dr Spyros Gardelis)
15:30-15:45	<i>Coffee Break</i>
15:45-17:15	<u>Lecture 2.3.1</u> : Gel-based protein analysis methods. (Dr Antonia Vlahou)
TUESDAY , 26 JUNE – NCSR “DEMOKRITOS”	
9:00-10:30	<u>Lecture 2.3.2</u> : Non-gel based protein analysis methods. (Dr Spiros D.Garbis)
10:30-10:45	<i>Coffee Break</i>
10:45-11:30	<u>Lecture 2.3.3</u> : (part 1) Binding Assays and Immunosensors Binding assays. (Dr Sotirios Kakabakos)
11:30-11:45	<i>Coffee Break</i>
11:45-12:30	<u>Lecture 2.3.3</u> : (part 2) Binding Assays and Immunosensors Immunosensors. (Dr Christos Mastichiadis)
12:30-12:45	<i>Coffee Break</i>
12:45-13:30	<u>Lecture 2.3.4</u> : DNA and Protein arrays: fabrication, detection and applications. (Dr Panayota Petrou)
13:30-14:30	<i>Lunch break</i>
14:30-15:15	<u>Lecture 2.3.6</u> : Introduction into Bioinformatics. (Dr Sophia Kossida)
15:15-15:30	<i>Coffee Break</i>
15:30-17:00	<u>Lecture 1.4</u> : Introduction to nanobiotechnology. (Invited: Professor Yossi Shacham-Diamand)
WEDNESDAY , 27 JUNE – ACADEMY OF ATHENS	
9:00-9:45	<u>Lecture 2.2.9</u> : Fluorescence imaging and 3D image visualization using confocal microscopy. (Dr Stamatis Pagakis)
9:45-10:00	<i>Coffee Break</i>

10:00-12:00 (shift 1)	<p><u>Laboratory 2.2.4</u>: State of the art confocal microscopy of biological samples. (Dr Stamatis Pagakis)</p> <p><u>Laboratory 2.3.1</u>: Protein separation by two-dimensional electrophoresis. (Dr Antonia Vlahou)</p> <p><u>Laboratory 2.3.2</u>: Mass spectrometry. (Dr Spiros D. Garbis)</p> <p><u>Laboratory 2.3.3</u>: Fabrication of protein microarrays using nanoplotted. (Dr George Tsangaris)</p> <p><u>Laboratory 2.3.6</u>: Bioinformatics laboratory. (Dr Sophia Kossida)</p>
12:00-12:15	<i>Coffee Break</i>
12:15-14:15 (shift 2)	<p><u>Laboratory 2.2.4</u>: State of the art confocal microscopy of biological samples. (Dr Stamatis Pagakis)</p> <p><u>Laboratory 2.3.1</u>: Protein separation by two-dimensional electrophoresis. (Dr Antonia Vlahou)</p> <p><u>Laboratory 2.3.2</u>: Mass spectrometry. (Dr Spiros D. Garbis)</p> <p><u>Laboratory 2.3.3</u>: Fabrication of protein microarrays using nanoplotted. (Dr George Tsangaris)</p> <p><u>Laboratory 2.3.6</u>: Bioinformatics laboratory. (Dr Sophia Kossida)</p>
14:15-15:15	<i>Lunch break</i>
15:15-17:15 (shift 3)	<p><u>Laboratory 2.2.4</u>: State of the art confocal microscopy of biological samples. (Dr Stamatis Pagakis)</p> <p><u>Laboratory 2.3.1</u>: Protein separation by two-dimensional electrophoresis. (Dr Antonia Vlahou)</p> <p><u>Laboratory 2.3.2</u>: Mass spectrometry. (Dr Spiros D. Garbis)</p> <p><u>Laboratory 2.3.3</u>: Fabrication of protein microarrays using nanoplotted. (Dr George Tsangaris)</p> <p><u>Laboratory 2.3.6</u>: Bioinformatics laboratory. (Dr Sophia Kossida)</p>
17:15-17:30	<i>Coffee Break</i>
17:30-19:30 (shift 4)	<p><u>Laboratory 2.2.4</u>: State of the art confocal microscopy of biological samples. (Dr Stamatis Pagakis)</p> <p><u>Laboratory 2.3.1</u>: Protein separation by two-dimensional electrophoresis. (Dr Antonia Vlahou)</p> <p><u>Laboratory 2.3.2</u>: Mass spectrometry. (Dr Spiros D. Garbis)</p> <p><u>Laboratory 2.3.3</u>: Fabrication of protein microarrays using nanoplotted. (Dr George Tsangaris)</p> <p><u>Laboratory 2.3.6</u>: Bioinformatics laboratory. (Dr Sophia Kossida)</p>
THURSDAY , 28 JUNE – NCSR “DEMOKRITOS”	
9:00-10:20	<u>Lecture 2.1.1</u> : Conventional patterning schemes for hard substrates for bioanalytical microdevices. (Dr Evangelos Gogolides)
10:20-10:30	<i>Coffee Break</i>
10:30-11:50	<u>Lecture 2.1.2</u> : Microfabrication technologies for plastic analytical microfluidics (Dr Angeliki Tserepi)
11:50-12:00	<i>Coffee Break</i>
12:00-13:30	<u>Lecture 2.1.3</u> : Patterning of biomolecules and other biological substances. (Dr Panagiotis Argitis)
13:30-14:30	<i>Lunch break</i>
14:30-15:50	<u>Lecture 2.1.4</u> : Molecular bioelectronics. (Dr Eleni Makarona)
15:50-16:00	<i>Coffee Break</i>
16:00-17:20	<u>Lecture 3.1</u> : Principles of Integrated Biosensing Devices. (Dr Konstantinos Misiakos)

FRIDAY , 29 JUNE – NCSR “DEMOKRITOS”

9:00-12:30 (shift 1)	<p><u>Laboratory 2.1.1:</u> Fabrication of microfluidic devices on plastic substrates by lithographic techniques. (Dr Angeliki Tserepi)</p> <p><u>Laboratory 2.1.2:</u> Fabrication of plastic microfluidic Devices by Lithography and deep polymer plasma etching techniques. (Dr Evangelos Gogolides)</p> <p><u>Laboratory 2.1.3:</u> Electrical characterization of tunneling devices based on organic molecules or biomolecules. (G. Chaidogiannos - Dr E. Makarona)</p> <p><u>Laboratory 2.3.4+2.3.5:</u> Fabrication of protein microarrays using lithography (Dr Antonis Douvas) Fluorescence detection of protein arrays. (Dr Panagiota Petrou).</p> <p><u>Laboratory 3.1:</u> Operation of a lab-on-a-chip optical device using model assays and real time measurements. (Dr Konstantinos Misiakos).</p>
12:30-13:30	<i>Lunch break</i>
13:30-15:00	<u>Lecture 3.2:</u> Lab on chip devices: Principles, applications, opportunities. (Invited: Dr Joel Rossier)
15:00-15:15	<i>Coffee Break</i>
15:15-16:30	<u>Lecture 3.3:</u> Acoustic wave sensors: from device fabrication to biological applications. (Invited: Dr Elektra Gizeli)

MONDAY , 2 JULY – NCSR “DEMOKRITOS”

9:00-11:30 (shift 2)	<p><u>Laboratory 2.1.1:</u> Fabrication of microfluidic devices on plastic substrates by lithographic techniques. (Dr Angeliki Tserepi)</p> <p><u>Laboratory 2.1.2:</u> Fabrication of plastic microfluidic Devices by Lithography and deep polymer plasma etching techniques. (Dr Evangelos Gogolides)</p> <p><u>Laboratory 2.1.3:</u> Electrical characterization of tunneling devices based on organic molecules or biomolecules. (G. Chaidogiannos)</p> <p><u>Laboratory 2.3.4+2.3.5:</u> Fabrication of protein microarrays using lithography. (Dr Antonis Douvas) Fluorescence detection of protein arrays. (Dr Panagiota Petrou).</p> <p><u>Laboratory 3.1:</u> Operation of a lab-on-a-chip optical device using model assays and real time measurements. (Dr Konstantinos Misiakos).</p>
11:30-12:00	<i>Coffee break</i>
12:00-14:30 (shift 3)	<p><u>Laboratory 2.1.1:</u> Fabrication of microfluidic devices on plastic substrates by lithographic techniques. (Dr Angeliki Tserepi)</p> <p><u>Laboratory 2.1.2:</u> Fabrication of plastic microfluidic Devices by Lithography and deep polymer plasma etching techniques. (Dr Evangelos Gogolides)</p> <p><u>Laboratory 2.1.3:</u> Electrical characterization of tunneling devices based on organic molecules or biomolecules. (G. Chaidogiannos)</p> <p><u>Laboratory 2.3.4+2.3.5:</u> Fabrication of protein microarrays using lithography (Dr Antonis Douvas) Fluorescence detection of protein arrays. (Dr Panagiota Petrou).</p> <p><u>Laboratory 3.1:</u> Operation of a lab-on-a-chip optical device using model assays and real time measurements. (Dr Konstantinos Misiakos).</p>
14:30-15:30	<i>Lunch break</i>

15:30-18:00 (shift 4)	<p><u>Laboratory 2.1.1:</u> Fabrication of microfluidic devices on plastic substrates by lithographic techniques. (Dr Angeliki Tserepi)</p> <p><u>Laboratory 2.1.2:</u> Fabrication of plastic microfluidic Devices by Lithography and deep polymer plasma etching techniques. (Dr Evangelos Gogolides)</p> <p><u>Laboratory 2.1.3:</u> Electrical characterization of tunneling devices based on organic molecules or biomolecules. (G. Chaidogiannos)</p> <p><u>Laboratory 2.3.4+2.3.5:</u> Fabrication of protein microarrays using lithography (Dr Antonis Douvas) Fluorescence detection of protein arrays. (Dr Panagiota Petrou).</p> <p><u>Laboratory 3.1:</u> Operation of a lab-on-a-chip optical device using model assays and real time measurements. (Dr Konstantinos Misiakos).</p>
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TUESDAY , 3 JULY – NCSR “DEMOKRITOS”

9:00-9:45	<u>Lecture 2.2.1:</u> Targeting RNA with small molecules; a Pharmaceutical Industry Study. (Dr Dionysios Vourloumis)
9:45-10:30	<u>Lecture 2.2.2 and 2.2.3:</u> (part 1) Drug Release and Delivery Systems Why controlled release. Advantages of controlled drug release Polymers in controlled drug release. (Dr Kyriaki Papadokostaki)
10:30-10:45	<i>Coffee Break</i>
10:45-11:30	<u>Lecture 2.2.2 and 2.2.3:</u> (part 2) Drug Release and Delivery Systems. Dendrimers & Liposomes as Drug Delivery Systems. (Dr Constantinos Paleos)
11:30-12:15	<u>Lecture 2.2.2 and 2.2.3:</u> (part 3) Drug Release and Delivery Systems Cyclodextrins as molecular carriers. (Dr Irene Mavridis, Dr K. Yannakopoulou)
12:15-13:15	<i>Lunch break</i>
13:15-14:30	<u>Lecture 2.2.4:</u> Bioengineered nanomaterials. (Invited: Dr Anna Mitraki)
15:00	<i>Excursion to Cape Sounion</i>
20:00	<i>Dinner</i>

WEDNESDAY , 4 JULY – NCSR “DEMOKRITOS”

9:00-10:30	<u>Lecture 2.2.8:</u> Imaging with Scanning Probes (AFM, STM, SNOM). (Invited: Dr Martin Bennink)
10:30-10:45	<i>Coffee Break</i>
10:45-11:30	<u>Lecture 2.2.5:</u> Magnetic Nanoparticles for Bioapplications (Dr Ioannis Rabias)
11:30-11:45	<i>Coffee Break</i>
11:45-12:45	<u>Lecture 2.2.6:</u> Principles of Biomimetics in Core Nanotechnologies (Invited: Prof. G.C.Papaefthymiou)
12:45-13:45	<i>Lunch break</i>
13:45-14:30	<u>Lecture 2.2.7:</u> Cell assays for apoptosis. (Dr Effie Tsilibary)
14:30-14:45	<i>Coffee Break</i>
14:45-15:45	<u>Lecture 2.3.5:</u> Metabolomics in the Post-Genomic Era (Invited: Dr Maria I. Klapa)
15:45-16:00	<i>Coffee Break</i>
16:00-16:45	<u>Lecture 2.3.7:</u> Applied Bioinformatics in BioNanoTechnology. (Dr Georgios Spyrou)

THURSDAY , 5 JULY – NCSR “DEMOKRITOS”

9:00-10:00	<p><u>Lecture 2.2.2 and 2.2.3:</u> (part 4) Drug Release and Delivery Systems Why controlled release. Advantages of controlled drug release NMR spectroscopy, X-ray diffraction characterisation of drug inclusion. (Dr Irene Mavridis, Dr K. Yannakopoulou)</p>
10:00-10:15	<p><i>Coffee Break</i></p>
10:15-13:45 (shift 1)	<p><u>Laboratory 2.2.1:</u> Drug inclusion in cyclodextrins: monitoring in situ by NMR spectroscopy, X-ray diffraction characterisation of drug inclusion and 3-D visualisation. (Dr Konstantina Yannakopoulou, Dr Emmanuel Saridakis).</p> <p><u>Laboratory 2.2.2+2.2.3:</u> Liposomes: preparation and characterisation by dynamic light scattering and ζ-potential. (Dr Dimitrios Tsiourvas). Video enhanced optical microscopy and Atomic Force Microscopy of Liposomes. (Dr Dimitrios Tsiourvas).</p> <p><u>Laboratory 2.2.5+2.2.6:</u> Magnetic nanomaterials for bio applications. Magnetic hyperthermia for Biomedical applications (Dr Ioannis Rabias) Determining Magnetic Anisotropy at the Nanoscale Case study: Horse Spleen Ferritin STEM, Mössbauer and SQUID measurements. (Prof. G. C. Papaefthymiou)</p> <p><u>Laboratory 3.2:</u> Demonstration of a capillary fluoroimmunosensor. (Dr Sotirios Kakabakos,)</p>
13:45-14:45	<p><i>Lunch break</i></p>
14:45-18:00 (shift 2)	<p><u>Laboratory 2.2.1:</u> Drug inclusion in cyclodextrins: monitoring in situ by NMR spectroscopy, X-ray diffraction characterisation of drug inclusion and 3-D visualisation. (Dr Konstantina Yannakopoulou, Dr Emmanuel Saridakis).</p> <p><u>Laboratory 2.2.2+2.2.3:</u> Liposomes: preparation and characterisation by dynamic light scattering and ζ-potential. (Dr Dimitrios Tsiourvas). Video enhanced optical microscopy and Atomic Force Microscopy of Liposomes. (Dr Dimitrios Tsiourvas).</p> <p><u>Laboratory 2.2.5+2.2.6:</u> Magnetic nanomaterials for bio applications. Magnetic hyperthermia for Biomedical applications (Dr Ioannis Rabias) Determining Magnetic Anisotropy at the Nanoscale Case study: Horse Spleen Ferritin STEM, Mössbauer and SQUID measurements. (Prof. G. C. Papaefthymiou)</p> <p><u>Laboratory 3.2:</u> Demonstration of a capillary fluoroimmunosensor. (Dr Sotirios Kakabakos)</p>

FRIDAY , 6 JULY – NCSR “DEMOKRITOS”

<p>9:00-12:30 (shift 3)</p>	<p><u>Laboratory 2.2.1</u>: Drug inclusion in cyclodextrins: monitoring in situ by NMR spectroscopy, X-ray diffraction characterisation of drug inclusion and 3-D visualisation. (Dr Konstantina Yannakopoulou, Dr Emmanuel Saridakis).</p> <p><u>Laboratory 2.2.2+2.2.3</u>: Liposomes: preparation and characterisation by dynamic light scattering and ζ-potential. (Dr Dimitrios Tsiourvas). Video enhanced optical microscopy and Atomic Force Microscopy of Liposomes. (Dr Dimitrios Tsiourvas).</p> <p><u>Laboratory 2.2.5+2.2.6</u>: Magnetic nanomaterials for bio applications. Magnetic hyperthermia for Biomedical applications (Dr Ioannis Rabias) Determining Magnetic Anisotropy at the Nanoscale Case study: Horse Spleen Ferritin STEM, Mössbauer and SQUID measurements. (Prof. G. C. Papaefthymiou)</p> <p><u>Laboratory 3.2</u>: Demonstration of a capillary fluoroimmunosensor. (Dr Sotirios Kakabakos,)</p>
<p>13:00-13:30</p>	<p><i>Closing ceremony</i></p>
<p>13:30-14:30</p>	<p><i>Lunch</i></p>