



# CURRENT MILESTONES IN NANOSCIENCE: NEW MATERIALS AND ENERGY SOURCES

**JULY 10-14, 2017**

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**Colabora:**

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MINISTERIO  
DE ECONOMÍA  
Y COMPETITIVIDAD



**N**anoscience refers to the study of matter on the scale of nanometers. The most significant finding at this scale is that matter exhibits new and unprecedented properties.

Because of the small size of the nanostructures, special methodologies are required to prepare, observe and to handle these materials which are also found in biological systems. Thus, nanoscience emerges as a transversal science involving scientists from disciplines such as physics, chemistry, materials science, biology, medicine and engineering. Actually, the last 2016 Chemistry Nobel Prize awarding the development of molecular machines fits by its own right into the domain of nanoscience and nanotechnology.

The nanoscience principles are used for a variety of advanced applications in fields such as the creation of new materials, renewable energies, medicine, computing, information storage, and wide variety of topics still to come. In this regard, the future of nanoscience will bring new breakthroughs by scaling up singular nanodevices to macroscopic systems and new structures with unprecedented properties and a great functionality.

Nanoscience and nanotechnology have already impacted our lives but this is only the tip of the iceberg. However, in order to implement these advances to society it is needed to know and understand the basic principles, methodologies and special techniques used in nanoscience. In this short course, the most relevant topics in nanoscience and nanotechnology are presented in a systematic manner by world renowned specialist from Europe in their respective topics, thus merging in a rather unique scientific course.

We inviting you to enjoy the Complutense campus when walking to the course headquarters, located at the heart of the University, where your scientific sessions will take place. Enjoy the lectures of this fantastic scientific program and enjoy also Madrid city. A very friendly and historic "villa" which, for sure, will provide you with plenty of good memories.



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## Monday, July 10<sup>th</sup>

- 9.00 h.** Prof. Nazario Martín, Complutense University, IMDEA-Nanoscience, Spain. “Carbon nanostructures: fullerenes (chemistry and properties)”
- 10.00 h.** Prof. Frank Würthner, Würzburg University, Germany. “Self-assembly of Dyes: Structural Elucidation of Dye Aggregates”
- 11.30 h.** Prof. Mohammad Khaja Nazeeruddin, EPFL, Switzerland. “New energy sources: Organic photovoltaics and Perovskites (I)”
- 12.30 h.** Prof. Nicolás Agrait, Autonoma University, IMDEA-Nanoscience, Spain. “Molecular electronics: Introduction and experimental tools”

## Tuesday, July 11<sup>th</sup>

- 9.00 h.** Prof. Nazario Martín, Complutense University, IMDEA-Nanoscience, Spain. “Carbon nanostructures: fullerenes (supramolecular chemistry)”
- 10.00 h.** Prof. Frank Würthner, Würzburg University, Germany. “Self-assembly of Dyes: Thermodynamics of Dye Assembly”
- 11.30 h.** Prof. Mohammad Khaja Nazeeruddin, EPFL, Switzerland. “New energy sources: Organic photovoltaics and Perovskites (II)”
- 12.30 h.** Prof. Nicolás Agrait, Autonoma University, IMDEA-Nanoscience, Spain. “Molecular electronics: Theoretical approach”
- 17.00 h.** Visit to IMDEA-Nanoscience (Madrid Institute for Advanced Studies in Nanoscience)

## Wednesday, July 12<sup>th</sup>

- 9.00 h.** Prof. Nazario Martín, Complutense University, IMDEA-Nanoscience, Spain. “Carbon nanostructures: Carbon nanotubes”
- 10.00 h.** Prof. Klaus Müllen, Max Planck Institute, Mainz, Germany, “Organic materials for electronics: graphene (I) Making Polycyclic Aromatic Hydrocarbons larger and larger, everything is bottom-up”



- 11.30 h. **Prof. Mohammad Khaja Nazeeruddin**, EPFL, Switzerland. “New energy sources: Organic photovoltaics and Perovskites (III)”
- 12.30 h. **Prof. Frank Würthner**, Würzburg University, Germany. “Self-assembly of Dyes: Kinetics of Dye Assembly”
- 17.00 h. **Round Table discussion with professors of the course “CURRENT MILESTONES IN NANOSCIENCE: New materials and Energy sources”**

### Thursday, July 13<sup>th</sup>

- 9.00 h. **Prof. Frank Würthner**, Würzburg University, Germany. “Self-assembly of Dyes: Functional Dye Aggregates”
- 10.00 h. **Prof. Klaus Müllen**, Max Planck Institute, Mainz, Germany, “Organic materials for electronics: graphene (II) Polyphenylenes between 2D-flatland and 3D-dendrimers”
- 11.30 h. **Prof. Klaus Müllen**, Max Planck Institute, Mainz, Germany, “Organic materials for electronics: graphene (III) Graphenes and their Composites for Energy Technology”
- 12.30 h. **Prof. Mohammad Khaja Nazeeruddin**, EPFL, Switzerland. “New energy sources: Organic photovoltaics and Perovskites (IV)”
- 17.00 h. **Visit to El Escorial (UNESCO World Heritage Site)**

### Friday, July 14<sup>th</sup>

- 9.00 h. **Prof. Klaus Müllen**, Max Planck Institute, Mainz, Germany, “Organic materials for electronics: graphene (IV) Graphene Nanoribbons and Conjugated Polymers as Semiconductors”
- 10.00 h. **Prof. Nicolás Agraït**, Autonomía University, IMDEA-Nanoscience, Spain. “Molecular electronics: Molecular junctions and molecular wires (I)”
- 11.30 h. **Prof. Nicolás Agraït**, Autonomía University, IMDEA-Nanoscience, Spain. “Molecular electronics: Molecular junctions and molecular wires (II)”
- 12.30 h. **Prof. Nazario Martín**. Concluding remarks