

# Nano Proteomics Summer Course 2018

**POWERED BY BIOSCOPE GROUP**  
**23rd - 27th July 2018**

Faculty of Sciences and Technology (FCT NOVA), Caparica, Portugal  
<http://summercourse.bioscopegroup.org/>

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BEYOND SCIENCE.**



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# THE HISTORY OF

## NANOTECHNOLOGY

**1857**

Michael Faraday discovered the metallic gold colloids, which led to the discovery of the Faraday-Tyndall effect. For this reason, Faraday is considered one of the first researchers into the nanoscience and nanotechnology field

**1925**

Richard Adolf Zsigmondy wins the Nobel Prize in Chemistry. First observations and size measurements of nanoparticles

**1951**

Erwin Müller invented the field ion microscope. He was the first one to ever experimentally observe atoms.

**1959**

Richard Feynman gave what is considered as the first lecture on nanotechnology and nanoscience entitled, "There's Plenty of Room at the Bottom"

**1974**

Norio Taniguchi first used the term "Nanotechnology" in a paper where he described the characteristic controls on the order of a nanometer

**1980s**

K. Eric Drexler developed the term of Nanotechnology and created the field of Molecular Nanotechnology

**1981**

Gerd Binnig and Heinrich Rohrer invented the scanning tunneling microscope, which allowed scientists to see individual atoms for the first time.

**1985**

The Interagency Working Group on Nanotechnology (IWGN) was formed

**2000s**

National Nanotechnology Initiative (NNI). Nanotechnology reaches the marketplace

**2006**

James Tour and colleagues at Rice University build a nanoscale car

## PROTEOMICS

**1971**

Automated Edman sequencing, ELISA technique

**1977**

DNA Sequencing (Sanger Method)

**1979**

First software for DNA sequence assembly

**1988**

MALDI-TOF (>10 kD), phage display, DNA pyrosequencing invented

**1994**

Introduction of the concept of PROTEOME. Correlation of tandem MS data with protein databases

**1996**

Yeast PROTEOME (MALDI/ESI), real-time DNA pyrosequencing. Data-controlled automated LC-MS/MS

**2002**

Yeast phosphoproteome, SILAC labelling, PAI

**2005**

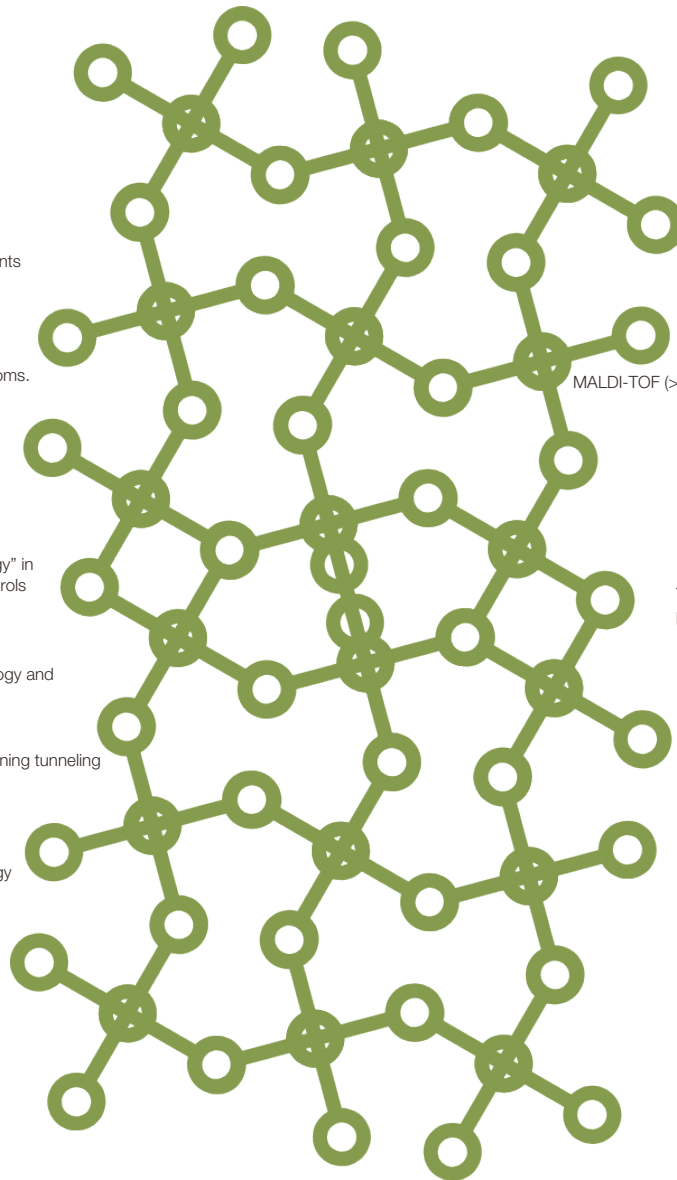
454 pyrosequencing, emPAI

**2008**

absolute SILAC

**2010**

Large-scale ab initio gene discovery from MS/MS data, MIPA quantitation



“

...The combination of nanotechnology with proteomic analysis will be of significant importance in developing miniaturized analytical nanomaterials, including separation media and channels at nanoscale levels for biomedical research...”

Lee Jia et al , 2013

”

# OUR TEACHERS



**Ruedi Aebersold, PhD**  
Inst. f. Molekulare Systembiologie  
(Switzerland)



**Carlos Lodeiro, PhD**  
University NOVA of Lisbon  
(Portugal)



**José Luís  
Capelo Martínez, PhD**  
University NOVA of Lisbon  
(Portugal)



**Hugo Santos, PhD**  
University NOVA of Lisbon  
(Portugal)



**Elisabete Oliveira, PhD**  
University NOVA of Lisbon  
(Portugal)



**Javier F. Lodeiro, PhD**  
University NOVA of Lisbon  
(Portugal)



**José A. M. Catita PhD**  
University of Porto | Paralab  
(Portugal)



**Luís Spencer Lima, PhD**  
University of Porto | Paralab  
(Portugal)



**Adrián F. Lodeiro**  
University NOVA of Lisbon  
(Portugal)



**Susana Jorge**  
University NOVA of Lisbon  
(Portugal)



**Jamila Djafari**  
University NOVA of Lisbon  
(Portugal)



**Gonçalo Martins**  
University NOVA of Lisbon  
(Portugal)



**Joana Flores**  
University NOVA of Lisbon  
(Portugal)



**Luís Carvalho**  
University NOVA of Lisbon  
(Portugal)

# THE COURSE

## THE LEARNING OUTCOMES

- Synthesis of magnetic nanoparticles
- Functionalization of magnetic nanoparticles
- Conjugation of antibodies to magnetic nanoparticles
- Use of nanoparticles in proteomics: Simplifying the proteome.
- Mass spectrometry-based proteomics
- Protein identification & quantification

## COURSE OUTLINE

### Nano-synthesis and characterization

- Synthesis of magnetic nanoparticles
- Antibody functionalization of magnetic nanoparticles
- Characterization of magnetic nanoparticles by DLS and Z-potential

### Proteomics

- Proteome extraction, clean-up and total protein quantification
- Nano-immunoaffinity purification and proteome fractionation
- Proteomics sample preparation: in-gel and in-solution.
- Proteomics sample preparation: 1D-gel electrophoresis
- Protein identification by Mass Spectrometry techniques (MALDI-TOF MS and ESI-MS/MS)
- Protein quantification by Mass Spectrometry (ESI-MS/MS)
- Bioinformatics





23<sup>RD</sup> - 27<sup>TH</sup> July 2018

23RD JULY 2018 (MONDAY)	
09:00	Registration
09:30	Introduction to Proteomics
10:30	Coffee Break
11:30	Introduction to Nanoparticles
12:30	Networking Lunch
14:00	Hands-on A: Nanosynthesis I - Synthesis of NanoParticles   Hands-on B: Proteomics I - Protein extraction, clean-up & total protein quantification
16:00	Coffee Break
16:30	Hands-on A: Nanosynthesis I - Synthesis of NanoParticles   Hands-on B: Proteomics II - Nano-immunoaffinity purification & proteome fractionation
24TH JULY 2018 (TUESDAY)	
09:30	Theory II
10:30	Coffee Break
11:30	Theory III
12:30	Networking Lunch
14:00	Hands-on A: Proteomics I - Protein extraction, clean-up & total protein quantification   Hands-on B: Nanosynthesis I - Synthesis of nanoparticles
16:00	Coffee Break
16:30	Hands-on A: Proteomics II - Nano-immunoaffinity purification proteome fractionation   Hands-on B: Nanosynthesis I - Synthesis of nanoparticles
25TH JULY 2018 (WEDNESDAY)	
09:30	A: Nano-characterization DLS   B: Proteomics Sample Preparation I
10:30	Coffee Break
11:30	B: Proteomics Sample Preparation I   A: Nano-characterization DLS
12:30	Networking Lunch
14:00	A   B : Proteomics Sample Preparation II
16:00	Coffee Break
16:30	A   B : Proteomics Sample Preparation III
26TH JULY 2018 (THURSDAY)	
09:30	A   B : MS Data Acquisition
10:30	Coffee Break
11:30	A   B : MS Data Acquisition
12:30	Networking Lunch
14:00	A   B : Protein Identification & Quantification Bioinformatics
16:00	Coffee Break
16:30	ALL TOGETHER - Beach Time @ Costa da Caparica
19:30	SUNSET @ Costa da Caparica

SCHEDULE

NP  
2018

23<sup>RD</sup> - 27<sup>TH</sup> July 2018

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27TH JULY 2018 (FRIDAY)

09:30

A | B : Roundtable Session I

10:30

Coffee Break

11:00

A | B : Roundtable Session II | Closing Remarks

12:30

Networking Lunch

# VENUE

## Faculty of Sciences and Technology (FCT NOVA)



## PRICES

SINGLE TICKET: **600€**

GROUP OF 2: **570€ (save 5%)**

GROUP OF 3 OR MORE: **540€ (save 10%)**

## APPLY NOW

For more information visit: [www.summertimecourse.bioscopegroup.org](http://www.summertimecourse.bioscopegroup.org)

Or e-mail Professor Capelo at [jlcm@fct.unl.pt](mailto:jlcm@fct.unl.pt) (subject: **Summer Course 2018**)

Or by phone at **+351 919 404 933**



# Recommended Accommodation

## Mercure Almada (\*\*\*\*)



### WHY THIS HOTEL?

This Hotel has direct connection with the University through the tram.

The Tram station is 450m away from the Hotel and there you can purchase a ticket to take you to the University (line 3 of the Tram Station. Destination: University).

The Tram Station near the Hotel is called "Ramalha".

A single Tram ticket (one way) costs 0,85€ or 0,75€ (if you purchase 10 at a time).

<http://www.mercure.com/gb/hotel-A040-mercure-lisboa-almada-hotel/index.shtml>

## Hotel Aldeia dos Capuchos (\*\*\*\*)



### WHY THIS HOTEL?

This Hotel has an excellent location, as it is 5 min away from the Caparica Beach and it has a SPA, Pool and a Golf facility.

Also, the food and the amazing views ensures its quality.

In order to go to the University from here, you should pick up a Taxi (5 to 8€, one ride).

You can call for a taxi in the reception of the hotel.

<http://www.aldeiadoscapuchos.pt/hotel-overview.html>



# Recommended Accommodation

## TRYP Lisboa Caparica Mar Hotel (\*\*\*\*)



### WHY THIS HOTEL?

This Hotel has an excellent location as it is just in front of the Caparica Beach. In order to go to the University you should pick a Taxi. One single journey costs approximately 5 to 8€. You can call for a taxi in the reception of the hotel.

<http://www.tryplisboacaparica.com>