



Departamento de  
Física de la  
Materia Condensada  
Universidad Zaragoza

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**César Moreno**

*Department of Earth Sciences and Condensed Matter Physics  
Universidad de Cantabria*

## **From nanoarchitectonics to nanoelectronics and membrane applications**

On-surface reactions, via programmed interactions of molecular building blocks, have recently emerged as a promising route to synthesise atomically precise materials from the 'bottom-up'. This approach ensures exquisite atomic-scale control of the structural and chemical functionalization, allowing to design a vast number of carbon-based nanoarchitectures not available by traditional solution chemistry nor with the 'top-down' methodologies. In particular, graphene nanoribbons (GNRs) with different structures can be synthesized with atomic precision and fine-tuned electronic band gap.

In this talk, I will describe the recent advances in the on-surface synthesis field. Then, I will discuss our recent results to synthesize atomically precise nanoporous graphene, graphene nanoribbons and their chemical functionalization and how to organize them into superlattices.

At the end of the day, this talk will demonstrate the full path to synthesize a semiconducting graphene material with a bandgap similar to that of silicon, its atomic-scale characterization, and its implementation in an electronic device. Further potential applications include in highly selective molecular filtration and sensing systems.

*César Moreno received his Ph.D in Material Science at the Institute of Materials Science of Barcelona (ICMAB) in 2010 and he moved as postdoctoral researcher at the Polytechnic University of Catalonia (CRNE-UPC). After two years, he was awarded with a tenure track position (ICYS) at the National Institute of Materials Science (NIMS) in Tsukuba-Japan, and he was also promoted as permanent researcher. In 2015 he worked back to Barcelona to work on atomically precise manufacturing of low-dimensional organic materials. In 2018 he was awarded with the Molecule of the Year by the C&EN of the American Chemical Society and in 2019 with the Spanish Vanguard of Science award and the Distinguished Research Award by the Spanish National Research Council (CSIC). At present he is at the University of Cantabria as Ramón y Cajal Research fellow.*

**18<sup>th</sup> of June (Friday)**

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**TIME: 12:30**

